The effect of the Tomatis Method on depressed young adults

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Hons. B.A.

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THE EFFECT OF THE TOMATIS METHOD ON DEPRESSED YOUNG ADULTS

ABSTRACT

In the current study the efficacy of the Tomatis Method (TM), was investigated with depressed young adults. The TM, a non-mainstream approach applicable to, amongst other psychological problems, depression, is based on sensori-neural integration training and psychotherapy.

The study was motivated by the paucity of research on Tomatis's (1974) assertion that the TM is effective with cases of "nervous depression". Depressed students, meeting DSM IV criteria for non-bipolar depression and manifesting at least moderate levels of depression on the BDI, were assigned to an experimental (n=9) and non-intervention control group (n=9) on availability grounds. Following pre-assessment the experimental group attended a Tomatis programme of 73 sessions and individual psychotherapy. The results confirmed the efficacy of the programme, in terms of practically significant reductions of depression, neuroticism and negative affect, and enhanced psychological well-being. No change occurred in the control group. While the results endorsed Tomatis's findings, methodological limitations necessitate further research, controlled for medication, psychotherapy and social support, to clarify remaining obscurities.

INTRODUCTION

Depression, currently the world's 4th largest health problem, has an estimated prevalence of 10.7% (Murray & Lopez, 1996). One of the most frequently observed psychological disorders even in college/university populations (Lester & Akandl, 1999), depression and suicidal preoccupation are also highly prevalent among South African students (Lester & Akandl, 1999). Given the morbidity and mortality associated with poor management of depression (American Psychiatric Association, 1994; Castonguay et al., 1999), as well as the need to nurture students as future leaders in society, the current study is an attempt to explore the efficacy of the Tomatis Method (TM) (Tomatis, 1991, 1994), a non-mainstream stimulation programme, in the management of depressed young adults.

Among the diversity of therapeutic approaches to depression (Bellack & Hersen, 1990; Castonguay et al., 1999), current mainstream treatment modalities for depression range from psychological interventions, primarily comprising cognitive behavioural therapy (CBT) (Bellack & Hersen, 1990), to psychiatric interventions like pharmacotherapy (Hollon & Garber, 1990; Hollon et al. 1992; Hollon et al., 1991) and electro-convulsive therapy (ECT) (Kaplan et al., 1994), an effective, but intrusive intervention, impacting negatively on short-term memory.

Etiologically the psychological approaches are embedded in, but not exclusively restricted to, early childhood experiences of loss of love objects, as portrayed in the psychodynamic approach (Bellack & Hersen, 1990; Freud, 1949; Karasu, 1990). Resultant cognitive distortions, ultimately manifesting in negative automatic thoughts, as conceptualised among cognitive behavioural therapists, are strongly associated with depression in later life (Beck & Haaga, 1992; Chang & Bridgewell, 1998; Freeman & Greenwood, 1987).

Consequently, psychotherapy with depressed patients, including students, is based on the development of a trusting relationship (Bellack & Hersen, 1990; Corsini & Wedding, 1989; Smith & Fitzpatrick, 1995), permitting the application of various therapeutic techniques, including cognitive restructuring, relaxation and behavioural experiments, applied to overcome depression (Beck & Haaga, 1992; Freeman & Greenwood, 1987). Psychodynamically, the onset of depression is viewed as the result of loss of a loved object and introjection of unconscious aggression, resulting in self-directed aggression (Bellack & Hersen, 1990; Freud, 1949; Karasu, 1990).

Relative to other psychological interventions, CBT is regarded as equally effective or better than pharmacotherapy in preventing post-termination relapse (Gortner et al., 1998; Hall & Robertson, 1998). Contrary to traditional attributions of therapeutic efficacy with depressed patients, to cognitive restructuring per sé (Bellack & Hersen, 1990; Beck & Haaga, l992; Freeman & Greenwood, 1987), recent attributions have been extended beyond therapeutic techniques to neurophysiological structures, i.e. a contemporary study found CBT to be twice as effective in depressed clients *with right ear dominance* (Bruder et al., 1997).

This association resonates with the "non-mainstream"-approach of Tomatis who, decades ago, documented the successful treatment of "nervous" depression by means of sound stimulation (Tomatis, 1974). Tomatis's method, evaluated with depressed young adults in the current study, is based on the interaction and interdependence of hearing and listening (audio), language and speech (phonology) and psychological attitude (psycho). The method is characterised as audio-psycho-phonology, the Tomatis Method (TM), sound stimulation (Gilmor et al., 1989; Tomatis, 1991; 1994), or sensori-neural integration training (De la Roque, 1998).

Although not presenting a systematised theory of depression, Tomatis's writings allude to possible causes of depression and a therapeutic approach,

applicable to 'nervous depression'. Though positing a unique, research based, auditory stimulation context, (Madaule, 1994; Tomatis, 1991; 1994), beneficial across a diversity of psychological problems, from learning difficulties (Stutt, 1983) to autistic spectrum disorders (Neysmith-Roy, 2001) its relation with the above approaches, will be briefly indicated. The central thread in Tomatis's theory is that the well-being of individuals is intimately linked to their auditory functioning (Van Jaarsveld & Du Plessis, 1988; Madaule, 1994; Tomatis, 1991). He posited that persons are motivated by a desire to communicate (listen), originating concurrently with the capacity to perceive the maternal voice, in utero, 4.5 months prior to birth (Gilmor et al., 1989; Tomatis, 1991, 1994).

The experience of traumatic life events, including pre- or postnatal rejection, as well as the death of a loved one, may result in a closing of the auditory "diaphragm" (Tomatis, 1991; Tomatis, 1994). Thus a disconnection of the listening function in relation to the external environment, and especially interpersonal relationships, is induced (Tomatis, 1991; 1994), endorsing the psychodynamic view of early onset of psychological problems (Karasu, 1990).

While the initial result of "disconnection", is anxiety (Tomatis, 1991; 1994), it is unclear whether depression arises as a result of unabated anxiety. Tomatis argues that the depressed, emotionally isolated person experiences diminished listening and becomes preoccupied with his/her internal environment (Tomatis, 1974). Hence, the cognitive behavioural emphasis on negative automatic thoughts is in keeping with the above notion of loss of auditory perception and persistent clinging to idiosyncratic beliefs (Karasu, 1990; Chang & Bridgewell, 1998).

