Assessing the potential of submaximal extended duration exercise as an adjunct treatment for sub-acute schizophrenic in-patients: A pilot study

Thesis submitted by

JAMES BARRY MUNNIK

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Abstract

Research into the therapeutic potential of aerobic exercise has proven fruitful over the past few years; however, no true experimental research undertakings have investigated the psychological benefits of aerobic exercise with schizophrenic semi-acute in-patients. The main objective of this thesis was to seek out evidence for the possibility that aerobic (submaximal long duration) exercise could be considered an adjunct treatment for hospitalised schizophrenic in-patients. In order to accomplish this objective the effects of a 45-minute walking programme, completed three days a week, for five weeks, was investigated. Various areas of mental health were explored in search of evidence of the therapeutic potential of aerobic exercise. These areas included, amongst other things: transfer and discharge rates, improvements in mood levels - Beck Depression Inventory-II (BDI-II; Beck, Steer, and Brown, 1996) Xhosa version; decreasing of anxiety levels (Beck Anxiety Inventory (BAI; Beck and Steer, 1993), Xhosa version); improved Global Assessment of Functioning (GAF; DSM-IV), Scale Scores; and decreases in the number of symptoms patients exhibited. 22 schizophrenic in-patients were randomly selected for this study and randomly assigned to either an aerobic (long duration submaximal) treatment group or (primarily anaerobic) control group. Results revealed that statistical significance could not be found in any of the treatment group's t-test results; despite the treatment group generally bordering on significance more so than the control group. Out of the five variables studied (Positive Symptoms, Negative Symptoms, BAI, BDI-II, and GAF Scale) three variables (Negative Symptoms, BDI-II, and GAF Scale) in the treatment group bordered more on significance than did the control group. Thus three (60 %) out of the five areas studied revealed that the treatment group had more significant results. This suggests an overall impression that the treatment group responded slightly better. The Researcher recommended that aerobic exercise therapy be considered a treatment protocol in psychiatric institutions and offered further suggestions pertaining to the effective implementation of these programmes. Included in these recommendations were motivational strategies and warnings about the possible negative effects of exercise therapy. A supplemental goal of this thesis was to explore all of the previously offered theoretical psychological mechanisms of positive mental change; and to seek out evidence, for or against these forces. Participants were given pre- and post- treatment quantitative interviews; as well as, qualitative post-treatment interviews where their phenomenological responses were analysed to seek out evidence of these mechanisms. Evidence of various causative factors was found and a new theoretical mechanism was proposed in this thesis.

Keywords

schizophrenia; psychotic symptoms; positive symptoms; negative symptoms: mood; anxiety; underlying mechanisms; aerobic exercise; submaximal long duration; anaerobic exercise; exercise therapy; kinesiotherapy; DSM-IV; BDI-II Xhosa version; BAI Xhosa version; semi-acute; in-patients; walking; soccer; experimental research; inferential statistics; phenomenology.

Declaration

It is well understood that plagiarism of any kind is unethical and unacceptable. It is hereby declared that the research contained in this thesis is entirely the work of the author, under the supervision of Professor Christopher R Stones. Due credit and adequate referencing has been indicated for the contributions, ideas and literature of other authors and theorists found in this thesis.

It is imperative to note that this thesis has never been submitted before for a degree or part of a degree at any other university.

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Thesis Data File

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1. The Data Collection Questionnaire Booklet
2. The Main Excel Data Captured Worksheet
3. Transcripts
4. Mechanisms Matrix
5. Log Book of the Treatment Group
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8. Distance Records, Graphs, and Weather Reports
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List of Definitions

Aerobic Exercise	Aerobic exercise is physical activity which is performed at a **submaximal intensity** and is continued for an **extended** duration. Oxygen consumption rises rapidly and to varying levels, which depends on the level of **submaximal intensity**; and then levels off to a **steady-state**. It implies "with oxygen."
Cardiovascular Exercise	Means the same as "Aerobic Exercise", however, some consider it to be a more preferable term for Aerobic Exercise.
Extended Duration, Submaximal Exercise/ Submaximal, Long duration	An even more preferred term in exercise science, which describes the exact nature of the aerobic exercise.
Anaerobic Exercise	Refers to **short duration**, **maximal exercise**. It draws primarily on the short term energy system. It implies "without oxygen".
Short Duration, Maximal Exercise	Another form of exercise that equally well describes the exact nature of anaerobic exercise.
Steady-state	**"**Is a balance between the energy required by the working muscle and the adenosine triphosphate (ATP) production in aerobic metabolism," (Christie, personal communication, October 26, 2006).
ATP	Represents the energy currency of the human body.

Energy Systems	Biological systems that fuel exercise. There are three energy systems; 1. **Short-term,** 2. **Intermediate,** and 3. **Long-term. Physical activities will always draw on each of these systems concurrently, however, to differing degrees as the task demands.**
Exercise Therapy	In this context, it is a term often given to the use of exercise for its therapeutic properties, including mental health properties.
Kinesiotherapy	Is an alternative term for "exercise therapy."

Section 1: Context and Rational of Research

The paradigm that "a healthy mind frequents a healthy body," is a fascinating notion that has been growing exponentially over the years. Since the time of the ancient philosophers scholars have been fascinated about the health properties of exercise. Jointer and Tickle (1998) suggest that historically, even Plato (360BC) during his Republic dialogue mentioned his observations about the therapeutic benefits and other advantages of exercise. Even more astonishing is the fact that early on in human history; Plato (360BC) declared that exercise possessed certain psychological advantages as well. "Have you noticed how a lifelong devotion to physical exercise, to the exclusion of anything else, produces a certain type of mind? Just as the neglect of it produces another type?" (Plato, 360BC).

More recently an immense amount of research, conducted primarily during the 1980s has shown that exercise has numerous physiological benefits. To a lesser extent during the same period, research was conducted to investigate the psychological benefits of exercise. Early and contemporary research has thus far proved immensely fruitful.

In order to understand the point of departure of this thesis, one needs to note some of the diverse and often interrelated areas of research that have been done on the therapeutic properties of exercise. The most current research on the psychological benefits of exercise has concentrated on some of the following areas of psychological well-being:

1. **Psychological Stress** and **Anxiety** reduction: (Focht, Koltyn, & Bouchard, 2000; Kleine, 1994; Leith, 1998; Petruzzello, 1991,1993; Plante & Rodin 1990, 1993; Rostad & Long, 1993, 1996; Steptoe, Moses, Edwards, Mathews, 1993).

2. **Improved mood**: (Acevedo, Gill, Goldfarb & Boyer, 1996; Bosscher, 1993; Dineo, Bauer, Varahram, Proest, & Halter, 2001; Martinsen, 1990, 1993: North, T.C., Mc Cullagh, P., & Tran, Z.V., 1990; O'Neal, Dunn & Martinsen, 2000; Thayer, 1987; Tuson, Sinyor, & Pelletier, 1995).

3. To a much lesser extent some recent research has looked at the effects of exercise on **psychotic** (**particularly schizophrenic**) patients by the following scientists: (Abbott, 1992: Adams, 1995; Faulkner & Biddle, 1999; Faulkner & Sparkes, 1999; Hatlova & Basnysen, 1995; Mrazek, 1995; Pelham, 1990, 1991; Pelham, Campagn, Ritvo, & Birnie, 1993; Plante, 1996; Saxena, 2005.

The bulk of research that has been carried out on the psychological benefits of exercise has been conducted with non-clinical populations. Where clinical populations have been studied, the majority of research on exercise has been done on depressed patients and to a lesser extent with anxious patients. Sparse research on the psychological benefits of exercise has been conducted with schizophrenic sufferers. To even a lesser extent, meagre research has looked at the psychological benefits of exercise with schizophrenic in-patients in terms of evaluating improvements in: moods; anxiety levels; or even exploring if exercise improves the positive and negative symptoms of the psychopathology. No research has been done with rural poverty stricken schizophrenic South African in-patients.

The typical treatment of schizophrenia has been dominated by attempts to control symptoms through psychiatric medication. Psychological treatments such as various Cognitive-Behavioural Therapies (CBT's) and/or family interventions have been used as co-treatments for schizophrenia. However, Faulkner and Biddle (1999) declare that the treatment of schizophrenia is far from flawless. "Other strategies still need examining that may reduce rates of relapse and reduce the residual symptoms or negative symptoms associated with schizophrenia," (Faulkner & Biddle, 1999, p. 442). Additionally some further, yet infinitesimal research has preliminarily suggested that exercise may indeed be a good coping strategy for some positive psychotic symptoms such as auditory hallucinations.

According to Potgieter (2003), in more recent times attention has been given to numerous non-traditional methods of intervening against various psychological problems. "Among these methods, physical exercise is increasingly recommended for the maintenance and enhancement of mental health," (Potgieter, 2003, p. 182).

Raglin (1990) has stated that previous research has revealed that greater effects of exercise have arisen in clinical populations than in non-clinical populations. According to Potgieter (2003), in more recent times attention has been given to numerous non-traditions methods of intervening against various psychological problems. "Among these methods, physical exercise is increasingly recommended for the maintenance and enhancement of mental health," (Potgieter, 2003, p.182).

Knapp (1997) asserts that schizophrenia is extremely prevalent today and imposes a heavy burden on sufferers, care givers, mental health institutions and society as a whole. Sue, Sue, and Sue (2000) state that complete recovery from schizophrenia is an unusual occurrence and that, many studies have shown that the risk of relapse is high. Other interventions thus need to be

explored and combined with psychotherapy and medication to provide a better treatment prognosis.

Based on the above, an investigation, to determine if physical activity can help relieve some of the psychotic symptoms of South African rural in-patients, is more than warranted. No studies so far have investigated the psychological benefits of exercise in a rural South African psychiatric hospital setting. More research is definitely needed on the benefits of exercise in an African context in order to compare these levels of benefit to Western Countries in the hope of further understanding the mysteries of the exercise-mental health link.

Examining the previous research on the proven psychological benefits and therapeutic potential of exercise, one needs to question whether these benefits can also be found in a rural African Psychiatric Hospital. It is logical to state that any intervention programme that has even the slightest potential to improve the physical and psychological well-being of people afflicted with schizophrenia should be thoroughly investigated.

Section 1: Research Questions and Goals of the Research

The main objective of this research was to seek out evidence for the possibility that aerobic (submaximal long duration) exercise could be considered an adjunct treatment for hospitalised schizophrenic in-patients. In order to accomplish this objective, five questions were asked, namely:

1. Does aerobic exercise (independent variable), in the form of brisk walking, relieve the Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV) clinical symptoms (dependent variable) of a group of semi-acute schizophrenic in-patients more so than a group receiving non-aerobic or less aerobic interventions?
2. Does aerobic exercise (independent variable) in the form of brisk walking, improve the Global Assessment of Functioning (GAF) Scores (dependent variable) of a group of semi-acute schizophrenic in-patients more so than a group receiving non-aerobic or less aerobic interventions?
3. Does aerobic exercise (independent variable) in the form of brisk walking, improve the moods (dependent variable) of a group of semi-acute schizophrenic in-patients more so than a group receiving non-aerobic or less aerobic interventions?
4. Does aerobic exercise (independent variable) in the form of brisk walking, improve the anxiety levels (dependent variable) of a group of semi-acute schizophrenic in-patients more so than a group receiving non-aerobic or less aerobic interventions?
5. Why and how do these benefits occur or not occur in the context of this research?

Although the main objective of this research was to seek out evidence for the therapeutic potential of aerobic another somewhat ostentatious ambition of this research was to do pioneering research on three areas that have never been explored before by local or international psychology. This first area was investigating the psychological effects of exercise and schizophrenia in a South African context. The second was to explore the reasons for psychological change in a South African context, and thirdly and most importantly was to undertake true experimental research with semi-acute schizophrenic in-patients, on exercise therapy, which has for some perplexing reason, never been conducted before any were in the world.

Section 2: Literature Review

The literature review of this thesis will be presented in two parts. Section 2.1. will examine aspects of the various literature and past research on aerobic exercise and mental health; while Section 2.2. will examine the literature and past research on the theoretical mechanisms responsible for improvements in mental health.

Section 2.1. Anxiety, Mood, Schizophrenia and Exercise

Herewith follows some of the most significant pieces of literature pertaining to past research on exercise and mental health. In the following order, key research related to: anxiety; mood; schizophrenia; and exercise will be illustrated. In addition, some of the key past criticisms regarding such research in these areas will be noted.

The International Society for Sport Psychology *ISSP* (1992) stated that exercise can reduce stress, anxiety and neuroticism. Sue et al., (2000) state that exercise is effective in reducing anxiety and is a good medium for increasing a persons tolerance towards psychological stress. Potgieter (2003) suggests that there are consistent research results regarding aerobic exercise and anxiety.

Long (1993), studied two groups of stressed people and found that running and counselling on stress reduction were equally effective in the intervention of stress.

When comparing the effects of walking and running to strength and agility exercises, it was found by Steptoe, Moses, Edwards, and Mathews (1993) that walking and running were a more effective means of controlling stress.

After reviewing multiple research undertakings regarding the use of exercise as a coping mechanism for stress; Rostad and Long (1996) believed that there was definitely growing evidence showing support for exercise being a useful intervention against stress. Rostad and Long (1996) both advocate that counsellors and psychotherapists should recommend aerobic exercise to their clients as a coping mechanism for stress.

Earlier, Morgan and Goldston (1987) articulated that it was generally agreed upon that long-term aerobic exercise is associated with anxiety reduction. According to Potgieter (2003) there is also a contention that, not only is long term exercise necessary to reduce anxiety, but can additionally

short-term acute exercise can have beneficial effects on anxiety as well. "Exercise can be used effectively as a Band-Aid approach to reducing anxiety. In fact, there is every reason to believe that exercise may prove effective as a minor tranquilliser for reducing situational anxiety," (Leith, 1998, p. 59).

A number of researchers have suggested that this reduction in anxiety does not result from all forms of exercise, but is limited to aerobic activity. However according to Potgieter (2003) results so far are contradictory. Koltyn, Raglin, O'Connor, and Morgan (1988) found that a programme of weight training did not result in significant reduction. Later, Petruzzello, Landers, Hatfield, Kubitz, and Salazar (1991) carried out three separate meta-analysis studies in order to review (in a quantitative manner) the exercise-anxiety literature for state anxiety, trait anxiety and psycho-physiological correlates of anxiety.

Certain tendencies in the reviewed literature offered some suggestions. The first assertion was that anxiety reductions are associated only with aerobic exercise and not other forms of physical activity. The second assertion was that trait anxiety will be significantly decreased only by aerobic exercise programmes that are of 10 weeks or longer. The third suggestion was that aerobic exercise must be of at least 21 minutes duration inorder to achieve reductions in state and trait anxiety. However at a later stage, Focht, Koltyn, and Bouchard (2000) found that one session of circuit resistance exercise of moderate intensity resulted in a reduction in anxiety that lasted for up to three hours following the end of the circuit work out.

As far as research specifically conducted with schizophrenic in-patients is concerned, no recent research has been conducted on the anxiety reducing benefits of aerobic exercise. However earlier research does exist. Gimino and Levin (1984), as far as it is possible to ascertain, were the last researchers to investigate anxiety reduction in this particular clinical population. Studying 80 chronic schizophrenic in-patients; with a quasi-experimental design; partaking in a 10 week programme of 40 minutes, three times a week; and using amongst other psychological measures the State-Trait Anxiety Inventory (STAI). It was found that only the aerobic exercise group had significant decreased anxiety scores ($P<0.05$).

Petruzzello, et al. (1991) state that, although exercise offers therapeutic benefits for reducing anxiety without side effects, it still remains a mystery precisely why exercise is associated with reductions in anxiety.

To conclude what has been ascertained thus far from the literature review, six important facts should be noted. Firstly, there is good evidence to suggest that aerobic exercise is an effective intervention to reduce anxiety. Secondly, it could be maintained that there is still room for

investigating further the argument that aerobic exercise is more beneficial in anxiety reduction than other types of exercise. Thirdly, most researchers in this area seem to agree that moderate exercise is more beneficial than high intensity exercise. Fourthly a dearth of research has been conducted amongst clinical populations particularly with schizophrenic in-patients. Fifthly more research needs to be done on the mechanisms producing anxiety reductions. Sixthly, it could be logically argued that more data must be produced to increase the efficacy and recommended parameters of effective exercise therapy in a psychiatric hospital situation and in other contexts.

Tuson, Sinyor, and Pelletier (1995) state that the greatest amount of research on the psychological benefits of exercise has been on improved affective states. Studies have looked at the impact of exercise on both reductions in negative affect i.e. depression, as well as increased positive affect (e.g. pleasantness, euphoria); although most studies have concentrated on the relief of negative emotions.

According to the American Psychological Association *APA* Online (2005) psychologists have found that exercise is a third successful alternative to psychotherapy or medication. "Evidence of the antidepressant benefits of exercise is being used by psychotherapists and other health practitioners who are increasingly recommending exercise to their patients as part of a treatment program," (APA ONLINE, 2005). One of the boldest claims comes from the International Society of Sport Psychology (1992), which states the following: "Studies on depressed patients have revealed that aerobic exercises are as effective as different forms of psychotherapy and that the exercises have had an anti-depressive effect on patients with mild to moderate forms of depression", (ISOSP, 1992, p. 87).

North, McCullagh, and Tran (1990) in a meta-analysis that summarized eighty studies on exercise and depression arrived at the following conclusions: exercise was found to be more beneficial than leisure activities as an intervention for different categories of depressive disorders. "Exercise was a beneficial antidepressant both immediately and over the long term. Although exercise decreased depression among all populations studied, it was most effective in decreasing depression for those most physically and/or psychologically unhealthy at the start of the exercise programme. Although exercise significantly decreased depression across all age categories, the older people were, (the ages ranged from eleven to fifty-five) the greater the decrease in depression with exercise. Exercise was an equally effective antidepressant for both genders. Walking and jogging were the most frequent forms of exercise that had been researched, but all modes of exercise examined, anaerobic as well as aerobic, were effective in lessening depression at least to some degree. The greater the length of the exercise program and the larger the total number of exercise sessions, the greater the decrease in depression with

exercise. The most powerful antidepressant effect occurred with the combination of exercise and psychotherapy" (American Psychological Association ONLINE 2005).

"Martinsen, Wedhus and Sandvik (1985) found that a nine week aerobic training programme reduced depression in hospitalised psychiatric patients more significantly than occurred in an occupational therapy control group; as well as in a group of patients that received traditional psychotherapy and medication," (Potgieter, 2003, p.185). Walking sessions as short as five minutes long were found by Thayer (1987) to lead to an improvement in mood. Later, Dimeo, Bauer, Varhram, Proest, and Halter (2001) documented a significant improvement in mood after submitting twelve patients with major depression to a 10-week programme of interval training walking on a treadmill.

An eight week running programme of 30 minutes, three times per week was found by Bosscher (1993) to have a positive influence on depressed psychiatric patients. A control group in the same hospital participating in a mixed programme of soccer, trampoline, volley ball and gymnastics actually showed no improvement.

Two factors were identified by Martinsen (1990) that determine the degree of success of exercise as an intervention for depressed patient. "He found that those who had not undergone any previous psychiatric treatment for depression, and those who had at some time in their adult life participated in some form of exercise or sport responded the most positively to exercise as therapy," (Potgieter, 2003, p.194).

Hays (2002), believes that there is not just one form of exercise guaranteed to lift depression. "For many people, walking, running, or swimming is helpful, but some people value yoga and others feel emotionally as well as physically strengthened by weight-lifting. This is an opportunity for personal experimentation," (Hays, 2002).

Pelham, and Campagna, 1991; as well as Pelham, Campagna, Ritvo, and Birnie, 1993, all used the Beck Depression Index (BDI) in their investigations. All eight projects showed that aerobic exercise significantly improved the mood of the patients.

Pelham, Campagna, Ritvo and Birnie (1993) in three studies comparing an aerobic test group to a non-aerobic exercise control group, found that aerobic exercise produced significantly superior results in mood reduction.

To conclude it should reinforced that although aerobic exercise and mood have been the most widely researched area in this field, not enough studies have been conducted with schizophrenic in-patients or have looked at the different effects anaerobic and aerobic exercise produce. Exercise, it appears, is most effective with clinical populations, however, its positive effect on mood and/or improved diagnosis in psychiatric institutional settings has not been studied as well as it should have. It is very clear from the available literature that high intensity training programmes do not generally produce anti-depressive outcomes and therefore should be avoided, particularly in a clinical setting.

The APA ONLINE (2005) also state that exercise can be an effective treatment for, among other things, the treatment of serious mental illness.

Karasu, Waltzman, Lindenmayer, and Buckley (1980) historically reported that often the physical needs of psychiatric clients are underserved by the overemphasis on treating patients with antipsychotic medication alone.

Faulkner and Biddle (1999) have claimed that "growing," albeit "limited" evidence that aerobic exercise can also be an "effective adjunctive treatment" for amongst other things "psychosis." It should be noted at this stage that despite this claim there has been hardly any research exploring the effects of exercise; or the use of exercise as an adjunct or even co-treatment specifically for - schizophrenic *in-patients*. However despite this, a limited amount of research has suggested that exercise may indeed be a useful adjunct treatment for some of the negative symptoms of schizophrenia as well as for depression and anxiety. Additionally, the limited research conducted has suggested that exercise may indeed be a good coping strategy for some positive symptoms, like auditory hallucinations.

Martinsen and Stanghelle (1997) point out that hardly any visible research exists on the degree to which medication interacts with the effects of exercise. As researchers like Clardy and Gale (1995) have pointed out exercise has been declared to be an effective counter for the side-effect of weight gain (resulting from anti-psychotic medication) in some patients.

Plante (1993) claimed that exercise may be helpful to psychotic patients experiencing anxiety, depression, and/or low self-esteem by alleviating these conditions but does not help reduce hallucinations or thought disorders. However Fallon and Talbot, 1981; Chamove (1986); as well as Faulkner and Sparkes (1999) made contradictory declarations to this statement, and stated that exercise may indeed help with reductions in positive schizophrenic symptoms. Earlier, Falloon and Talbot (1981) asserted that many schizophrenic patients have reported that they have used

exercise in some way to reduce various hallucinations and many patients have successfully coped with their acute psychosis by increasing their physical activities. Chamove (1986) a little later, found that patients displayed less psychotic features during days of physical activity; while Faulkner and Sparkes (1999) sites two participants who successfully used exercise to control auditory hallucinations. According to Faulkner and Biddle (1999) no research has yet precisely and directly probed the effects of exercise on psychotic symptoms. As far as negative symptoms of schizophrenia are concerned, first-rate results have been found, but Faulkner and Biddle (1999) warn that one must be cautious because only a limited number of studies have been conducted thus far. "Greater social interest, energizing effects, improved behaviour on days of activity and improvements in self-esteem are also reported albeit inconsistently," (Faulkner & Biddle, 1999).

"Previous reviews concluded that evidence in support of exercise as a treatment for schizophrenia and psychotic symptoms were inconclusive because of inconsistent results and design flaws. Unfortunately, no new controlled studies investigating the effects of exercise on the functioning of individuals with schizophrenia have been published. (Tkachuk & Martin, 1999, p.278).

The most extensive review, on this topic, undertaken thus far by any academics has been by Faulkner and Biddle (1999). The main motive for Faulkner and Biddles' review was critically to evaluate the existing research that has examined the utilisation of exercise as an adjunct therapy for schizophrenia. Faulkner and Biddle (1999) reviewed 12 studies (both qualitative and quantitative in nature), spanning two decades on the uses of exercise as a co-treatment for schizophrenia. The details of the different studies are as follows:

1. Eight pre-experimental research projects were reviewed. The total number of subjects in these studies were 59. Of the eight studies only one research undertaking examined in-patients with 17 patients in total. Of all the 59 participants only one participant (1.7 %) did not have a beneficial outcome, while the rest of the group had some degree of improvement.

2. Three quasi-experimental research projects were also reviewed. The total number of subjects in the quasi-experimental studies was 190. Here two out of the three studies had in-patients with 150 patients in total. Outcome results indicated that all the participants benefited in some way from the exercise. Improvements were found in all the instrument scores except with the PEAS scale.

3. Of all the studies reviewed, only one study was true experimental research which incorporated randomization. Pelham, Campagna, Ritvo, and Birnie (1993) studied 10 chronic

schizophrenic out-patients. Each participant was given a fitness assessment and a BDI test, at three, six, nine, and 12 week intervals. Significant reductions in BDI ($p<0.05$) baseline scores was found in the aerobic group; while non significant improvements were found in the non -aerobic exercise control group.

This research was truly experimental; however, all 10 participants were out-patients. This study showed that five patients in the 12 week exercise group had significant reductions in depression scores (BDI) and also increase in aerobic fitness. The control group was assigned to a 12 week course that did not do aerobic exercise. After 12 weeks no improvements in BDI scores or aerobic fitness levels were reported. "No explanation was offered for the difference in BDI scores across the two conditions," (Faulkner & Biddle, 1999, p. 449).

So to summarise the literature review completed by Faulkner & Biddle (1999): 12 studies were examined in total. Only three out of the 12, (25 %) studies reviewed used psychiatric in-patients, and only one study (8.3 %) of the studies was truly experimental, however it was conducted with out-patients only.

The various "standardized psychological instruments" used in past research to test dependant variables included: the Beck Depression Inventory (BDI), the Mental Health Inventory (MHI), Brief Psychotic Rating Scale (BPRS), and the Nurses' Observation Scale for In-Patient Evaluation (NOSIE), Profile of Mood States (POMS), the State-Trait Anxiety Inventory (STAI), the Physical Estimation and Attraction Scales (PEAS) and the Symptoms Check List-90 (SCL-90). The different qualitative methods used in past research are: self-reports and ethnography (participant observation).

Faulkner and Biddle (1999) offer the following comments and conclusions regarding their review:

Research on the benefits of physical activity on schizophrenia has been limited for a number of reasons. Firstly, according to Faulkner and Biddle (1999), because many professionals and academics have biased theoretical values when reviewing existing research; and secondly, because of methodological problems. Methodological trepidations arise because it is obviously very difficult to assess exercise interventions with schizophrenic populations. "… Professionals are sceptical of anything not deemed to meet the rigorous criteria of randomized control trials but such studies may be impractical with such a population," (Faulkner & Biddle, 1999, p. 453).

Due to the nature of the population group being examined, they recommend that greater methodological diversity should be accepted when studying a population group with such a severe condition as schizophrenia.

Faulkner and Biddle (1999) also felt that all the reviewed studies had in some way or another violated certain principles of external and internal validity. Only one reviewed study did random assigning of participants. "Of the utmost significance is that all participants were self-selected," (Faulkner & Biddle, 1999, p.449). Faulkner and Biddle (1999) declare that more vigorous research designs are needed but admit that they are exceedingly difficult to conduct. "Attempts should be made to conduct rigorous experimental design, particularly utilizing a randomized control treatment when possible. Specifically, the comparison of varying types of exercise (e.g. aerobic/non-aerobic), both against and in combination with other therapies, such as CBT, is needed," (Faulkner & Biddle, 1999, p.450).

As far as the ideal prescribed type and amount of exercise with schizophrenic people, Faulkner and Biddle (1999) maintain that further research needs to be conducted to explore the ideal exercise type and duration, but this is also further complicated because of individual differences between people. Faulkner and Biddle (1999) logically recommend that it is a good idea to document the exact nature of the exercise programme as well as the frequency and intensity of the exercise. They recommend that it is a good idea to include reporting on changes in fitness levels. Faulkner and Biddle (1999) offer the notion that, because schizophrenic sufferers generally have a history of institutionalisation, they may be quite inactive and thus one must explore what "minimum exercise dosage" is needed for benefits.

Due to the fact that patients sometimes have co-morbid diagnoses, generalizations are difficult to make. Another problem Faulkner and Biddle (1999) correctly noted was the fact that there are wide variations in the test settings such as out-patients, in-patients and community settings. This makes it hard to make generalizations about the treatment benefits of exercise. Finding large numbers of patients is difficult which adds to difficulty in this type of research. It should also be noted that patients are sometimes in withdrawal from substance abuse and this can make attendance numbers low. Because of the nature of schizophrenia self-reports can often not be reliable and one must be aware of this fact in future studies. A great barrier contributing the great dearth in information is the fact that it is hard to gain access to schizophrenic individuals to deliver an exercise programme.

Faulkner and Biddle (1999) concluded their study with some of the following observations:

It seems that the reviewed research did not give any firm conclusions about the psychological benefits of exercise with schizophrenic individuals. The research did show, however, that evidence does indeed exist that supports the notion that exercise has potential to alleviate the negative schizophrenic symptoms and to act as a coping strategy for positive symptoms. These two researchers correctly believe that increasing the quality of life of those with schizophrenia is of supreme importance and opportunities for ongoing and structured exercise activities will encourage this goal while at the same time helping to complement any other psychological, occupational or medical treatment. They also concluded that further quantitative and qualitative research is urgently needed to examine the efficacy of exercise as a therapy, particularly in comparison with other common treatments.

Burbach (1997), Faulkner and Biddle (1999) all state that further controlled studies are needed to convince the average mental health professional that exercise is an effective co-treatment in schizophrenia. According to these researchers the effects of exercise on schizophrenia is definitely an underdeveloped area of study and needs further research.

It may then be correctly argued that any intervention that has the possibility of increasing the quality of life of schizophrenic patients should be thoroughly investigated. There seems to be evidence that exercise might have great potential as an adjunct treatment and may improve the effectiveness of prescribed medication, psychotherapy and occupational therapy. When anxiety levels are lowered and positive feelings increased, it is logical to speculate that a patient will be more likely to cooperate with treatment; become more social and optimistic; and also take an active part in managing his or her condition. All of this might result in him or her being rehabilitated sooner and the possibility of relapse might equally be reduced.

Only one study (8.3 %) of all the studies reviewed by Faulkner and Biddle (1999) was truly experimental and the participants were all out-patients. Thus it could be worthwhile declaring that true experimental research designs conducted with schizophrenic in-patients is urgently needed as this area is truly unexplored and might provide real worthwhile information from which patients, hospital staff, researchers and decision makers could benefit from.

Due to there being no direct research on the effects of exercise on the positive and negative symptoms of schizophrenia this would definitely be a worthwhile exploit. So too would comparisons between aerobic exercise as a treatment compared to other non-aerobic exercise treatments in an in-patient psychiatric setting.

What also needs to be determined is the question: "Can shorter aerobic exercise sessions be as beneficial as longer sessions?" It is a common contention that 10 weeks it is minimal required degree of time needed to produce results, however, patients in an in-patient hospital may not be hospitalised for that degree of time and thus more investigations into more acute exercise programmes are urgently needed.

Pelham (1993) did not try to explain the positive connection between aerobic exercise and fitness levels with improvements in BDI scores. Endeavouring to uncover what the main underlying mechanism(s) that cause these positive results is crucial to increasing understanding of the exercise-mental health phenomenon.

Faulkner and Biddle (1999) argue that exercise could easily fit into a Cognitive-Behavioural Therapy (CBT) programme as exercise is a direct behavioural intervention and thus fits in agreeably with the CBT model and other modalities. In fact Pelham, Campagna, Ritvo, and Birnie (1993) found that schizophrenic patients, who participated in an aerobic exercise programme, actually participated more in other rehabilitation treatments, than others in a control group.

Another valid reason for doing a study of this nature is to investigate an intervention that may even prevent suicide in schizophrenic patients. Tomori and Zalar (2000) researched physical activity and sport participation in male and female adolescents and found that fewer adolescents who were physically active attempted suicide. What it being suggested here is that, because the suicide epidemiology shows that "11 %" (Sue, et al. 2000), of schizophrenic patients commit suicide, it is worthwhile investigating exercise interventions as it might also have the benefit of decreasing the suicide rate of this disorder.

Some of the methodological shortcomings, mentioned by Faulkner and Biddle (1999), of previous research have been touched upon. However, there are still many other criticisms related to past research on schizophrenia, anxiety, depression and exercise; that need to be mentioned. Some of the most prominent criticisms of part research on these topics now follow.

"Although there are many studies that give strong indications that physical exercise is associated with psychological well-being, the cause-effect relationship is difficult to prove," (Potgieter, 2003, p. 182).

Rostad and Long (1996) have pronounced, similarly to many other researchers, that future research designs and procedures should incorporate an individual's phenomenological experiences and coping mechanisms to explain the cause-effect relationship of exercise.

Potgieter (2003) illustrates that sometimes the belief in the positive effects of exercise have in some cases inhibited research into the possible negative effects of exercise. "The problem with most of these studies is that researchers did not use control groups, and made no allowance for the Hawthorne effect", (Raglin and Morgan, 1985).

Another research problem mentioned by Potgieter (2003); is that of the problem of "social desirability." "When you are continually bombarded with information and encouragement about the positive effects of fitness, your expectations, and not the exercise as such, may cause the desired effects. This can also occur when therapists exercise with their patients. The therapist's expectations and perceptions tend to mediate the individual's response to exercise," (Solomon, 1984). Ojanen (1994) believes that the real effects of exercise on mental health/well-being cannot be completely studied because expectations will always be present in studies where the participants understand what is being studied.