The general therapeutic aim of the TM is to rekindle the original desire to communicate by re-exposing individuals to a simulation of their prenatal sound world (Gilmor et al., 1989; Madaule, 1994; Tomatis, 1991). In this regard, the Tomatis Method surpasses conventional approaches by creating an auditive "holding environment", as emphasised by Winnicott (1960), through the use of

the maternal voice, or recordings of Mozart's violin concertos, progressively filtered to create high frequency stimulation, which result in a "microgymnastic" of the middle ear muscles. This is done by means of the Electronic Ear, an apparatus devised and refined by Tomatis (1991; 1994), that progressively focuses the sound stimuli onto the depressed person's right ear, to facilitate a right auditory dominance and concurrent stimulation of the language area of the left hemisphere. This explains why CBT is bound to be more successful with depressed patients, with right auditory lateralization.

Since the high frequency sounds are transformed into energy impulses in the organ of Corti in the inner ear (Madaule, 1994; Tomatis, 1991) and transmitted to the brain stem and brain, the cerebral cortex is recharged and the energy distributed throughout the body (De la Roque, 1998). In this way, the depressed person is hypothesised to become energised, regain the desire to communicate and experience a motivational charge. The "recharge" through sound is reminiscent of the "antidepressant" electric discharge in electro-convulsive therapy (ECT), but without the latter's intrusiveness. Sound stimulation by means of the TM has to be complemented by appropriate counselling to guide the person through the process (Tomatis, 1991; 1994).

The first leg of a programme consists of 60 half-hour sessions, augmented by further shorter programmes of 30 sessions each, until the desired result is obtained (Tomatis, 1991; 1994). Abroad listening programmes average around 150 half-hour listening sessions (Sollier, 1996).

Contrary to the research attention afforded by Tomatis's notion that the TM is associated with anxiety reduction (Du Plessis & Van Jaarsveld, 1988; Du Plessis, 1982); the same cannot be said about its effect on depression. Tomatis's (1974) original paper documented case studies, without formal assessments by means of self-report questionnaires, and without control groups. Regrettably, it has only evoked scant research interest. Minson (1997), a psychiatrist, commented favourably on the impact of the method, stating that

depression is often the result of the realization that existential potentialities are not optimally fulfilled. The energising effect of the Tomatis Method is thus believed to enable depressed individuals to communicate more freely, thereby facilitating a more concise redefinition of emotional problems in a problem-focused way (Minson, 1997; Madaule, 1994; Tomatis, 1991). On account of Minson's existential stance, deemed useful since the majority of participants were graduate students, preparing to enter the labor market, and confront existential transitions to new life tasks, it was decided to include an existential thread in the study.

To date, Botes's mini dissertation (1979) appears to be the only systematic outcome study on the impact of the TM with depressed female students. Three cases, substantiated with pre-post programme assessments pertaining to cognitive, affective and interpersonal functioning, were described. Her findings, primarily indicative of reduced depression, are interesting, but because of the small sample (n=3) and non-involvement of a control group, of limited significance.

However, the finding that cognitive functioning increased significantly at post assessment, suggesting that symptom reduction was coupled with enhanced psychological well-being, merited further investigation, as two previous studies (Du Plessis et al., 2000) and Rolf (1998), both involving non-clinical samples, also resulted in enhanced psychological well-being.

Psychological research across the world appears not to be exclusively focussed on the pathogenic paradigm any more. Instead, evidence of a progressive focus on psychological well-being as well, is noted, diversely conceptualised and operationalised in terms of positive psychology (Seligman & Csikszentmihalyi, 2000); psychological well-being (Ryff & Keyes, 1995; Ryff & Singer, 1998); salutogenesis (Antonovsky, 1987, 1992); fortigenesis/origin and development of human strengths (Wissing & Van Eeden, 1998; 1999).

Thus the paucity of research on the impact of the TM on depression, warranted further, more rigorously structured, investigation. To obtain meaningful results in the contemporary research context, both a pathogenic (assessment of depression and negative affect) and fortigenic perspective (assessment of psychological well-being), would thus be required.

AIMS

The investigation was aimed at assessing whether participation in the programme would:

(i) reduce depression, negative affect, and

(ii) angry hostility, a prominent feature of depression among adolescents and young adults (Reinecke et al., 1998), was measured in the current study by the NEO PI-R, and distinguished from negative affect, measured by the AFM2, despite possible conceptual overlap;

(iii) enhance psychological well-being in terms of satisfaction with life, sense of coherence and purpose in life.

It was hypothesised that participation in the Tomatis programme would lead to reduced depression, negative affect and angry hostility, and enhance psychological well-being, as expressed in terms of positive-negative affect balance, sense of coherence and purpose in life.

METHOD

Research design

A two group pre-post-assessment design was used.

Participants

Twenty depressed individuals (15 females and 5 males) from Potchefstroom were recruited to participate in the study and assigned to an experimental (n=9) and control group (n=9) on availability grounds. All but 2 were university students.

Procedure

The study was introduced to a depression support group on campus and an undergraduate psychology class. Prospective participants were then individually screened in terms of two inclusion criteria, namely

(i) meeting the DSM IV criteria for depression, distinguished as: major depressive episode, recurrent; dysthymic disorder; and major depressive disorder (APA, I994); and

(ii) achieving a minimum cut-off score of 8 on the Beck Depression Inventory (BDI), indicative of at least suffering from a moderate degree of depression.

Participants who met DSM IV criteria, and achieved the cut off score on the BDI, were provided information on the study, including a time frame, informed that it was their choice to enter into the Tomatis programme, or decline involvement, and that they could withdraw at any time, even if they initially opted to participate. Thus informed consent was obtained. Two full-time employed participants suffering from major depression, were included as well. Once identified, participants were interviewed comprehensively and thereafter assessed psychometrically.

Experimental participants were requested to draw pictures with wax crayons on A3 paper, at the onset, in the middle of, and after the programme, to express their thoughts and feelings at the time, by means of a metaphor, coupled with brief, explanatory notes. Drawings by one of the participants are presented as a case study in Drawing 1, 2 and 3.

Together with the other pre-post-assessments, the Profile of Mood States (POMS), was used to monitor the experimental group's progress *during* the Tomatis programme, after 20 and 40 half-hour sessions.

Control group members were offered participation in a programme after completion of post-assessment.

A 4-week lapse occurred between pre- and post-assessment.

A high attrition rate of 20% occurred, since 2 experimental participants ended their involvement, respectively because of termination of studies and experiencing the programme as too time consuming.

Measuring instruments

Beck Depression Inventory

The BDI (Beck & Beamesderfer, 1974) is a self-rating assessment instrument based on the cognitive approach and composed of 21 categories of symptoms and attitudes, with each category describing a specific behavioural manifestation of depression (Beck, 1991; Beck & Steer, 1991; Beck et al., 1961).

Internal consistency, as indicated by the Kruskal-Wallis parametric analysis of variance by ranks, showed a significant relationship at the 0.001 level for all categories, except category S, which is significant at the 0.01 level. Reliability, as indicated by a Pearson coefficient, is 0,86, while the test-retest method and inter-rater reliability confirmed the stability of the test (Beck et al., 1961). A progressively higher mean score with each increment in the magnitude of depression, was confirmed by the Kruskal-Wallis one-way analysis of variance by ranks and the Mann-Whitney U test (Beck et al., 1961). In the current study a high Cronbach alpha coefficient of 0.80 was obtained.

Affectometer 2 (AFM2)

The AFM2 is an inventory of general happiness or sense of well-being, based on measuring the balance of positive and negative feelings in recent experience (Kammann & Flett, 1983). An alpha coefficient of 0,95 confirmed the scale's internal consistency, while an analysis of stability over time also yielded favourable results. Wissing & Van Eeden (1998) reported Cronbach alpha coefficients of 0,86, 0,9 and 0,02 for positive affect, negative affect and positive-negative affect balance respectively in South African populations. In the current study a Cronbach alpha reliability of 0.83 and 0.70 for positive and negative affect respectively, confirmed satisfactory reliability.

Sense of Coherence Scale (SOC)

The SOC, a 29-item semantic differential questionnaire explaining the maintenance or improvement of location on a health ease/dis-ease continuum, provides a global orientation of the extent to which a person has a pervasive, enduring and dynamic feeling of confidence, thus constituting a measure of psychological well-being (Antonovsky, 1987; 1993). Cronbach alpha coefficient measures of internal consistency range from 0,82 to 0,95. Wissing & Van Eeden (1998) reported a Cronbach alpha coefficient of 0,85 for South African populations. The systematic procedure used in scale construction and examination of the final product points to a high level of content, face and consensual validity, while the data sets available indicate a high level of construct validity (Antonovsky, 1993). A high Cronbach alpha coefficient of 0.83, consistent with Wissing & Van Eeden's findings, was obtained in the current study and hence confirmed its reliability.

Purpose in Life Test (PIL)

The PIL is a 20-item attitude scale designed to assess the degree to which a person perceives a sense of meaning and purpose in life, scored on a Lickert scale (Moomal, 1999). Crumbaugh & Maholick (1969) reported that the PIL has the necessary construct validity and reliability. A Cronbach alpha of 0.92 confirmed its reliability in the current study. Although overlapping with the SOC (Moomal, 1999), the PIL was included as the flagship instrument, within Frankl's Logotherapeutic perspective, the most representative strand of the existential approach (Corey, 1995; Corsini & Wedding, 1989; Stricker & Gold, 1993) on account of Minson's (1997) observations of the recovery of existential potentialities in the course of a Tomatis programme.

Revised NEO Personality Inventory (NEO PI-R)

The NEO PI-R, a 240-item scale, is a concise measure of the major dimensions of personality and some of the more important traits that define each domain (Costa & McCrae, 1992). It comprises five sub-scales, namely Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness (Costa & McCrae, 1992). In the current study only the Neuroticism dimension, comprising the following sub-scales: anxiety, angry hostility, depression, self-consciousness, impulsiveness and vulnerability, was used, as a measure of negative affect, together with the negative affect sub-scale of the AFM2. Angry hostility was separately assessed, in view of its importance in adolescent and young adult depression. Reasonable internal consistency was obtained by the following Cronbach alpha's: *Neuroticism* = 0.56; *Extraversion* = 0.50; *Openness* = 0.50; *Agreeableness* = 0.60 and *Conscientiousness* = 0.61. Sufficient test-retest reliability over time intervals and validity index were also confirmed (Costa & McCrae, 1992). In the current study Cronbach alphas of respectively 0.70 for N, 0.84 for E, 0.68 for O, 0.52 for A, 0.86 for C and 0.64 for angry hostility confirmed its reliability.

Profile of Mood States (POMS)

The POMS is a checklist of 65 items, measuring various mood states (McNair et al., 1992). Adequate test-retest reliability, internal consistency and construct validity are reported (McNair et al., 1992). In the current study high Cronbach alphas were obtained for *Tension* = 0.87; *Depression* = 0.89; *Anger* = 0.89; *Vigor* = 0.49; *Fatigue* = 0.88 and *Confusion* = 0.64.

The Tomatis programme

Experimental group

Participants were divided into two groups and attended the Tomatis programme during different time slots, to suit the needs of both participants and researcher. A minimum of 60 half-hour sessions of auditory stimulation by means of the Electronic Ear was attended. Four participants opted for an additional 30 sessions, following a three-week break. Overall, the participants listened to an average of 73 half-hour sessions, at a rate of 5 sessions per evening, 4 days a week, over a 4-week period.

The stimulation programme comprised three phases, first, a preparatory phase called 'inverse sonic birth' (Madaule, 1994; Tomatis, 1991); during which participants were exposed to progressively more extensively filtered reproductions of Mozart's violin concertos. The first phase, lasting 15 half-hour sessions, was followed by an average of 40 sessions of filtered music. The final phase constituted audio-vocal training lasting an average of 5 sessions (Tomatis, 1991; 1994). The participants articulated words from literature, usually *The Little Prince*, into a microphone. The Electronic Ear modified the verbal input; to feed back their voices, enriched in the middle and high frequencies. The 4 participants who completed 90 sessions included an additional 25 half-hour sessions of filtered music, and 5 more audio-vocal training sessions.

Concomitant psychotherapy

Each participant attended an average of 7 psychotherapeutic interviews of 1 hour each, involving combined short-term cognitive behavioural-, existential - and psychodynamic therapy. The researcher followed an eclectic approach, widely recognised as an effective psychotherapeutic intervention strategy (Stricker & Gold, 1993) in individual sessions, which consistently began with a comprehensive interview. In line with CBT, a collaborative relationship was established in which therapist and client formulated therapeutic aims for change, followed by identifying cognitive distortions and automatic thoughts which were altered through a variety of cognitive and behavioural techniques, including assertiveness and social skills training plus homework assignments. During individual therapy, conducted at intervals during the course of the programme, at least once a week, clients were encouraged to identify, seek and explore social, academic and familial issues that contributed to meaning in their lives. Existential issues often emerged in the latter part of the programme. Clients were also encouraged to explore interpersonal and academic problems and guided to understand their defence mechanisms.

Control group

No intervention was carried out in this group, but members were given the opportunity to participate in a separate programme after post-assessment results were obtained. Only 4 members chose to participate, of whom none completed the programme.