Tuson, Sinyor and Pelletier (1995), criticised past research on the effects of acute exercise on positive affect, by claiming that previous research was limited by: methodological weaknesses, by theoretical orientations, and by failure to consider the psychological variables (like perceived intensity levels) that mediate the effects of exercise. "In general, we believe that the failure to incorporate research within a larger conceptual framework has contributed to the confusion surrounding the exercise-affect link, and the resulting lack of consensus regarding future research directions," (Tuson, Sinyor & Pelletier, 1994, p. 140).

"There has been a dearth of psychological variables that have been examined as possible contributors to the effects of exercise. By convention, psychological variables have been confined to the role of measuring outcomes (i.e., dependent variables), whereas non-psychological variables have been used as measures of process (i.e., independent variables). This reliance on non-psychological variables (e.g., fitness level, exercise intensity) to explain the presence of what can be considered a largely psychological phenomenon, namely changes in affective state, may represent an important oversight" (Tuson, Sinyor & Pelletier, 1994, p. 140).

With regard to the exercise programmes employed to test the effects of exercise, Rostad and Long (1996) mentioned the fact that in many studies the intensity, frequency and duration of the exercise programmes had not been stated. Therefore one could not determine what exact

exercise programme participants were put on and so this failure to report such variables makes the interpretation of test results and replication of these studies extremely problematic. "Clear specification of the exact nature of the exercise programme is needed as well as guidelines for systematic implementation of the programme" (Rostad & Long, 1996, p. 214).

Plante (1996) has criticized past research, on the relationship between schizophrenia and exercise results, because they were only based on case reports, anecdotes or small group studies. However, Faulkner and Biddle (1999), defend some of the past research efforts, because they have provided a platform for future research efforts; and have given other researchers extended areas and directions to explore. "If definitions of good science and acceptable research methods are too narrow and include only empirical studies, then this exclusionary approach has the potential of retarding progress in examining the psychological benefits of an active lifestyle" (Berger, 1996, p. 343).

Section 2.2. Mechanisms of Improvement

There is little agreement on what physiological and psychological mechanisms are ultimately responsible for psychological improvement resulting from exercise. Morgan (1988) proposed that it was probably likely that more than one mechanism played a mediating role in the outcomes of exercise. Since this statement, only a few research undertaking have sought out evidence for any of these mechanisms directly. Later, Focht, Koltyn, and Bouchard (2000) also suggest that since several mechanisms may be operating concurrently. It is thus hereby suggested that future research should be considered to test the existence of these mechanism and the interactions between them.

What now follows is a literature review mentioning all the most common theories that have been offered to explain the positive effects of exercise. Also included is a new theory offered by the Researcher. Any past research conducted that has attempted to explore any of these theories is also mentioned in this literature review. The theories are numbered 1 to 14, but do not represent any prominence in order.

2.2.1. Self-Efficacy / Self-Mastery Theories

Sonstroem (1998); Alfermann and Stoll (2000), have all proposed that exercise initially influences one's physical self-concept. Thus people develop a higher degree of physical competence and physical acceptance and this leads to elevated feelings of self esteem; and then vice versa. Therefore according to Sonstroem (1998) physical activity can improve perceived physical competence and thus self-esteem, "the skill development hypothesis" and this increase in self-esteem can also positively influence physical activity "the skill enhancement hypothesis."

With regard to the mechanisms that increase self-esteem, it has been suggested by Folkins and Sime (1981) that it is not necessarily the objective level of fitness that enhances self-esteem but rather the subjective perceived positive changes in fitness levels. It is generally accepted that there is a definite association between positive self-concept and good physical fitness. It has been suggested that improvement in physical appearance i.e. in body mass, muscular tone, decreased fat percentages and increased performance lead to an enhanced self-concept, (Sonstroem, 1997; Alfermann & Stroll, 2000).

Self-efficacy was first conceptualised by Bandura in 1977. Baron and Byrne (2000), quoting Bandura (1977) suggested that, "Self-efficacy is a person's evaluation of his or her ability or

competency to perform a task, reach a goal, or overcome an obstacle," (Baron & Byrne, 2000, p. 182).

Bandura (1988) exclaims that feelings of efficacy stimulate the body to produce *endogenous opioids* that function as natural painkillers. McAuley and Courneya (1992) as well as Baron and Byrne (2000), argue that high self-efficacy about one's physical abilities leads to perceived success at physical activities and to attributions of personal control. According to Bandura (1986) positive feedback about one's skill i.e. (fitness level) can lead to a rise in self-efficacy.

All the self-efficacy theorists have mentioned that a person's subjective feeling of self-efficacy is the reason for; or one of the reasons, why there is often found to be a psychological improvement after test subjects are put on an exercise programme.

"It is generally correctly believed that it is difficult to adhere to a regimen of regular exercise. Therefore, if a person succeeds in exercising regularly it creates a sense of mastery, control and self-confidence which can lead to enhanced feelings of well-being," (Potgieter, 2003, p.190).

It is suggested by Sonstroem and Morgan (1989), that positive physical changes in peoples bodies resulting from exercise, such as increased muscle strength; physical endurance, flexibility, and general appearance can result in feelings of mastery, control and general feelings of competence. "The implication of this is that it is not primarily the physical and physiological (fitness) changes that lead to improved self-concept, but rather perceptions of ability (self-efficacy)," (Potgieter, 2003, p.187). Potgieter (2003) goes on to suggest that it can be assumed that the improvement in self-efficacy equips a person to cope more effectively with stressful events.

Fox (1994) suggests there are three primary mechanisms behind the enhancement of self esteem, namely improved body image, sense of mastery/accomplishment and self-control/empowerment. It must be noted that quite often the self-efficacy theory is incumbently linked to the expectancy hypothesis. The expectancy hypothesis will be explained later. As far as direct research into this theory goes, there have been no direct investigations on this theory as related to exercise and schizophrenic in-patients.

2.2.2. Exercise as a Distraction from Stress / Time-out Hypothesis

The idea that exercise provides a reasonable distraction from ones problems is according to

Potgieter (2003), a popular explanation for the positive effects of exercise on the mind. "Exercise may also simply be a diversion, a time-out from worries and responsibilities. How deeply can you worry about your work when you're worried about getting your next breath? Can you think quite as much about the kids when you're not sure that you'll ever get over the next hill?" (Solomon, 1984).

Martinsen (1993) also believes that it is not necessary to improve a patient's level of fitness in order to improve their psychological condition. Martinsen (1993) suggests that it is the distraction provided by exercise that leads to improved feelings of well-being. Therefore Martinsen (1993) suggests that exercise does not necessarily have to be confined to aerobic activity to produce effective results. Sharkey (1997) goes on to propose that exercising regularly can be a positive coping strategy. "… a diversion from life's stresses because it occupies the mind," (Sharkey, 1997).

Few contemporary studies have explored this topic thoroughly; however, one study although slightly dated, did have some interesting results. "Bahrke and Morgan (1978) tested three groups who were subjected to different kinds of treatment. One group showed a significant decrease in anxiety after exercising for twenty minutes at 70% of their maximal oxygen uptake capacity. These positive results did not differ significantly from those in the second group who meditated for twenty minutes or from the third group who rested for the same period in a sound-filtered room. Because exercise, meditation and quiet rest were equally effective in reducing anxiety, Bahrke and Morgan proposed that the reduction in stress could be attributed to the diversion effects of the three types of treatment," (Potgieter, 2003, p.189). Much more recently Faulkner and Sparkes (1999) tentatively explored this topic, and produced some marginal data to suggest that it is indeed a plausible factor.

2.2.3. The Social element as a reason for Improvement in Psychological Well-being

The social dimension of exercise is another theory offered as an explanation of the healing powers of exercise. Solomon (1984) ascribes positive feelings resulting from exercise as a result of social factors, rather than as a result of the physical activity itself. "The mere social interaction- the banter and chatter among subjects, the concern for their well-being by the researchers, the exchange of opinions and progress - must lift the spirits. Isolation is the enemy of the depressed and the anxious. Give such people a group to belong to and fellows with whom to unburden worries and some relief is bound to occur," (Solomon, 1984, p.91). Pelham and

Campagna (1991) have mentioned the role of exercise in fostering interpersonal social relations with schizophrenic persons.

As cited earlier, Faulkner and Sparkes (1999) studied three participants in an out-patient aerobic exercise programme. They attempted to note the effects of social interaction amongst the participants using participant observations and conducting interviews. These two researchers found some evidence to support this social theory.

Potgieter (2003) imparts that although social effects of exercise seem to him to be a reasonable explanation for positive subjective feelings; he feels that too few empirically accurate or many well designed studies have been done.

2.2.4. The Biological theory that exercise Increases Cognitive Functioning

"There are indications that exercise has a small-to-moderate positive effect on cognitive functioning (e.g., memory), especially among the older population," (Nieman, 1989). Some theorists believe that aerobic exercise may very well increase blood flow and subsequent oxygen to the brain and that this may lead to improved psychological conditions. Nieman (1989) has also volunteered the idea that positive changes in brain-wave activity can result from regular exercise.

It is interesting to note that according to Potgieter (2003) some studies with animal subjects show that regular exercise leads to actual structural changes in the animals brains. These include such things as additional blood vessels and nerve endings in the test animal's brains. Dishman (1998) warns that so far there is little supporting evidence that this particular phenomenon works the same way in human beings and results in feelings of well-being. Potgieter (2003) argues that more intensive research is required in order to validate these cognitive assumptions.

2.2.5. The Biological Theory that changes in the Endocrine System is a plausible explanation for the Positive Effects of Exercise

Many medical theorists believe that the exercise may produce dynamic chemical reactions in the brain. One line of thought mentioned by Boutcher (1993) suggests that a depletion of amine hormones, i.e. (noradrenaline, dopamine, serotonin) is a feature of different stressful situations. A historical study by Brown and Van Huss (1973) showed that exercise increases noradrenalin and dopamine levels in rats. "It is possible that this increase in amine levels can lead to feelings

of enhanced mood," (Potgieter, 2003, p.191).

Another line of thought is the endorphin hypothesis. Many believe that secretion of endorphins is the reason for the positive effects of exercise. "These opiate - like molecules produced in the brain, have effects similar to morphine on the central nervous system. They can lead to an inhibition of pain and induce euphoric states" (Morgan, 1985).

"There are still scientists who question the existence of true feelings of euphoria as reported by exercisers, especially the so-called "runners' high." In addition, at this stage there is insufficient experimental evidence in humans to support the popular endorphin-hypothesis," (Dishman, 1998). Potgieter (2003) shares Dishman's (1998) sentiments and states that there is, in his opinion, a lack of concrete evidence about this endorphin hypothesis.

2.2.6. The Thermogenic Hypothesis

Another theory worthy of noting is the thermogenic hypothesis. This is quite an old theory and was studied a great deal in the past.

According to Potgieter (2003) the raising of people's body temperature for therapeutic reasons has been very popular for many years. Saunas and hydrotherapy have been promoted to be ways of increasing health and feelings of well-being. Potgieter (2003) postulates that anxiety reduction following exercise may be due to reduced muscle tension as a result of an increase in body temperature.

There is not a great number of recent intensive research on the thermogenic hypothesis and this has left room for a great deal of possible future findings. Most studies are quite dated. "Objective data indicate that levels of tension in the skeletal muscles (i.e. somatic anxiety) are reduced following a sauna session," (De Vries, Beckman, Huber, & Dieckmeir, 1968). Raglin and Morgan (1985) also, have recounted that "a five minute shower with a water temperature of 38.5 degrees Celsius led to a significant decrease in anxiety."

2.2.7. The Effect of Exercise on Sleeping Patterns

Potgieter (2003) illustrates another theory explaining the positive effects of exercise on psychological health; and that is the influence exercise has on sleep patterns. "Lack of quality sleep affects mood negatively. Quality slow-wave sleep, on the other hand, helps to restore and

revitalise the mind," (Potgieter, 2003, p.193). Youngstedt (2000) articulates that despite, it being difficult for researchers to measure sleep quality, it does appears that exercise may enhance the quantity and quality of sleep.

Nieman (1989) notifies us that there are indications that subjects who exercise regularly at optimal levels actually spend more time in slow-wave sleep than their inactive counterparts. Faulkner and Sparkes (1999) found that two of the three participants phenomenologically experienced better sleeping patterns resulting from the exercise. However, it should be noted that one of the participants in Faulkner and Sparkes (1999) study had dropped out, thus there were only two real participants and both experienced positive sleep benefits from the exercise.

2.2.8. The Expectancy Hypothesis /The Placebo Effect

The expectancy of subjects and the placebo effect are commonly sited errors in data collection; but they are also in this context frequently offered as an explanation for the positive results of aerobic exercise. These ideas suggest that the researcher communicates an expectancy that the subject then fulfils to the detriment of the validity of the results.

Ojanen (1994) believes that the true effects of effective exercise do not occur without some degree of a placebo effect, as with medication and psychotherapy. Thus he believes that exercise and psychotherapy work most effectively when the participant believes in the process. The placebo effect may also work differently with regard to different exercise intensities.

Research has generated support both for and against the idea that expectations mediate the effects of exercise on mental health of chronic exercisers and it is thus in many ways inconclusive.

Berger, Owen, Motl, and Parks (1998) conducted two experiments to study the relationship between the expectancy of benefiting psychologically from exercising and actual mood alteration in joggers. In both experiments joggers reported significant mood benefits of training as tested on the (POMS) and almost all of the six (POMS) subscales had improved following exercise. The only difference between the results of the two tests was that only the first experiment offered possible support for the psychological expectancy factor. In their discussion these researchers suggested that maybe, as Youngstedt, Dishman, Cureton and Peacock (1993) suggested, expectancies may be more strongly connected to long term rather than to short term psychological effects of exercise.

Rostad and Long (1996) recommend that expectancy questionnaires should be employed when assessing the stress reduction benefits of exercise in order to determine what beliefs the participants might have about exercise.

As mentioned earlier the self-efficacy hypothesis is endurably linked to this hypothesis, in a way that sometimes it is difficult to separate the two. But for clarity's sake one can argue that ones expectations about achieving something and ones expectations about one's self will affect ones ability and thus one's self-efficacy.

2.2.9. The Hawthome effect/Hawthorne effect/ Measurement Effect/Novelty Effect

This is another commonly sited error in data collection, but it is also a suggested process responsible for causing positive changes in participants in clinical facilities.

Participants may become more productive because they are being observed and when there is a change in routine. Participants may also enjoy this special attention which could result in affective change. "The name comes from a series of experiments conducted by Elton Mayo, at the Hawthorne, Illinois, plant of Westinghouse Electric during the 1920's and 1930's. Researchers modified many aspects of working conditions (e.g., lighting, time from breaks, etc) and measured productivity. They discovered that productivity rose after each modification, no matter what it was. This curious result occurred because the workers did not respond to the treatment, but to the additional attention they received from being part of the experiment; and knowing that they were being watched. Later research questioned whether this occurred, but the name is used for an effect from the attention of researchers. A related effect is the effect of experiencing something new, which may later wear off over time," (Neuman, 2000, p.240).

The Hawthorne effect is a specific kind of reactivity. "Subjects may react differently in an experiment than they would in real life, because they know they are in a study and this is called reactivity," (Neuman, 2000, p. 240). When participants respond in a particular way, not because of the test variables but, because they know they are being watched this is the Hawthorne effect. The Hawthorne effect has been used to explain the beneficial results of exercise and even used to dispute the validity of certain results.

This theory shows the tendency of people to be more productive and generally function better when the are enjoying special attention or experiencing something novel or interesting.

"In cases where controls were used, positive psychological effects were found among the subjects who received the exercise treatment as well as among the members of the control groups who received only special attention," (Raglin & Morgan, 1985).

2.2.10. Subjective Cognitive Appraisal and the Optimal Stimulation Theory

These theories are closely linked to the expectancy hypothesis and thus, to a lesser extent, the self-efficacy hypothesis. In actual fact these theories are not truthfully speaking a theory of why exercise is beneficial but rather a suggested requirement for exercise to work. Nevertheless it is important to understand and test these notions, if one is going to advance knowledge in this field. Generally this theory has been linked to experiments on mood change more than anything else.

Tuson, Sinyor and Pelletier (1995) believe that it is not the actual objectively measured level of exercise intensity (i.e.VO2max) that will predict changes in affect after acute exercise; but rather the test subject's personal perceived exercise intensity (subjective appraisal) - in other words how hard they find the exercise to be. These theories have been mostly influenced by the work of cognitive theorists such as Lazarus (1984).

Tuson, Sinyor and Pelletier (1995) postulated that the perceived (subjective) exercise intensity, as opposed to the actual (objective) exercise intensity of a bout of acute exercise, would be a more meaningful predictor of a post-exercise positive affect. Thus exercise that was felt to be moderate would yield the most positive changes in affect.

Tuson et al., (1995) used the Borg's rating of perceived exertion (Borg, 1985) to test whether participants found a session of exercise to be light, moderate or intense. Subjects were also assessed objectively. Tuson, et al (1995), confirmed their hypothesis that changes in positive affect were associated only with the participants subjective ratings of perceived intensity, rather than the actual work load. They also showed that exercise which was experienced as moderate yielded the best results as opposed to exercise that was felt to be too light or too intense. This confirmed the (Optimal Stimulation Theory) of Csikszentmihalyi (1992), which stated that when the challenges of an activity are perceived by a person to greater than their level of confidence then feelings of anxiety ensue; and by contrast, when the challenges are perceived to place too little or no demand on an individual's capabilities, decreased motivation is the result. "Optimal experience occurs when there is a match between the challenges faced and one's skills" (Tuson, Sinyor & Pelletier, 1995, p. 142). It is at this point that one can experience feelings of interest, enjoyment, and mastery, often described in terms of peak experiences.

2.2.11. Needs Theory

This is not a frequently offered explanation for the benefits of exercise but, as it is the theoretical framework of this thesis, it is nonetheless worthwhile exploring. Maslow (1970) and later Alderfer (1972) believed that human behaviour is determined, to a great degree, by biological and psychological needs.

Maslow (1970) proposed that a hierarchy of needs are innate in each person. These needs range from basic physiological needs (necessary for survival) to: security, affiliation, esteem and finally self-actualisation needs. The physiological needs are explained as a quest for survival, and the need for oxygen, food, water and sleep are powerful determinants of behaviour. Potgieter (2003) illustrates that included in these basic physiological needs, is the need for stimulation. "Stimulation is essential to life. The human organism has a constant need for movement and sensory stimulation," (Potgieter, 2003, p. 12). People, and particularly children, want to be active. People become restless if they sit still for too long.

Many studies have been done that show that more active people generally enjoy more psychological and physical health as compared to less active people. This being declared it could be argued that all past research on this matter has been explained or influenced by this assumption of human beings having a primary need to move, at least to some degree.

2.1.12. The Catharsis Hypothesis

This theory comes from Freud's (n.d.) psychoanalytical - psychosexual drive/instinct theory, as illustrated by Meyer, Moore, and Viljoen (1997). Proponents of this theory like Bandura (1973) and Baron (1977) believe that children and adults need to express subconscious aggression in harmless ways, such as through exercise and sport. "This hypothesis, which is based on Freud's drive theory, and more specifically on his 'thanatos' concept, states that the tendency towards aggressive behaviour will diminish when people have the opportunity to express their aggression in a harmless way, thereby reducing the energy of the death drive," (Meyer, et al., 1997, p.92). These neo-Freudians see exercise as having a cathartic affect which purges subconscious sexual and aggressive energy. This acceptable release or "sublimation" promotes positive mental health and thus feelings of well-being.

Lorenz (1966) proposed that this is one of the main roles of sport in society. It has been suggested that this is one of the reasons why sport is so popular in institutions such as American prisons.

In the past, psychoanalytical theory including the "catharsis hypothesis' was an extremely popular theory; and thus a great many research projects were undertaken, seeking out proof of the "catharsis hypothesis." Because of diminishing interest in the psychoanalytical approach, no current research has studied the "catharsis hypothesis" lately. Some time ago Fresbach (1961) tested the catharsis hypothesis by introducing an aggression provoking stimulus (a firearm) to a group; and then exposing the experimental group to an aggressive film about boxing. A control group watched a more placid film. Results showed that the experimental group later projected fewer aggressive responses in a word association test. Despite this promising result, this research was highly criticised and subsequent research over the years did nothing to confirm the hypothesis.

2.2.13. The Environmental Theory

This theory is more related to explaining improvements in mood as apposed to the other areas that have been studied in this thesis. Potgieter (2003) reports that some academics have suggested that it might not only be the exercise activity that leads to subjective perceptions of well-being, but it could also be factors in the environment. Patient's suffering from seasonal affective disorder, having been successfully treated by being exposed to artificial sunlight, is one example cited by Potgieter (2003) of how our environment can have an impact on our mood. Thus it has been suggested by O'Neal, Dunn, and Martinsen (2000) that exposure to light and not just exercise may be a reason for people's depression being lifted when exercising outdoors

No research comparing the mood effects of exercising indoors against exercising outdoors could be found. Much of the discussions of the effect of the physical environment, fall under studies of the distraction hypothesis.

2.2.14. The Kinetic Life Validation Hypothesis

This is an entirely new proposition, developed by the Researcher as a possible explanation for improvements, particularly improvements in mood. For the purpose of this study, this theoretical subconscious mechanism will be called the "Kinetic Life Validation Hypothesis."

This notion has been influenced by the "proof of life" component of the Medical Hypnoanalysis approach. Explaining Medical Hypnoanalysis (as taught by the South African Clinical Hypnosis Society and the American Academy of Medical Hypnoanalysis) in its entirety is far beyond the scope of this thesis. So too is comprehensively explaining the Triple Allergenic Theory of

psychopathological aetiology; the psychometric techniques of word association exercises; the diagnosis of Walking Zombie Syndrome, and behavioural manifestations of proof of life behaviours. What will be attempted here is to give a brief explanation of what fundamental medical hypnoanalysis notions encompass the Kinetic Life Validation idea.

Medical Hypnoanalysis views the most prominent determinant of behaviour including psychopathology to be the subconscious located in the right hand side of the brain. This subconscious part of the mind has many life sustaining functions such as controlling the automatic nervous system, however, one of the subconscious's primary functions is the survival of the person. The subconscious is seen as the memory bank of the individual; storing all significant life experiences that have entered through the conscious side of the mind. The subconscious mind has one great disadvantage from the conscious mind and that is the fact that the subconscious is tremendously illogical, and sometimes cannot make sense of reality. This could easily account for why our dreams although very creative, are often devoid of any logic and sense.

Aetiology of many psychological problems is commonly attributed in Medical Hypnoanalysis to threats to the integrity of the self, i.e. past threats to the patient's survival. This is particularly the case in mood disorders. In medical hypnoanalysis the age regression identification of traumatic prenatal and births of patients is seen as the seed that may manifest as psychopathology in later life. Thus similar to the way an allergy develops in the human body; negative experiences in later life can add to these negative prenatal and birth experiences and thus only then manifest psychopathology.

Depending on the circumstances of a difficult birth situation numerous diagnoses may be given, but the diagnosis of interest regarding mood disturbances is the Walking Zombie Syndrome (WZS) WZS is when the individual subconsciously carries the belief that they are actually dead resulting from the traumatic birth process. Thus individuals carry subconsciously the belief that they are infact dead and this is experienced as a dead-like feeling. To clarify further the Medical Hypnoanalysts view of depression as a dead-like feeling and the ultimate way to cure the depressed mood is to remove that subconscious belief that the client is dead. This is done through age regression where the therapist takes the patient back to his or her birth, lets him or her get rid of the negative emotions, and then take a deep breath after the birth to confirm that they are "alive" mentally, emotionally, immunologically, and even spiritually.

This breath(s) confirming the person is alive is called the "proof of life." Many case studies have confirmed that this process cures instantaneously and indefinitely the person's depression, and also helps the patient deal with past traumas more effectively at a later date.

Many behaviours people exhibit like smoking are attributed to being a kind of proof of life in many depressed individuals. Medical Hypnoanalyst would see smoking as an ineffective attempt at a proof of life, but a proof of life nonetheless. The sensation of smoking, feeling the air going into ones lungs, seeing the air coming out again, is a kind of visual and biofeedback that lets the smoker know (on a subconscious level) that her or she is in some way alive. This is in great contrast to the psychoanalytical theory that sees smoking as an oral fixation.

What the Researcher is trying to suggest is that maybe aerobic exercise, particularly for depressed individuals may function also as a kind of subconscious proof that they are actually alive. The biofeedback the person receives from the sensation of breathing, sore and stiff muscles, physical motion, feeling and maybe even hearing their heart beating, provide clues to the persons subconscious that they are indeed alive and thus the result is clearer thoughts and more positive emotions. Thus the psycho-neuromuscular system provides cues to the subconscious that the person is moving and thus he or she must be alive. Also physical cues like condensation from exhaling may also provide subconscious proof of life.
It should again be emphasised that this Kinetic Life Validation proposition, is not necessarily a Medical Hypnoanalysis theory, but is based on the notions found within this hypnotherapy approach.

Feeling more alive has been described as a resultant factor from exercising in past research, but it has never been offered as an explanation for positive psychological change resulting from exercise.

It is this Researcher's contention regarding depressive moods that when one engages in aerobic exercises and has a constant awareness of one's heavy breathing, this on some level, may indeed provide a "proof of life" to the depressed person and result in the person feeling more alive, even if the feeling is merely slight.

Section 3: Method

The research design, participant information, data collection methods, research process, data analysis and ethical statement are all illustrated in this section of the thesis.

Section 3.1. Research Design

Different approaches were used for the different branches of the thesis. In order to answer the questions found in, "Section 1: Research questions and goals of the research." Questions 1 to 4 were conducted quantitatively, utilizing inferential statistics; while Question 5 was approached in a qualitative manner incorporating semi-structured interviews with both closed and open ended questions.

Section 3.2. Research Participants

A description of the population demographics, as well as the methods used in selecting participants are found in this section.

3.2.1. Population Group Utilised

The patients that partook in this project were all current Komani Psychiatric Hospital, recently admitted, sub-acute schizophrenic in-patients. Research was undertaken only with sub-acute participants because acute patients were expected to be too psychotic to participate and indeed presented a flight risk. Acute patients additionally are often too catatonic or psychotic to do purposeful activity, such as walking or playing soccer.

Only recently admitted patients were used, as patients who have been admitted two months or so earlier may not have had the same amount of, and severity of, symptoms that newer patients presented. Additionally patients admitted a few months earlier might have been involved in various Occupational Therapy activities, and this would have presented a challenge to managing the interventions and may have affected the results.

Chronic/long term patients (i.e. institutionalised participants) and patients over 35 years of age were also not used in this research, because it was felt that there are seldom any radical improvements with chronic long-term patients. Furthermore, patients from outpatient care, as

well as from the pre-discharge wards, the psychogeriatric ward, clinic (sick bay), and state president patients (forensic patients) wards were all excluded from possible selection.

Outpatients were not used in this research because the majority of past research looking at schizophrenic patients and exercise has been conducted with this profile of participant; and thus this would not be pioneering research in the truest sense. Psycho-geriatric patients were not used because they are often too sickly and frail to participate and thus would require a separate and slower walking intervention. Physically ill patients were not used because it is never wise to exercise while ill. State Presidents patients were not used because they presented a flight risk and thus could not be removed from their high security wards.

3.2.2. The Selection Process of Participants

Each of the Professional Nurses in charge of the appropriate male and female wards were approached and given a tabulated list to fill out which asked for:

1. The names of all the patients aged 18 to 35 years;
2. The patients file numbers;
3. The patients ages; and
4. The patient's admission dates.

From wards one, two, three, four, seven, eight, 15, and 16 a list of exactly 92 patients was compiled. 78 male (84.782 %) and 14 (15.217 %) female patients in all. (Consult hospital census file for the original record).

The list of 92 names was screened and patients were eliminated from the list on grounds of being admitted over a month ago from the date of the compilation of the lists. Thus only patients who were in the hospital less that one month were utilised. Some patients were included in the list that were older than 35 or younger than 18 and they also were eliminated from the list. The result of this elimination process resulted in a list of exactly 30 potential participants being compiled, 28 males (93.33 %) and two females (6.666 %). Each of the 30 potential participants was allocated a representative number, i.e. PP01, PP02, et cetera.

Utilising the random number table software of "Microsoft Office with Front Page" Excel's 'Data Analysis ToolPak' program, 22 potential participants were then completely randomly selected. Utilising this random number table software ensured complete and unadulterated random selection of a very specific population group, i.e. (under 35 semi-acute in-patients). Utilising the

computer software the participants were randomly allocated on a 50/50 % basis into either a treatment group and into a control group.

The entire number of male participants was 20 which represented 90.9 % of the entire sample. The entire number of female participants was two which represented 9.1 % of the entire sample.

(It was greatly hoped that all 30 potential participants would have been used to increase the statistical power of the research; however at the time of the research the Clinical Psychologists responsible for conducting and scoring the Beck Anxiety Index (BAI Xhosa version) and Beck Depression Index (BDI-II Xhosa version) were unable to afford the time to do all 30 patients; but were generous enough to do the 22 participants). The sample was completely reflective though, of the specific population and adequately reflected the male to female ratio of the hospitals semi-acute population. Research reliability and validity was thus maintained because the samples used were representative of the entire population; even though the female population was under-represented because of there only being three in the initial 30 potential participants list.)

Section 3.3. Data Collection

This section explains how the data was collected, as well as, the rationale for collecting the data in the first place. The data collection instrument that was used was a 12 page questionnaire booklet (see appendix) that recorded the pre- and post-intervention data. The booklet was placed in a file along with the participants other details including their consent form. The following data was collected, recorded in the booklet and stored in the file of each participant:

1. The details of the participant in an epidemiological format (Questions 1 to 17 in booklet). This was to done in order to describe the entire population demographically and to determine if there were significant differences between the groups that may influence the results of the experiment.

2. The pre- and post- intervention behaviours of the participant (Questions 18.1 and 18.2 in the booklet). This was recorded in order to determine if there were significant improvements in behaviour and to compare these changes between the test and control group.

3. The pre- and post- intervention medication card details of the patient (Questions 19.1 and 19.2 in the booklet). This information was recorded in order to observe whether medication was a mediating factor that could explain results.

4. The pre- and post- intervention "other treatments and activities" the participant received (Questions 20.1 and 20.2 in the booklet). These were recorded in order to determine if there were improvements and to determine if these activities might have been a mediating factor in results.

5. The pre- and post- intervention list of present positive and negative psychotic symptoms the patient possesses (Questions 21.1 to 22.1 and 21.2 to 22.2 in booklet). This was recorded in order to answer Question 1.

6. The pre- and post- intervention objective Beck Depression Index (BDI-II Xhosa version) and Beck Anxiety Index (BAI Xhosa version) scores of the participant (Questions 23.1 and 24.1, as well as, 23.2 and 24.2 in the booklet). These psychometric tests were given in order to answer Questions 3 and 4, respectively.

7. The pre- and post- intervention current diagnoses of the patients (Questions 25.1 and 25.2 in booklet). This was recorded in order to observe any improvements in the diagnoses of the patients, thus determining the effectiveness of aerobic exercise in improving the entire condition of the patient.

8. The pre- and post- treatment Global Assessment of Functioning (GAF) scores of the patient (Questions 25.1 - Axis V and 25.2 - Axis V in the booklet). This was included in the booklet inorder to answer Question 2. The reason for the inclusion of this score is too numerically strengthen any findings related to the symptom and diagnosis improvement; as well as behaviour improvement of the patient.

9. Structured objective questions relating to the pre-hospitalisation levels of activity of the patient (Questions 26 and 27). This was included to generate data to answer and validate various suggestions found in the literature review; such as, "Do more previously active individuals respond more positively to exercise than do less previously active individuals, et cetera?"

10. The expectancy of the patient was recorded in order to try and confirm or disprove this influential mechanism (Questions 28.1 in the booklet). This was partly to explore Question 5.

11. The pre- and post- treatment sleep patterns were explored (Questions 29.1 to 31.1 and 29.2 to 32 in the booklet). This was recorded in order partly to answer Question 5.

12. Post-intervention open-ended questions (Questions 26.2 and 33) were used to attempt partly to answer Question 5, using qualitative methods. These two questions were recorded on a video device and transcribed in a dialogue format. The patient's responses were transcribed in order to later analyse the content and seek out subjective data from the patient's responses.

13. Post-intervention closed-ended questions (Questions 34 and 35) were utilised in order to complete the exploration of Question 5.

Section 3.4. Research Process

This is how the research was conducted step by step.

Step 1: Participants were randomly selected and randomly assigned to a treatment or a control group.

Step 2: Participants in the treatment and the control group were randomly assigned to the two different Clinical Psychologists for individual psychometric tests; namely the Beck Depression Index (*BDI-II* Xhosa version) test and the Beck Anxiety Index (*BAI* Xhosa version). The psychologists were unaware which group the participants were in.

Step 3: A file was created for each participant.

Step 4: After all the pre-intervention psychometric assessments were completed, a pre-intervention interview was conducted individually with each participant, by the Principal Psychiatrist and the Researcher. The interview proceeded in the following manner:

Firstly, the nature of the research as well as the activity details were explained to the patient and their written informed consent received. This was placed in the individuals file. Secondly, the patient's details were recorded in the booklet of the patient, and stored in the patients file. The details of the patient included such things as: demographic information and observed behavioural manifestations. These behavioural observations were conducted by the Principal Psychiatrist and the Researcher, having input mainly from the Senior Professional Nurse of the ward. The treatment card of the patient was read and the current medication recorded. Ward activities and any other

treatments were also recorded. The Principal Psychiatrist recorded the patient's current positive and negative symptoms, as well as, offered a complete current DSM-IV diagnosis. Thirdly, the Researcher completed a pre-intervention interview which was recorded with an audio device. Fourthly, a full medical examination was done on each patient and this was recorded in the patient's file.

Step 5: The psychometric tests were collected from each psychologist. These were placed in each of the patient's files and the results recorded in the booklets.

Step 6: The actual group activities commenced and ran for five weeks. Details of the different programmes are recorded in section 3.5 below.

Step 7: Post-intervention psychometric tests were then completed by the same psychologists as before. Each psychologist did the assessment with each of the participants they had seen before. Again the psychologists did not know which group each participant was in, to eliminate this variable influencing the test results.

Step 8: Post-intervention interviews were then commenced by the same professionals who did the initial interviews. Included in these post-interviews were additional questions relevant to the experiment, and a qualitative interview. The qualitative interviews were recorded on a video device.

Step 9: The psychometric forms were then collected, stored in the file and recorded in the patient's booklets. Patients were then discharged or transferred where necessary.

Step 10: The qualitative and quantitative data were then captured, via using Microsoft Excel for the quantitative data and via verbatim transcripts for the qualitative data.

Step 11: The qualitative data was analysed using phenomenological content analysis and also described and compared with descriptive statistics. The quantitative data was analysed using inferential statistics.

Section 3.4.1. The different stimuli/independent variables

The sample of 22 patients, being randomly assigned to either a test group (aerobic exercise therapy group) or the control group (anaerobic soccer practice group) completed their interventions.

3.4.1.1. Treatment Group (Aerobic Exercise Therapy)

The stimulus/independent variable of the treatment/test groups was a three times a week, 45 minute brisk walk that ran for five weeks in total (consult 'exercise participation log' in Data File). Male and female participants walked on separate days.

The typical itinerary of the aerobic exercise therapy was conducted as follows:

1. The patients were collected at about 14h00 from their various wards and transported to different locations.
2. After depositing the patients at a location, the patients would each be given a juice 500 ml bottle containing chilled fruit juice, inorder to keep hydrated during the entire exercise activity.
3. Once the participants had their juice bottle the group would do stretching (warm up) exercises. The pre-walk stretching exercises would normally not be longer than five minutes in duration and all the exercises were prescribed by a physiotherapist.
4. After the pre-walk stretching then walking would commence. Walkers were encouraged to walk at their own pace and fitness level, but encouraged to walk as if they were in a real hurry.
5. After 45 minutes of brisk walking, the participants would stop and do post-walking stretching (cool down) exercises.
6. After completing the post-walking stretching the participants would then be rewarded with various foods and occasionally other soft drinks for their participation in the project (consult refreshment list in Data File).

(As noted in the proposal, participants were going to be expected to walk for 45 minutes minimally. However, for the first two sessions both the male and female participants could not walk for 45 minutes in total because of many participants being too sedentary. Thus it took two sessions for participants to reach the goal of 45 minutes a session.)

For the first two weeks participants were encouraged to swing their arms in a marching motion to increase cardiovascular intensity. However after this period, under the directions of a qualified fitness instructor, participants were then asked to swing their arms almost in the motion of a boxer's uppercut jabbing motion, i.e. they had to swing their arms with a 45 degree angled bend in the arm. This was the ideal motion; unfortunately few of the participants were able to maintain this movement for long and often got tired, throughout the entire five week period.

For the first couple of sessions walking was only done on the sports field, but after it became apparent to everyone that this was getting boring different walking paths were followed. At least once a week, however, the participants would return to the field in order to calculate if the collective group's pace was increasing, indicating some increased degree of fitness and endurance levels (consult 'distance log' in Data File).

(It is important to note that it was hoped that the intervention would run for 10 weeks; as it was suggested by many in the literature review that 10 weeks alone was the minimum required duration, for exercise therapy to be of any benefit. However various problems arouse that required an early termination of the activities. These problems included:

1. Various patients needing to return to their homes in order for their families and themselves to receive their government grant. Had they failed to appear they would have lost the grant and had to reapply. Two participants had this problem.
2. One participant failing to mention she was a domestic worker at the commencement of the research was told that she had to return to work by her employer or she would be retrenched.
3. Due to a rapid intake of newly admitted patients, some of the nurses in various wards had mentioned that patients who were ready to be discharged or moved to the pre-discharge wards were blocking the flow of newer patients into and out of their wards.
4. Some patients started mentioning that they would prefer to go home, because they felt much better.

All things considered it was necessary to terminate the experiment earlier than expected. However, even though the experiment was terminated prematurely, all was not in vain. Quite to the contrary in fact, as data produced from this research disputes previous theory and offers more exiting findings about the effectiveness of even more acute aerobic exercise programmes, than previously thought possible).

3.4.1.2. Control Group

The stimulus of the control groups was a once a week anaerobic training *(maximal, short term)* and less low intensity aerobic exercise *(submaximal, short term)* (consult the 'exercise participation log' in the Data File). Male participants participated in a 10 minutes programme of soccer (football) practice (low intensity, short duration training = anaerobic) and/or five players (or so) a side soccer match on a small field (high intensity, short duration = anaerobic). The female control patient enjoyed 10 minutes with a five minute break of either, netball practice

(low intensity, short duration training = anaerobic) and/or a netball match with very few players (high intensity, short duration = anaerobic). Again males and females took part on separate days.

The control group differed from the test group in that they mainly did anaerobic training, supplemented with the occasional low intensity and short duration aerobic activities. And they only trained one a week for a lot shorter duration than the treatment group.

The typical process of the controls group activities were conducted as follows:

1. The patients were collected at about 10h00 from their various wards and transported to different locations.
2. After depositing the patients at a location, the patients would also each be given a juice 500 ml bottle containing chilled fruit juice, in order to match the treatment group.
3. Once the participants had their juice bottle the group would do stretching (warm up) exercises. The pre-soccer/netball stretching exercises would normally not be longer than five minutes in duration. These stretches were also done exactly the same way as the test group.
4. After the pre-soccer/netball stretching the activities would commence. Participants would do mild soccer/netball training, i.e. kicking one after the other (at a slow pace) at the goal posts or practicing throwing through the netball hoop. After this was done for about five minutes a soccer/netball match would be conduced for about five to 15 minutes.
5. After the soccer/netball ended, the participants would stop and do post-intervention stretching (cool down) exercises, in order to match this variable as well.
6. After completing the post- soccer/netball stretchers the participants would then be rewarded with various foods and occasionally other soft drinks for their participation in the project (consult refreshment list in Data File).

Sometimes the activities and locations changed slightly to prevent boredom and to match the test group who also walked at different locations. The soccer/netball group participated only once a week; however, they were removed from their wards for three times longer than the test group, inorder to match the amount of time the test group participants had been removed from the wards, during the week. Additionally the control group also received three times the amount of food that the test group participants had received, in order to also match this variable as much as possible.

(Originally it was planned that the control group would only have typical treatment and do nothing out of the ordinary. Later it was felt that, because the purpose of this thesis was to research 'aerobic' exercise as an adjunct therapy, then a control group participating in another

types of exercise would be more appropriate. This also satisfied the Hospital Management, who were more interested to see what the effect soccer would have on participants. It should also be noted that occasionally the female control participant was accompanied by other patients and more staff members than usual, to match the socialisation aspect, which the male participants enjoyed. This was also arranged for the female treatment participant).

Section 3.5. Data Analysis

The data generated from the quantitative data sets were managed and analysed in the following ways.

3.5.1. Descriptive Statistics

Descriptive statistics were utilised throughout this thesis. These statistics were primarily generated to describe, as well as, analyse the differences and similarities between the treatment and control groups (Consult Main Excel Data Captured Worksheet).

3.5.2. Questions 1 to 4 (Inferential statistics)

The *quantitative data* for this part of the thesis was analysed using the SPSS (version 13) computer software package. Inferential statistics were utilised here and analysed with the SPSS (version 13) package. This statistical software is a well recognised statistical analysis tool; and it has been proven to be a reliable and valid statistical tool, which is frequently made use of in psychological research. It has a library of proven reliable tests, it easily understood outputs, and provides accurate warnings if both statistical assumptions are violated or when criteria of reliable interpretation are violated.

Data (Questions 21.1, 21.2, 22.1, 22.2, 23.1, 23.2, 24.1, 24.2, 25.1, and 25.2) from the Questionnaire Booklets were captured firstly in Microsoft Excel and then later entered into and analysed with the SPSS software.

The analysis of the data was undertaken in two ways. Initially only the means of the treatment and control groups were compared to determine which group achieved the greatest improvements (Consult table: 1). This is considered a more reliable method of comparison when observing a small population sample.

After which, using the SPSS.13 software package, an *independent sample t-test*, was conducted with each of the pre- and post- treatment variables being analysed. *Tests of significance* were thus done between the *means* of *each* of the *variables* studied. *Correlations* and *partial correlations (partial corr*) were additionally generated, should this data reveal any interesting revelations.

It is extremely necessary to mention that the use of an independent sample t-test are by protocol only usually conducted with larger samples, but in order to compare the results of this thesis with past research, it was felt necessary to attempt to do it.

3.5.3. Question 5 (Emergent themes and descriptive statistics)

The supportive qualitative subjective (translated) responses were visually and audibly recorded. These responses were transcribed verbatim (See transcriptions file).

Any of the responses of the participants that covertly or overtly gave some credence to a suggested theoretical mechanism was highlighted using a colour code key system. (See mechanisms tabulation sheet). This allowed for data to be *coded* as far as falling under a particular theory. These data sets were then *cross-sectionally coded* and *described* in terms of percentages (descriptive statistics) in order to *organise* the data; and to determine the *frequency* of any arising evidence and themes that emerged from the transcripts.

Specific qualitative *emergent themes* were then grouped together and expounded upon by linking them to the literature review on each of the proposed theoretical underlying mechanism of change. This process of *successive approximation* led to evidence being collected for or against each of the different mechanisms explored.

The data generated from the *quantitative data* sets was analysed in the following way. Descriptive statistics was utilised to compare the differences and similarities between the test and control groups.

Section 3.6. Ethical Statement

During the entire research process the ethical mandate declaration found in the appendix, was at all times followed (consult Appendix). Presently, and at no time did this research violate any of these statements.

Section 4: Results

4.1. Questions 1 to 4

Herewith follows the results of the comparison of the means, as well as, the *t- test (independent samples)* and *correlations* of the variables studied. The results of each of these variables will then be examined independently.

To observe the correlations of the treatment group and control group separately consult Appendix B.

Mean Comparison

Variable	Group	Pre-treat Mean		Post treat Mean		Improvement	Difference
BAI	Treatment	12.8182		1.1818		11.636362 (decrease)	+ 3.181813
	Control	12.3636		3.9091		8.454549 (decrease)	
BDI-II	Treatment	19.8182		1		18.81818182 (decrease)	+ 1.81818182
	Control	25.8182		8.8182		17 (decrease)	
+ Symptoms	Treatment	6.9091		5		1.909090909 (decrease)	+ 1.272727273
	Control	6.6364		6		0.636363636 (decrease)	
- Symptoms	Treatment	1.1818		0.3636		0.818181818 (decrease)	+ 0.454545455
	Control	2.1818		0.9091		1.272727273 (decrease)	
GAF	Treatment	28.7273		65.2727		36.546 (increase)	+ 14.637
	Control	27.7273		49.6364		21.909 (increase)	

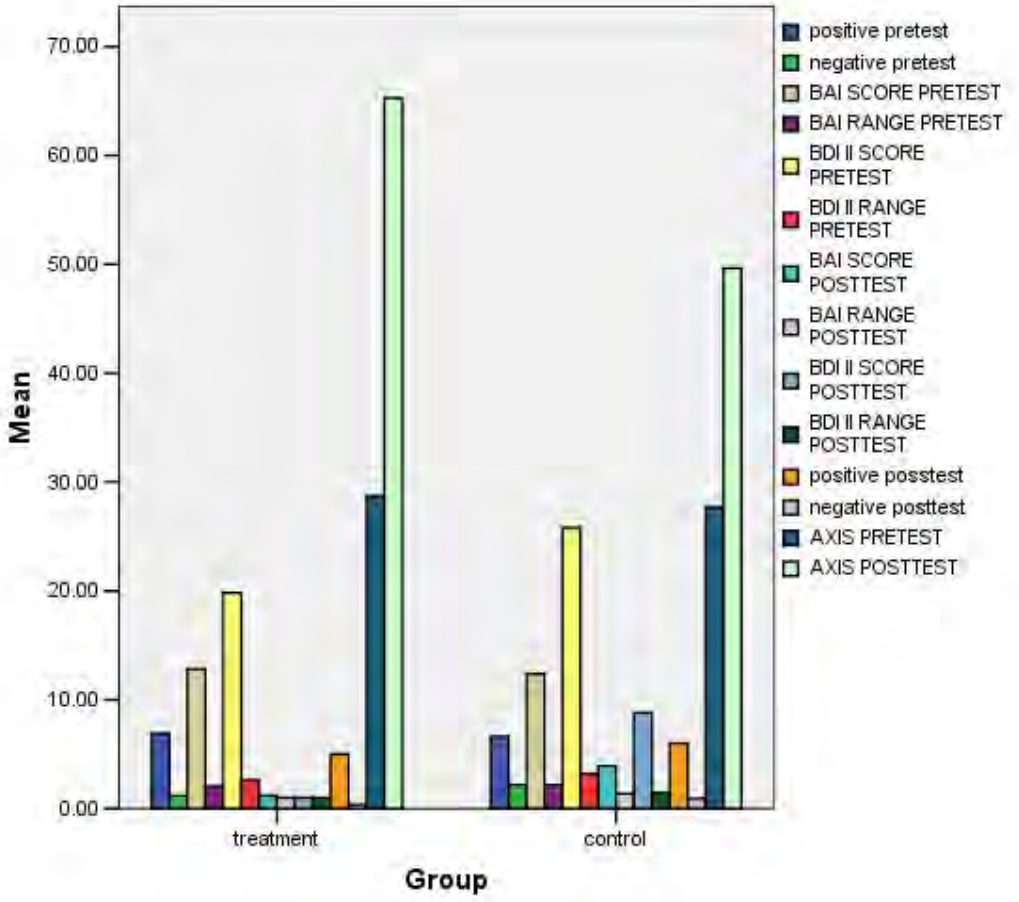
Table 1: Basic mean scores.

Consult Appendix B for more specific results concerning the mean scores, i.e. *case processing summaries*, *report details*, *ANOVA tables* and *measures of association.*

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Positive pretest	treatment	11	6.9091	4.59248	1.38469
	control	11	6.6364	4.71747	1.42237
Negative pretest	treatment	11	1.1818	.87386	.26348
	control	11	2.1818	.75076	.22636
BAI SCORE PRETEST	treatment	11	12.8182	10.03811	3.02660
	control	11	12.3636	9.06943	2.73454
BAI RANGE PRETEST	treatment	11	2.0909	.94388	.28459
	control	11	2.1818	.98165	.29598
BDI II SCORE PRETEST	treatment	11	19.8182	11.53099	3.47672
	control	11	25.8182	8.26823	2.49297
BDI II RANGE PRETEST	treatment	11	2.6364	1.02691	.30963
	control	11	3.1818	.87386	.26348
BAI SCORE POSTTEST	treatment	11	1.1818	1.99089	.60028
	control	11	3.9091	6.81842	2.05583
BAI RANGE POSTTEST	treatment	11	1.0000	.00000	.00000
	control	11	1.3636	.80904	.24393
BDI II SCORE POSTTEST	treatment	11	1.0000	1.41421	.42640
	control	11	8.8182	12.09808	3.64771
BDI II RANGE POSTTEST	treatment	11	1.0000	.00000	.00000
	control	11	1.4545	1.03573	.31228
Positive posstest	treatment	11	5.0000	5.84808	1.76326
	control	11	6.0000	3.63318	1.09545
Negative posttest	treatment	11	.3636	.80904	.24393
	control	11	.9091	1.04447	.31492
AXIS PRETEST	treatment	11	28.7273	8.98989	2.71055
	control	11	27.7273	8.17424	2.46463
AXIS POSTTEST	treatment	11	65.2727	19.70325	5.94075
	control	11	49.6364	19.63300	5.91957

Table 2: Group Statistics.



Graph 1: Graphic Representation of Mean Scores.

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Positive pretest	**Equal variances assumed**	.001	.973	.137	20	.892	.27273	1.98507	-3.86805	4.41351
	Equal variances not assumed			.137	19.986	.892	.27273	1.98507	-3.86824	4.41370
Negative pretest	**Equal variances assumed**	.739	.400	-2.879	20	.009	-1.00000	.34736	-1.72459	-.27541
	Equal variances not assumed			-2.879	19.556	.009	-1.00000	.34736	-1.72564	-.27436
BAI SCORE PRETEST	**Equal variances assumed**	.039	.846	.111	20	.912	.45455	4.07897	-8.05404	8.96313
	Equal variances not assumed			.111	19.798	.912	.45455	4.07897	-8.05962	8.96872
BAI RANGE PRETEST	**Equal variances assumed**	.158	.695	-.221	20	.827	-.09091	.41060	-.94741	.76559
	Equal variances not assumed			-.221	19.969	.827	-.09091	.41060	-.94750	.76568
BDI II SCORE PRETEST	**Equal variances assumed**	.688	.417	-1.402	20	.176	-6.00000	4.27814	-14.92404	2.92404
	Equal variances not assumed			-1.402	18.133	.178	-6.00000	4.27814	-14.98331	2.98331
BDI II RANGE PRETEST	**Equal variances assumed**	.870	.362	-1.342	20	.195	-.54545	.40656	-1.39352	.30261
	Equal variances not assumed			-1.342	19.501	.195	-.54545	.40656	-1.39491	.30400
BAI SCORE POSTTEST	**Equal variances assumed**	4.176	.054	-1.273	20	.217	-2.72727	2.14168	-7.19473	1.74019
	Equal variances not assumed			-1.273	11.693	.228	-2.72727	2.14168	-7.40722	1.95267
BAI RANGE	**Equal**	14.694	.001	-1.491	20	.152	-.36364	.24393	-.87248	.14520

POSTTEST	**variances assumed**									
	Equal variances not assumed			-1.491	10.000	.167	-.36364	.24393	-.90716	.17988
BDI II SCORE POSTTEST	**Equal variances assumed**	8.600	.008	-2.129	20	.046	-7.81818	3.67255	-15.47898	-.15738
	Equal variances not assumed			-2.129	10.273	.058	-7.81818	3.67255	-15.97172	.33536
BDI II RANGE POSTTEST	**Equal variances assumed**	13.111	.002	-1.456	20	.161	-.45455	.31228	-1.10596	.19687
	Equal variances not assumed			-1.456	10.000	.176	-.45455	.31228	-1.15036	.24126
Positive posstest	**Equal variances assumed**	2.692	.117	-.482	20	.635	-1.00000	2.07583	-5.33012	3.33012
	Equal variances not assumed			-.482	16.718	.636	-1.00000	2.07583	-5.38525	3.38525
Negative posttest	**Equal variances assumed**	6.316	.021	-1.369	20	.186	-.54545	.39834	-1.37638	.28548
	Equal variances not assumed			-1.369	18.824	.187	-.54545	.39834	-1.37973	.28882
AXIS PRETEST	**Equal variances assumed**	.635	.435	.273	20	.788	1.00000	3.66353	-6.64200	8.64200
	Equal variances not assumed			.273	19.822	.788	1.00000	3.66353	-6.64641	8.64641
AXIS POSTTEST	**Equal variances assumed**	.128	.725	1.864	20	.077	15.63636	8.38653	-1.85763	33.13036
	Equal variances not assumed			1.864	20.000	.077	15.63636	8.38653	-1.85765	33.13037

Table 3: Independent Sample Test.

		group	positive pretest	negative pretest	BAI SCORE PRETEST
group	Pearson Correlation	1	-.031	.541**	-.025
	Sig. (2-tailed)		.892	.009	.912
	N	22	22	22	22
positive pretest	Pearson Correlation	-.031	1	-.018	.207
	Sig. (2-tailed)	.892		.938	.354
	N	22	22	22	22
negative pretest	Pearson Correlation	.541**	-.018	1	-.037
	Sig. (2-tailed)	.009	.938		.870
	N	22	22	22	22
BAI SCORE PRETEST	Pearson Correlation	-.025	.207	-.037	1
	Sig. (2-tailed)	.912	.354	.870	
	N	22	22	22	22
BAI RANGE PRETEST	Pearson Correlation	.049	.097	.051	.950**
	Sig. (2-tailed)	.827	.669	.821	.000
	N	22	22	22	22
BDI II SCORE PRETEST	Pearson Correlation	.299	.211	.357	.694**
	Sig. (2-tailed)	.176	.345	.103	.000
	N	22	22	22	22
BDI II RANGE PRETEST	Pearson Correlation	.287	.297	.330	.568**
	Sig. (2-tailed)	.195	.179	.134	.006
	N	22	22	22	22
BAI SCORE POSTTEST	Pearson Correlation	.274	.034	.334	.346
	Sig. (2-tailed)	.217	.879	.128	.115
	N	22	22	22	22
BAI RANGE POSTTEST	Pearson Correlation	.316	-.091	.451*	.135
	Sig. (2-tailed)	.152	.688	.035	.548
	N	22	22	22	22
BDI II SCORE POSTTEST	Pearson Correlation	.430*	-.109	.505*	.123
	Sig. (2-tailed)	.046	.631	.016	.584
	N	22	22	22	22
BDI II RANGE POSTTEST	Pearson Correlation	.309	-.110	.442*	.075
	Sig. (2-tailed)	.161	.627	.040	.740
	N	22	22	22	22
positive posstest	Pearson Correlation	.107	.707**	.269	.380
	Sig. (2-tailed)	.635	.000	.226	.081
	N	22	22	22	22
negative posttest	Pearson Correlation	.293	.013	.341	-.098
	Sig. (2-tailed)	.186	.954	.120	.665
	N	22	22	22	22
AXIS PRETEST	Pearson Correlation	-.061	-.585**	-.230	-.184
	Sig. (2-tailed)	.788	.004	.303	.413
	N	22	22	22	22
AXIS POSTTEST	Pearson Correlation	-.385	-.376	-.406	-.031
	Sig. (2-tailed)	.077	.085	.061	.892
	N	22	22	22	22

Table 4: **Correlations**

		BAI RANGE PRETEST	BDI II SCORE PRETEST	BDI II RANGE PRETEST
group	Pearson Correlation	.049	.299	.287
	Sig. (2-tailed)	.827	.176	.195
	N	22	22	22
positive pretest	Pearson Correlation	.097	.211	.297
	Sig. (2-tailed)	.669	.345	.179
	N	22	22	22
negative pretest	Pearson Correlation	.051	.357	.330
	Sig. (2-tailed)	.821	.103	.134
	N	22	22	22
BAI SCORE PRETEST	Pearson Correlation	.950**	.694**	.568**
	Sig. (2-tailed)	.000	.000	.006
	N	22	22	22
BAI RANGE PRETEST	Pearson Correlation	1	.693**	.587**
	Sig. (2-tailed)		.000	.004
	N	22	22	22
BDI II SCORE PRETEST	Pearson Correlation	.693**	1	.935**
	Sig. (2-tailed)	.000		.000
	N	22	22	22
BDI II RANGE PRETEST	Pearson Correlation	.587**	.935**	1
	Sig. (2-tailed)	.004	.000	
	N	22	22	22
BAI SCORE POSTTEST	Pearson Correlation	.292	.255	.136
	Sig. (2-tailed)	.188	.252	.548
	N	22	22	22
BAI RANGE POSTTEST	Pearson Correlation	.125	.242	.197
	Sig. (2-tailed)	.579	.277	.380
	N	22	22	22
BDI II SCORE POSTTEST	Pearson Correlation	.154	.389	.362
	Sig. (2-tailed)	.495	.073	.097
	N	22	22	22
BDI II RANGE POSTTEST	Pearson Correlation	.089	.246	.225
	Sig. (2-tailed)	.694	.269	.313
	N	22	22	22
positive posstest	Pearson Correlation	.302	.632**	.636**
	Sig. (2-tailed)	.172	.002	.001
	N	22	22	22
negative posttest	Pearson Correlation	-.101	.197	.168
	Sig. (2-tailed)	.654	.379	.454
	N	22	22	22
AXIS PRETEST	Pearson Correlation	-.107	-.369	-.453*
	Sig. (2-tailed)	.637	.091	.034
	N	22	22	22
AXIS POSTTEST	Pearson Correlation	.011	-.578**	-.663**
	Sig. (2-tailed)	.960	.005	.001
	N	22	22	22

Table 4: Correlations (Continued)

		BAI SCORE POSTTEST	BAI RANGE POSTTEST	BDI II SCORE POSTTEST
group	Pearson Correlation	.274	.316	.430*
	Sig. (2-tailed)	.217	.152	.046
	N	22	22	22
positive pretest	Pearson Correlation	.034	-.091	-.109
	Sig. (2-tailed)	.879	.688	.631
	N	22	22	22
negative pretest	Pearson Correlation	.334	.451*	.505*
	Sig. (2-tailed)	.128	.035	.016
	N	22	22	22
BAI SCORE PRETEST	Pearson Correlation	.346	.135	.123
	Sig. (2-tailed)	.115	.548	.584
	N	22	22	22
BAI RANGE PRETEST	Pearson Correlation	.292	.125	.154
	Sig. (2-tailed)	.188	.579	.495
	N	22	22	22
BDI II SCORE PRETEST	Pearson Correlation	.255	.242	.389
	Sig. (2-tailed)	.252	.277	.073
	N	22	22	22
BDI II RANGE PRETEST	Pearson Correlation	.136	.197	.362
	Sig. (2-tailed)	.548	.380	.097
	N	22	22	22
BAI SCORE POSTTEST	Pearson Correlation	1	.886**	.787**
	Sig. (2-tailed)		.000	.000
	N	22	22	22
BAI RANGE POSTTEST	Pearson Correlation	.886**	1	.942**
	Sig. (2-tailed)	.000		.000
	N	22	22	22
BDI II SCORE POSTTEST	Pearson Correlation	.787**	.942**	1
	Sig. (2-tailed)	.000	.000	
	N	22	22	22
BDI II RANGE POSTTEST	Pearson Correlation	.799**	.979**	.970**
	Sig. (2-tailed)	.000	.000	.000
	N	22	22	22
positive posstest	Pearson Correlation	.149	.102	.137
	Sig. (2-tailed)	.509	.653	.543
	N	22	22	22
negative posttest	Pearson Correlation	.180	.123	.125
	Sig. (2-tailed)	.423	.584	.580
	N	22	22	22
AXIS PRETEST	Pearson Correlation	.099	.068	.082
	Sig. (2-tailed)	.660	.763	.715
	N	22	22	22
AXIS POSTTEST	Pearson Correlation	-.262	-.342	-.468*
	Sig. (2-tailed)	.239	.120	.028
	N	22	22	22

Table 4: Correlations (Continued)

		BDI II RANGE POSTTEST	positive posstest	negative posttest
group	Pearson Correlation	.309	.107	.293
	Sig. (2-tailed)	.161	.635	.186
	N	22	22	22
positive pretest	Pearson Correlation	-.110	.707**	.013
	Sig. (2-tailed)	.627	.000	.954
	N	22	22	22
negative pretest	Pearson Correlation	.442*	.269	.341
	Sig. (2-tailed)	.040	.226	.120
	N	22	22	22
BAI SCORE PRETEST	Pearson Correlation	.075	.380	-.098
	Sig. (2-tailed)	.740	.081	.665
	N	22	22	22
BAI RANGE PRETEST	Pearson Correlation	.089	.302	-.101
	Sig. (2-tailed)	.694	.172	.654
	N	22	22	22
BDI II SCORE PRETEST	Pearson Correlation	.246	.632**	.197
	Sig. (2-tailed)	.269	.002	.379
	N	22	22	22
BDI II RANGE PRETEST	Pearson Correlation	.225	.636**	.168
	Sig. (2-tailed)	.313	.001	.454
	N	22	22	22
BAI SCORE POSTTEST	Pearson Correlation	.799**	.149	.180
	Sig. (2-tailed)	.000	.509	.423
	N	22	22	22
BAI RANGE POSTTEST	Pearson Correlation	.979**	.102	.123
	Sig. (2-tailed)	.000	.653	.584
	N	22	22	22
BDI II SCORE POSTTEST	Pearson Correlation	.970**	.137	.125
	Sig. (2-tailed)	.000	.543	.580
	N	22	22	22
BDI II RANGE POSTTEST	Pearson Correlation	1	.073	.054
	Sig. (2-tailed)		.747	.810
	N	22	22	22
positive posstest	Pearson Correlation	.073	1	.261
	Sig. (2-tailed)	.747		.240
	N	22	22	22
negative posttest	Pearson Correlation	.054	.261	1
	Sig. (2-tailed)	.810	.240	
	N	22	22	22
AXIS PRETEST	Pearson Correlation	.105	-.631**	-.269
	Sig. (2-tailed)	.643	.002	.227
	N	22	22	22
AXIS POSTTEST	Pearson Correlation	-.351	-.700**	-.505*
	Sig. (2-tailed)	.109	.000	.016
	N	22	22	22

Table 4: Correlations (Continued)

		AXIS PRETEST	AXIS POSTTEST
group	Pearson Correlation	-.061	-.385
	Sig. (2-tailed)	.788	.077
	N	22	22
positive pretest	Pearson Correlation	-.585**	-.376
	Sig. (2-tailed)	.004	.085
	N	22	22
negative pretest	Pearson Correlation	-.230	-.406
	Sig. (2-tailed)	.303	.061
	N	22	22
BAI SCORE PRETEST	Pearson Correlation	-.184	-.031
	Sig. (2-tailed)	.413	.892
	N	22	22
BAI RANGE PRETEST	Pearson Correlation	-.107	.011
	Sig. (2-tailed)	.637	.960
	N	22	22
BDI II SCORE PRETEST	Pearson Correlation	-.369	-.578**
	Sig. (2-tailed)	.091	.005
	N	22	22
BDI II RANGE PRETEST	Pearson Correlation	-.453*	-.663**
	Sig. (2-tailed)	.034	.001
	N	22	22
BAI SCORE POSTTEST	Pearson Correlation	.099	-.262
	Sig. (2-tailed)	.660	.239
	N	22	22
BAI RANGE POSTTEST	Pearson Correlation	.068	-.342
	Sig. (2-tailed)	.763	.120
	N	22	22
BDI II SCORE POSTTEST	Pearson Correlation	.082	-.468*
	Sig. (2-tailed)	.715	.028
	N	22	22
BDI II RANGE POSTTEST	Pearson Correlation	.105	-.351
	Sig. (2-tailed)	.643	.109
	N	22	22
positive posstest	Pearson Correlation	-.631**	-.700**
	Sig. (2-tailed)	.002	.000
	N	22	22
negative posttest	Pearson Correlation	-.269	-.505*
	Sig. (2-tailed)	.227	.016
	N	22	22
AXIS PRETEST	Pearson Correlation	1	.511*
	Sig. (2-tailed)		.015
	N	22	22
AXIS POSTTEST	Pearson Correlation	.511*	1
	Sig. (2-tailed)	.015	
	N	22	22

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4: Correlations (Continued)

Control Variables			Positive pretest	Negative pretest
Group	Positive pretest	Correlation	1.000	-.001
		Significance (2-tailed)	.	.996
		df	0	19
	Negative pretest	Correlation	-.001	1.000
		Significance (2-tailed)	.996	.
		df	19	0
	BAI SCORE PRETEST	Correlation	.207	-.028
		Significance (2-tailed)	.368	.904
		df	19	19
	BAI RANGE PRETEST	Correlation	.098	.029
		Significance (2-tailed)	.671	.901
		df	19	19
	BDI II SCORE PRETEST	Correlation	.231	.243
		Significance (2-tailed)	.313	.288
		df	19	19
	BDI II RANGE PRETEST	Correlation	.320	.217
		Significance (2-tailed)	.158	.346
		df	19	19
	BAI SCORE POSTTEST	Correlation	.045	.230
		Significance (2-tailed)	.848	.316
		df	19	19
	BAI RANGE POSTTEST	Correlation	-.085	.351
		Significance (2-tailed)	.713	.119
		df	19	19
	BDI II SCORE POSTTEST	Correlation	-.106	.359
		Significance (2-tailed)	.649	.110
		df	19	19
	BDI II RANGE POSTTEST	Correlation	-.105	.343
		Significance (2-tailed)	.650	.128
		df	19	19
	Positive posstest	Correlation	.715	.252
		Significance (2-tailed)	.000	.270
		df	19	19
	Negative posttest	Correlation	.023	.227
		Significance (2-tailed)	.921	.322
		df	19	19
	AXIS PRETEST	Correlation	-.588	-.235
		Significance (2-tailed)	.005	.305
		df	19	19
	AXIS POSTTEST	Correlation	-.420	-.255
		Significance (2-tailed)	.058	.264
		df	19	19

Table 5: Partial Correlations (Partial Corr)

Control Variables			BAI SCORE PRETEST	BAI RANGE PRETEST
Group	Positive pretest	Correlation	.207	.098
		Significance (2-tailed)	.368	.671
		df	19	19
	Negative pretest	Correlation	-.028	.029
		Significance (2-tailed)	.904	.901
		df	19	19
	BAI SCORE PRETEST	Correlation	1.000	.952
		Significance (2-tailed)	.	.000
		df	0	19
	BAI RANGE PRETEST	Correlation	.952	1.000
		Significance (2-tailed)	.000	.
		df	19	0
	BDI II SCORE PRETEST	Correlation	.735	.712
		Significance (2-tailed)	.000	.000
		df	19	19
	BDI II RANGE PRETEST	Correlation	.601	.599
		Significance (2-tailed)	.004	.004
		df	19	19
	BAI SCORE POSTTEST	Correlation	.367	.289
		Significance (2-tailed)	.102	.203
		df	19	19
	BAI RANGE POSTTEST	Correlation	.151	.116
		Significance (2-tailed)	.513	.618
		df	19	19
	BDI II SCORE POSTTEST	Correlation	.149	.147
		Significance (2-tailed)	.521	.525
		df	19	19
	BDI II RANGE POSTTEST	Correlation	.087	.077
		Significance (2-tailed)	.708	.739
		df	19	19
	Positive posttest	Correlation	.385	.299
		Significance (2-tailed)	.084	.189
		df	19	19
	Negative posttest	Correlation	-.095	-.121
		Significance (2-tailed)	.683	.601
		df	19	19
	AXIS PRETEST	Correlation	-.186	-.104
		Significance (2-tailed)	.420	.654
		df	19	19
	AXIS POSTTEST	Correlation	-.044	.033
		Significance (2-tailed)	.851	.887
		df	19	19

Table 5: Partial Corr (Continued).