Assessing pre-treatment group equivalence

Since both groups were based on availability samples of depressed participants, not randomly allocated, it was important to establish the degree of pre-treatment equivalence across groups, for all psychometric variables and clinical

characteristics involved. Results of the Wilcoxon Rangsumtest (WRT), measuring pre-programme differences, are presented in Table 1.

Table 1 here

From the results of Table 1 it was clear that no differences occurred between the experimental and control group, on depression, negative affect, neuroticism, and angry hostility, confirming pre-treatment group equivalence concerning symptomatic behaviour. In terms of the norms of the BDI, both groups could be described as severely depressed (mean BDI, both groups>16). In comparison to the mean score obtained by a non-clinical group of young adult South Africans (Van der Walt, 1996), the mean neuroticism score of both groups exceeded the normative mean score by 1 standard deviation. Thus, a high degree of emotional instability was confirmed for all participants, at pre-assessment. The high level of morbidity consequently also reduced the total group's level of psychological well-being. Their mean score of 97.9 on sense of coherence was nearly two standard deviations below the mean score of the normative group of young adult South Africans (Van der Walt, 1996).

Only on Purpose In Life did the experimental group show a tendency towards higher scores than the control group (d=0.576). The low overall mean score of 76.6 on the PIL, confirmed a lack of clear sense of purpose in life, further amplifying the plight of both groups.

Clinical characteristics of the participants are depicted in Table 2.

Table 2 here

As shown in Table 2 the majority of participants were postgraduate students, indicating that despite a history of depression, they were still able to pursue their academic careers, thus reflecting sustained resilience. Since only 11.11 % were first-year students, the group's depression could not primarily be

attributed to difficulties to adapt to the challenges of university life. Numerous markers confirmed the presence of severe depression among participants: the majority received psychotherapy on previous occasions, while 44% of the experimental and 33% of the control members had been taking antidepressants (serotonin-specific reuptake inhibitors) (SRI's) for at least the preceding 6 weeks. A total of 8 participants, 4 in the experimental and 4 in the control group, consulted a psychiatrist at least once before the onset of the programme. In keeping with findings of Puig-Antich & Rabinovich (1986) and Tuma & Maser (1985), many had a family history of depression, possibly indicative of genetic predispositions.

A striking finding was that the majority of participants were first born, thus supporting a hypothesised association between ordinal position and depression, although such an association has not been well documented in clinical studies (Gittelman, 1986).

Ornish's claim of an association between smoking and depression (Ornish, 2000), might possibly be linked to the finding that the majority of experimental participants were smokers.

Noteworthy 72.22% of the participants were single and not involved in romantic relationships, possibly portraying social withdrawal, lack of self-esteem and low self-confidence, characteristic of depressed individuals (APA, 1994; Kaplan & Sadock , 1998).

Overall, the biographical data confirmed comparability across groups in terms of gender, marital status, ordinal position, student status and previous psychotherapy. Age ranged between 20–24 years for the majority of both groups.

Despite global evidence of pre-treatment group equivalence, possible reasons why experimental participants involved themselves in the Tomatis programme, also emerged. Antidepressants were used by almost twice as many as in the control group, and regular smoking featured almost 5 times as

prominent among them than among the control group. Since almost 66% of them were post-graduate students compared to only 44% of the control group, the demands of advanced studies amid depression, were clearly more problematic for them.

RESULTS

Statistics

The SAS/STAT System for Windows release 6.12 (1996) was used for the statistical analyses. Descriptive statistics (means and standard deviations) and Cronbach alpha reliability indices were computed for each scale and/or sub-scales. The significance of differences within groups was computed by means of the Wilcoxon sign rank test, and between groups by means of the Wilcoxon Ranksum Test (Cohen, 1977).

Although the use of p-values were excluded, since the study was based on availability samples, p-values were noted, together with Cohen's d-values, (Cohen, 1977), in terms of which the degree of practical significance between or within groups was established. An effect size of (d=0.5) was regarded as indicative of a tendency towards practical significance, while an effect size of (d=0.8) was indicative of a large, practical difference.

Reduction of depression, neuroticism and negative affect

Significant pre-post differences within the experimental group are provided in Table 3.

Table 3 here

From Table 3 it was clear that levels of depression on the BDI were reduced practically significantly (d=0.957). Further practically significant reductions occurred on negative affect, measured by the AFM2 (d=0.828), and Neuroticism (d=0.933). In contrast, no reduction occurred on angry hostility.

Significant pre-post differences within the control group are portrayed in Table 4.

Table 4 here

From Table 4 it was clear that no significant reduction of depression, neuroticism or negative affect occurred within the control group. The significance of pre-post-differences between the experimental and control group are presented on Table 5.

Table 5 here

From Table 5 it was clear that large practical differences occurred on all variables, confirming the findings of the significant differences within the experimental group.

Enhancement of psychological well-being

From Table 3 it was also clear that a significant enhancement of psychological well-being occurred in the experimental group, in terms of: a large practical increase in positive affect on the AFM2 (d=1.7); as well as on the positive-negative affect balance (d=0.848); and sense of coherence (d=1.157). A tendency towards enhancement of purpose in life occurred within the experimental group (d=0.578).

Finally vigor, a positive mood state, was enhanced practically significantly (d=1.623), within the first 20 listening sessions, while concomitant negative mood states were reduced rapidly as well, especially confusion (d=1.405) and tension (d=1.259).

In contrast to enhanced psychological well-being in the experimental group, Table 4 showed that no change occurred in the control group. Similarly, no enhancement of vigor occurred in the Control group (see Graph 1).

Graph 1 here

DISCUSSION

The results of the study provided psychometric support for the hypothesis that the Tomatis Method, in combination with individual psychotherapy, is associated with reduced depression and, surprisingly, enhanced psychological well-being, both of which are discussed below.

Reduction in depression, negative affect and angry hostility

Severe depression, established at pre-assessment, became reduced to mild depression (mean post-assessment score on BDI>4<7). This improvement was also validated by significant reduction in neuroticism, as the experimental group's mean post-assessment score was reduced by almost an entire standard deviation, in comparison to the mean score of the normative South African group. Negative affect was also significantly reduced, underlining the extensive recovery from pre-programme morbidity. The results replicated Botes's (l979) findings and Tomatis's original assertion of reduced "nervous' depression following the Tomatis programme. By defining depression more clearly in terms of DSM IV criteria for major depressive episode, recurrent; major depressive reaction and dysthymic disorder, further supported by a definite cut-off score on the BDI, the current results extend and further clarify Tomatis's original findings, based on the vague notion of "nervous" depression.