Control Variables			BDI II SCORE PRETEST	BDI II RANGE PRETEST
Group	Positive pretest	Correlation	.231	.320
		Significance (2-tailed)	.313	.158
		df	19	19
	Negative pretest	Correlation	.243	.217
		Significance (2-tailed)	.288	.346
		df	19	19
	BAI SCORE PRETEST	Correlation	.735	.601
		Significance (2-tailed)	.000	.004
		df	19	19
	BAI RANGE PRETEST	Correlation	.712	.599
		Significance (2-tailed)	.000	.004
		df	19	19
	BDI II SCORE PRETEST	Correlation	1.000	.928
		Significance (2-tailed)	.	.000
		df	0	19
	BDI II RANGE PRETEST	Correlation	.928	1.000
		Significance (2-tailed)	.000	.
		df	19	0
	BAI SCORE POSTTEST	Correlation	.189	.062
		Significance (2-tailed)	.413	.790
		df	19	19
	BAI RANGE POSTTEST	Correlation	.163	.117
		Significance (2-tailed)	.480	.615
		df	19	19
	BDI II SCORE POSTTEST	Correlation	.302	.276
		Significance (2-tailed)	.183	.226
		df	19	19
	BDI II RANGE POSTTEST	Correlation	.169	.150
		Significance (2-tailed)	.463	.517
		df	19	19
	Positive posttest	Correlation	.633	.636
		Significance (2-tailed)	.002	.002
		df	19	19
	Negative posttest	Correlation	.120	.092
		Significance (2-tailed)	.604	.692
		df	19	19
	AXIS PRETEST	Correlation	-.368	-.455
		Significance (2-tailed)	.101	.038
		df	19	19
	AXIS POSTTEST	Correlation	-.526	-.624
		Significance (2-tailed)	.014	.002
		df	19	19

Table 5: Partial Corr (Continued).

Control Variables			BAI SCORE POSTTEST	BAI RANGE POSTTEST
Group	Positive pretest	Correlation	.045	-.085
		Significance (2-tailed)	.848	.713
		df	19	19
	Negative pretest	Correlation	.230	.351
		Significance (2-tailed)	.316	.119
		df	19	19
	BAI SCORE PRETEST	Correlation	.367	.151
		Significance (2-tailed)	.102	.513
		df	19	19
	BAI RANGE PRETEST	Correlation	.289	.116
		Significance (2-tailed)	.203	.618
		df	19	19
	BDI II SCORE PRETEST	Correlation	.189	.163
		Significance (2-tailed)	.413	.480
		df	19	19
	BDI II RANGE PRETEST	Correlation	.062	.117
		Significance (2-tailed)	.790	.615
		df	19	19
	BAI SCORE POSTTEST	Correlation	1.000	.876
		Significance (2-tailed)	.	.000
		df	0	19
	BAI RANGE POSTTEST	Correlation	.876	1.000
		Significance (2-tailed)	.000	.
		df	19	0
	BDI II SCORE POSTTEST	Correlation	.771	.941
		Significance (2-tailed)	.000	.000
		df	19	19
	BDI II RANGE POSTTEST	Correlation	.781	.976
		Significance (2-tailed)	.000	.000
		df	19	19
	Positive posstest	Correlation	.125	.072
		Significance (2-tailed)	.590	.757
		df	19	19
	Negative posttest	Correlation	.108	.034
		Significance (2-tailed)	.640	.884
		df	19	19
	AXIS PRETEST	Correlation	.121	.092
		Significance (2-tailed)	.602	.690
		df	19	19
	AXIS POSTTEST	Correlation	-.177	-.251
		Significance (2-tailed)	.444	.272
		df	19	19

Table 5: Partial Corr (Continued).

Control Variables			BDI II SCORE POSTTEST	BDI II RANGE POSTTEST
Group	Positive pretest	Correlation	-.106	-.105
		Significance (2-tailed)	.649	.650
		df	19	19
	Negative pretest	Correlation	.359	.343
		Significance (2-tailed)	.110	.128
		df	19	19
	BAI SCORE PRETEST	Correlation	.149	.087
		Significance (2-tailed)	.521	.708
		df	19	19
	BAI RANGE PRETEST	Correlation	.147	.077
		Significance (2-tailed)	.525	.739
		df	19	19
	BDI II SCORE PRETEST	Correlation	.302	.169
		Significance (2-tailed)	.183	.463
		df	19	19
	BDI II RANGE PRETEST	Correlation	.276	.150
		Significance (2-tailed)	.226	.517
		df	19	19
	BAI SCORE POSTTEST	Correlation	.771	.781
		Significance (2-tailed)	.000	.000
		df	19	19
	BAI RANGE POSTTEST	Correlation	.941	.976
		Significance (2-tailed)	.000	.000
		df	19	19
	BDI II SCORE POSTTEST	Correlation	1.000	.974
		Significance (2-tailed)	.	.000
		df	0	19
	BDI II RANGE POSTTEST	Correlation	.974	1.000
		Significance (2-tailed)	.000	.
		df	19	0
	Positive posttest	Correlation	.101	.042
		Significance (2-tailed)	.662	.856
		df	19	19
	Negative posttest	Correlation	-.001	-.040
		Significance (2-tailed)	.996	.864
		df	19	19
	AXIS PRETEST	Correlation	.121	.130
		Significance (2-tailed)	.603	.574
		df	19	19
	AXIS POSTTEST	Correlation	-.364	-.264
		Significance (2-tailed)	.105	.247
		df	19	19

Table 5: Partial Corr (Continued).

Control Variables			Positive posstest	Negative posttest
Group	Positive pretest	Correlation	.715	.023
		Significance (2-tailed)	.000	.921
		df	19	19
	Negative pretest	Correlation	.252	.227
		Significance (2-tailed)	.270	.322
		df	19	19
	BAI SCORE PRETEST	Correlation	.385	-.095
		Significance (2-tailed)	.084	.683
		df	19	19
	BAI RANGE PRETEST	Correlation	.299	-.121
		Significance (2-tailed)	.189	.601
		df	19	19
	BDI II SCORE PRETEST	Correlation	.633	.120
		Significance (2-tailed)	.002	.604
		df	19	19
	BDI II RANGE PRETEST	Correlation	.636	.092
		Significance (2-tailed)	.002	.692
		df	19	19
	BAI SCORE POSTTEST	Correlation	.125	.108
		Significance (2-tailed)	.590	.640
		df	19	19
	BAI RANGE POSTTEST	Correlation	.072	.034
		Significance (2-tailed)	.757	.884
		df	19	19
	BDI II SCORE POSTTEST	Correlation	.101	-.001
		Significance (2-tailed)	.662	.996
		df	19	19
	BDI II RANGE POSTTEST	Correlation	.042	-.040
		Significance (2-tailed)	.856	.864
		df	19	19
	Positive posstest	Correlation	1.000	.242
		Significance (2-tailed)	.	.291
		df	0	19
	Negative posttest	Correlation	.242	1.000
		Significance (2-tailed)	.291	.
		df	19	0
	AXIS PRETEST	Correlation	-.629	-.263
		Significance (2-tailed)	.002	.250
		df	19	19
	AXIS POSTTEST	Correlation	-.718	-.445
		Significance (2-tailed)	.000	.043
		df	19	19

Table 5: Partial Corr (Continued).

Control Variables			AXIS PRETEST	AXIS POSTTEST
Group	Positive pretest	Correlation	-.588	-.420
		Significance (2-tailed)	.005	.058
		df	19	19
	Negative pretest	Correlation	-.235	-.255
		Significance (2-tailed)	.305	.264
		df	19	19
	BAI SCORE PRETEST	Correlation	-.186	-.044
		Significance (2-tailed)	.420	.851
		df	19	19
	BAI RANGE PRETEST	Correlation	-.104	.033
		Significance (2-tailed)	.654	.887
		df	19	19
	BDI II SCORE PRETEST	Correlation	-.368	-.526
		Significance (2-tailed)	.101	.014
		df	19	19
	BDI II RANGE PRETEST	Correlation	-.455	-.624
		Significance (2-tailed)	.038	.002
		df	19	19
	BAI SCORE POSTTEST	Correlation	.121	-.177
		Significance (2-tailed)	.602	.444
		df	19	19
	BAI RANGE POSTTEST	Correlation	.092	-.251
		Significance (2-tailed)	.690	.272
		df	19	19
	BDI II SCORE POSTTEST	Correlation	.121	-.364
		Significance (2-tailed)	.603	.105
		df	19	19
	BDI II RANGE POSTTEST	Correlation	.130	-.264
		Significance (2-tailed)	.574	.247
		df	19	19
	Positive posstest	Correlation	-.629	-.718
		Significance (2-tailed)	.002	.000
		df	19	19
	Negative posttest	Correlation	-.263	-.445
		Significance (2-tailed)	.250	.043
		df	19	19
	AXIS PRETEST	Correlation	1.000	.530
		Significance (2-tailed)	.	.014
		df	0	19
	AXIS POSTTEST	Correlation	.530	1.000
		Significance (2-tailed)	.014	.
		df	19	0

Table 5: Partial Corr (Continued).

4.1.1. Psychotic Symptoms

4.1.1.1. Positive Symptoms

On average the treatment group had 6.9 symptoms and the control group about 6.6 symptoms at the start of the intervention. Thus they scored very similar results at the beginning of the interventions, both close to seven symptoms in fact. At the end of the interventions the treatment group had decreased, i.e. improved by 1.9 symptoms on average and the control group by a slightly lesser amount of 0.6. Thus from this perspective the hypothesis that aerobic (submaximal long duration) exercise is superior to other exercise forms, namely anaerobic (intensive short duration exercise) and ineffective submaximal short duration) exercise in reducing the number of *positive symptoms appears* to be correct. However, as we shall see based on the t-test *result*, this unfortunately is not the case.

The *t-test* could not show inferentially that there was significant improvement from the pre-test to the post-tests scores in the treatment group (F=1.71 p=0.492). And surprisingly the control group recorded a significant statistical improvement at (p=0.013). This surprising result is, however, explainable in light of the fact that the improvements were very minor, and the sample was very small.

All-in-all, we need to adhere to the t-test result when concluding whether the hypothesis that aerobic (submaximal long duration) exercise is a definite adjunct treatment for positive psychotic symptoms. Thus from this perspective the hypothesis that aerobic submaximal long duration exercise is superior to other exercise forms, namely anaerobic (intensive short duration exercise) and ineffective submaximal short duration) exercise in reducing the number of *positive symptoms* is thus *not proven correct*.

4.1.1.2. Negative Symptoms

The treatment group had an average decrease of only 0.81 in their mean score and the control had a greater decrease of 1.27. However, this apparently superior result of the control group can be attributed to the fact that the control group had a greater mean (2.18), i.e. twice as many symptoms at the start of the intervention than the treatment group had with an average of (1.18).

As far as the inferential statistics are concerned: although neither the treatment group (p=0.152) nor the control group (p=0.946) showed any significant statistical improvement; it is obvious to note when comparing the different means that the treatment group produce more significant

results. Again it should be noted that these results are suspicious because of the low statistical power of doing t-tests with only 22 participants.

4.1.1.3. Positive Symptoms and Negative Symptoms

The somewhat contradictory results shows that the treatment group achieved superior performance in terms of *means* in *reducing positive symptoms*, but *not negative symptoms*. Equally confusing is the data showing that the treatment group achieved a more *statistical significant* result in reducing negative symptoms, but *not* in the total decrease of their *mean* score. Thus one needs, for the sake of clarity, to re-examine this question. If we now consider both the positive and negative symptoms collectively we get a more encompassing answer.

Positive and Negative Symptoms (Out of 44 possible symptoms)

Group	Pre-treatment mean	Post-treatment mean	Improvement	Superior
Treatment	4.045455	2.681818	1.363637 decrease	0.409091
Control	4.409091	3.454545	0.954546 decrease	

Table 6: Comparison of Total Number of Psychotic Symptoms.

Based on Table 6, it appears that the hypothesis that aerobic (submaximal long duration) exercise is *slightly* superior to other exercise forms, namely anaerobic (intensive short duration exercise) and ineffective aerobic (submaximal short duration) exercise in reducing the number of *positive and negative symptoms* of schizophrenia is thus proven correct based on the mean results. Thus it appears that aerobic exercise does indeed appear to have potential as an adjunct treatment for relieving slightly some of the positive and negative symptoms of schizophrenia.

4.1.2. Global Assessment of Functioning (GAF)

When comparing the mean scores of the two groups, the results clearly reveal that the treatment group gained greatly superior results compared to the control group. The treatment group's mean GAF Scale improved, i.e. *increased* by 36.6 and the control groups GAF Scale increased by 21.9; from an original mean of 28.7 and 27.7 respectively. Thus, from a very similar baseline GAF Scale, the treatment group achieved markedly superior results.

However, statistically significant improvement in GAF scores of both the treatment group

(p=0.236) and control group (p=0.325) was not found. Again this statistic is not so perplexing in light of the fact that only 22 patients participated in this study. A larger sample could have achieved a more anticipated significant result as anticipated.

Thus, when only considering the comparison between the *means* of the groups, the hypothesis that aerobic (submaximal long duration) exercise therapy has *exceptional* potential to increase the level of *social* and *occupational functioning* of in-patients, is observed to be correct. And it is vastly superior to (intensive short duration exercise) and (submaximal short duration) exercise in improving the global functioning of in-patients.

4.1.3. Mood

The *mean* results do illustrate that the treatment group (post-treatment mean = 1) achieved an ever so *slightly superior result* compared to the control group (post-treatment mean = 8.818). The treatment group's mood scores decreased, i.e. improved by 18.818, and the control likewise decreased, i.e. improved by 17. Thus, by a very small amount, the treatment group had a superior result, decreasing their depression score by 1.818 more than the control group.

Thus these results do show that a short term aerobic exercise therapy programme, was significantly superior (in terms of mean comparison) to the control programme in enhancing the general mood of the patients; and thus the hypothesis that aerobic exercise has a mood enhancing effect is shown to be correct.

Again as expected, the inferential t-test side of the statistics, suggested that significant results were not achieved neither by the treatment group (p=0.141), nor the control group (p=0.472). However, the treatment group did gain a slightly more significant result the control group.

As far as the more valid *mean results* are concerned, it appears that short term aerobic (submaximal long duration) exercise therapy does have potential to elevate the mood of schizophrenic in-patients, *slightly* more effectively than anaerobic (intensive short duration exercise) and ineffective (submaximal short duration) exercise. Thus, short term aerobic exercise therapy, could possibly be considered a valid adjunct treatment, for amongst other things, co-morbid mood disorders in schizophrenic patients.

4.1.4 Anxiety

As it has been shown with the previous variables, the mean anxiety scores reveal that on average the treatment group achieved a greater improvement, i.e. decrease in general anxiety, than the control group demonstrated. At a similar baseline average of about 12, the treatment group's anxiety scores decreased an average of 11.636 points, while the control group had a lesser average decrease of 8.464 points. Thus even though the treatment group had an original average anxiety score, which was 0.4546 points larger than the control, the *mean* data nevertheless reflects that the treatment group achieve better improvement; and decreased their anxiety level by 3.181 points more than the control.

Despite the above, again no statistical significance was produced in the t-test regarding the treatment group ($p=0.682$) and more surprisingly only the control group was shown to have had significant improvement ($p=0.284$). Thus one cannot claim that the treatment group significantly improved in anxiety levels, thus inferentially this result does not confirm the hypothesis.

All-in-all some Statisticians would agree that t-test results appears to be non-consequential because of the small sample studied. A much greater sample would produce a more accurate result. Again it is argued that one must concentrate predominately on the mean results in this case. That being declared, one can again state that according to the *mean* scores, the hypothesis that aerobic (submaximal long duration) exercise therapy is superior to other exercise types of exercise in decreasing anxiety appears correct, however this is in great conflict with the t-test so the hypothesis is not confirmed.

4.1.5 Summary of Results

In most cases the t-test is always the more appropriate indicator of significance. However it is well know that the larger the sample size, the more reliable the comparison between two independent means. Most Statisticians and Social Scientists would agree that in the case of this thesis having a small sample and marginal data, it is more prudent to concentrate mainly on the raw mean scores and less on the t-test results, when trying to determine which group achieved the better result. That being the case, when we compare the *mean* results of the treatment group with the control group, it was found that the treatment group achieve slightly *more significant results* in: reducing depression scores (BDI scores), increasing the GAF Scales (Axis V, DSM-IV), and reducing the total number of negative psychotic symptoms. Thus the treatment group appears to have achieved more significant results.

As interesting as this maybe, however, one must keep in mind that *statistical significance could not* be found in any of the treatment group's results (*despite the treatment group generally bordering on significance more so than the control*); because of only a small sample being entered into the SPSS.13 software. Thus no treatment group result is *definitely proven significant; however, it is still worthwhile noting that out of the five variables studied (Positive Symptoms, Negative Symptoms, BAI, BDI-II, and GAF Scale) three variables (Negative Symptoms, BDI-II, and GAF Scale) in the treatment group boarded more on significance than did the control group. Thus three (60 %) out of the five areas studied revealed that the treatment group had more significant results, which suggests that overall leaning to the treatment group having responded slightly better.*

4.2. Results of Question 5

The descriptive results of each of the mechanisms studied within this thesis will be given individually. Any significant phenomenological findings will be expounded upon at the end of this section. The results of any recurring themes of significance will be noted under "Additional and Prominent Results".

4.2.1. Self-efficacy/Mastery Hypothesis

Results from the qualitative questions reveal that six (55 %) out of the 11 test group participants offered some evidence for this effect. 11 (50 %) of the entire sample appeared to offer slight evidence of this effect. Much of these responses, however, related more to simply perceived physical benefits than actual mastery.

4.2.2. Distraction / Time-out Hypothesis

Only three participants (27 %) of the test group indicated that distraction from their lives and problems was a reason for their improvements. Five participants (46 %) in the control group believed that distraction was a reason for their improvements. Thus only eight participants (36 %) of the total sample population mentioned, believed directly or indirectly, that distraction was a causal factor. It could be argued, based on the above, that soccer provided a more stimulating distraction from problems, but it does not explain why aerobic walking programme produced superior results across the board. Although the percentage of responses produced relatively low results it could be validly argued that there is still sufficient evidence to continue exploring this factor in future studies. When comparing this current study to Faulkner and Sparkes's (1999) previous study it should be noted that although these researchers probably produced more in-depth phenomenological responses, they only had three participants, while this study had 22. Regardless both studies produced incidental and marginal evidence of this mechanism.

4.2.3. The Social Interaction between Participants

Only two patients (18 %) in the test group and four patients (36 %) in the control group mentioned anything related to the social interaction of patients as a reason for the exercise being of value. One participant was influenced into suggesting social interaction as a mechanism, by the interpreter during the interview, thus it could also be argued that even a lesser percentage

might have been recorded. All-in-all this is a surprising result in light of the context of the participants.

4.2.4. Cognitive Functioning

As many as nine participants (82 %) in the test group and seven participants (64 %) of the control group subjectively suggested that they found the various exercise programmes to be beneficial. This amounts to 16 participants (73 %) in the entire participant group declaring that they have experienced benefits from the exercise. What is most significant is that the test group claimed to have more cognitive benefits than was found in the control group, and this evidence is supported by the fact that the test group experienced more significant results in all the diagnostic and psychometric tests. Thus it is argued that there is significant evidence produced in this research to suggest that indeed exercise, increases cognitive functioning; and that aerobic exercise produces more significant cognitive benefits than anaerobic exercise, particularly in a schizophrenic population.

4.2.5. The Thermogenic Hypothesis

Any responses by the participants that indicated a muscle relaxing effect (no matter how arbitrary) of the exercise programme was captured. Six participants (55 %) in the test group mentioned this effect, while only two participants (18 %) in the control group did the same. Logically it could be argued that at the time of this research, few participants subjectively noticed this thermogenic process.

4.2.6. Sleeping Patterns

Results confirm the earlier findings by Faulkner and Sparkes (1999); and probably offer more compelling evidence; due the fact that more participants participated in this research than their study. All male participants in the test group experienced subjectively improved sleeping patterns, while only the female participant experienced no great improvement. Thus 10 participants (90 %) in the exercise group experienced subjectively better sleep patterns; and nine participants (82 %) in the control group reported the same.

4.2.7. The Expectancy Hypothesis

Only the test group was studied in this area. Of the 11 test group participants, eight participants (73 %) believed that the intervention was going to help them in some way and three participants (23 %) did not think the intervention was going to be of much use.

Seven out of the eight (87, 5 %) expectant participants were discharged from the hospital at the conclusion of the exercise; while only one out of the three (33, 3 %) of the non-expectant participants was discharged. When compared to the average improvement (Mean = 36,6) found in GAF scores of the test group population, six (75 %) expectant participants had better than average GAF improvements; while the non-expectant group all three (100 %) non-expectant participants had below average improvements. When comparing the BDI-II scores of the expectant and non-expectant participants, it was found that seven (87, 5 %) of the expectant participants had better than average (mean = 1) improvements than the non-expectant participants where only one (33, 3 %) participant had above average improvement. Also there were significant differences in the reductions of positive symptoms of the patients. Six (75 %) of the expectant participants experienced better than average (mean = 5) reductions in positive symptoms, while only one (33.3 %) of the non-expectant patients had better than average improvements. Significant differences between expectant and non expectant participants could neither be found with regard to BAI scores nor with negative symptoms. Thus it appears that participant expectancy is a determining factor with regard to patients experiencing less depression, less positive symptoms, functioning at a higher level (GAF) and being discharged sooner, but is not such a great determinant of patients decreasing in anxiety (in terms of this context) and negative symptoms.

4.2.8. The Hawthorne Effect

Data generated from the post-interviews revealed that only one participant (9 %) of both the test and the control group, mentioned anything pertaining to this effect. Thus little evidence of this effect working in this context was generated.

In order to explore the novelty effect, patients who were admitted for the first time were compared with those admitted more than once. One patient (9.09 %) from the test group, as well as three patients (27.27 %) of the control group were admitted to Komani for the first time. Assuming that the novelty effect will not affect these patients admitted for the first time, as prominently as the others who have previously been in Komani, results should be less positive

in this group. The only prominent finding was that these four inexperienced Komani first timers all scored below average in the BAI (test group mean = 1.182, control group mean = 3.909.) scores. All other results suggested no significant poor performances in the other areas observed.

4.2.9. Subjective Cognitive Appraisal / Optimal Stimulation Theory

The results of this study, it could be argued, reflect the results of Tuson et al., (1995). Not only did the two participants in the test group who found the exercise to be moderate, both show improvements above the mean in BDI-II mood scores; but they also had better than average improvements in GAF, positive symptoms, negative symptoms, and both were discharged. Of those participants who found the intervention easy (n = 8), six (75 %) of them improved in BDI-II scores; while two (25 %) did not. Only 1 participant found the programme difficult and did not show average or above average improvement in BDI-II scores. What is interesting is that patient PP19 who found the exercise therapy difficult, also was at the bottom end of improvements in average scores in all other areas.

The control group only had 1 participant, who found the soccer moderate. That patient improved above average in BDI-II, BAI, GAF, negative symptoms and he was discharged. Of the patients in the control who found the soccer easy (n=7), five (71, 42 %) had average and better results, were only two (28, 57 %) had less than average improvement in BDI-II scores. In great contrast to the test group, those who found the soccer hard, all improved in BDI-II scores and BAI scores; however, none of these persons had a decrease in negative symptoms and none were discharged.

Thus overall it seems that moderate exercise appears to be the superior type of intensity for aerobic exercisers; however, again the limited number of participants in this research, makes this evidence slightly unreliable at this stage. Again it should be noted that repeated research, preferably with larger samples should strengthen this proposition.

4.2.10. Needs Theory

Only PP06 mentioned anything in the lines of needing to exercise. Thus this is very limited evidence in terms of the interviews of exercise being overtly a generally agreed upon need. As far as the effect of extra edibles and beverages offered to participants for reward is concerned; only three patients in the test group mentioned food as a reason for enjoying the programme and/or for achieving positive results from the exercise. Only one of these same patients mentioned being given shoes as being important. Thus only three (27, 27 %) patients in the test

group suggested an increased basic need as a reason for their psychological improvement. It is obvious that this increase in nutrition would have a mediating effect; however, the control group was also given the same food so it does not adequately explain various improvements, i.e. faster inter-ward transference and discharge rate, between groups.

Thus, there is insufficient evidence to suggest that food was a great mediating factor in the project, especially when only two patients (18, 18 %) of the control group also mentioned food and/or drink as a mediating factor.

4.2.11. The Catharsis Hypothesis

The interviews were screened to see if any of the responses mentioned anything relating to decreased aggression or sexual drive. Two participants (18.18 %) in the test group indicated that cathartic effects may have been taking place because of the exercise; however, one participant also in the test group appears to have produced an opposite effect to the cathartic effect by apparently increasing his libido. No participants in the control group mentioned anything in the line of decreased aggression, as a positive outcome.

Thus, one can conclude that little evidence was produced in this particular research regarding the cathartic properties of exercise therapy being momentously apparent.

4.2.12. The Environmental Theory

Findings related to the physical environment being important were limited. Only one participant (9. 09 %) in the test group and only two (18, 181) in the control group mentioned something to do with the physical outdoor environment. It is quite possible that environmental forces did occur but were recorded as related to the distraction/time out hypothesis, because of the way they were explained by the participants.

4.2.13. Kinetic Life Validation Proposition

When asked question "35" in the questionnaire data collection booklet, all 11 patients in the Treatment Group (100 %) replied that they felt more alive when exercising. An equally high number of patients of in the control group, namely 10 patients (90.09 %), also responded that they felt more alive when exercising.

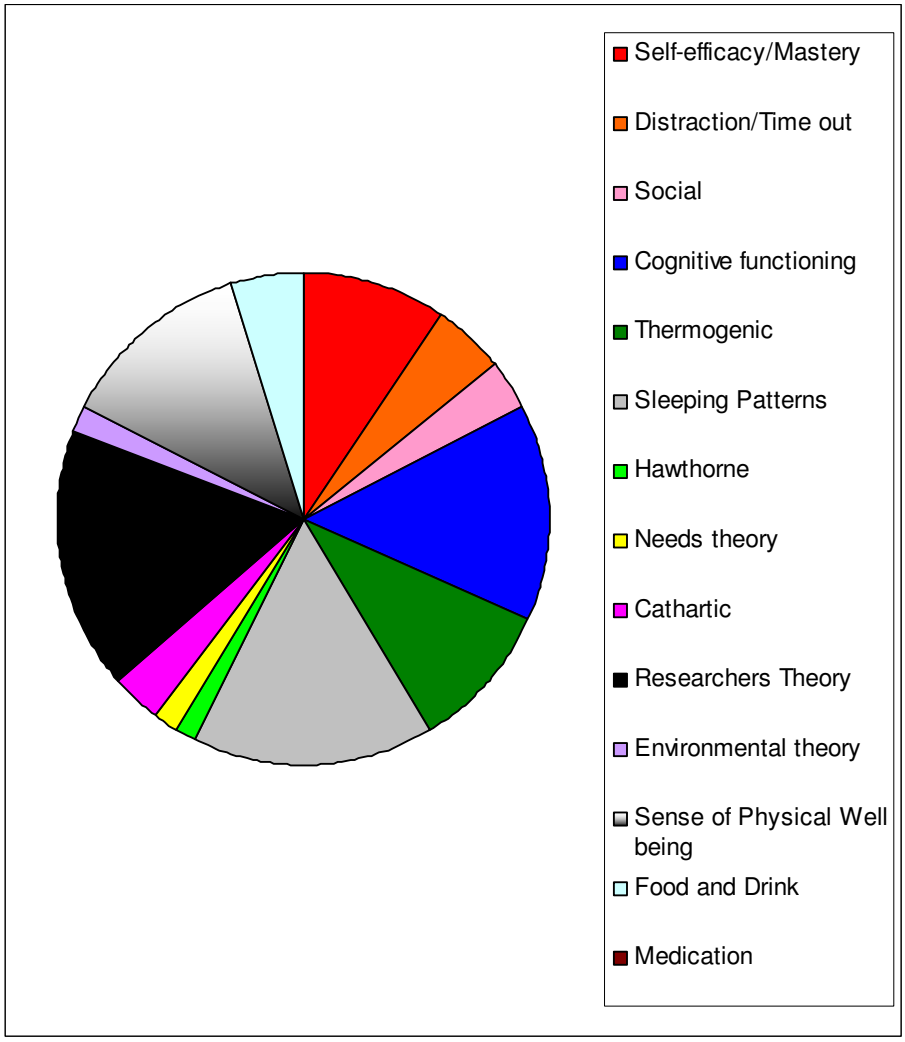
4.2.14. Additional and Prominent Results: Perception of Physical Well-being

A question may be asked about what qualitative responses formed the most consistent pattern. Equally it could be asked what unprompted phenomenological response occurred most of all. The answer to both these questions is found in the following paragraph.

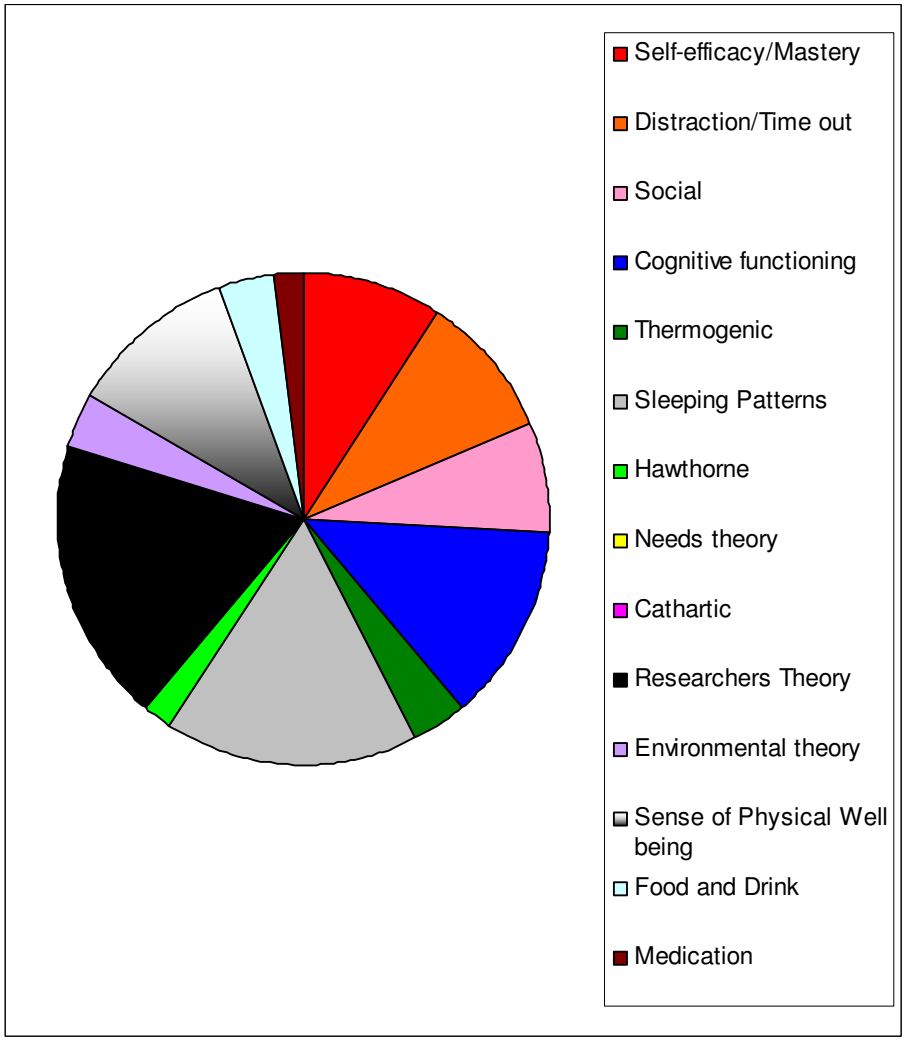
Numerous participants mentioned various *physical/bodily benefits* as being relevant to perceived improvements to their psychological well-being. This self-perception of increased general physical well-being, as well as; increased muscular strength, flexibility, better blood circulation/cardiovascular fitness, and better increased immunological functioning was a recurrent and prominent theme in the responses of the participants.

In the test group patients PP02, PP06, PP07, PP13, PP19, PP21, PP22, and PP27 all mentioned something to this effect. Thus eight (72.727 %) patients in the test group, all mentioned perceived improvements in various physical areas as being the reasons for their improvements. Patients PP07 and PP27 (25 % n = 8) felt that improvements occurred because of increased fitness. Patients PP06, PP19, and PP21 (37.5 % n = 8) mentioned increased flexibility as a reason for improvements.

Six patients (54, 545 %), namely PP04, PP09, PP14, PP16, PP25, and PP26 in the control group also mentioned the physical benefits of the programme being the reason for their improvements. Therefore (63, 636 %) of all participants in this entire population (Mean = 22) offered evidence for this mechanism unprompted by the Researcher. That being understood, this theme is the largest uninfluenced subjective phenomenologically recurrent theme produced by this thesis.



Graph 2: Graphic Representation of the Treatment Group Patterns.



Graph 3: Graphic Representation of the Control Group Patterns.

4.3 Other Miscellaneous Results

4.3.1. Medication

The results show that in the test group there were fewer increases in anti-psychotic medication (Largactil, Serenace, and Leponex). There were three changes in the anti-psychotic medication in the treatment group and six changes in the control group.

There were no differences between the two groups in the use of anti-depressants, mood-stabilisers and anti-epileptic medication. It is important to note that the changes in PRN medicine were a result of the admitting doctor neglecting to prescribe it.

The fewer increases in anti-psychotic medication found in the treatment group medically suggests that the patients were responding positively to the aerobic exercise therapy.

4.3.2. Admittance Period

The mean amount of time the treatment group spend in Komani hospital was 69,727 days; while the control group spent a mean time of 70,545 days at the hospital. Thus both groups spent a very similar amount of time in the hospital.

4.3.3. Inter-ward Transfers

The actual progress of male patients from ward one (admissions/acute ward) to wards two, three, and four provides evidence of the rate persons are being semi-stabilised. After the ward lists were compiled by the nurses: 15 patients comprising of seven patients in the test group and eight patients in the control group were still found to be in the admission ward. At the commencement of the exercise therapy on 19 June 2006: nine patients comprising of four treatment and five control group patients, had still not been transferred to the semi-acute wards.

Of the treatment patients left behind: two were transferred after three days, one after seven days and one after 15 days. Of the control group: three patients were transferred after seven days, one after 12 days and one after 15 days.

4.3.4. Discharges and Transfers

Discharge/Transfer Status (Treatment Group)	Frequency	Percentage
Full Discharge	7	63,636
Transferred to pre-discharge wards	2	18,181
Leave of Absence	1	9,09
No Discharge	1	9,09
Total	**11**	**100**

Table 07: Discharge and Transfer Statistics of Treatment Group (n=11).

Discharge/Transfer Status (Control Group)	Frequency	Percentage
Full Discharge	5	45,454
No Discharge	3	27,272
Transferred to pre-discharge wards	2	18,181
Leave of Absence	1	9,09
Total	**11**	**100**

Table 08: Discharge and Transfer Statistics of Control Group (n=11).

4.3.5. Homogeneousness of the Two Groups

At the commencement of the research, both the treatment and control group were found to be very similar in many demographic areas. Both the treatment and control group were very similar in their ages. The treatment group had a mean age of 29,454; and the control group had a mean age of 29,545. The race of both groups was identical (100 %) African. The only employed person in both populations was found in the control group, thus both groups are almost identical in the unemployment rates. Eight (72,727 %) out of the 11 treatment group participants admitted

to abusing some sort of substance; and very similarly nine (81,818 %) of control patients admitted abusing substances.

The test group had a slightly larger percentage (81,818 %) of patients who primarily spoke only Xhosa; while the control group had more bilingually competent individuals (27,272 %). The average level of education of the treatment group (about Standard nine/Grade 11) was at a slightly higher level than the control group (about Standard eight/Grade 10).

Section 5: Discussion and Recommendations

This section will be presented in the following sequence. Firstly discussions and recommendations pertaining to the various results of the thesis will be offered. Secondly more evidence will be considered for the rationale of implementing exercise therapy in a psychiatric setting. Thirdly strategies for motivating patients and staff will be discussed. Fourthly an examination of the possible negative side of exercise will be explored. Fifthly some practical suggestions will be made available with regard to implementing aerobic exercise therapy in hospitals similar to Komani Psychiatric Hospital.

5.1. Discussions and Recommendations arising from Results

5.1.1. Discussions and Recommendations pertaining to Question 1 to 4

5.1.1.1. Question 1: Psychotic Symptoms

Fallon and Talbot (1981); Chamove (1986); Faulkner and Biddle (1999); and the APA (2005) appear to be correct, by the *mean results* and additional data (more discharges) of this thesis; in declaring that aerobic exercise is an effective adjunct treatment for schizophrenia.

However, it seems that the exercise therapy was better suited to significantly decreasing the negative symptoms of schizophrenia, rather than the positive symptoms according to the t-test. Thus it appears that exercise therapy is more able to decrease the negative symptoms of schizophrenia, than the positive symptoms. This is actually a more exiting prospect, since the presence of negative symptoms always denotes a less positive prognosis.

When one considers the *t-test* result of the positive symptoms, Plante's (1993) assertion that aerobic exercise will not significantly reduce hallucinations or thought disorders, is at this stage *not proven to be incorrect.*

It should be mentioned that this data is slightly methodologically limited and may possess some further degree of error. Although it appears that only a decrease in the number of symptoms is a sign of improvement; it is also apparent that occasionally increased numbers of symptoms can be a sign that the patient is actually starting to recover. For example improvements in the patient's

communication can bring to light more symptoms and this may be seen as a negative sign, when in fact the reverse is true. Future research into this topic should take this into consideration when developing future data collection methods on this topic.

5.1.1.2. Question 2: Global Assessment of Functioning (GAF)

It is simple to detect that the *mean superiority* of the treatment group over the control group, rightly advocates the potential of aerobic exercise to increase the overall level of functioning of patients.

The DSM-IV (1994) advocates that, "the GAF Scale may be particularly useful in tracking the clinical progress of individuals in global terms, using a single measure" (DSM-IV, 1994, p. 30). In determining the therapeutic capabilities of aerobic exercise therapy with schizophrenia, one must not just restrict evaluations to mere symptoms. Other dimensions of the patient also need to be considered when evaluating their rehabilitation. The GAF Scale is invaluable in rating not only patient's psychological functioning, but also their social and occupational functioning, as well.

Some evidence has definitely been generated by this thesis, that not only does aerobic (submaximal long duration) exercise significantly reduce the number of psychopathological symptoms of schizophrenic in-patients; but additionally it can concurrently improve the social and occupational functioning of this population.

5.1.1.3. Question 3: Moods

The research results of this part of the thesis, all concurred with the postulations and findings of: Martinsen et al. (1985); Thayer (1987); North, et al. (1990); Martinsen (1990); Pelham and Campagna (1991); Pelham et al. (1993); Dimeo, et al. (2001); Hays (2002); The ISOSP (1992); Bosscher (1993); and The APA (2005). Thus the findings of this thesis, based on the *mean comparisons*, suggest that aerobic exercise enhances affect. More so, these findings suggest that aerobic exercise is equally effective at slightly enhancing the affect of rural South African schizophrenic in-patients and in a shorter term than expected

The most significant finding of this part of the thesis is that the results reflect those of Pelham, et al. (1993) and Bosscher (1993). Thus in this study aerobic (submaximal long duration) exercise ($p=0.141$) has been shown to be markedly therapeutically superior, compared to more anaerobic

(intensive short duration), exercise (p=0.472) in terms of affect enhancement, which is a close result to Pelham, et al. (1993).

Patients PP6 and PP27 in the treatment group and patients PP3 and PP25 are very active in sport and exercise at home. The average decrease in BDI-II scores in the treatment group was -18.82, while the average decrease in this score in the control group was -17.09. Statistically only two out of the four people here accomplished a better than average decrease in depression scores. However, it should be noted that some of these people had very low BDI-II scores to begin with. All-in-all Martinsen's (1990) declaration that previously active people will achieve superior results from exercise than others is deemed untrue in this case; however, it should be noted that all these previously active people were all discharged, thus Martinsen (1990) may not be entirely off the mark.

Results of this thesis illustrate that although Hays (2002) may be correct in assuming that multiple exercise mediums may lift depression; Hays (2002) fails to note that aerobic exercise is, nonetheless, much more significantly effective.

The results of this part of the thesis suggest that aerobic exercise therapy has marvellous healing potential, particularly for co-morbid mood disorders in schizophrenic patients. Thus the therapeutic properties of exercise therapy could very well be enhanced, especially where schizoaffective disorder is concerned.

The *mean* results of this thesis enlighten us further about the mood enhancing benefits of aerobic exercise; and reflect those of previously conducted research abroad. It does thus appear that aerobic exercise has affect improving benefits in an African context, the same way it does in a Western context.

5.1.1.4. Question 4: Anxiety

The fact that the t-test did not show the treatment group to be statistically superior to the control group does not mean that the ISSP (1992) declaration that exercise can reduce anxiety is, in correct. It probably just means that the duration of the interventions was too short to be effective with this variable and again the sample was far too small. Similarly, Steptoe et al. (1993) observations that aerobic exercise is superior to anaerobic exercise in decreasing anxiety; also cannot be proven statistically in this thesis. Again the intervention may have not run for a sufficient amount of time inorder to accurately prove or disprove the effectiveness of long-term

exercise programmes; but may just show that shorter bouts of exercise may not have significant anxiety reducing benefits.

Thus this thesis has not significantly proven Leith (1988); Potgieter (2003) and Focht (2000) correct in suspecting that short-term aerobic exercise can be of just as much value as longer exercise programmes, however results may not be entirely statistically significant at this stage.

Petruzeello, et al. (1991) on the other hand may be proven correct in suggesting that only exercise programmes longer than 10 weeks will significantly reduce anxiety.

However the further research is still recommended, because despite the results there is still need to see if longer exercise periods will have a more significant result. Being hospitalised and away from home can be a traumatic and an uncertain time for many admitted patients. If there is still the possibility that exercise can help schizophrenic psychiatric in-patients adjust to hospitalisation and to their illness then further investigations of the anxiety and stress reducing effects of exercise in a hospital setting is invaluable.

One could contend that any intervention that has the possibility of decreasing the anxiety levels of psychotic patients is of ample worth. The various stressful and anxiety producing hallucinations and delusions that schizophrenics patients have, may still be effectively co-managed with *submaximal long duration aerobic exercise therapy*. More research with longer durations and larger samples is needed. Again the frequent co-morbidity of schizophrenia with Anxiety Disorders makes implementing and further studying this approach to anxiety management exceptionally worth while.

Any possible intervention in the hospital setting that can help schizophrenic patients to feel less anxious will probably promote the likelihood of adjustment to their condition or even aid rehabilitation. Aerobic exercise, has not been completely disproven to help, it may just be the case that acute exercise therapy is not as effective as longer periods of exercise.

Again the potential stress reducing effects of exercise need to be studied more in psychiatric populations, as most of the studies have been done with non-clinical populations. One could thus argue that any investigation exploring the anxiety reducing effects of exercise with schizophrenic in-patients is still of immeasurable worth.

5.1.2. Discussion and Recommendations pertaining to Question 5

While, Questions 1 to 4 were asked in order to ascertain "if" aerobic exercise could be considered a adjunct therapy in a South African psychiatric institution; Question 5 was asked in order to determine "why" it works in order to strengthen or dispute the therapeutic properties of aerobic exercise. Another reason for engaging in a study into these proposed mechanisms was the hypothesis that, if one can understand why aerobic exercise works, then these benefits might be enhanced when the mechanism(s) that cause these changes are better understood. Such information might not just help one strengthen the therapeutic properties of exercise, but may also help to enhance the effect of other therapies such as psychotherapy, counselling, psycho-pharmacology and occupational therapy.

In order to answer the question "why and how do these benefits occur or do not occur in the context of the research?" data was analysed from the objective and subjective responses of the participants. What now follows is a discussion on each of the mechanisms sited in this research and any possible suggestions for future research into these areas. Again each mechanism will be discussed individually and then, at the end of this subsection, a conclusion will be offered.

5.1.2.1. Self-Efficacy

The self efficacy theory is particularly related to self-esteem and is only to a lesser extent mood enhancement. The theory has never been used to explain improvements in schizophrenic symptoms. Thus one limitation about this theory is that it does not adequately explain positive results regarding schizophrenic symptoms, but rather just improvements in mood and particularly self-esteem.

However, the theory is still nonetheless important because as McAuley (1992) articulates; people who perceive themselves to be self-efficacious are more likely to take up and keep up an active lifestyle than their counterparts who lack feelings of self-efficacy. This indeed cannot only be a theory still worth investigating further, but also a possible motivational tool to encourage patients to continue exercising.

In the context of this research one cannot declare with absolute certainty if the evidence generated and described as "Perception of Physical Well-being" falls under this section or is a completely new idea. On the surface it appears that self-efficacy is more related to perceptions of ability, than it is to perceptions of physical wellness. This will be discussed later.

5.1.2.2. Exercise as a Distraction from Stress and the Time-out Hypothesis

This is an enduring and moreover still remains a popular causative theory, save for lack of recent research exploring this theory. Again, although this theory appears valid in explaining the anxiety reducing and mood enhancing benefits of exercise, it does not adequately explain reductions in psychotic symptoms. In any case, recommending that future research aimed at testing to see if aerobic exercise, compared to other distracting activities work equally well will probably produce the most compelling evidence. Thus, maybe a study similar to Bahrke and Morgan's (1978) research needs to be duplicated, to see if indeed aerobic is superior to other activities; however, this current dissertation has shown that although the soccer group gave the greatest evidence of this mechanism, it still cannot explain why the test group produced superior results. Thus there is still great room for debate and further exploration is definitely warranted.

5.1.2.3. Social

It has been suggested that anthropologically speaking traditional African culture is more community oriented; while western culture is suggested to be more individualistic. If indeed the positive effects of exercise are largely a result of the social interaction of participants then logically this research with Komani participants should have significantly reflected this idea more so than any western study. Surprisingly this was not the case.

It could be suggested that one way to further investigate the social facilitating nature of exercise would be to compare a few participants who are put on an exercise programme and exercise alone, with a group who exercise in a group. The hypothesis here is that if participants who exercised in a group achieve better results than those who exercised alone then this theory would gain greater supportive evidence.

Whether social interaction is a contributing factor to feelings of well-being or if better social interaction is the result of a decrease in feelings of depression, may be a valid question; but regardless, it could be argued that this is still a valid theory, despite the limited evidence generated by the results and it still warrants further investigation.

5.1.2.4. Cognitive Functioning Results

Obviously a research undertaking of this specialised nature that investigates such things as: changes in blood flow and brain oxygen levels, as well as, increased brain wave activity would probably be impossible to do in a developing country like South Africa. Additionally it could

also be argued that a study like that would best be restricted to such fields as neurology and psycho-neurology, using such equipment as EEGs. Studying the nerve endings of living humans is without saying - impossible at this time, so studies of this nature would have to be post-mortem. Thus, although this theory is certainly worth investigating; it's highly specialised and expensive nature, would probably best be left to well-funded and equipped overseas research. However, using Intelligent Quotient (IQ) tests and other psychometric intelligence assessments to do pre- and post-exercise therapy evaluations could be a viable tool to use in future experiments of this nature. Regardless a great majority of the participants agreed that the exercise therapy had helped them to think better and the fact that so many patients in the aerobic group were discharged attests to this fact.

5.1.2.5. The Biological Theories

Evaluating the results of this thesis from a physiological perspective, Dr. C. Christie (personal communication, October 26, 2006) an Exercise Scientist / Biokinetist, at Rhodes University's Human Kinetics and Ergonomics Department, gave some insights into the results of the thesis.

Dr. Christie (2006) suggested that superior results occurred in the treatment group, because the type of exercise engaged in by the treatment group was more likely to release endorphins.

Furthermore Dr. Christie (2006) goes on to suggest that there are other biological explanations for superior results found in the treatment group. "From a physiological perspective, the type of training you did in the treatment group was endurance training (submaximal, long duration) which results in several adaptations over time. Hormonal profile is altered by each exercise bout – particularly blood glucose control is better managed. More long term adaptations include the ability to perform submaximal activities for prolonged periods of time, changes in the active skeletal muscle such as increased capillarization and increased muscle oxidative capacity. This latter adaptation has important implications for fuel use in that the muscle becomes better adapted to using fat as an energy source" (Christie, personal communication, October 26, 2006).

Thus, from a physiological perceptive it has been suggested by Dr. Christie (2006) that the superior results experienced by the test group could be attributed to increased physical fitness and the subsequent physiological benefits that accompany this. Simply stated, the only the treatment group trained at an acceptable duration and intensity to gain cardiovascular fitness.

Hormonal changes in the brain are a very popular and rational theory. Naturally studying this theory is of paramount worth, but unfortunately this research could not study these biological

changes empirically. Again, it would be impossible to study this comprehensively in South Africa. Prof. D. Swingler, a professor of psychiatry (personal communication, n.d, 2005) does not believe there is any facility in South Africa equipped to do such blood analyses. As unfortunate as this reality may be, there is always hope that overseas studies may shed more empirical light on this theory. One would hope that more research is done to test this theory because the majority of research done on this matter is indeed quite dated and inconclusive.

5.1.2.6. The Thermogenic Hypothesis

Queenstown in the Eastern province region of South Africa is a small, rural and extremely arid town. The temperatures in summer are unbearably hot and have during the year of this thesis, reached as high as 46 degrees Celsius; while the winter temperature has during the course of the year have fallen to as low as -7 degrees Celsius. In any further research investigating the thermogenic effect, it could be advised to compare a winter test group with a summer test group. This should give us more of an indication that elevating bodily temperature is a factor in anxiety reduction. However logical it is that a relaxed body cannot be tense or anxious at the same time; this theory lacks the depth to explain fully why aerobic exercise seems to be superior to other exercise activities in reducing psychotic symptoms. Indeed this theory does not appear to answer the question why the aerobic exercise therapy was so successful in reducing both depressed mood and the numbers and severity of psychotic symptoms.

5.1.2.7. Sleep

This is another theory that is difficult to study objectively because observations and lack of monitoring equipment will make this study impossible at a place like Komani Hospital and in a country like South Africa at the present moment. At this stage one could only investigate this theory by inquiring from the participants about their sleeping behaviour.

Improved sleep patterns appears to be some of the most significant consequences of both the interventions. This then appears to prove that Nieman (1989); Faulkner and Sparkes (1999) and Youngstedt (2000) are probably correct in their assertions that exercise improves sleep patterns. However better sleep patterns do not fully explain why the test group achieved better results, over the controls if both groups experienced similar improvements in sleep patterns.

How exactly the exercise worked in improving the sleeping patterns of the patients is still a mystery. Hopefully future research endeavours, possibility incorporating various bio-feedback machines, may shed light on this area. The most significant result of researching this theoretical

mechanism of change is the evidence that both aerobic and anaerobic exercise seem to improve the sleeping patterns of the patients. Most would agree that sleep is important and any intervention that aids patients to sleep better is most beneficial.

5.1.2.8. Expectancy

The data generated in this part of the research culminates in some of the most interesting and compelling results produced thus far. Even though expectancy, as suggested in this research, is not a complete indication of improvement across the board, it clearly is a powerful factor in determining the outcome of exercise therapy. Exercise therapists would be wise to promote and reinforce the belief in the healing benefits of aerobic exercise in the minds of their clients.

5.1.2.9. The Hawthorne Effect

The results are very inconclusive at this stage, mainly because the sample is very small and even more so are the first time Komani admittance group. Only if this exercise therapy intervention is repeated (preferably with a larger sample) and results compared could results be more conclusive.

When researching exercise and mental health, it is no doubt hard to control and test for this effect. However taking into account that this effect may be present, there is still no adequate explanation for why novelty and special attention would produce reductions in psychotic symptoms and better (social and occupational) functioning in the aerobic exercise therapy test group.

5.1.2.10. Subjective Cognitive Appraisal / Optimal Stimulation Theory

According to the above theorists it may not be exercise intensity per se that leads to changes in mood, but rather the subjective experienced intensity associated with taking part in exercise. At this stage, as far as aerobic exercise is concerned, moderate exercise still appears to be the most beneficial type of training. However, the results indicate that it is not an absolute requirement for affect and anxiety improvement.

Because this is a matter of subjective rating, the exercise leader would be advised to influence the exerciser to keep at their own moderate pace, in order to achieve superior results. The exercise therapist should also reinforce the suggestion that the participant is training at a moderate level in order to achieve superior results.

5.1.2.11. Needs Theory

Maslow's (1970) theory was at the onset of this thesis going to be used to explain why no psychological benefits were found in the research; if indeed that had been the case. However, even though the entire population group of this research live in a context of poverty and deprivation, fortunately some dynamic results did occur, i.e. more aerobic patients being discharged than in the control group. Although no real overt evidence of this effect was produced from the interviews, excluding arguably PP06, there is considerable evidence to suggest that this theory underlines to some extent, all the other theories as a possible explanation for the positive results found in this research. For example in the case of the social theory, Maslow's theory both explains why individuals have a need to exercise and why exercising in a group satisfies the social needs of people. Thus on many levels Maslow's theory is still valid as a generic explanation for the positive effects of exercise.

Some academics may argue that the increased nutrition (a basic need) played a great mediating variable in the result, however, as Fox (1999) points out, "There is no body of knowledge specifically directed at the interaction between diet and exercise in mental health," thus one cannot declare with absolute certainty how increased dietary nutrition, exercise and mental health interact. However, because both the control group and the test group received the exact same amount of extra nutrition, this does not explain why the aerobic exercise therapy group showed superior improvements.

Maslow's (1970) theory is in no doubt a sound theoretical framework to investigate and explain results of any test on exercise and mental health. Seeing more research conducted and results explained using this theory would be most welcomed.

5.1.2.12. The Catharsis Hypothesis

As Meyer, et al. (1997) have pronounced, the catharsis hypothesis is not often regarded in modern psychology as a satisfactory vindication of neuroticism release. Declaring that, directly investigating this theory would be problematic, is no doubt an understatement. The notion of "catharsis" like Maslows (1970) theory may best be utilised as a theoretical framework only. This is because studying this theory directly is probably impractical and too problematic, because in a psychiatric hospital it would be inappropriate to explore this theory in too great a detail. When studying such a theory great caution must be taken because most of the studies on

the cathartic nature of exercise have shown that exercise might not have a cathartic effect (i.e. aggression release) at all and in some cases has even the opposite effect.

Some might argue that the thermogenic properties of the exercise are a result of cathartic processes; however, this portion of the research was looking particularly at decreasing of aggression only, as evidence for cathartic processes.

5.1.2.13. The Environmental Theory

In future research, if one was to compare a group of exercisers who exercise indoors with a group who exercise outdoors in the sun, and seeing if any differences exist will no doubt be of ample worth in produce evidence for this notion or not. This is probably the most superior way to test this theory and hopefully future research endeavours will do such things. Again it is prudent to mention that this theory is more related to mood enhancement and does not adequately explain symptom, behavioural and diagnosis improvements resulting from aerobic exercise.

5.1.2.14. Kinetic Life Validation Proposition

11 (100 %) patients in the Treatment Group and 10 (90.09 %) of patients in the control group pronounced that they felt more alive when exercising. These figures suggest that, even though this is a prototype theory, it none the less the most compelling data yet generated from the direct questions asked to the patients. These highly significant responses of patients are followed secondly, by "sleep improvement" and thirdly by "increased cognitive ability."

These answers give great credence to this suggested mechanism of change. Future studies on the existence of this mechanism; or studies validating this theoretical framework, to explain psychological improvement, are recommended. It may well be grandiose at this stage to declare that the Kinetic Life Validation Proposition constitutes a new "theory"; however, in time, and after further refinement and study, it may come to pass that this is recognised as a new theory.

5.1.2.15. Additional and Prominent Results: the Perceptions of Physical Well-being

It truly debatable whether this, "sense of physical well-being", is only proof of the self-efficacy theory; or a unique pattern never seen before. The most reasonable answer at this stage would be to declare that it is most likely a self-efficacy response manifested in a very specific (and cultural) way. Thus it is not related to per se, enhanced perceptions of: ability, mastery/skill

improvement, control, appearance; but merely the subjective belief in the physical/health benefits alone. It is quite possible that patients having expectant aspirations regarding the physical benefits of exercise; will thus see these beliefs as explanatory reasoning for any positive psychological benefits they may experience.

It would be greatly advised that any future research exploring mechanism of change, should at least to some degree, explore this theme qualitatively and quantitatively.

5.1.3. Discussions and Recommendations pertaining to Miscellaneous Findings

5.1.3.1. Medication

An analysis of the initial prescribed medication, as well as, changes to the medication were recorded. The purpose of this was to determine how the patient's medication interacts with and affects results of the various psychometric tests and other consequences of the exercise treatments.

The fact that no significant differences were found between the treatment and control group in terms of anti-depressants, mood-stabilisers and anti-epileptic medication; suggests that these medications could not be considered to be responsible for any of the results of the psychometric tests and other evaluations.

It would be prudent to suggest that future research undertakings which also attempt to determine the effectiveness of exercise therapy; should include an analysis of the changes in patient's medication, to substantiate the effectiveness of exercise programmes, in the same fashion that this thesis has done.

5.1.3.2. Time Spent in the Hospital

It is important to note what the average amount of time each group's participants spent in the hospital; in order to compare if one group generally had a population that had spend more time in the hospital and thus had a greater time to recover.

The fact that both groups spent parallel amounts of time admitted to the hospital, suggests that the more *significant mean* result of the treatment group could not be a result of greater time spent being treated by the various other therapeutic modalities of the hospital. In fact, because on average the control group spend one day extra in hospital, gives minute credence to the therapeutic superiority of the aerobic exercise intervention.

5.1.3.3. Inter-ward transfers

The patients in the treatment group appeared to be transferred slightly sooner than the control group patients. However, because of the small number of participants a definite pattern can not be completely professed.

5.1.3.4. Discharges and Transfers

These results could ultimately be the most significant data of the entire thesis. At the end of the day the therapeutic properties of aerobic exercise can only be fully determined when comparing the treatment group to the control group in terms of the number of patients discharged at the end of the programme.

The results demonstrate that seven (63,636 %) of the treatment group participants were fully discharged; while only five (45,454 %) of the control group participants were discharged. *This important result seems to suggest that aerobic (submaximal long duration) exercise may indeed result in more discharges of patients - in less time. The implications of this are vast.*

5.1.3.5. Homogeneousness of the Two Groups

When comparing the treatment and control group in terms of similarities and differences; it was found that both groups were extremely well matched in all spheres. Despite the low numbers of participants used in the thesis the demographics of the patients is extremely well matched and this adds slightly to the validity of the research.

5.2. A further argument for Implementing Aerobic Exercise Therapy

When one is undertaking to determine adequately, if exercise therapy has therapeutic potential in a psychiatric hospital; it is prudent to ask if there are any other reasons why exercise therapy could be recommended. Following the literature on the psychological benefits of exercise and after considering the encouraging results of this current research; one still needs to determine whether there are any further reasons for validating therapy, in Komani and similar institutions.

5.2.1. The Physical Benefits of Exercise

Although psychological outcomes associated with participation in exercise are important, consideration also needs to be given to patients' wider needs. Regardless of an academic theorist's views on the mind-body connection, one cannot deny the importance of the physical body. It is understood that occasionally a psychiatric illness might be induced due to a physical problem. Often clinicians have to make a diagnosis of a mental illness caused by a "General Medical Condition", (DSM-IV, 1994, p. 27-28, 166-167). Thus it is vital that we consider the idea of exercise therapy *holistically* (for lack of a better word) if indeed we are to decide if exercise is a viable option in any psychiatric hospital.

Since the early 1970s the academic community has increasingly grown interested in the positive effects of exercising and this generated a great deal of research on the various physiological benefits of exercise. Substantial amounts of evidence have been accumulated which gives credence to the physiological benefits of exercise. Aerobic exercise has been found to promote health and vitality by: controlling body mass, reducing the risk of having a heart attack, preventing heart disease, and strengthening cardiovascular functioning (Oberman, 1985); improving respiratory functions and improving the metabolism of carbohydrates (Lennon, Nagle, Stratman, Shago and Dennis, (1985); decreasing body fat and lowering risk of diabetes (Rosenthal, Haskell, Solomon, Widstrom, and Raven, 1983); and lowering blood pressure, preventing hypertension and decreasing the risk of having a stroke (Blair, Goodyear, Gibbons, and Cooper, 1984). Exercise may even assist in the reduction of cholesterol, (Haskell, 1984); and osteoporosis (Ryan, Nicklas, & Dennis, 1998). Actually some exercise physiologists believe that exercise can add years to one's life (Lee, Hsleh, & Paffenarger, 1995).

Exercise has the potential to simultaneously improve schizophrenic's physical and psychological health. “A number of studies have highlighted that clinical populations tend to suffer from poor physical health,” (Daley, 2002, p. 269). Chamove (1986) has pointed out that schizophrenic

patients score well below the normal population on physical fitness. Vieweg, Thomas, Janisko, Booth, Femandex, and Pandurangi (2004) notifies us that obesity is a major problem (in the United States) amongst the psychotic patient population. Persons with schizophrenia are commonly overweight carrying excess body fat and thus are commonly in a cardiovascular poor condition; however Komani patients are undeniably the exception to the rule, because they may appear underweight. This is probably due to poverty, poor governmental hospital catering and lack of physical activity. In any case, as researchers such as Clardy and Gale (1995) have publicized, exercise has been described as an effective counter for the side-effect of weight gain some psychotic patients get from psycho-medications.

Due to the fact that there is a high co-morbidity of substance abuse in Komani as shown by previous research at the hospital on substance abuse; exercise has added potential in this context. Munnik (2004) showed that in a sample of 120 Komani consecutively admitted patients, 82 patients (68.33 %) confessed to some form of substance abuse, with alcohol being the most frequently abused substance (40.83 %). Palmer, Vacc, and Epstein (1988) as well as others such as Donaghy (1997) have each shown us that people who abuse alcohol generally possess poor physical fitness; lose bone mass easily; and often have reductions in muscle tissue. Exercise is a good counter to these negative side effects and therefore presents sufficient reason (particularly in Komani's context) for being included as part of the treatment programme for in-patients.

van Dyk (2001) has revealed that exercise is frequently prescribed for the health care management of HIV positive people. La Perriere, Klimas, Fletcher, Perry, Ironson, Perna, and Schneiderman (1997) have made known the fact that physical activity has been linked to increased CD4 cell counts and also to superior coping skills for HIV-positive persons. Since the estimated prevalence rate of HIV/AIDS in the Eastern Cape is high (like all of sub-Saharan Africa) and because there is indeed a very high prevalence of HIV/AIDS patients at Komani, this just gives one more onus for suggesting exercise therapy in hospitals such as Komani.

Karasu, Waltzman, Lindenmayer, and Buckley (1980) as stated earlier in the thesis, as well as, Faulkner and Biddle (2001) reported that often the physical needs of psychiatric clients are underserved by the overemphasis on treating patients with antipsychotic medication only. This is truer than ever in Komani's case, were the patients have very little physical activities to do because there is seldom any occupational therapy, entertainment or sporting opportunities to engage in.

Considering the physical benefits of exercise alone, it could be argued that one is provided with enough evidence and sufficient reason for including an aerobic exercise therapy in Komani Psychiatric Hospital's treatment protocols, as well as, the protocols of other similar institutions.

5.2.2. The Financial Benefits of Exercise Therapy

(Craft & Landers, 1998; Daley, 2002; Fox, Boutcher, & Faulkner 2000; and Tkachuk & Martin, 1999), are just some of the writers who have advocated the financial benefits of exercise therapy.

"There is, therefore, a need for simple, innovative, cost-effective strategies to be offered to clinical populations as part of their rehabilitation process, which could also contribute to a reduction in health care costs. Given that many common treatments (e.g. medication and cognitive–behavioural therapy) can be expensive and often in short supply, there is much to commend other strategies," (Fox, et al. 2000).

Improving the physical and psychological health of psychotic in-patients has great cost remuneration for a financially constrained third world rural psychiatric hospital such as Komani and similar establishments. At the time when this thesis was initiated, the Eastern Cape Health Department placed a moratorium on all hospitals in the Eastern Cape area. A hospital with over four hundred and fifty beds and only one psychiatrist, two clinical psychologists, and one occupational therapist does not allow for each and every patient to receive specialised one to one psychotherapy and/or counselling. Likewise there are only a handful of professional nurses at Komani. The result of this is that many patients are not adequately attended to and this results in slowing down the discharging process of patients. Until such time as the state of affairs improves other interventions are needed to help rehabilitate patients.

Exercise could indeed prove to be an intervention that can help stabilize clients more rapidly than the generic treatment generally given by the hospital. This then should be an effective solution for taking some of the financial pressures off the Eastern Cape's Department of Health, which will no doubt allow for improved service delivery.