Based on the results on the BDI and AFM-2, personal observation and self-report, the experimental group also experienced an improvement in general mood and simultaneously reduced inadequacy and feelings of hopelessness and negative affect. Participants verbally reported that they felt more relaxed, an outcome confirmed by the test results, thus supporting Du Plessis's (1982) findings that the TM is associated with anxiety reduction.

From test results and participant self-report, a reduction also occurred in disruptive emotions such as feelings of fear, sadness, embarrassment and guilt, often characteristic of depression (APA, 1994). Members reported that they had

more energy to complete daily chores, supporting the assertion that the TM has an energising effect (Tomatis, 1991; 1994) – a finding of special relevance in a disorder characterised by chronic energy deficits (APA, 1994).

A number of factors contributed to the lowered depression. The assumption of reactivating individuals' desire to communicate (Madaule, 1994; Tomatis, 1991; 1994) enabled participants to overcome their social withdrawal, so typical of depressive states (APA, 1994; Reinecke et al., 1998). Thus the energising effect of sound stimulation, transformed into energy impulses in the inner ear (Tomatis, 1991; 1994) provided participants with energy to confront problematic issues in their lives and taking constructive measures to cope with these issues. The energising effect was confirmed by the Vigor sub-scale on the POMS (see Graph 2). However, the impact of individual psychotherapy and antidepressant medication also need to be acknowledged.

Graph 2 here

In attempting to understand the reduction of depression and negative affect, one can only assume that the programme provided a therapeutic/growth context, in which various complex interactions occurred: between sound stimulation, antidepressants, researcher and participants and participants among themselves, which can hardly be isolated to discern the effect of each. At a minimum one can state that the lack of change among control group members, devoid of this therapeutic context, points to the robustness of the treatment "package", consisting of audio-psycho-phonological, interpersonal, therapeutic and biochemical factors.

The hypothesis that angry hostility would be decreased, could not be supported. Although the potential for irritability remained, the POMS scores suggested a lowering of anger, possibly indicating increased frustration tolerance in the experimental group.

Valuable lessons were learnt from the 2 non-completers. One male, diagnosed with childhood Attention-Deficit/Hyperactivity Disorder (ADHD) , experienced severe depression according to the BDI. Initially progressing well on the programme, he gradually lost heart because of consistent poor academic performance, ending in academic (and programme) termination.

The other, a perfectionistic female undergraduate music student, with passive aggressive tendencies, deserted after 30 sessions and stated that she could no longer accommodate the programme in her tight study schedule. The researcher belatedly learnt that prospective participants with chronic comorbidity or overly busy schedules should not be granted access to brief Tomatis programmes.

Enhancement of general psychological well-being

The significant enhancement in experimental participants' level of psychological well-being, over and above their reduced depression and negative affect, was consistent with Minson's (1997) view that the TM helps clients to rediscover their inner motivation, zest for life and existential reasons for living. Scores on sense of coherence increased by one standard deviation in comparison to the mean score of the normative South African group, implying that they were now on par with them.Thus the results denoted significantly increased confidence that their inner and outer worlds were well structured, coherent and predictable, and furthermore, that resources were available to meet the demands posed by environmental stimuli. Increased Purpose in Life scores also indicated their acknowledgement that life was more meaningful than before, possibly believing that programme participation implied self-controlled, proactive management of their depression. Therefore, they felt more in control of their problems and aware of their well-being, possibly resulting in increased appreciation of purposefulness in their lives.

The enhancement in general psychological well-being corresponds with Lightsey's (1996) findings that positive thoughts reduce depression and potential

relapses. The experimental group clearly experienced a natural unfolding of more positive feelings and thoughts after completion of the programme, possibly attributable to the lowering of depression, as well as the reinforcement of positive thoughts that would hopefully prevent relapse episodes.

The effect of the programme was illustrated by the drawings of a 23-year old female, ms M., diagnosed by a psychiatrist with major depressive episodes, recurrent, a year prior to the programme. In Drawing 1, drawn at programme commencement, she drew a cat, noting that she felt like one, and added that "a cat spends the entire day sleeping in the sun.

Drawing 1 here

Every so often, it wakes up, stretches, eats, drinks water and continues sleeping." The metaphor vividly portrayed feline aloofness (disconnectedness) and the lack of energy and general passivity experienced in Ms. M.'s depressed state. She added that when the cat walked, "it moved lazily, tail between the legs and with its head hanging", clearly indicating how immobilised, vulnerable and hopeless she felt at the time.

At completion of 30 sessions (halfway through her involvement) she drew a parachutist (see Drawing 2).

Drawing 2 here

Her description was: "I feel like a parachutist, but when I jump, I am afraid and think twice whether I should jump or not." She explained the metaphor by saying that she had lately thought a lot about a romantic relationship, a major precipitant of her depression, terminated a year ago. She realised that she had to accept that it was irreversibly over, carry on with her life and seek another relationship. Refering to the parachutist's broad smile, she noted ..."she enjoys falling to the ground, because when your feet reach the ground and you look back, you realise that it was worth the jump and then you feel proud of yourself."

Drawing 2 obviously suggested enhanced energy (vigor) and willingness to take the risk of coming home to mother earth/her real self.

Drawing 3, a picture of the sun personified with a broad smile, was drawn after 60 sessions.

Drawing 3

M. wrote: "I feel like the sun and I am very cheerful. For the first time in a long while, I feel that I have found my place in the sun." The drawing aptly illustrated that programme participation brought about significant enhancement of psychological well-being and a heightened level of consciousness, as it was also underscored by her comments. Although the case study was interpreted subjectively, on the basis of her written comments, most of the trends were in keeping with observations made by the current researcher.

The metaphorical transition from aloof passivity to dynamic, controlled risk taking, concurred with rapid energy increases during the first 20 sessions of the programme. The energising effect of the programme, as expressed on the Vigor sub-scale of the POMS (see Graph 3), concurred with decreased confusion and tension. It was interesting that although tension was reduced within 20 sessions, fatigue only decreased after 60 sesssions.

Graph 3 here

Graph 3 vividly portrays the simultaneous enhancement of vigor, a positive mood state and reduction of various negative mood states. The current researcher believes that the energising effect of the sound stimulation resulted in accelerated cognitive functioning, furthering inherent potential toward decisiveness and problem solving, previously obscured by depression.

However, the maintenance of angry hostility necessitates a cautious interpretation of the findings on the whole, as it suggests that conflicts

underlying and possibly perpetuating depression had obviously not been eliminated completely. It is further borne out by the continued existence of mild depression. Also, the final mean PIL score of 108 indicated that, despite significant enhancement, participants were still not experiencing a clear sense of purpose in life (Crumbaugh & Maholick, 1969). A follow-up is clearly indicated.

Researcher/Therapist observations

To further the validity of the findings, some observations are briefly noted. The experimental participants became increasingly talkative and spontaneous during the course of the programme. Personal observation supported the findings of Graph 3, in which it was evident that during the first 20 sessions of the programme, there were significant increases in vigor/energy and communication, and decreases in tension and anxiety among them. They showed more resilience by becoming more flexible and decisive. Some initiated major life decisions during the programme. One girl terminated a chronically unstable, turbulent marriage. A postgraduate student, immobilised by procrastination, completed a long overdue assignment and subsequently his studies, shortly after the programme. Another participant obtained clarity regarding his masters research. The researcher believes that these observations were indicative of the energising effect of the TM, since it is thought that increased levels of energy mobilise depressed individuals to react more appropriately to life stressors which had demobilised their functioning up to that point.

Finally the researcher/therapist believes that his personal experience of the Tomatis programme as a Masters student, his developmental proximity regarding the participants, and their familiarity with psychotherapy, provided a favourable context for change.

Conclusions

The programme contributed to a demonstrable decrease in symptomatic behaviour and thus endorsed the findings of Tomatis (1974), Minson (1997) and Botes (1979). It also corresponded with observations of therapeutic growth in depressed patients attending the TM. It also lends credence to Tomatis (1991; 1994) claims that energy impulses derived from auditory stimulation are relayed to the cortex, thereby raising a client's awareness of emotional conflicts, enabling them to grapple with emotional conflicts constructively, gain emotional distance and discern coping options. However, several obscurities remain, as assumed interaction between auditory stimulation, medication, researcher-participant therapeutic interaction and inter-participant social support cannot be explained.

Despite their significance, the results are limited by methodological deficits. As random sampling was impossible, the results cannot be generalised to other depressed populations. Only based on Afrikaans-speaking students, replication studies involving culturally diverse groups are essential.

The current study, conducted in tandem with another student-participant based study (Vermeulen, in progress), precluded a follow up, to determine retention effects, because of the upcoming year-end examinations; as well as the use of the Tomatis Listening Test, to reduce cop-out risk among participants with tight study schedules, hence forfeiting potentially valuable data.

Finally, remaining obscurities, resulting from combining listening, individual psychotherapy, social support and antidepressant medication, should be resolved by a comparative outcome study involving the TM against an acknowledged therapeutic approach like CBT, controlled for variables like medication, as was conducted on anxiety in children (Du Plessis & Van Jaarsveld, 1988).

Table 1: Significant pre-assessment differences between experimental and control group

Variable	Experimental group (n = 9)	Control group (n = 9)		
	M	M	p	d
BDI	16.889	18.889	0.447	0.296 ♦
AFM-2				
PA	26.000	25.333	0.451	0.092
NA	32.000	30.778	0.859	0.222 ♦
PA – NA	-6.000	-5.444	0.657	0.044
SOC	102.222	92.667	0.085	0.424 ♦
PIL	83.556	69.556	0.116	0.576 ♦♦
NEO PI-R *Neuroticism*	120.444	124.111	0.556	0.212 ♦
NEO PI-R *Angry Hostility*	17.778	21.222	0.772	0.213 ♦
POMS				
TA	24.444	27.556	0.312	0.465 ♦♦
DP	31.556	36.333	0.376	0.486 ♦♦
A	28.000	28.778	0.859	0.071
V	10.667	11.222	0.893	0.151
F	17.778	19.000	0.504	0.191
CF	18.667	20.111	0.654	0.313 ♦

M - Mean, p – Statistical significance: Wilcoxon Signed Rank Test, d – Practical Significance: Wilcoxon Test, BDI – Beck Depression Inventory, AFM-2 – Affectometer 2, PA – Positive affect, NA – Negative affect, PA – NA – Positive – Negative affect, SOC – Sense of Coherence Scale, PIL – Purpose in Life Scale, NEO PI-R – NEO Personality Inventory – Revised, POMS – Profile of Mood States, TA– Tension Anxiety, DP – Depression, A – Anger, V – Vigor, F- Fatigue, CF - Confusion.

* $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$

♦ d = 0.2 – Small practical significance

♦♦ d = 0.5 – Medium practical significance

♦♦♦ d = 0.8 – Large practical significance

Table 2 Biographical profile of participants

	EG	CG	EG %	CG %	Total %
Gender					
Female	7	7	77.78	77.78	77.78
Male	2	2	22.22	22.22	22.22
Age					
Under 20 years	1	2	11.11	22.22	16.67
20-24 years	6	6	66.67	66.67	66.67
25-29 years	1	0	11.11	0	5.55
Above 30 years	1	1	11.11	11.11	11.11
Marital status					
Married	1	1	11.11	11.11	11.11
Divorced	0	0	0	0	0
Involved in relationship	1	2	11.11	22.22	16.67
Not involved	7	6	77.78	66.67	72.22
Ordinal position					
1st born	6	5	66.67	55.56	61.11
Last born	0	1	0	11.11	5.55
Middle of 3	0	1	0	11.11	5.55
Only child & adopted	4	1	44.44	11.11	27.77
Handedness					
Left-handed	2	1	22.22	11.11	16.67
Right-handed	7	8	77.78	89.89	83.33
Career					
Student	9	7	100.00	77.78	88.89
Employed	0	2	0	22.22	11.11
Academic year					
1st – 3rd year	3	3	33.33	33.33	33.33
4th – 5th year	6	4	66.67	44.44	55.56
Academic course					
Bachelors degree	5	3	55.56	33.33	55.56
Honours degree	2	2	22.22	22.22	22.22
Masters degree	1	1	11.11	11.11	11.11
Other course	1	1	11.11	11.11	11.11
Use of medication					
Antidepressants	4	3	44.44	33.33	38.89
Other chronic medication	3	6	33.33	66.67	50.00
Use of alcohol					
Never	1	1	11.11	11.11	11.11
Seldom	0	2	0	22.22	11.11
Socially	6	5	33.33	55.56	61.11

Weekly	2	0	22.22	0	11.11
Smoking habits					
Non-smoker	3	6	33.33	66.67	50.00
Smokes on occasion	1	2	11.11	22.22	16.67
Regular smoker	5	1	55.56	11.11	33.33
Psychotherapy					
Prior psychotherapy received	7	7	77.78	77.78	77.78
No prior psychotherapy received	2	2	22.22	22.22	22.22
Family history of depression					
Family history of depression	7	4	77.78	44.44	61.11
No family history of depression	2	5	22.22	55.56	38.89
History of suicide attempts					
One or more attempts	1	2	11.11	22.22	16.67
None	8	7	88.89	77.78	83.33