5.2.3. Lack of Human Resources as an Impetus for Exercise Therapy

As mentioned beforehand the Eastern Cape's Department of Health has placed a moratorium on professional placements in all of the hospitals under its control, and placements that are desperately needed. One psychiatrist, two clinical psychologists and one occupational therapist are not sufficiently equipped to deal with over 450 patients. Intensive psychotherapy and

counselling are thus done infrequently and the primary intervention done at Komani is restricted greatly to psycho-pharmacology.

The Occupational Therapy department of the hospital concentrates more on long term, mentally retarded and pre-discharge patients. The OT is also very understaffed and other easily administered and controlled interventions are urgently needed.

5.2.4. Relief of Boredom

One practical suggestion is to propose that at the very least; exercise therapy could significantly relieve boredom in the wards. Psychiatric patients for the most part are not convicts and the hospital is not a prison; thus the patients physical, emotional, and even entertainment needs should for at least the most part be accommodated as reasonably as possible.

The fact is that in both the test and control group 21 out of 22 patients (95.45 %) stated they enjoyed the interventions in which they participated. At the very least one can suggest that this is a good enough reason to include an exercise therapy programme in a psychiatric hospital, because at the very least, exercise relieves some of the boredom of the patients; and thus somewhat enhances the quality of their lives.

All in all we have sufficient rationale to recommend exercise being included in the activities for patients based on the above physical, financial, and entertainment benefits of exercise therapy.

5.3. Motivation Strategies for Patients and Staff to engage in Aerobic Exercise Therapy

It is futile to provide evidence of the therapeutic potential of aerobic exercise therapy without practically considering actual implementation strategies. One key area that will determine if this adjunct therapy is effective is that of ensuring patients are motivated to exercise. Motivating patients to participate in exercise therapy while institutionalised and to continue exercising once they are discharged is of considerable importance. Motivating psychotic patients who are often catatonic can be quite difficult. This being understood, one thus needs to understand some of the basic theories of human motivation, if one is effectively to convince psychotic in-patients, to commence and continue with aerobic exercise therapy.

5.3.1. Motivational Strategies fostered on Needs

According to Potgieter (2003) human beings have a basic primary need to move. "Stimulation is essential to life. The human organism has a constant need for movement and sensory stimulation. This can be classified as a physiological need" (Potgieter, 2003, p. 12).

Thus, if indeed, Alderfer (1972), Maslow (1970), and Potgieter (2003) are correct in assuming that people have a basic physiological need for movement then motivating patients should indeed be possible, and this is an excellent point of departure for inducing patients to exercise.

Thus it could be suggested that before commencing any exercise activity and once engaging in the activity; staff can motivate patients by suggesting to the patients that they enjoy walking and it is a pleasurable activity to do. Hence the exercise therapist lifts the arousal levels of the patients by getting them excited about the activity itself. By doing this the patients will most likely accept the idea that they enjoy the activity and may maintain this desired exercise behaviour in the future. Thus encouragement, positive suggestion and positive reinforcement are key approaches to help promote and maintain exercise therapy.

Following Maslow's (1970) physiological needs and security needs one now finds affiliation needs on the needs hierarchy pyramid. Potgieter (2003) points out that some exercise participants have stated that the social value of exercise is their most important reward for participating. This being noted, it would be wise to convince the staff responsible for the exercise therapy, to continually motivate the participants; by illustrating that exercising in a group is enjoyable and a pleasant social activity to perform together. If indeed de Beer, Maree,

Wouters, and Costello (1997) are correct in proclaiming that Xhosa speaking Africans are extremely group orientated then this knowledge, should be extensively used by the exercise therapy staff to incessantly motivate and encourage the patients.

Lastly, concerning what Maslow (1970) and the other needs theorists have taught us about affection/validation needs; it could also be a valuable motivating technique to encourage exercise therapists to listen to the needs of the participants while exercising. This will enhance the therapeutic properties of the exercise therapy by utilising supportive "active listening" techniques. This dual therapeutic action of the exercise therapy, combined with a supportive and encouraging atmosphere, should make the intervention more enjoyable and beneficial.

5.3.2. Utilising Innate Survival Instincts

Freud (n.d.) speaking about ego survival; and to a greater extent Bryant (n.d.), as illustrated by Zelling (n.d.), advocated that survival was the basic and most powerful instinct of all human beings. Assuming that humans are generally motivated to survive, then utilising this knowledge can provide a sound base for motivational techniques. Exercise therapists should astutely remind participants about the benefits of exercise to their physical well-being and ultimate survival. Telling patients that if they exercise they will live longer and be sick less often is no doubt a powerful motivational tool.

5.3.3. Responsible Hedonism

Closely linked to survival instincts in the description of how these survival instincts actually manifest. According to the philosophical notion of hedonism, Homo sapiens possess a powerful tendency to "seek pleasure and avoid pain." Potgieter (2003) illustrates the simple proposition that people tend to do what they find "intrinsically" pleasurable and avoid doing what they find subjectively unpleasant. Thus it could be argued that positively reinforcing the idea that exercise is pleasurable and enjoyable is vital for encouraging adherence. Patients should be reminded of the suggestion that that any minor (short term) discomfort experienced is, nonetheless, worth the pleasure (long term benefits) of exercising.

5.3.4. Fostering Intrinsic Motivation and offering Extrinsic Rewards

Potgieter (2003) has stated that people are motivated to continue to participate in physical activities if they are intrinsically (self) motivated, extrinsically (in the form of external rewards) motivated or a combination of both. However according to Potgieter (2003) intrinsic motivation

is apparently superior to extrinsic motivation. The intrinsic rewards that people often derive from exercise are enjoyment, satisfaction, competence and feelings of self-efficacy. This being understood, it would thus be advisable that exercise leaders/therapists in a hospital setting try and make the exercise activities as enjoyable as possible; simultaneously utilising positive reinforcement and encouragement. When patients perform better than previously, the exercise leaders should bring this up and praise the patients.

Although, according to the literature internal motivation is superior to external motivation, there is nonetheless a place for including where possible, external rewards for patients participating. It could be validly argued that external rewards would have a powerful motivating force because of the third world context the patients find themselves in. Komani and other rural government psychiatric hospitals provide patients with only meagre rations a day and it is not uncommon for patients to go without basic products like milk, tea and sugar. This fact allows for an opportunity for staff to motivate patients to exercise and take ownership of their rehabilitation by rewarding them with some basic foodstuffs and other privileges for participating wholeheartedly in the exercise therapy programme.

The potential benefits of aerobic exercise as found in this thesis more than justify the costs of basic rewards, if patients are stabilised and released into outpatient care sooner. Rewards can indeed be decided upon by the exercise managers and they can utilise whatever resources are available to them to externally motivate patients.

It is also valid to note that, when encouraging participants to exercise; Potgieter (2003) elaborates on an important point that positive reinforcement is more motivating than constant negative feedback and thus exercise therapists should avoid this approach.

5.3.5. Creating and Maintaining Self-efficacy in Patients

The self-efficacy theory of Bandura (1977) can indeed give us guidelines regarding motivating patients. "The individual's level of self-efficacy affects his or her attraction or avoidance of particular activities," (Potgieter, 2003, p. 26). As Bandura (1977) has pointed out self-efficacy can be enhanced by successful experiences. Thus, in this context, patients should be cheered for the effort they have put into any exercise activity. They should preferably be made to feel that they have accomplished something positive and thus they have the potential to do it again. On any given exercise day the exercise leader can remind patients that they have the physical and mental abilities to complete the exercise task. The exercise therapist should always give positive feedback to any physical task completed well and this will promote positive self-efficacy,

competence and increase the likelihood of the exerciser to continue with the therapy.

5.3.6. Goal Setting

Prochaska and DiClemente (1983) declared that exercise therapy should include various cognitive-behavioural techniques to promote positive exercise outcomes. Amongst these techniques goal setting was suggested. Burton (1993) believes that goal setting is one of the greatest motivational techniques in the behavioural sciences. Effective goal setting leads to better performance and ultimately greater intrinsic motivation. Exercise therapists ideally should be taught effective goal setting strategies to help increase the long term persistence of their patients to exercise.

5.3.7. Promoting Aerobic Exercise Therapy as a Life-style

Motivating patients to continue exercising once transferred to an out-patient programme or when fully discharged is vital if the positive effects of exercise therapy are to be maintained. Drop-out from exercise has been identified as a major health issue in non-clinical individuals and there is no reason to assume that this will not be the case with clinical populations. Daley (2002) has stated that exercise therapy alone is insufficient to promote long term persistence in patients to continue exercising once discharged. Daley (2002) goes on to suggest that exercise "dropping out" is common in healthy individuals and thus this would be equally true with discharged schizophrenic patients. "Many clinical patients will previously have been mostly sedentary or they will not possess the psychological skills or knowledge to adhere to a regular exercise programme and therefore they will need more than exercise alone.

Ideally, exercise should be offered in conjunction with exercise counselling that is aimed at equipping individuals with skills, knowledge and confidence so they feel able to participate in physical exercise on a regular basis throughout the rest of their lives," (Daley, 2002, p. 267). Thus the exercise leader/therapist should strive to give patients "exercise counselling" that will endow patients with effective strategies (such as goal setting techniques) to help them continue with and adapt when necessary their exercise programmes at home. Thus the exercise therapist has an important role to play in helping patients to develop positive exercise attitudes and to take greater ownership of their rehabilitation and to try and prevent or reduce future relapses.

5.3.8. Motivating Staff to partake in and manage Exercise Therapy

Ultimately it is hospital staff members who must take charge of the exercise therapy and this role requires that staff members need to supervise and thus also partake in the exercise therapy. Hospital management should illustrate to staff members the value of exercise therapy as part of the treatment protocols of the hospital. When hospital staff members (particularly nursing staff) are convinced themselves of the various physical benefits and therapeutic properties of exercise; they will be more likely to cooperate with taking a leadership role in exercise activities. One must remember that exercising in a hospital setting, offers not only physical benefits to patients, but nursing staff as well.

Vieweg, Thomas, Janisko, Booth, Femandez, and Pandurangi (2004) all observed that in the United States of America, a large majority of the nursing staff in mental health institutions were grossly obese. Similar observations noted by Govender (2005) about South Africa's own nursing body having a very large population of overweight female nurses. In the Komani nursing community this is definitely the case, where the majority of nursing staff are clearly obese. However this epidemiology in a Eastern Cape context does have an explanation.

It is a known fact that in Komani and in the community where most of the nurses reside, obesity has recently become a kind of beauty statement. As strange as it may sound many female nurses at Komani and surrounding hospitals are intentionally trying to gain weight, as a formal declaration that they are not HIV positive or suffering from AIDS. The perceived stigma of being vulnerable to HIV/AIDS by working in a hospital, has resulted in many female nurses deliberately attempting to become overweight and thus proving themselves to be HIV negative. This rather unique cultural/community situation results in many nurses force feeding themselves on hospital food. The resulting consequence is a nursing staff body of many morbidly obese female nurses, who themselves are often in poor physical health, due to a poor physical condition. It was clear when seeking nursing support to do this intervention that many female nurses clearly dreaded the prospect of exercising themselves and thus risking weight loss. Conversely the majority of male nurses were often willing to partake in the intervention and were often candid as to why the female nurses were less willing to participate.

All this being the case in Komani's situation and similar rural hospitals in the Eastern Cape; if one is going to promote the idea of exercise therapy amongst the nursing population, one obvious strategy needed would be to educate nursing staff on issues like HIV/AIDS and how even HIV positive persons can be overweight. Nurses should be shown how much they are risking their own health by partaking in such otiose behaviours. It does not do the Department of Health any credit to have so many uneducated nurses, who should at the very least, promote a

certain level of good physical health.

Thus, hopefully, if many of these nurses see the futility of their weight-gaining and weight-maintaining activities they should be more motivated to partake in exercise activities themselves.

Another obstacle to implementing exercise therapy is the proverbial response, “it is not in my job description!” Three reasonable responses that may easily overcome this attitude are the following: Firstly, by showing that indeed caring for psychiatric patients is foremost in any psychiatric hospitals employees' job description. Secondly, by promoting exercise amongst staff for personal health benefits using the same techniques one would use to motivate patients. And thirdly, try to identify staff members who themselves live an active lifestyle and would willingly partake in these therapeutic activities.

All these suggestions then, hopefully, would make it possible to implement exercise therapy in Komani and similar hospitals and institutions.

5.4. Examining the Potential Negative Effects of Exercise

One of the most imperative considerations one needs to make when assessing the potential of aerobic exercise therapy is to identify if there are any risk factors involved in exercise as therapy. When offering a rationale for promoting the use of exercise in psychiatric contexts one must not only look at the potential "pros" of exercise therapy without examining closely the risk of "cons." Indeed there are some risk factors that need to be mentioned; however, there many things one can do to prevent and overcome these negative aspects of exercise.

As Daley (2002) indicates, exercise interventions are not always suitable or useful for all patients such as those with physical injuries and ailments. One would need to identify such patients and obviously get medical approval before continuing with any programme.

Pitts (1971) warns that exercise may in certain patients increase anxiety levels. Pitts (1977) proceeds to suggest that the building up of lactic acid and the increased secretion of adrenaline during exercise; may cause anxiety in neurotic patients. "These symptoms include an accelerated heart-rate and shortness of breath. In anxious individuals, these reactions may increase anxiety levels even more." (Potgieter, 2003, p.195). Likewise there might be patients who are too anxious to participate and who might have had unpleasant past experiences about exercise. Forcing such people may not be the wisest thing to do and may aggravate the patient's condition further.

Giving a patient a stringent pre-exercise interview, in order to identify if any negative experiences exist and continually assessing the client's emotions and behaviour during exercise therapy should prevent any negative consequences.

Another potential negative consequence of exercise in some individuals is that exercise activities have the potential to impact negatively on their self-esteem. "Those who fail in their attempts to adhere to an exercise programme may develop feelings of failure and inferiority" (Potgieter, 2003, p.195). However with professional exercise counselling this should not be the case.

So, too, there are people who may be negatively affected because of social phobias and body dymorphic disorders. "There are some people who are excessively self-conscious about their physical appearance and this gives rise to the so-called Social Physique Anxiety," (Potgieter, 2003, p.195). This is the anxiety some people experience because of their fear that other individuals are evaluating their physical appearance. These individuals may find it stressful to exercise in public places and gymnasiums. "Women appear to suffer more from this problem

than men and there also are cultural differences with regards to this phenomenon," (Potgieter, 2003, p.195).

Isogai, Brewer, Cornelisus, Komiya, Tokunaga, and Tokushima (2001) offer some help in suggesting that this self-consciousness tends to decrease with age and after a couple of training sessions. Equally relevant is the suggestion that traditional Africans are less self-conscious about their physical appearance than westerns so these problems should be less apparent.

Again, the exercise therapist should guard against these things by determining if the patient is shy and self conscious before exercising and terminate the session if the therapy is causing undue stress, embarrassment or anxiety.

Dishman (1988) warns that overtraining and burnout can cause the opposite desired effect. "Overtraining can lead to mood disturbances, staleness and a decline in physical health," (Potgieter, 2003, p196). Some examples of the severe negative psychological and medical effects of overtraining are: an increase in epinephrine; mood disturbances; sleep problems; increased blood pressure and reduced general performance and vitality. Stale athletes often suffer from sleep disturbances and emotional distress, of which depression is a common manifestation. In one study by Morgan (1988) it was found that 80 % of swimmers who over-trained in a ten year study developed significant signs of depression.

The obvious solution to prevent overtraining is to educate exercise therapists and patients on the dangers of doing aerobic exercise at a high intensity, level for longer than 60 minutes, and more than three times a week.

Eating disorders like anorexia and bulimia can also be negative phenomena associated with over exercising. Katz (1986) established that many anorexic patients are generally physically active before developing their eating disorders. Case studies have shown incidents where persons have developed eating problems after embarking on intensive long-distance training programmes. "In other words, there are indications that long-distance running can stimulate the onset of anorexia nervosa among individuals who are biologically and psychologically vulnerable to eating disorders," (Potgieter, 2003, p.197).

Sundgot-Borgen (1994) revealed that eight percent of female athletes suffered from "anorexia athletica." Rosen, MeKeag, Hough, and Curley (1986) reported specific eating disorders related to exercise in long distance runners. So to did Dummer, Rosen, Heusner, Roberts, and Councilman (1987) find significant occurrences of eating disorders amongst competitive

swimmers and Rose and Hough (1988) likewise in professional gymnasts. It has been estimated by Black and Burckes-Miller (1988) that a great percentage of 38 % to 75 % of female university athletes suffer from an eating disorder related to intensive exercising. Pruitt, Kappius, and Imm (1991) point out that laboratory studies with animals show that physical exercise coupled with food deprivation can result in anorexia in animals.

Davis (1997) pronounced that studies have shown that 80 % of female anorexia patients and 50 % of female bulimia sufferers do exercise too excessively. "Exercise therapy might not be appropriate with patients who have, or who are experiencing severe eating disorders, because it could hinder their recovery," (Daley, 2002).

There is probably a low risk of the run of the mill patient developing an eating disorder to enhance the performance of exercise therapy; unless of course he or she is a professional athlete. Nevertheless, counselling on good nutritional practises would be advised in promoting exercise therapy. The risk of developing an eating disorder is also very low in the demographic of similar patients to those found in this study. This is because of the epidemiology of eating disorders, suggests that these disorders are less prevalent in traditional African societies.

Muscular Dysmorphia (also refereed to as the Adonis complex, bigorexia, or reverse-anorexia) a Body Dysmorphic Disorder is a disorder that occurs sometimes with body builders and can lead to the abuse of anabolic steroids and other illegal performance enhancing drugs. Typically persons suffering from bigorexia are actually usually very big and muscular but see a smaller version of themselves reflected in the mirror.

The risk of developing the disorder of muscular dysmorphia would probably be restricted to a patient who is a bodybuilder or a similar athlete. Also this disorder is not likely to be initiated or strengthened by aerobic exercise therapy and is more likely to be associated with anabolic weight resistance training. Should a mental health professional prescribe exercise therapy with weight resistance training, it would be recommended to warn the patient before hand on the risks of being obsessed with bodily appearance, and the side effects of anabolic steroids.

Potgieter (2003) warns that exercise sometimes may lead to compulsive and self-destructive behaviour in certain individuals. Some people have actually developed obsessive-compulsive behaviour as regard to exercise and this has disrupted their social and occupational functioning. Glasser (1976); Little (1979); Morgan and O'Connor (1989); and Davis, Katzman, and Kirsh (1999) have all explained that excessive exercising can take on a pathological nature and become self abusive can lead to physiological and psychological problems. A few individuals have

actually become totally addicted to exercising; and like any addiction, training then becomes the main focus of an athletes life.

Smith, Smoll, and Ptacek (1990) suggest that a deprivation of regular running may result in the loss of coping mechanisms for those who run for stress and other psychological benefits. Injuries pose the greatest risk to this coping mechanism. Smith et al. (1990) declares that some people will just handle the physical discomfort and pain, associated with continued exercising, rather than to deal with the psychological tension, anxiety and depression of not exercising. "Presumably the stronger the athlete's preoccupation with health and fitness, the more intense these negative manifestations of exercise deprivation will be," (Potgieter, 2003, p. 248).

Chan and Grossman (1988) observed a sample of 30 regular runners who had been injured and had to stop running. They established that the injured runners had elevated depression, tension and confusion scores on the POMS (Profile of Mood States) scale and lower self-esteem scores than a control group of non-injured runners still training.

Again, thorough exercise counselling would be recommended before prescribing exercise therapy. In counselling one needs to offer suggestions about alternative copying strategies should the patient become too obsessed with exercising or become injured.

In conclusion of the negative possible side effects of exercise therapy, one can argue the following. Despite these very improbable negative effects of exercise, it seems that the general consensus is that the positive effects of exercise seem to outweigh the negative risks; and as Potgieter (2003) points out, that there is no decisive evidence showing that moderate amounts of exercise can cause seriously negative side effects.

The most important lesson one can learn from the above darker side of exercise is that when developing and motivating any exercise therapy, one needs to warn patients and exercise leaders about some of the risks of exercise and how to avoid them.

5.5. Successful Implementation of Exercise Therapy

Offering intelligent suggestions about successfully implementing exercise therapy is imperative if one is to explore the potential of exercise therapy fully in applied circumstances. Despite the suggestions and warnings offered earlier, other matters need consideration.

Implementing exercise programmes in Komani Psychiatric Hospital and similar rural psychiatric hospitals would require amongst other things - overcoming an array of obstacles. Daley (2002) articulates that in despite of a growing body of evidence supporting the use of exercise therapy for; schizophrenia and mood disturbances, psychiatric institutions have been reluctant to endorse the use of exercise in treating mental illness. Furthermore, Daley (2002) suggests that some clinical psychologists and psychiatrists (in the United Kingdom); have been reluctant to utilize the psychological benefits of exercise, because they view exercise as having only minor incidental value. The key, therefore, to getting aerobic exercise effectively utilized as an adjunct treatment, in rural hospital settings, or any psychiatric setting for that matter; is to create awareness of these benefits amongst key mental health decision makers. These decision makers preferably should be from the hospital themselves. South African psychological and other journals should be used to effectively show the past and current research on these matters and then let the health care professionals make up their own minds.

A generic exercise programme (similar to the one provided in this thesis) should be developed and given to the hospitals themselves, as an experiment for each hospital to determine if the exercise therapy programme is beneficial to their demographic of patients or not. Provided the therapy proves fruitful it will then fall on the onus of each hospital to take up this opportunity or not.

One obvious question remains, "who ultimately would be in charge of exercise therapy?" As stated earlier the nursing and security staff are the staff members who interact mostly with the patients and would undoubtedly be the people in the best position to help support exercise therapy in terms of manpower. But are these people adequately trained to help patients get the most out of the therapy?

Obviously it would be recommended that whoever is managing the exercise therapy should be persons who have some sort of training in exercise science/physiology.

So the question remains, what is the professional domain of the professional who would be ideal to be employed in hospital situations as an exercise therapist? The answer to this question lies

overseas in the United States of America where certain exercise professionals are now currently employed in many psychiatric hospitals doing exercise therapy.

These currently employed exercise therapists are called Kinesiotherapists. Kinesiotherapists formally known as "Corrective Therapists" are exercise science/physiology and physical education graduates, who do additional training, examinations and then internships in various settings. One of these settings is in psychiatric hospitals. Thus, having completed an internship a kinesiotherapist can register as a psychiatric kinesiotherapist with the American Kinesiotherapy Association. Reporting to a supervising physician in the hospital these exercise professionals are adequately trained and experienced to develop, implement, and manage physical training programmes in psychiatric hospitals.

In South African one could quite easily create this type of modality of professional. Exercise science / physical education / biokinetics graduates could easily complete extra coursework in sports psychology and psychopathology to become registered as exercise therapists / kinesiotherapists; with the Health Professions Council of South Africa (HPCSA). South African Universities should at least investigate this possibility. Thus professional psychiatric kinesiotherapy would ultimately be the ideal medium for the effective instigation of exercise therapy country wide.

Section 6: Conclusion

In this section the limitations of the research, as well as, its strengths will be noted. The final conclusion will then follow.

6.1 Limitations of this thesis

No academic can really grasp the limitations of a research project more so than Researcher him/herself. Personally discussing any limits to any academic work, including limits to validity and reliability, shows that the Researcher has a non biased approach to interpreting research. This further demonstrates that the Researcher is open to further criticisms, which is a reasonable response when one is pursuing scientific truth. This being the case the following section describes some of the limitations of both the quantitative and qualitative sides of the project.

6.1.1. Limitations of the Quantitative Data

The inferential statistical side of this thesis does possess some unfortunate data analysis limitations. As mentioned previously, the most obvious limitation of data is that the sample size was very small, which begat low statistical power and limited the ability of one to correctly reject a false null hypothesis. It is quite possible that the small sample size made the data more susceptible to outliers that may skew results.

A larger sample size of 72 is always preferred more maximal statistical power in statistical research. "A large sample size (72) would assure the desired power for social science research (>70 %), assuring justified reliability in interpretation of results" (J. Pienaar, personal communication, November 24, 2006).

6.1.2. Limitations of the Qualitative Data

The qualitative side of this thesis that was used to investigate subjectively the theoretical mechanisms of: positive effect, diagnosis, and anxiety change; also possesses many research limitations.

The first major qualitative limitation is that of low *data saturation*. A bounty of rich cultural specific narrative is largely lacking in the thesis. This was due mostly to the somewhat arduous process of interviewing psychiatric patients with the use of an interpreter. The fact that the

dialogue was intermittently split between three or four persons, resulted in a poor flow of communication and also an absence of abundant dialogue.

Another reason for this *low saturation* was the fact that schizophrenic in-patients often possess "poverty of speech" to varying degrees. The sedentary nature of some of the medications the patients were receiving may also have contributed to a lack of copious in-depth responses.

The second major limitation of the qualitative data is the fact that it possesses *low credibility* because of the context of the participants. When studying schizophrenic patients one needs to be aware that sometimes the participant's responses may not be entirely correct or truthful, because of his or her diagnosis and presenting symptoms.

Another apparent reservation one needs to note about the integrity of the participant's responses is that, it is quiet possible that some of the responses were not entirely truthful. Some of the patients who were at this stage of the research process, longing to be discharged might have tried to respond with the answers they thought would enhance their chances of being discharged. In short there is a possibility that the data may possess *low credibility* and *low quality*, because patients may have even lied.

The third major scientific limitation of the research is the possibility that the *reliability* and *quality* of the responses were limited to the competence of the interpreters. Thus the competence of the various interpreters used in this may or may not affect the results. Interpreters in a rural psychiatric hospital seldom have qualifications in interpreting and this may cause doubt on the integrity of results.

6.1.3. Other Methodological Limitations

As, Bowerman, 1981; Brislin, 1980; and Steel (2003) explain there are many factors that threaten the validity of cross-culturally translated questionnaires. Some criticism might be leveled at the methodology of this thesis relating to the translation process of the questionnaires. Sight cultural, geographical, demographical, linguistic and semantic discrepancies can sometimes occur in the translation of questionnaires, which are initially written in English and then later translated into Xhosa. Some trepidations can arise, because without strict and extensive translation methods, doubts arise about the relevance of a questionnaire and/or interview. B*ack-translation*, *committee*, and *bilingual approaches* are often utilized to translate material in the most valid way possible. It was felt, however, that because of the exploratory nature of this thesis, such a tedious and time consuming process was in this case unnecessary.

Such rigorous translation methods are probably more necessary in the translation of psychometric tests than in the case of simple qualitative interviews.

6.2. Strengths of this Thesis

Despite the limitations of the research mentioned earlier, this thesis possesses much strength as well. In fact it could be declared that the strengths of the research out weigh some of its limitations.

The most obvious strength of this thesis lies in the fact that no research undertaking of this exploratory nature has ever been conducted before, locally or otherwise. What is meant by this is that no research on the therapeutic properties and complexities of aerobic exercise has yet attempted to study concurrently the interconnected topics this research attempted to do. So too has no *true experimental design* study, thus far been attempted to simultaneously test the anxiety reducing, mood enhancing and psychotic symptom lessening effects of aerobic exercise. Another asset of this thesis is found in its boldness in exploring mechanism of positive change. Neither has any research undertaking world wide ever attempted to research nearly all the proposed theoretical mechanisms of change concurrently; and no recent studies has tried to develop newer prototypal theories for the effects of aerobic exercise.

Faulkner and Biddle (1999) correctly declared that more scientific studies needed to be conducted to investigate additional strategies to treat and relieve the symptoms of schizophrenia. This thesis has done just that and more. No true experimental type research has ever been conducted with schizophrenic in-patients before and never has exercise therapy ever been examined in a rural South African context. It has been exciting to note that the positive effects of exercise appear to be not just a Western occurring phenomenon but an African phenomenon as well. Thus it may be possible to declare that this research has shown the positive effects of aerobic exercise may be a universally beneficial phenomenon.

Burbach (1997), Faulkner and Biddle (1999) all state that the effect of aerobic exercise on schizophrenia is a greatly underdeveloped area of knowledge. Faulkner and Biddle (1999) go on to suggest that no research had yet specifically and steadfastly probed the effects of exercise on psychotic symptoms. This research has fulfilled this need by incorporating the most scientifically valid means possible.

Findings in this thesis do more than suggest that aerobic exercise is a good coping mechanism for positive symptoms of schizophrenia. The findings also suggest that exercise may promote

faster rehabilitation, and actually decrease the symptoms the person is experiencing. No study thus far has looked at this possibility from this angle. Negative symptoms are often declared to be an indication of a poor prognosis; however, aerobic exercise appears to decrease the effects of negative symptoms, to the point of eliminating some of them, resulting in a better diagnosis and prognosis.

Faulkner and Biddle (1999) proclaim that a "minimum exercise dosage" needs to be found that produces results. Although this thesis has not entirely explored this "dosage" it has nonetheless suggested that five weeks of moderate exercise three times a week for 45 minutes will produce *slight* results. However this research has not entirely disproved that the contention that 10 weeks is the minimal required length of time to produce *statistical significant* positive results with regard to depression and anxiety. However based on the *mean comparison* it is now suggested that more acute exercise therapy may also produce slight positive effects on anxiety, depression and psychotic symptoms.

Furthermore the exact natures of the exercise interventions have been adequately recorded in this research, just as Rostad and Long (1996) and Faulkner and Biddle (1999) suggested. Although estimating increased fitness levels by monitoring the weekly increased distance of the group is a crude method; it is in the case of this thesis; according to Dr. C. Christie (personal communication, October 26, 2006) an acceptable method. Dr. C. Christie (personal communication, October 26, 2006) goes to pronounce that past research in exercise science has used distance as a protocol to assess improvements in fitness levels. It is also relevant to mention that because the details of the exercise activities of both groups were meticulously recorded and individual participation logs kept, as well as, a video example being available with the permission of the participants; exercise scientists will be in a position to further analyse the exercise in future research if necessary.

Overall the core strength of this thesis lies in its methodology. This research is further strengthened by the fact that some of the methodological limitations of the past on exercise therapy have been eliminated here. Despite possessing low statistical power in terms of the number of people studied, in no other way were principles of external and internal validity violated. All of the participants were randomly selected and were at the onset not volunteers. Only after the random selection and distribution to the various groups, was their assent sought. Faulkner and Biddle (1999) appealed for more rigours experimental designs with strict randomization of both the test and control groups; that specifically compared aerobic exercise to non-aerobic exercise. This thesis has unadulterated answered that request.

By using a control group who are exposed to the same *participant observations* the Research has made allowance for the Hawthorne effect to be largely limited from affecting the results of the two exercise groups. This is another methodological strength of the research because it fulfils the requirements issued by Raglin and Morgan (1985) in producing more credible evidence of aerobic exercise benefits.

From a data analysis point of view, despite the limitations previously mentioned, this thesis does possess some methodological advantages. The meticulous data collection methods applied in this thesis, which sought to eliminate as much bias as possible; and generate the maximum amount of data possible, is apparent.

Likewise the identification and utilisation of a very homogeneous population eliminates some of the disadvantages of utilising a small sample. Additionally, the identification and utilisation of an enormously homogeneous population results in very a representative sample, which can be generalised to a larger population.

Another great methodological strength of this thesis lies in the fact that the data was not only in the hands of one researcher, but was also handled by an independent Social Scientist, (Jacqueline Pienaar, Registered Research Psychologist), who had no vested interest in the outcome of the results. Thus this independence has lead to greater reliability in the interpretation of what was analysed and meant that the data was not tampered with.

Due to the fact that the patients were all in-patients, meant that it was possible to monitor and control the activities of patients during the whole research process. This insured that no *leakage* was found in both the test and control group patients, because the interventions were applied in an *extremely standardised fashion*. This was particularly true with the treatment group. This greatly increases the statistical integrity of the research.

Furthermore, because of the detailed account of the intervention being kept, Dr. C. Christie (personal communication, October 26, 2006) was in an informed position to declare that the treatment group's exercise was sufficient to be declared: *submaximal, long duration* (aerobic). She went on to declare that this exercise was sufficient to result in various physiological changes including: endorphin release; increased endurance; better blood glucose control; increased capillarizatrion and oxidative capacity in the skeletal muscle tissue, which results in better fuel usage in the muscles, because of the more efficient use of fat as an energy source. The control group did not train sufficiently enough to produce these physiological changes.

Additionally, because the specific nature of the intervention was meticulously described, allows for more specific conclusions to be made, which has hardly been at all possible in the past. This fact further fulfils the suggestions of Faulkner and Biddle (1999) concerning future research.

Despite the lack of grand translation methodologies some effort was made, however, to render the questionnaires as linguistically and culturally valid as possible. The translations were undertaken in a crude process of informal *decentering*, where the language of both the English and Xhosa translations were simultaneously examined during the translation process. Bilingual Xhosa psychologists and professional nurses were used in this process. The decentering methodology is referred to here as "crude" because the simplicity of the words used and the nature of the interview process did not necessitate rigorous investigations. The "interview process" allowed for participants and translators/interpreters to have an opportunity to co-create meaning with each other and thus arrive at an appropriate understanding.