Table 3: Significant pre-post differences within the experimental group

Variable (n=9)	M – pre	M – post	M – difference	SD	p	d
BDI	16.889	4.222	-12.667	5.679	0.004 *	0.957 ♦♦♦
AFM-2						
PA	26.000	37.889	11.889	7.090	0.004 *	1.700 ♦♦♦
NA	32.000	20.444	-11.556	7.510	0.004 *	0.828 ♦♦♦
PA – NA	-6.000	17.444	23.444	13.501	0.004 *	0.848 ♦♦♦
SOC	102.222	126.778	24.556	21.226	0.018 *	1.157 ♦♦♦
PIL	83.556	108.000	24.444	21.113	0.018 *	1.158 ♦♦♦
NEO PI-R *Neuroticism*	120.444	104.000	-16.444	17.622	0.020 *	0.933 ♦♦♦
NEO PI-R *Angry Hostility*	17.778	16.889	-0.889	4.649	0.257	0.258 ♦
POMS						
T	24.444	14.125	-10.375	8.245	0.023 *	1.259 ♦♦♦
D	31.556	14.000	-17.25	14.840	0.023 *	1.160 ♦♦♦
A	28.000	14.750	-13.25	11.536	0.031 *	1.149 ♦♦♦
V	10.667	18.500	7.875	4.853	0.015 *	1.623 ♦♦♦
F	17.778	8.375	-10.25	9.015	0.031 *	1.137 ♦♦♦
C	18.667	10.500	-8.750	6.228	0.007 **	1.405 ♦♦♦

M-pre – Mean pre-assessment score, M-post – Mean post-assessment score, M – Mean, SD – Standard deviation, p – Statistical significance: Wilcoxon Signed Rank Test, d – Practical Significance: Wilcoxon Test, BDI – Beck Depression Inventory, AFM-2 – Affectometer 2, PA – Positive affect, NA – Negative affect, PA – NA – Positive – Negative affect, SOC – Sense of Coherence Scale, PIL – Purpose in Life Scale, NEO PI-R – NEO Personality Inventory – Revised, POMS – Profile of Mood States, T – Tension Anxiety, D – Depression, A – Anger, V – Vigor, F- Fatigue, C - Confusion.

* $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$

♦ $d = 0.2$ – Small practical significance

♦♦ $d = 0.5$ – Medium practical significance

♦♦♦ $d = 0.8$ – Large practical significance

Table 4: Significant pre-post differences within the control group

Variable (n=9)	M – pre	M - post	M – difference	SD	p	D
BDI	18.889	19.222	0.333	4.500	0.957	0.073
AFM-2						
PA	25.333	24.556	-7.778	5.210	0.516	0.149
NA	30.778	31.444	0.667	5.120	0.828	0.130
PA – NA	-5.444	-6.889	-1.444	9.356	0.848	0.154
SOC	92.667	94.444	1.778	9.370	0.570	0.190
PIL	69.556	71.667	2.111	12.272	0.578	0.018
NEO PI-R						
Neuroticism	124.111	125.556	1.444	17.544	0.734	0.080
NEO PI-R						
Angry						
Hostility	21.222	21.667	0.444	5.855	0.902	0.076
POMS						
TA	27.556	24.889	-2.667	7.331	0.1719	0.364 ♦
DP	36.333	36.000	-0.333	10.897	0.9531	0.031
A	28.778	27.778	-1.000	9.925	0.8867	0.101
V	11.222	9.667	-1.556	4.503	0.2344	0.346 ♦
F	19.000	18.222	-0.778	5.911	0.8672	0.132
CF	20.111	18.778	-1.333	3.969	0.4219	0.336 ♦

M-pre – Mean pre-assessment score, M-post – Mean post-assessment score, M – Mean, SD – Standard deviation, p – Statistical significance: Wilcoxon Signed Rank Test, d – Practical Significance: Wilcoxon Test, BDI – Beck Depression Inventory, AFM-2 – Affectometer 2, PA – Positive affect, NA – Negative affect, PA – NA – Positive – Negative affect, SOC – Sense of Coherence Scale, PIL – Purpose in Life Scale, NEO PI-R – NEO Personality Inventory – Revised, POMS – Profile of Mood States, TA– Tension Anxiety, DP – Depression, A – Anger, V – Vigor, F- Fatigue, CF – Confusion

* $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$

♦ d = 0.2 – Small practical significance
♦♦ d = 0.5 – Medium practical significance
♦♦♦ d = 0.8 – Large practical significance

Table 5: Significant post-assessment differences between experimental and control group

Variable	Experimental group (n = 9)	Control group (n = 9)		
	M	M	p	d
BDI	4.222	19.222	0.0003 ***	2.290 ♦♦♦
AFM-2				
PA	37.889	24.556	0.002 *	1.785 ♦♦♦
NA	20.444	31.444	0.002 *	1.630 ♦♦♦
PA – NA	17.444	-6.889	0.004 *	1.843 ♦♦♦
SOC	126.778	94.444	0.009 *	1.073 ♦♦♦
PIL	108.000	71.667	0.021 *	1.057 ♦♦♦
NEO PI-R *Neuroticism*	104.000	125.556	0.093 *	1.015 ♦♦♦
NEO PI-R *Angry Hostility*	16.889	21.667	0.722	0.228 ♦
POMS				
TA	14.125	24.889	0.080 *	1.139 ♦♦♦
DP	14.000	36.000	0.016 *	1.596 ♦♦♦
A	14.750	27.778	0.042 *	0.902 ♦♦♦
V	18.500	9.667	0.005 **	1.716 ♦♦♦
F	8.375	18.222	0.451 *	1.431 ♦♦♦
CF	10.500	18.778	0.009 **	1.339 ♦♦♦

M – Mean, p – Statistical significance: Wilcoxon Signed Rank Test, d – Practical Significance: Wilcoxon Test, BDI – Beck Depression Inventory, AFM-2 – Affectometer 2, PA – Positive affect, NA – Negative affect, PA – NA – Positive – Negative affect, SOC – Sense of Coherence Scale, PIL – Purpose in Life Scale, NEO PI-R – NEO Personality Inventory – Revised, POMS – Profile of Mood States, TA– Tension Anxiety, DP – Depression, A – Anger, V – Vigor, F- Fatigue, CF- Confusion.