Some may argue that a *psychotic symptom list* based on the DSM-IV (1994) could create a cultural bias in the data. However, it is the Researcher's contention that every symptom listed in the questionnaires, included adequate listings that could be used to record and culturally specific manifestation of schizophrenia. Thus it is the Researcher's contention that *Amafufunyana* is not a *culturally-bound syndrome,* but infact a culturally bound *symptom* of schizophrenia, manifesting in a specific manner. Thus with this thought in mind, the use of the positive and negative symptom lists, is still valid and appropriate to this study and does not result in cultural bias or statistical limitations.

It is imperative to note that the Researcher made every attempt not to project any expectancy of the therapeutic nature of the exercise onto the patients during the treatment, and this should be noted when evaluating these results. Thus heading the warning of Solomon (1984) and Ojanen (1994) about the mediating force of clients taking on the expectancy of the exercise therapist has been eliminated as much as possible.

The weaknesses of past research into exercise therapy resulting from failure to consider subjective intensity levels, as described by Tuson et al. (1995) has also been dealt with in this thesis.

By working under a broad non-rigid theoretical framework this thesis has successfully incorporated the suggestions of Tuson et al. (1994) in an attempt to improve knowledge of the exercise-mind link.

The processes that lead to affect, anxiety, and psychotic symptom change have been adequately explored. The mental notions of each patient have been studied and may psychological dynamics have been greatly explored. Thus Tuson et al. (1994) should be pleased that nearly every psychological process that could explain results has thus been explored.

Despite the uniqueness of the study and the methodological strengths found in this thesis there are other factors worth mentioning that have added to the integrity of the thesis. One of these is the fact that the thesis has answered the call by Martinsen and Stanghell (1997) to produce more research endeavours that try to determine the way medication interacts with exercise.

In fulfilment of the directions of Rostand and Long (1996) individual phenomenological experiences have been explored to complement this primarily quantitative methodological approach.

Another auxiliary usage of this thesis has been to offer a possible solution to the high suicide rate associated with schizophrenia. If schizophrenic patients are less depressed, less anxious and have less psychotic symptoms, they are logically less inclined to commit suicide. Thus when one is contemplating the complexities of schizophrenia; newer ideas such as this one need to be reflected upon.

The psycho-diagnostic instruments used in this thesis are well known for their empirical validity and reliability. The DSM-IV (1994) declares that the disorder classifications and methods of diagnoses are grounded in extensive empirical research.

The use of translated BDI-II and BAI inventories into Xhosa has also strengthened the research by using language and culturally appropriate instruments to monitor psychometric changes in affect and anxiety.

Steele (2003) with the consent of Aaron Beck the developer of the BAI and BDI-II instruments; translated these instruments using "back-translation" and "committee" translation methods.

Xhosa spoken dialects and Xhosa written language, like many languages often have variations in the pronunciations and interpretations of words, because of demographical and geographical variations in a specific cultural and linguistic population. Efforts were made to ensure that: vocabulary, idiomatic, grammatical-syntactical, experiential, cultural distance and conceptual equivalence were maintained in the translations; thus ensuring as culturally relevant translations as possible. Geographically the translations were developed to be of use to people in the Eastern

Cape. Thus the incorporation of the Xhosa translations in this thesis gives the results added validity and reliability.

"The preliminary reliability and validity results reveal that the XBDI-II, the XBHS, and the XBAI have levels of reliability and validity that are very much in line with those found for the English versions, in the international literature" (Steel, 2003, p. 90). Steele (2003) found suitable levels of concurrent, convergent, discriminant and nomological validity to be present in the translations; and thus showed the translations to possess high quality psychometric properties.

The use of these translated inventories in the thesis, added to the cultural relevance of the investigation, and thus is of great value to the integrity of the research. Additionally the use of the Xhosa BDI-II instrument has meant that objective comparisons, at least with this particular instrument, can be made with other studies previously conducted overseas.

6.3. Final Conclusions

6.3.1. Aerobic Physical Exercise as an Adjunct Treatment for Anxiety and Mood

Although the main focus of this thesis was to assess the treatment potential of aerobic exercise therapy for improving diagnoses and for decreasing psychotic symptoms in schizophrenic patients; part of this study also examined the anxiety decreasing and mood benefits of exercise as well. This was done for three reasons. Firstly, because the schizophrenic condition often accompanies an array of negative emotions, including anxieties and depressed affect. Any co-treatment that could simultaneously manage these negative co-occurring emotions resulting from schizophrenia would be of considerable worth. Secondly, because of the high co-morbidity of psychopathology in general, psychotherapy and psycho-pharmacological treatments are often designed to have dual function. For instance, medication such as (Modecate, Largactil and Serenace) often have a dual function to control psychosis and also stabilise mood. Any adjunct treatment that also possesses this similar dual effect is of paramount worth. Thirdly, because past research has shown that aerobic exercise can reduce depression, stress and anxiety in other populations, it was vital to observe if similar effects happen in an African context with schizophrenic in-patients.

The results of the research show that *submaximal intensity extended duration aerobic exercise*, completed three times a week, for 45 minutes and undertaken for five weeks possesses *marginal* potential to reduce depression. Mental health practitioners would be wise to note this and are advised to prescribe exercise therapy, particularly for those patients who present co-morbid mood disorders.

The results also show us, however, that *submaximal intensity extended duration aerobic exercise*, completed three times a week, for 45 minutes and undertaken for five weeks *does not* appear to produce a significant anxiety reducing result when compared to other exercise interventions. It is quite possible that interventions completed for longer than five weeks and which possess more participants may produce more significant results with this particular population.

6.3.2. Aerobic Physical Exercise as an adjunct Treatment for Schizophrenic Psychosis

The results of this thesis do suggest that *extended duration submaximal intensity* physical activity do have the potential to:

1. Decrease slightly the number of active negative symptoms of schizophrenia; but not so much the number of active positive symptoms.
2. Decrease these symptoms significantly enough to change the diagnosis to in partial

remission or full remission;

3. Allow for quicker transfer of patients from acute to semi-acute wards, and even hasten the transfer of patients from acute to pre-discharge wards;
4. Likewise and more importantly, aerobic *extended duration submaximal* exercise has the potential to increase the possibility of patients being rehabilitated and discharged much sooner than previously thought;
5. Considerably enhance the social and occupational functioning of patients sooner, as shown in the GAF Scale scores and the nurse's observations of behaviour. This suggests that a patient might become more cooperative and socially pleasant with staff and others. This has vast implications, because now patients will be more cooperative with Occupational Therapy and Psychotherapy.

When all things are considered it appears that *extended duration submaximal intensity exercise*, undertaken for 45 minutes, three times a week for, five weeks or more; does have immense potential to be an effective adjunct treatment intervention.

6.3.3. Psychological Mechanisms of Change

Although the expectation of the physiological empowering (self-efficacy enhancing) benefits of exercise, coupled with feeling more alive appears to be the paramount psychological mechanism of improvement; some evidence was found for other mechanisms being present. Thus, this thesis has offered some substantiation to the notion that all of these mechanisms may work concurrently; and thus Morgan (1988) is largely correct in asserting that more than one mechanism plays a mediating role. Although this is very exciting contributory evidence, the potential value of these findings may be infinitely greater.

One can also claim that inadvertent and potentially valuable knowledge has arisen out of this study of the mechanisms of adjustment. It is suggested that the potential value of the evidence might have an applied application. To some degree, each one of these theoretical mechanisms has been given credence by the responses of the patients. Each one of these mechanisms and theories could easily and effectively be integrated into a platform for building more effective motivational strategies. The premise of this new philosophy is thus; exercise leaders/instructors, kinesiotherapists, occupational therapists, sport/exercise psychologists, and all others involved in sport and performance enhancement could motivate people to exercise, by suggesting and reinforcing suggestions based on these theories.

A simplistic applied integration of these theories into a motivational approach would crudely speaking appear something like this. Before commencing an exercise programme and while participating in an exercise programme; exercise therapists would do well to, *continually*:

1. Try and shape the perceptions and ultimately the expectancy (Expectancy Hypothesis) of the Exerciser, *particularly with regards to the next few points*.
2. Remind the exerciser about the health benefits of exercising (satisfying the Physical Benefits Theory, Needs Theory, and Kinetic Life Validation Proposition).
3. Prompt the client to think about how exercising makes them feel more alive (Kinetic Life Validation theory) and how exercise is good for their circulation (Physical Benefits Theory) and other bodily functions (satisfying any perceptions about Endocrinal, Life Span and other Health Benefits).
4. Reinforce the idea that the client is getting healthier, fitter, and more physically adept (Self Efficacy/Mastery Theory).
5. Reinforce the notion that the client enjoys exercising because he or she can leave his or her troubles behind and just focus on what they are doing, i.e. pace, pulse, form, etc. (Distraction/Time out Hypothesis).
6. Repeat to the client that it is pleasurable to train with others and too interact with others who are similar to themselves. (Socialisation Theory).
7. Instruct clients to train their problems (Distraction/Time out hypothesis) and frustrations (Cathartic Theory) away.
8. Communicate the notion that exercise helps one to become more relaxed, centred and focused (Cognitive Improvement Theory); and in the case of schizophrenic patients, remind them that they can effectively manage hallucinations and delusions by exercising, together with other strategies they have learned in psychotherapy.
9. Motivate clients to constantly monitor how they are subjectively experiencing the exercise, to keep it at an moderate level that they can easily cope with the activity (Subjective Cognitive Appraisal). One could use subjective rating scale instruments to accomplish this.
10. Converse with clients about the sleep benefits of exercising. One could suggest to the client that he or she are going to enjoy a good nights sleep (Sleep Improvement), because of the work he or she is doing and this will result in a healthier body and mind (Sleep, Physical benefit, and Cognitive Theories).
11. Direct the Exercisers attention to notice how relaxed their muscles are while exercising and instruct them always to have hot showers after training to help their muscles recover (Thermogenic Hypothesis).
12. Train outdoors, during the day and in different picturesque locations as much as possible (Environmental Theory).

13. Speak and actively listen to clients and show them that you are interested in their training, progress, feelings, general health and life (Hawthome/Hawthorne effect). It may be a noble idea to keep records of client's progress and encouragingly discuss this with them. Change the programme and monitoring techniques often (Hawthrome/Hawthorne effect and Distraction Effect).

This maybe a completely new notion of using all of these theories in an applied manner, but the potential of performance enhancement and creating more enjoyable training situations is invaluable. Which is the single most formative biological or conscious and/or subconscious psychological mechanism of psychological improvement resulting from exercise might never really be determined. By utilising all of these theories concurrently, however, exercise therapists should be able to maximise the therapeutic effect of these processes. Future research looking specifically at this approach to motivation and psychological improvement would be most welcomed.

6.3.4. Epilogue

Based on the empirical results of this thesis, as well, as the many anecdotal indications it presents; it could be argued that Faulkner and Biddle (1999) are correct in declaring that it is worthwhile to encourage the acceptance of exercise as a treatment for schizophrenia amongst mental health professionals. In answer to the all encompassing question of this thesis namely; "Does aerobic exercise therapy have potential as an adjunct treatment for sub-acute schizophrenic in-patients?" The answer, based on observing the *mean scores*, *t-tests, and all the factors mentioned in 6.3.2.* at this stage is "yes it does". However, it is not the cure for schizophrenia nor does it appear to surpass psycho-medication as the primary treatment; in spite of this it is definitely of some use. Its benefits appear to be very slightly significant but most likely would be more apparent if an exercise therapy programme continues for more than five weeks.

Some caution should be kept in mind when evaluating the evidence of this thesis. The exploratory nature of this thesis, the small samples studied, the great diversity of topics investigated; as well as, the fact that the intervention was not repeated with other samples, makes it impossible to generalise findings.

Despite the treatment group showing superior improvement in terms of each one of the variables studied mean scores when directly comparing the post-intervention mean scores together; great statistical trepidations have occurred. Unfortunately because of a small sample of only 22 patients being used, has in particular resulted, in it being impossible to show real significant statistical improvement in most of the variables studied. And thus this makes it particularly impossible to generalise findings at this stage and justifiably claim without reservation that the treatment group achieve statistically significant results.

Thus it is impractical at this stage to claim with absolute certainty that similar results will be produced by aerobic exercise; in similar populations to the ones studied here. However, it is quite possible that similar positive results may be produced. Similar testing with larger samples would produce more satisfactory evidence.

The mental health professionals who work closely with the patients would be in a paramount position to evaluate the therapeutic potential of exercise on an applied level. Hopefully the data generated in this thesis will inspire these professionals to at least, suggest exercise therapy for their patients and determine, in their own professional capacity, if this adjunct treatment is effective in their patient's own context.

It could be argued that continued research into this topic is more than necessary (particularly with larger samples and longer duration studies) for a number of reasons. One of these less obvious reasons is that there is a minute possibility that codicil data may be produced by such research as this one, which may directly or indirectly contribute to greater understanding of some of the mysteries of schizophrenia and other psychotic disorders, as well.

The title of this thesis denotes it as a "pilot study" and not only because a small sample was used. It is truly a pilot study because of the fact that true *experimental* research on this topic, (utilising amongst other methods inferential statistics) has *never* been conducted with *schizophrenic in-patients before*; nor has any research simultaneously tried to study *all* the *proposed reasons* why people respond to exercise the way they do; nor has any *new prototypal theory* been offered as to why people improve and change; and furthermore, no theorist has ever tried to create motivational strategies specifically designed for increasing adherence to exercise therapy in a psychiatric situation. Thus on all four fronts this is new territory in psychology, and thus this theory has been described as a pilot study because it is hoped that this project will become a baseline for future research on this topic that will contribute to increased knowledge in the areas of: Schizophrenia, Anxiety Disorders, Mood Disorders, Clinical Psychology, Psychiatry, Psychiatric Nursing, and Occupational Therapy; as well as, Exercise Science, Kinesiotherapy and Exercise/Sport Psychology.

Psychology is in the business of amongst other things, improving the quality of life of the people we are entrusted to care for. Exercise therapy may be another means of doing just that, even if only marginally. We probably have only touched the surface in studying the therapeutic benefits of both exercise and the discipline of psychology which could have a great role to play in further research and the implementation of such exercise programmes in psychiatric in- and out-patient care.

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Academic Search Premier (via EBSCOhost)	http://0-web.ebscohost.com.
American Academy of Medical Hypnoanalysis (AAMH)	http://www.aamh.com
American College of Sports Medicine	http://www.acsm.org/
American Psychiatric Association ONLINE	http://www.psych.org
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American Psychological Association APA ONLINE	http://www.apa.org
Applied Behavioural Health Care	http://www.mnhypnosis.com/psy/add.php
Blackwell Synergy	http://www.blackwell-synergy.com
EBSCOHOST PsycArticles	http://0-web.ebscohost.com
EBSCOHOST Research Databases	http://0-atoz.ebsco.com.echea.ru.ac.za/
Find articles	http://findarticles.com
Google Scholar BETA	http://scholar.google.com
Health Source - Consumer Edition (via EBSCOhost)	http://0-web.ebscohost.com.echea.ru.ac.za/
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National Library of Medicine and the National Institute of Health	http://www.pubmed.gov
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PsycEXTRA	http://www.apa.org/psycextra/
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Public Health Nutrition	http://www.cambridge.org
Rhodes University Library	http://www.ru.ac.za/library/
SA ePublications	http://0-www.sabinet.co.za
Self-efficacy information web site: A community of scholars	http://www.des.emory.edu/mfp/self-efficacy.html
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SpringerLink	http://www.springerlink.com
The Psychological Corporation	http//harcourtassessment.com
University of Cape Town Library	http://www.lib.uct.ac.za

James Barry Munnik
MA Student
House 14
Komani Psychiatric Hospital
Queenstown
5320
072 766 9096
jbmunnik@yahoo.co.uk

Research Projects Review Committee (RPRC)
Humanities Higher Degrees Committee (HHDC)
Department of Psychology
Rhodes University
Grahamstown
6140

Dear Committee members:

Ethical considerations

Due to the sensitive nature of doing research with psychiatric patients I have taken the liberty of submitting an extremely comprehensive and detailed ethical statement to protect all those who will be involved in this sensitive project. Herewith follows my ethical declaration related to working with psychiatric patients and pertaining to the research in general.

Regards,

James B Munnik
Master of Arts candidate

Ethical Statement

1. Accountability; permission; supervision; responsibility; and professional conduct

I am aware that I am accountable for all the research endeavours I undertake during the course of this proposed thesis. I am aware that I am accountable to the following persons and institutions:

1. Prof. C. R. Stones (Supervisor);
2. Rhodes University, Grahamstown;
3. Komani Psychiatric Hospital (staff and patients), Queenstown.

I am also aware that I am accountable to society as a whole. I pledge to uphold the integrity of Rhodes University; and I shall neither bring the psychology department, nor Komani Psychiatric Hospital into disrepute.

I shall obtain written approval before conducting any research activity whatsoever from my supervisor and from Komani Hospital Management. I promise to adhere completely to the directions, imposed limitations and restrictions placed on me by my supervisor and Hospital Management. I will at all times submit to the supervision and authority of any health professional appointed to supervise me at the hospital by the hospital management. I shall get permission at every step of the research process from the Komani Management in writing. Permission will be obtained by the hospital for each of the patients that will be partaking in the exercise programmes and interviewed. Each patient will be given a full physical examination by a medical doctor before being allowed to partake in any moderate exercise programmes or activities. Permission from each of the patient's doctors will be obtained in writing and shall be appropriately documented.

I shall at all times adhere to the ethical rules of conduct (FORM 223) of the professional board for psychology. Additionally I will adhere to the ethical policies and procedures of the Universities Ethical Standards Committee, (1997). The ethical requirements of the Research Committee of Komani psychiatric hospital will additionally be followed. I pledge to communicate with my supervisor on a continuous and regular basis during the entire research process. I will, without delay, contact my supervisor and/or the Ethics Committee of the university if I am unclear about any ethical question or dilemma, should such a question or problem arise.

When delegating work to another person, i.e. an interpreter in whatever capacity, I shall take measures to ensure that I do not, delegate work to persons who have multiple relationships with those being researched so as not to lose objectiveness. I will only delegate responsibilities to those who can be expected to perform competently on the basis of their training or experience; and I shall ensure that such persons perform their tasks competently.

I will always behave in a mature and professional manner when interacting with patients and Komani staff. I will not disclose any detrimental information I found in my study about Komani Psychiatric Hospital or any of its staff.

2. Komani psychiatric participants and Human Rights

I am aware that psychiatric patients are a vulnerable group in society and I shall be very cautious when interacting with them. I pledge that I will not inflict any harm; interfere with any medical, occupational or psychotherapeutic treatment; nor cause any anxiety to any patient during my research. I will not threaten, intimidate nor provoke any patients or staff in any manner whatsoever.

I shall not violate the human rights of any individual or group. I shall not harm any person or group in any way. In the unlikely event, however, that I become aware of any research procedures of mine that have harmed a participant or group of participants, I will take reasonable action to reduce this harm. Should I become aware that a patient is responding negatively to an exercise programme I will terminate the use of that patient immediately. I shall at all times respect the interests, dignity and worth of all individuals associated with this proposed thesis. I shall continuously endeavour to preserve and protect all the fundamental human rights of all the participants used in my research and any persons connected with this thesis. I pledge during my research not to discriminate against any participant or group. I promise not to discriminate against nor be prejudiced against; any person(s) based on their age, values, belief systems, birth place, conscience, colour, culture, disabilities, diseases, ethnic and social origins, gender, language, marital status, pregnancies, race, religion, sexual orientation, socio-economic status and in anyway whatsoever. I vow that none of my research will be used to produce or strengthen any biases or negative stereotypes towards any particular group.

I shall not offer any vastly excessive or inappropriate financial or other inducements to obtain participation, especially when this might be seen to force participation. I will not offer any reward to the participant that might later be used by the participant to hurt themselves or others.

I will not give any participant a reward that might be later sold or traded by that participant for drugs or alcohol.

All the participants that I propose to use will be over the age of eighteen and in a position to make an informed decision about participating in the research or not. I shall not financially, sexually or by any other means, exploit any research participant or any person or organisation connected to this research endeavour.

3. Miscellaneous Ethical Declarations

3.1. Professionalism

I hereby declare that I shall ensure that I only undertake research in those areas for which I am appropriately trained; and shall, when investigating aspects unknown to me, seek appropriate literature and guidance. I shall consciously make certain that I am adequately prepared for conducting my research. I state that I will make every effort to educate myself in such areas as current knowledge about psychotic disorders, exercise science, cultural anthropological factors, Komani Hospital policies and procedures.

In the extremely unlikely event that I become impaired because of physiological, pharmacological, mental and emotional factors or problems; I shall promptly refrain from continuing my research and will seek appropriate professional assistance.

3.2. Scientific integrity; Linguistic and Cultural factors

I shall strive to maintain a high standard of professional competence to ensure that my research reflects international standards of quality science. I shall make certain that my research will be founded on established scientific and professional knowledge in the field of psychology. I shall make certain that I am proficiently knowledgeable about the various research methodologies available to me. I shall at all times pursue the principles of scientific reliability and validity. Should I find that any factor or limitation may reduce the reliability or validity of an aspect of my research I shall bring this to attention.

I claim that, as far as I am aware, no biases of my own shall interfere with the objective findings recorded or evaluations made. I state categorically that no information found in my research will be a fabrication or falsification of any findings. Should it come to my attention that significant inaccuracies in my unpublished or published data exist; I shall then take appropriate measures to

correct such errors in a formal correction, retraction, and erratum or by any other appropriate means. I will not put my pride before reason; nor shall I convince myself of the infallibility of my theories or calculations before the integrity of sound science and psychological research method. I am conscious of the most frequently sited errors in research and will avoid such errors for example: interviewer bias; social desirability effects; evaluations apprehension, et cetera. I hereby state that I shall entirely disclose my methodology and techniques of analysis. I propose to plan and conduct my research in a manner consistent with the law of the South Africa.

When developing, administering, scoring or interpreting psychometric tests and questionnaires, I will only do so in a way that is relevant and appropriate to the areas I am investigating. I will not misuse any questionnaires, subjective replies or any test results. When designing assessment questionnaires or using any other assessment method I only use recognised scientific measures, test designs, standardisations, validations, theological frameworks and so on.

Any interviews, observations and tests done with patients will be conducted in the home/first language of each participant. A bilingually fluent clinical psychologist has agreed to supervise and help with interviews and assessments. Any other interpreter made use of will also be well informed about the aims and exact nature of the research and questions.

When doing interviews or designing and implementing any test measures of psychological constructs I will be mindful of the linguistic, economical, and cultural differences of people and will ensure, to the best of my ability, that any psychometric test or any utilised investigation method I shall employ will be culturally relevant. When I am interpreting test or questionnaire results, I will take into account the various test factors and characteristics of my test subjects. I will be attentive to such contextual issues like linguistic and cultural differences that might affect responses and reduce the scientific accuracy of my interpretations.

3.3. Declaration

I proclaim that none of the information in my thesis will be in any way plagiarized. I shall take credit only for ideas and work that I have actually conceived and performed. I will make public all comments and contributions of other researchers and authors used in the thesis. I shall give credit to any other contributor or publication accurately reflecting the relative scientific or professional contributions of that individual or publication; regardless of the relative status of the individual or publisher. I shall not present extensive portions or elements of another researcher, theorist, or writer's work or data as my own even if this work is cited occasionally. Any minor contributions to my proposed research shall also be appropriately acknowledged.

3.4. Informed consent; confidentiality; and deception

I shall get informed consent from every participant used in my proposed thesis. Informed consent shall be appropriately recorded and obtained verbally and in writing. All written informed consent will be well documented. I shall show on the document the exact nature of any psychological test, exercise programmes and interviews; state the clients right to refuse participation; state any limits to confidentiality; and warn them of any possible side-effects from testing, interviews and/or exercising. I shall always inform a participant of the nature of the research, inform him or her that they are at all times free to continue to participate or to decline or to withdraw from participation. I will point out any anticipated consequences of declining or withdrawing. I will explain any other aspects about the research which a participant may enquire about. I will inform participants about any risks involved in participating, being recorded and so on, although I perceive there not to be any. I shall use language that is completely understandable to each research participant when obtaining his or her appropriate informed consent.

I will obtain full consent before video recording or audio recording any participant, as well as before storing, dispensing and transporting such media. I will inform participants about any risks involved although I perceive there not to be any. I will only record and investigate data, behaviour and observations that are relevant to my proposed thesis. I will ensure that all the patients who are interviewed, tested or recorded with audio or video mediums, know that they can terminate the interview, test, or recording at any time should they want to.

Confidentiality and anonymity will be of the strictest importance in my proposed research. I shall discuss confidentiality at the beginning of any relationship with any person or organisation and also when any new circumstances warrant this discussion. I know that I am obliged to converse with participants and corresponding organisations any limitations on confidentiality. Participants will be informed about who will have access to their personal details, assessments and remarks. I shall not disclose confidential information to my supervisor(s) or any other party, without the written informed consent of a research participant. I will never disclose any confidential information that could plausibly lead to the identification of any research participant. I will take steps to ensure confidentiality and protection of personal details and will only share personal details if required with my supervisor(s) and only with the permission of the participants. I will take deliberate steps to disguise the identity of each research participant and will in all cases replace research participant's real names with pseudonyms.

I shall not use deception in my research unless the use of deceptive techniques is justified by an aspect of my research's aims and permission has been given to me by my supervisor. At the earliest feasible moment I will debrief any participant about the deception used and the purpose of such deception. Again any deception used will not be in anyway harmful to the participants. I shall not in the course of my proposed study deceive a participant about significant aspects that would affect such participant's willingness to participate in the study.

3.5. Property Rights

When using data, materials or property of another/others; I shall at all times respect the proprietary rights of such information, material and/or property. I shall in this research proposal give accurate information about the manner in which I intend to carry out my research and which venues I will use. I will adhere strictly to the restrictions and protocols of the hospital regarding any location, area, building or piece of equipment utilized or borrowed.

4. Summary of Ethical Statement

In conclusion to this ethical statement "**I swear to do no harm"** in my thesis nor shall I allow any of my research results to harm any person or party in any way, whatsoever.

……. …….

James Barry Munnik Date

Appendix B

T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
positive pretest	11	6.9091	4.59248	1.38469
negative pretest	11	1.1818	.87386	.26348
BAI SCORE PRETEST	11	12.8182	10.03811	3.02660
BAI RANGE PRETEST	11	2.0909	.94388	.28459
BDI II SCORE PRETEST	11	19.8182	11.53099	3.47672
BDI II RANGE PRETEST	11	2.6364	1.02691	.30963
BAI SCORE POSTTEST	11	1.1818	1.99089	.60028
BAI RANGE POSTTEST	11	1.0000	.00000[a]	.00000
BDI II SCORE POSTTEST	11	1.0000	1.41421	.42640
BDI II RANGE POSTTEST	11	1.0000	.00000[a]	.00000
positive posstest	11	5.0000	5.84808	1.76326
negative posttest	11	.3636	.80904	.24393
AXIS PRETEST	11	28.7273	8.98989	2.71055
AXIS POSTTEST	11	65.2727	19.70325	5.94075

a. t cannot be computed because the standard deviation is 0.

One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
positive pretest	4.990	10	.001	6.90909	3.8238	9.9944
negative pretest	4.485	10	.001	1.18182	.5947	1.7689
BAI SCORE PRETEST	4.235	10	.002	12.81818	6.0745	19.5619
BAI RANGE PRETEST	7.347	10	.000	2.09091	1.4568	2.7250
BDI II SCORE PRETEST	5.700	10	.000	19.81818	12.0716	27.5648
BDI II RANGE PRETEST	8.515	10	.000	2.63636	1.9465	3.3263
BAI SCORE POSTTEST	1.969	10	.077	1.18182	-.1557	2.5193
BDI II SCORE POSTTEST	2.345	10	.041	1.00000	.0499	1.9501
positive posstest	2.836	10	.018	5.00000	1.0712	8.9288
negative posttest	1.491	10	.167	.36364	-.1799	.9072
AXIS PRETEST	10.598	10	.000	28.72727	22.6878	34.7668
AXIS POSTTEST	10.987	10	.000	65.27273	52.0359	78.5096

Correlations FOR THE TREATEMENT GROUP ONLY

		positive pretest	negative pretest	BAI SCORE PRETEST	BAI RANGE PRETEST
positive pretest	Pearson Correlation	1	.005	.190	.048
	Sig. (2-tailed)		.989	.575	.888
	N	11	11	11	11
negative pretest	Pearson Correlation	.005	1	.164	.342
	Sig. (2-tailed)	.989		.630	.304
	N	11	11	11	11
BAI SCORE PRETEST	Pearson Correlation	.190	.164	1	.962**
	Sig. (2-tailed)	.575	.630		.000
	N	11	11	11	11
BAI RANGE PRETEST	Pearson Correlation	.048	.342	.962**	1
	Sig. (2-tailed)	.888	.304	.000	
	N	11	11	11	11
BDI II SCORE PRETEST	Pearson Correlation	.358	.470	.816**	.801**
	Sig. (2-tailed)	.279	.145	.002	.003
	N	11	11	11	11
BDI II RANGE PRETEST	Pearson Correlation	.374	.527	.653*	.657*
	Sig. (2-tailed)	.257	.096	.030	.028
	N	11	11	11	11
BAI SCORE POSTTEST	Pearson Correlation	.527	-.251	.377	.256
	Sig. (2-tailed)	.096	.457	.253	.447
	N	11	11	11	11
BAI RANGE POSTTEST	Pearson Correlation	.[a]	.[a]	.[a]	.[a]
	Sig. (2-tailed)	.	.	.	.
	N	11	11	11	11
BDI II SCORE POSTTEST	Pearson Correlation	.570	.405	.458	.449
	Sig. (2-tailed)	.067	.217	.157	.165
	N	11	11	11	11
BDI II RANGE POSTTEST	Pearson Correlation	.[a]	.[a]	.[a]	.[a]
	Sig. (2-tailed)	.	.	.	.
	N	11	11	11	11
positive posstest	Pearson Correlation	.659*	.411	.470	.435
	Sig. (2-tailed)	.027	.209	.144	.181
	N	11	11	11	11
negative posttest	Pearson Correlation	.117	.463	-.090	-.048
	Sig. (2-tailed)	.731	.152	.793	.889
	N	11	11	11	11
AXIS PRETEST	Pearson Correlation	-.451	-.286	-.099	-.020
	Sig. (2-tailed)	.164	.394	.772	.953
	N	11	11	11	11
AXIS POSTTEST	Pearson Correlation	-.611*	-.311	-.171	-.104
	Sig. (2-tailed)	.046	.352	.615	.762
	N	11	11	11	11

Correlations

		BDI II SCORE PRETEST	BDI II RANGE PRETEST	BAI SCORE POSTTEST
positive pretest	Pearson Correlation	.358	.374	.527
	Sig. (2-tailed)	.279	.257	.096
	N	11	11	11
negative pretest	Pearson Correlation	.470	.527	-.251
	Sig. (2-tailed)	.145	.096	.457
	N	11	11	11
BAI SCORE PRETEST	Pearson Correlation	.816**	.653*	.377
	Sig. (2-tailed)	.002	.030	.253
	N	11	11	11
BAI RANGE PRETEST	Pearson Correlation	.801**	.657*	.256
	Sig. (2-tailed)	.003	.028	.447
	N	11	11	11
BDI II SCORE PRETEST	Pearson Correlation	1	.931**	.106
	Sig. (2-tailed)		.000	.756
	N	11	11	11
BDI II RANGE PRETEST	Pearson Correlation	.931**	1	-.111
	Sig. (2-tailed)	.000		.745
	N	11	11	11
BAI SCORE POSTTEST	Pearson Correlation	.106	-.111	1
	Sig. (2-tailed)	.756	.745	
	N	11	11	11
BAI RANGE POSTTEST	Pearson Correlation	.[a]	.[a]	.[a]
	Sig. (2-tailed)	.	.	.
	N	11	11	11
BDI II SCORE POSTTEST	Pearson Correlation	.748**	.689*	.355
	Sig. (2-tailed)	.008	.019	.284
	N	11	11	11
BDI II RANGE POSTTEST	Pearson Correlation	.[a]	.[a]	.[a]
	Sig. (2-tailed)	.	.	.
	N	11	11	11
positive posstest	Pearson Correlation	.811**	.783**	.129
	Sig. (2-tailed)	.002	.004	.706
	N	11	11	11
negative posttest	Pearson Correlation	.094	.175	-.293
	Sig. (2-tailed)	.784	.607	.381
	N	11	11	11
AXIS PRETEST	Pearson Correlation	-.477	-.640*	.372
	Sig. (2-tailed)	.138	.034	.260
	N	11	11	11
AXIS POSTTEST	Pearson Correlation	-.605*	-.741**	.060
	Sig. (2-tailed)	.049	.009	.861
	N	11	11	11

Correlations

		BAI RANGE POSTTEST	BDI II SCORE POSTTEST	BDI II RANGE POSTTEST
positive pretest	Pearson Correlation	.[a]	.570	.[a]
	Sig. (2-tailed)	.	.067	.
	N	11	11	11
negative pretest	Pearson Correlation	.[a]	.405	.[a]
	Sig. (2-tailed)	.	.217	.
	N	11	11	11
BAI SCORE PRETEST	Pearson Correlation	.[a]	.458	.[a]
	Sig. (2-tailed)	.	.157	.
	N	11	11	11
BAI RANGE PRETEST	Pearson Correlation	.[a]	.449	.[a]
	Sig. (2-tailed)	.	.165	.
	N	11	11	11
BDI II SCORE PRETEST	Pearson Correlation	.[a]	.748**	.[a]
	Sig. (2-tailed)	.	.008	.
	N	11	11	11
BDI II RANGE PRETEST	Pearson Correlation	.[a]	.689*	.[a]
	Sig. (2-tailed)	.	.019	.
	N	11	11	11
BAI SCORE POSTTEST	Pearson Correlation	.[a]	.355	.[a]
	Sig. (2-tailed)	.	.284	.
	N	11	11	11
BAI RANGE POSTTEST	Pearson Correlation	.[a]	.[a]	.[a]
	Sig. (2-tailed)		.	.
	N	11	11	11
BDI II SCORE POSTTEST	Pearson Correlation	.[a]	1	.[a]
	Sig. (2-tailed)	.		.
	N	11	11	11
BDI II RANGE POSTTEST	Pearson Correlation	.[a]	.[a]	.[a]
	Sig. (2-tailed)	.	.	
	N	11	11	11
positive posttest	Pearson Correlation	.[a]	.834**	.[a]
	Sig. (2-tailed)	.	.001	.
	N	11	11	11
negative posttest	Pearson Correlation	.[a]	.000	.[a]
	Sig. (2-tailed)	.	1.000	.
	N	11	11	11
AXIS PRETEST	Pearson Correlation	.[a]	-.252	.[a]
	Sig. (2-tailed)	.	.455	.
	N	11	11	11
AXIS POSTTEST	Pearson Correlation	.[a]	-.707*	.[a]
	Sig. (2-tailed)	.	.015	.
	N	11	11	11

Correlations

		positive posstest	negative posttest	AXIS PRETEST	AXIS POSTTEST
positive pretest	Pearson Correlation	.659*	.117	-.451	-.611*
	Sig. (2-tailed)	.027	.731	.164	.046
	N	11	11	11	11
negative pretest	Pearson Correlation	.411	.463	-.286	-.311
	Sig. (2-tailed)	.209	.152	.394	.352
	N	11	11	11	11
BAI SCORE PRETEST	Pearson Correlation	.470	-.090	-.099	-.171
	Sig. (2-tailed)	.144	.793	.772	.615
	N	11	11	11	11
BAI RANGE PRETEST	Pearson Correlation	.435	-.048	-.020	-.104
	Sig. (2-tailed)	.181	.889	.953	.762
	N	11	11	11	11
BDI II SCORE PRETEST	Pearson Correlation	.811**	.094	-.477	-.605*
	Sig. (2-tailed)	.002	.784	.138	.049
	N	11	11	11	11
BDI II RANGE PRETEST	Pearson Correlation	.783**	.175	-.640*	-.741**
	Sig. (2-tailed)	.004	.607	.034	.009
	N	11	11	11	11
BAI SCORE POSTTEST	Pearson Correlation	.129	-.293	.372	.060
	Sig. (2-tailed)	.706	.381	.260	.861
	N	11	11	11	11
BAI RANGE POSTTEST	Pearson Correlation	.[a]	.[a]	.[a]	.[a]
	Sig. (2-tailed)	.	.	.	.
	N	11	11	11	11
BDI II SCORE POSTTEST	Pearson Correlation	.834**	.000	-.252	-.707*
	Sig. (2-tailed)	.001	1.000	.455	.015
	N	11	11	11	11
BDI II RANGE POSTTEST	Pearson Correlation	.[a]	.[a]	.[a]	.[a]
	Sig. (2-tailed)	.	.	.	.
	N	11	11	11	11
positive posstest	Pearson Correlation	1	.211	-.639*	-.814**
	Sig. (2-tailed)		.533	.034	.002
	N	11	11	11	11
negative posttest	Pearson Correlation	.211	1	-.480	-.245
	Sig. (2-tailed)	.533		.135	.467
	N	11	11	11	11
AXIS PRETEST	Pearson Correlation	-.639*	-.480	1	.793**
	Sig. (2-tailed)	.034	.135		.004
	N	11	11	11	11
AXIS POSTTEST	Pearson Correlation	-.814**	-.245	.793**	1
	Sig. (2-tailed)	.002	.467	.004	
	N	11	11	11	11

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

a. Cannot be computed because at least one of the variables is constant.

Correlations FOR THE CONTROL GROUP ONLY

		positive pretest	negative pretest	BAI SCORE PRETEST	BAI RANGE PRETEST
positive pretest	Pearson Correlation	1	-.008	.225	.145
	Sig. (2-tailed)		.982	.505	.670
	N	11	11	11	11
negative pretest	Pearson Correlation	-.008	1	-.275	-.321
	Sig. (2-tailed)	.982		.413	.336
	N	11	11	11	11
BAI SCORE PRETEST	Pearson Correlation	.225	-.275	1	.947**
	Sig. (2-tailed)	.505	.413		.000
	N	11	11	11	11
BAI RANGE PRETEST	Pearson Correlation	.145	-.321	.947**	1
	Sig. (2-tailed)	.670	.336	.000	
	N	11	11	11	11
BDI II SCORE PRETEST	Pearson Correlation	.067	-.123	.622*	.621*
	Sig. (2-tailed)	.844	.719	.041	.042
	N	11	11	11	11
BDI II RANGE PRETEST	Pearson Correlation	.260	-.208	.533	.540
	Sig. (2-tailed)	.440	.540	.091	.086
	N	11	11	11	11
BAI SCORE POSTTEST	Pearson Correlation	-.085	.453	.449	.346
	Sig. (2-tailed)	.804	.162	.166	.297
	N	11	11	11	11
BAI RANGE POSTTEST	Pearson Correlation	-.119	.539	.225	.160
	Sig. (2-tailed)	.727	.087	.505	.638
	N	11	11	11	11
BDI II SCORE POSTTEST	Pearson Correlation	-.213	.499	.164	.155
	Sig. (2-tailed)	.529	.118	.630	.650
	N	11	11	11	11
BDI II RANGE POSTTEST	Pearson Correlation	-.147	.526	.130	.107
	Sig. (2-tailed)	.666	.096	.704	.754
	N	11	11	11	11
positive posstest	Pearson Correlation	.858**	-.037	.252	.112
	Sig. (2-tailed)	.001	.915	.455	.743
	N	11	11	11	11
negative posttest	Pearson Correlation	-.048	.023	-.102	-.177
	Sig. (2-tailed)	.889	.946	.766	.602
	N	11	11	11	11
AXIS PRETEST	Pearson Correlation	-.737**	-.170	-.291	-.193
	Sig. (2-tailed)	.010	.617	.385	.570
	N	11	11	11	11
AXIS POSTTEST	Pearson Correlation	-.234	-.192	.098	.165
	Sig. (2-tailed)	.489	.572	.774	.629
	N	11	11	11	11

Correlations

		BDI II SCORE PRETEST	BDI II RANGE PRETEST	BAI SCORE POSTTEST
positive pretest	Pearson Correlation	.067	.260	-.085
	Sig. (2-tailed)	.844	.440	.804
	N	11	11	11
negative pretest	Pearson Correlation	-.123	-.208	.453
	Sig. (2-tailed)	.719	.540	.162
	N	11	11	11
BAI SCORE PRETEST	Pearson Correlation	.622*	.533	.449
	Sig. (2-tailed)	.041	.091	.166
	N	11	11	11
BAI RANGE PRETEST	Pearson Correlation	.621*	.540	.346
	Sig. (2-tailed)	.042	.086	.297
	N	11	11	11
BDI II SCORE PRETEST	Pearson Correlation	1	.932**	.294
	Sig. (2-tailed)		.000	.380
	N	11	11	11
BDI II RANGE PRETEST	Pearson Correlation	.932**	1	.137
	Sig. (2-tailed)	.000		.687
	N	11	11	11
BAI SCORE POSTTEST	Pearson Correlation	.294	.137	1
	Sig. (2-tailed)	.380	.687	
	N	11	11	11
BAI RANGE POSTTEST	Pearson Correlation	.280	.180	.913**
	Sig. (2-tailed)	.404	.596	.000
	N	11	11	11
BDI II SCORE POSTTEST	Pearson Correlation	.401	.335	.796**
	Sig. (2-tailed)	.222	.315	.003
	N	11	11	11
BDI II RANGE POSTTEST	Pearson Correlation	.291	.231	.814**
	Sig. (2-tailed)	.386	.494	.002
	N	11	11	11
positive posstest	Pearson Correlation	.236	.378	.186
	Sig. (2-tailed)	.484	.252	.585
	N	11	11	11
negative posttest	Pearson Correlation	.160	.020	.209
	Sig. (2-tailed)	.638	.954	.537
	N	11	11	11
AXIS PRETEST	Pearson Correlation	-.206	-.216	.068
	Sig. (2-tailed)	.542	.523	.843
	N	11	11	11
AXIS POSTTEST	Pearson Correlation	-.433	-.491	-.278
	Sig. (2-tailed)	.184	.125	.408
	N	11	11	11

Correlations

		BAI RANGE POSTTEST	BDI II SCORE POSTTEST	BDI II RANGE POSTTEST
positive pretest	Pearson Correlation	-.119	-.213	-.147
	Sig. (2-tailed)	.727	.529	.666
	N	11	11	11
negative pretest	Pearson Correlation	.539	.499	.526
	Sig. (2-tailed)	.087	.118	.096
	N	11	11	11
BAI SCORE PRETEST	Pearson Correlation	.225	.164	.130
	Sig. (2-tailed)	.505	.630	.704
	N	11	11	11
BAI RANGE PRETEST	Pearson Correlation	.160	.155	.107
	Sig. (2-tailed)	.638	.650	.754
	N	11	11	11
BDI II SCORE PRETEST	Pearson Correlation	.280	.401	.291
	Sig. (2-tailed)	.404	.222	.386
	N	11	11	11
BDI II RANGE PRETEST	Pearson Correlation	.180	.335	.231
	Sig. (2-tailed)	.596	.315	.494
	N	11	11	11
BAI SCORE POSTTEST	Pearson Correlation	.913**	.796**	.814**
	Sig. (2-tailed)	.000	.003	.002
	N	11	11	11
BAI RANGE POSTTEST	Pearson Correlation	1	.947**	.976**
	Sig. (2-tailed)		.000	.000
	N	11	11	11
BDI II SCORE POSTTEST	Pearson Correlation	.947**	1	.981**
	Sig. (2-tailed)	.000		.000
	N	11	11	11
BDI II RANGE POSTTEST	Pearson Correlation	.976**	.981**	1
	Sig. (2-tailed)	.000	.000	
	N	11	11	11
positive posstest	Pearson Correlation	.136	.036	.080
	Sig. (2-tailed)	.690	.915	.816
	N	11	11	11
negative posttest	Pearson Correlation	.043	-.001	-.050
	Sig. (2-tailed)	.900	.997	.883
	N	11	11	11
AXIS PRETEST	Pearson Correlation	.137	.213	.193
	Sig. (2-tailed)	.687	.530	.569
	N	11	11	11
AXIS POSTTEST	Pearson Correlation	-.356	-.436	-.375
	Sig. (2-tailed)	.283	.180	.256
	N	11	11	11

Correlations

		positive posstest	negative posttest	AXIS PRETEST	AXIS POSTTEST
positive pretest	Pearson Correlation	.858**	-.048	-.737**	-.234
	Sig. (2-tailed)	.001	.889	.010	.489
	N	11	11	11	11
negative pretest	Pearson Correlation	-.037	.023	-.170	-.192
	Sig. (2-tailed)	.915	.946	.617	.572
	N	11	11	11	11
BAI SCORE PRETEST	Pearson Correlation	.252	-.102	-.291	.098
	Sig. (2-tailed)	.455	.766	.385	.774
	N	11	11	11	11
BAI RANGE PRETEST	Pearson Correlation	.112	-.177	-.193	.165
	Sig. (2-tailed)	.743	.602	.570	.629
	N	11	11	11	11
BDI II SCORE PRETEST	Pearson Correlation	.236	.160	-.206	-.433
	Sig. (2-tailed)	.484	.638	.542	.184
	N	11	11	11	11
BDI II RANGE PRETEST	Pearson Correlation	.378	.020	-.216	-.491
	Sig. (2-tailed)	.252	.954	.523	.125
	N	11	11	11	11
BAI SCORE POSTTEST	Pearson Correlation	.186	.209	.068	-.278
	Sig. (2-tailed)	.585	.537	.843	.408
	N	11	11	11	11
BAI RANGE POSTTEST	Pearson Correlation	.136	.043	.137	-.356
	Sig. (2-tailed)	.690	.900	.687	.283
	N	11	11	11	11
BDI II SCORE POSTTEST	Pearson Correlation	.036	-.001	.213	-.436
	Sig. (2-tailed)	.915	.997	.530	.180
	N	11	11	11	11
BDI II RANGE POSTTEST	Pearson Correlation	.080	-.050	.193	-.375
	Sig. (2-tailed)	.816	.883	.569	.256
	N	11	11	11	11
positive posttest	Pearson Correlation	1	.316	-.640*	-.613*
	Sig. (2-tailed)		.343	.034	.045
	N	11	11	11	11
negative posttest	Pearson Correlation	.316	1	-.085	-.606*
	Sig. (2-tailed)	.343		.803	.048
	N	11	11	11	11
AXIS PRETEST	Pearson Correlation	-.640*	-.085	1	.240
	Sig. (2-tailed)	.034	.803		.476
	N	11	11	11	11
AXIS POSTTEST	Pearson Correlation	-.613*	-.606*	.240	1
	Sig. (2-tailed)	.045	.048	.476	
	N	11	11	11	11

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Means control group only

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
positive pretest * positive posstest	11	100.0%	0	.0%	11	100.0%

Report

positive pretest

positive posstest	Mean	N	Std. Deviation
.00	1.0000	1	.
1.00	1.0000	1	.
3.00	4.0000	1	.
5.00	3.0000	2	1.41421
7.00	10.0000	2	1.41421
8.00	12.0000	1	.
9.00	7.0000	2	.00000
12.00	15.0000	1	.
Total	6.6364	11	4.71747

ANOVA Table

		Sum of Squares	df	Mean Square	F	Sig.
positive pretest * positive posstest	Between Groups (Combined)	218.545	7	31.221	23.416	.013
	Within Groups	4.000	3	1.333		
	Total	222.545	10			

Measures of Association

	Eta	Eta Squared
positive pretest * positive posstest	.991	.982

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
negative pretest * negative posttest	11	100.0%	0	.0%	11	100.0%

Report

negative pretest

negative posttest	Mean	N	Std. Deviation
.00	2.1667	6	.75277
2.00	2.2000	5	.83666
Total	2.1818	11	.75076

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
negative pretest * negative posttest	Between Groups	(Combined)	.003	1	.003	.005	.946
	Within Groups		5.633	9	.626		
	Total		5.636	10			

Measures of Association

	Eta	Eta Squared
negative pretest * negative posttest	.023	.001

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
BAI SCORE PRETEST * BAI SCORE POSTTEST	11	100.0%	0	.0%	11	100.0%

Report

BAI SCORE PRETEST

BAI SCORE POSTTEST	Mean	N	Std. Deviation
.00	8.0000	4	9.48683
1.00	11.6667	3	4.04145
3.00	8.0000	1	.
4.00	28.0000	1	.
11.00	8.0000	1	.
22.00	25.0000	1	.
Total	12.3636	11	9.06943

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
BAI SCORE PRETEST * BAI SCORE POSTTEST	Between Groups	(Combined)	519.879	5	103.976	1.718	.284
	Within Groups		302.667	5	60.533		
	Total		822.545	10			

Measures of Association

	Eta	Eta Squared
BAI SCORE PRETEST * BAI SCORE POSTTEST	.795	.632

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
BAI RANGE PRETEST * BAI RANGE POSTTEST	11	100.0%	0	.0%	11	100.0%

Report

BAI RANGE PRETEST

BAI RANGE POSTTEST	Mean	N	Std. Deviation
MINIMAL	2.1111	9	1.05409
MODERATE	2.5000	2	.70711
Total	2.1818	11	.98165

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
BAI RANGE PRETEST * BAI RANGE POSTTEST	Between Groups	(Combined)	.247	1	.247	.237	.638
	Within Groups		9.389	9	1.043		
	Total		9.636	10			

Measures of Association

	Eta	Eta Squared
BAI RANGE PRETEST * BAI RANGE POSTTEST	.160	.026

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
BDI II SCORE PRETEST * BDI II SCORE POSTTEST	11	100.0%	0	.0%	11	100.0%

Report

BDI II SCORE PRETEST

BDI II SCORE POSTTEST	Mean	N	Std. Deviation
.00	6.0000	1	.
1.00	22.0000	1	.
2.00	19.0000	1	.
3.00	30.5000	2	6.36396
5.00	28.5000	2	7.77817
6.00	30.0000	1	.
8.00	28.0000	1	.
25.00	29.0000	1	.
39.00	32.0000	1	.
Total	25.8182	11	8.26823

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
BDI II SCORE PRETEST * BDI II SCORE POSTTEST	Between Groups	(Combined)	582.636	8	72.830	1.442	.472
	Within Groups		101.000	2	50.500		
	Total		683.636	10			

Measures of Association

	Eta	Eta Squared
BDI II SCORE PRETEST * BDI II SCORE POSTTEST	.923	.852

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
BDI II RANGE PRETEST * BDI II RANGE POSTTEST	11	100.0%	0	.0%	11	100.0%

Report

BDI II RANGE PRETEST

BDI II RANGE POSTTEST	Mean	N	Std. Deviation
MINIMAL	3.1111	9	.92796
MODERATE	3.0000	1	.
SEVERE	4.0000	1	.
Total	3.1818	11	.87386

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
BDI II RANGE PRETEST * BDI II RANGE POSTTEST	Between Groups	(Combined)	.747	2	.374	.434	.662
	Within Groups		6.889	8	.861		
	Total		7.636	10			

Measures of Association

	Eta	Eta Squared
BDI II RANGE PRETEST * BDI II RANGE POSTTEST	.313	.098

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
AXIS PRETEST * AXIS POSTTEST	11	100.0%	0	.0%	11	100.0%

Report

AXIS PRETEST

AXIS POSTTEST	Mean	N	Std. Deviation
20.00	20.0000	1	.
30.00	35.0000	1	.
35.00	20.0000	1	.
40.00	40.0000	1	.
41.00	25.0000	1	.
50.00	27.5000	2	3.53553
60.00	30.0000	1	.
65.00	20.0000	2	7.07107
90.00	40.0000	1	.
Total	27.7273	11	8.17424

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
AXIS PRETEST * AXIS POSTTEST	Between Groups	(Combined)	605.682	8	75.710	2.423	.325
	Within Groups		62.500	2	31.250		
	Total		668.182	10			

Measures of Association

	Eta	Eta Squared
AXIS PRETEST * AXIS POSTTEST	.952	.906

Means for treatment group

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
positive pretest * positive posstest	11	100.0%	0	.0%	11	100.0%

Report

positive pretest

positive posstest	Mean	N	Std. Deviation
.00	2.0000	2	1.41421
1.00	9.0000	2	7.07107
2.00	3.5000	2	2.12132
3.00	6.0000	1	.
7.00	10.0000	1	.
8.00	6.0000	1	.
14.00	12.0000	1	.
17.00	13.0000	1	.
Total	6.9091	11	4.59248

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
positive pretest * positive posstest	Between Groups	(Combined)	154.409	7	22.058	1.171	.492
	Within Groups		56.500	3	18.833		
	Total		210.909	10			

Measures of Association

	Eta	Eta Squared
positive pretest * positive posstest	.856	.732

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
negative pretest * negative posttest	11	100.0%	0	.0%	11	100.0%

Report

negative pretest

negative posttest	Mean	N	Std. Deviation
.00	1.0000	9	.86603
2.00	2.0000	2	.00000
Total	1.1818	11	.87386

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
negative pretest * negative posttest	Between Groups	(Combined)	1.636	1	1.636	2.455	.152
	Within Groups		6.000	9	.667		
	Total		7.636	10			

Measures of Association

	Eta	Eta Squared
negative pretest * negative posttest	.463	.214

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
BAI SCORE PRETEST * BAI SCORE POSTTEST	11	100.0%	0	.0%	11	100.0%

Report

BAI SCORE PRETEST

BAI SCORE POSTTEST	Mean	N	Std. Deviation
.00	10.4286	7	7.56873
1.00	17.0000	1	.
2.00	10.0000	1	.
5.00	20.5000	2	21.92031
Total	12.8182	11	10.03811

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
BAI SCORE PRETEST * BAI SCORE POSTTEST	Between Groups	(Combined)	183.422	3	61.141	.519	.682
	Within Groups		824.214	7	117.745		
	Total		1007.636	10			

Measures of Association

	Eta	Eta Squared
BAI SCORE PRETEST * BAI SCORE POSTTEST	.427	.182

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
BAI RANGE PRETEST * BAI RANGE POSTTEST	11	100.0%	0	.0%	11	100.0%

Report

BAI RANGE PRETEST

BAI RANGE POSTTEST	Mean	N	Std. Deviation
MINIMAL	2.0909	11	.94388
Total	2.0909	11	.94388

ANOVA Table[a]

a. Fewer than two groups - statistics for BAI RANGE PRETEST * BAI RANGE POSTTEST cannot be computed.

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
BDI II SCORE PRETEST * BDI II SCORE POSTTEST	11	100.0%	0	.0%	11	100.0%

Report

BDI II SCORE PRETEST

BDI II SCORE POSTTEST	Mean	N	Std. Deviation
.00	14.8333	6	9.76559
1.00	18.0000	2	2.82843
2.00	18.0000	1	.
3.00	32.0000	1	.
4.00	43.0000	1	.
Total	19.8182	11	11.53099

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
BDI II SCORE PRETEST * BDI II SCORE POSTTEST	Between Groups	(Combined)	844.803	4	211.201	2.614	.141
	Within Groups		484.833	6	80.806		
	Total		1329.636	10			

Measures of Association

	Eta	Eta Squared
BDI II SCORE PRETEST * BDI II SCORE POSTTEST	.797	.635

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
BDI II RANGE PRETEST * BDI II RANGE POSTTEST	11	100.0%	0	.0%	11	100.0%

Report

BDI II RANGE PRETEST

BDI II RANGE POSTTEST	Mean	N	Std. Deviation
MINIMAL	2.6364	11	1.02691
Total	2.6364	11	1.02691

ANOVA Table[a]

a. Fewer than two groups - statistics for BDI II RANGE PRETEST * BDI II RANGE POSTTEST cannot be computed.

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
AXIS PRETEST * AXIS POSTTEST	11	100.0%	0	.0%	11	100.0%

Report

AXIS PRETEST

AXIS POSTTEST	Mean	N	Std. Deviation
30.00	15.0000	1	.
40.00	20.0000	1	.
50.00	25.5000	2	7.77817
71.00	26.6667	3	7.63763
80.00	37.5000	2	3.53553
85.00	40.0000	1	.
90.00	35.0000	1	.
Total	28.7273	11	8.98989

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
AXIS PRETEST * AXIS POSTTEST	Between Groups	(Combined)	618.515	6	103.086	2.174	.236
	Within Groups		189.667	4	47.417		
	Total		808.182	10			

Measures of Association

	Eta	Eta Squared
AXIS PRETEST * AXIS POSTTEST	.875	.765

Appendix C

Example of Data Collection Questionnaire Booklet

PATIENT DETAILS BOOKLET

1. ***Interviewer's initials:*** _____ **2.1** ***Date of first interview*****:** ___DD__/___MM___/__YY___

3 ***Patient Number:*** _____

4. ***Gender:*** **Male** **Female** **5.** ***Age:***

6. ***Race*****:** **African** **Asian** **Coloured** **White**

Home Language**:**_____

Highest level of education completed (circle grade/option):

7.

None	**1 2 3 4 5 6**	**7**	**8 9 10 11**	**12**	**Any Tertiary**

8. ***Employment status:***

1	Working full-time	**4**	Apprenticeship/internship	**7**	Housewife
2	Working part-time	**5**	Student/learner	**8**	Pensioner
3	Not working	**6**	Grant	**9**	Other: _____

		(i) Substance name (***write in***)	(ii) Routes of administration (***circle all relevant codes***)					(iii) Frequency past month (***circle one code***)				(iv) Age at 1st use (**years**)
13.	1st most frequently used		1	2	3	4	5	a	b	c	d	
14.	2nd most frequently used		1	2	3	4	5	a	b	c	d	
15.	3rd most frequently used		1	2	3	4	5	a	b	c	d	
16.	4th most frequently used		1	2	3	4	5	a	b	c	d	

(ii) Route: 1=swallow, 2=smoke, 3=snort/sniff, 4=inject, 5=other
(iii) Frequency: a=daily, b=2-6 days per week, c=Once per week or less often, d=not used in past month

17. ***Has the patient ever been in hospital prior to this time?***

Yes	**No**	**No. of times?**

18.1 ***What is the participants current behaviour?***

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

19.1 ***Current Medication:***

Chemical Name	Trade Name	Form	Dosage	Times per day
Biperiden	Akineton	Tablet	2 mgm	3 x daily
Lithium Carbonate	Camcolit	Tablet	200 mgm	3 x daily
Zuclopenthixol Dec	Clopixol Depot	Vial	200 mgm	Monthly
Orphenadrine	Disipal	Tablet	50 mgm	3 x daily
Phenytoin	Epanutin	Tablet	300 mgm	At night
Valproate Sodium	Epilim	Tablet	200 mgm	3 x daily
Chlorpromaxine	Largactil	Tablet	100 mgm	3 x daily
Clozapine	Leponex	Tablet	100 mgm	3 x daily
Fluphenazine Dec	Modecate	Vial	25 mgm	Monthly
Fluoxetine	Prozac	Capsule	20 mgm	Mornings
Haloperidol	Serenace	Tablet	5 mgm	3 x daily
Carbamazepine	Tegretol	Tablet	200 mgm	3 x daily
Amitriptyline	Tryptanol	Tablet	75 mgm	At night
Other				
Other				

20.1 ***Current Treatment:***

Medication	Exercise Therapy

Psychotherapy :

Occupational Therapy :

Ward activities :

PRE-INTERVENTION DIAGNOSIS

21.1 Present Positive Symptoms

Delusions

- Delusions of grandeur
- Delusions of control
- Delusions of persecution
- Delusions of references
- Delusions of withdrawal
- Religiose
- Somatic
- Thought insertion
- Other(s)

Perceptual Distortions

- Auditory
- Visual
- Olfactory
- Gustatory
- Tactile
- Other(s)

Catatonic behaviour

- Decreased reactivity
- Catatonic stupor
- Rigid postures
- Catatonic rigidity
- Catatonic negativism
- Catatonic posturing
- Catatonic excitement
- Other(s)

Disorganised Behaviour

- Childlike silliness
- Unpredictable agitation
- Can't manage life
- Can't maintain hygiene
- Untidy
- Unusual Dress
- Improper sexual behaviour
- Other(s)

Disorganised thinking

- Formal thought disorder
- Loosening of association
- Thought broadcasting
- Lack of insight into symptoms
- Other(s)

Disorganised speech

- Derailment
- Tangentiality
- Incoherence / world salad
- Other(s)

Total

22.1 Present Negative Symptoms

- Alogia
- Avolition
- Flat/Blunted affect
- Other(s)

23.1 BAI

- 0 - 7 Minimal
- 8 - 15 Mild
- 16 - 25 Moderate
- 26 - 63 Severe
- Other(s)
- Date
- Tester

24.1 BDI-II

- 0 - 9 Minimal
- 10-16 Mild
- 16 - 29 Moderate
- 30 - 63 Severe
- Other(s)
- Date
- Tester

25.1 DSM-IV Diagnosis

Axis I

Axis II

Axis III

Axis IV

Axis V

Pre-Intervention Interview

26. Before being hospitalised how often and how far did the participant walk a day? (Xhosa - Ngaphambi Kokuba Ulaliswe Esibhedlela ubuhamba umgama ongakanani ngosuku?)

27. Does the patient do any other kinds of exercise? **For example; do they have a physical job or do they play sport? (Xhosa - Ingaba unayo into oyenzai eshukunisa umzimba enjengomesebenzi okanye ukudlala imidladlo?)**

28.1 Does *the patient feel that an exercise programme will help them to feel, think and function better; and why? (Xhosa - Ingaba ucinga okokuba le nkqubo yokushukunyiswa komzimba izaiwkunceda ukuba uzive kahuhle Okanye uphile kakuhle okanye uphile kakuhle? Kutheni ucnga ngolohlogo?)*

29.1 ***Does the client fall asleep easily at night? (Xhosa - Ulala kakuhle e'busuku? Ingaba awunangxa ki nobuthongo ebusuku?)***

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

30.1 Does the client sleep well through the night? (Xhosa - Ulala kakuhle ubusuke bonke?)

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

31.1 Does the client wake up easily in the morning? (Xhosa - Ingaba kulula ukuuuka ekuseni?)

_____
_____
_____
_____
_____
_____
_____
_____
_____

POST-INTERVENTION DIAGNOSIS

2.2 ***Date of second interview:*** ___DD__/___MM___/__YY___

21.2 Present Positive Symptoms

Delusions

- Delusions of grandeur
- Delusions of control
- Delusions of persecution
- Delusions of references
- Delusions of withdrawal
- Religiose
- Somatic
- Thought insertion
- Other(s)

Perceptual Distortions

- Auditory
- Visual
- Olfactory
- Gustatory
- Tactile
- Other(s)

Catatonic behaviour

- Decreased reactivity
- Catatonic stupor
- Rigid postures
- Catatonic rigidity
- Catatonic negativism
- Catatonic posturing
- Catatonic excitement
- Other(s)

Disorganised Behaviour

- Childlike silliness
- Unpredictable agitation
- Can't manage life
- Can't maintain hygiene
- Untidy
- Unusual Dress
- Improper sexual behaviour
- Other(s)

Disorganised thinking

- Formal thought disorder
- Loosening of association
- Thought broadcasting
- Lack of insight into symptoms
- Other(s)

Disorganised speech

- Derailment
- Tangentiality
- Incoherence / world salad
- Other(s)

Total

20.2 Current *Treatment:*

22.2 Present Negative Symptoms

- Alogia
- Avolition
- Flat/Blunted affect
- Other(s)

23.2 BAI

- 0 - 7 Minimal
- 8 - 15 Mild
- 16 - 25 Moderate
- 26 - 63 Severe
- Other(s)
- Date
- Tester

24.2 BDI-II

- 0 - 9 Minimal
- 10-16 Mild
- 16 - 29 Moderate
- 30 - 63 Severe
- Other(s)
- Date
- Tester

25.2 DSM-IV Diagnosis

Axis I

Axis II

Axis III

Axis IV

Axis V

Medication	Exercise Therapy

Psychotherapy :

Occupational Therapy :

Ward activities :

19.2 ***Current Medication:***

Chemical Name	Trade Name	Form	Dosage	Times per day
Biperiden	Akineton	Tablet	2 mgm	3 x daily
Lithium Carbonate	Camcolit	Tablet	200 mgm	3 x daily
Zuclopenthixol Dec	Clopixol Depot	Vial	200 mgm	Monthly
Orphenadrine	Disipal	Tablet	50 mgm	3 x daily
Phenytoin	Epanutin	Tablet	300 mgm	At night
Valproate Sodium	Epilim	Tablet	200 mgm	3 x daily
Chlorpromaxine	Largactil	Tablet	100 mgm	3 x daily
Clozapine	Leponex	Tablet	100 mgm	3 x daily
Fluphenazine Dec	Modecate	Vial	25 mgm	Monthly
Fluoxetine	Prozac	Capsule	20 mgm	Mornings
Haloperidol	Serenace	Tablet	5 mgm	3 x daily
Carbamazepine	Tegretol	Tablet	200 mgm	3 x daily
Amitriptyline	Tryptanol	Tablet	75 mgm	At night
Other				
Other				

18.2 ***What is the participants current behaviour? Is there a clinically significant improvement?***

Post-Intervention Interview

29.2 ***Does the client fall asleep easily at night? (Xhosa - Ulala kakuhle e'busuku? Ingaba awunangxa ki nobuthongo ebusuku?)***

30.2 Does the client sleep well through the night? (Xhosa - Ulala kakuhle ubusuke bonke?)

31.2 Does the client wake up easily in the morning? (Xhosa - Ingaba kulula ukuuuka ekuseni?)

32. Does the participant feel that the exercise helped them to sleep better? (Xhosa - Ingaba umguli uziva kumnceolo nq ukudlala okanye ukuhamba-hamba kumenza alala kakukle na?)

26.2 ***Does the patient feel that the intervention helped them to feel, think and function better and why? (Xhosa - Ingaba lento esiyezayo ikuncedile okokuba uziue kakuhle, veingekakulhle uphile kakuhle? Kutheni usitshonjalo?)***

33. ***Did the patient enjoy the walking (other) programme they undertook? and "Why?"***
(Xhosa - Ingaba uyonwabele inkqubo jokuhamba ebesiyesiza? Kutheni usitswo njalo?)

34. How hard did they find the walking (other) programme? (Xhosa - Ingaba kube nzima kangakonani ukuyenza?) Easy (Kulula), Moderate (Kuphakathi), or Difficult (Kunzime)?

35. ***Do you feel more physically, cognitively, and emotionally alive when you exercise? (Xhosa - Ingaba uzva betele emzimbeni, enoyeni nasengqondweni xa usenze imithambo?)***