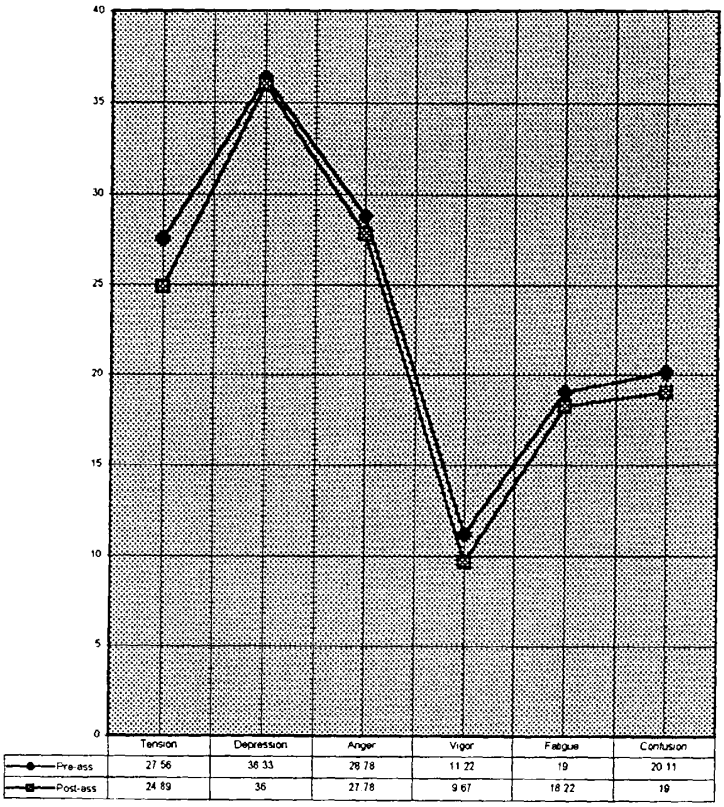
* $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$

♦ d = 0.2 – Small practical significance

♦♦ d = 0.5 – Medium practical significance

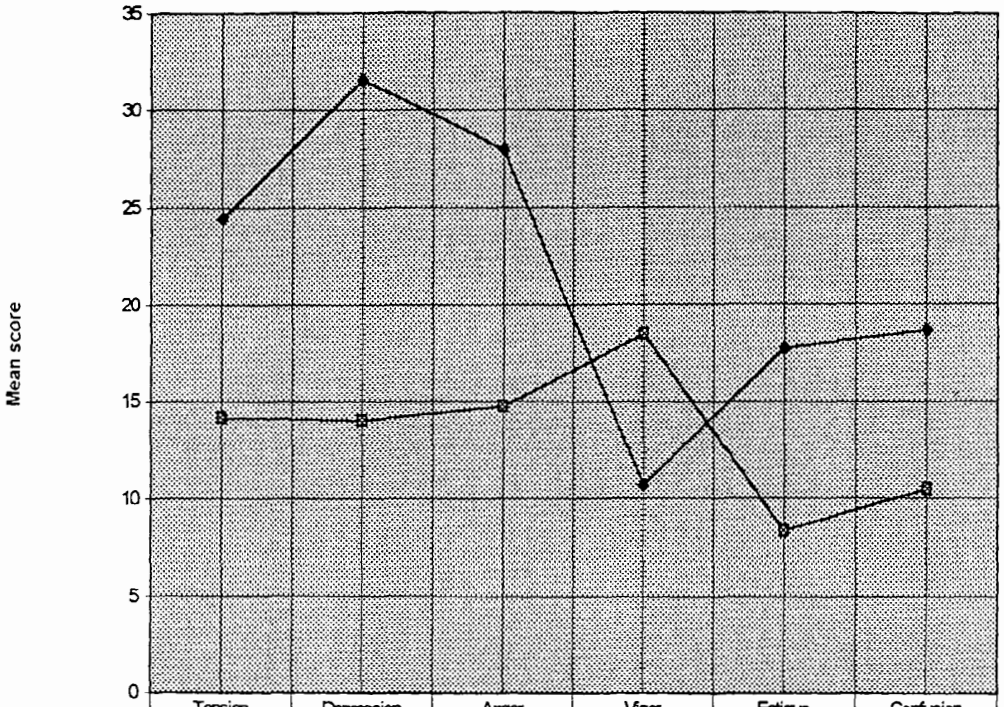
♦♦♦ d = 0.8 – Large practical significance

Graph 1: Pre-post mean scores on the Profile of Mood States (POMS) for the control group (n=9)



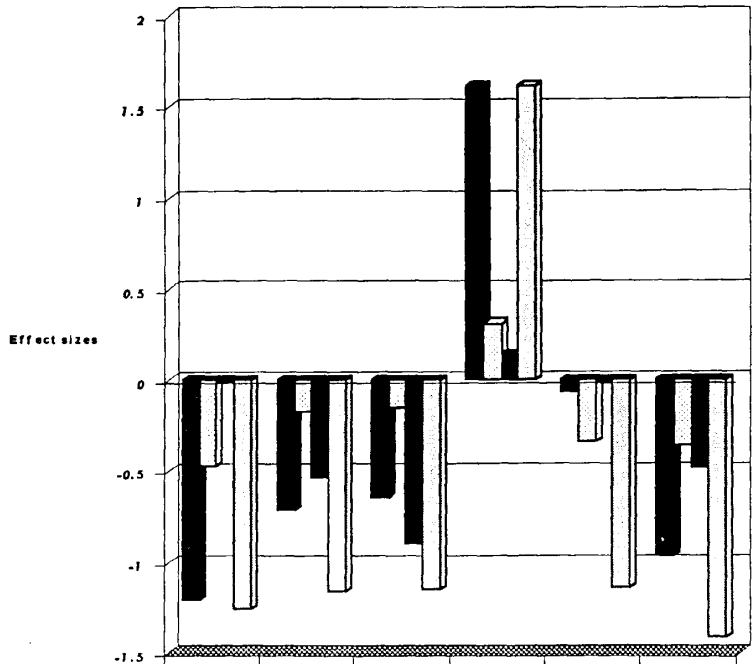
	Tension	Depression	Anger	Vigor	Fatigue	Confusion
Pre-ass	27 56	36 33	28 78	11 22	19	20 11
Post-ass	24 89	36	27 78	9 67	18 22	19

Graph 2: Pre-post-programme mean scores on the Profile of Mood States (POMS) for the experimental group (n=9)



	Tension	Depression	Anger	Vigor	Fatigue	Confusion
Pre-ass.	24.44	31.56	28	10.67	17.78	18.67
Post-ass.	14.16	14	14.75	18.5	8.38	10.5

Graph 3: Significant mood state changes on the POMS in the experimental group (n=9) at various stages of the programme

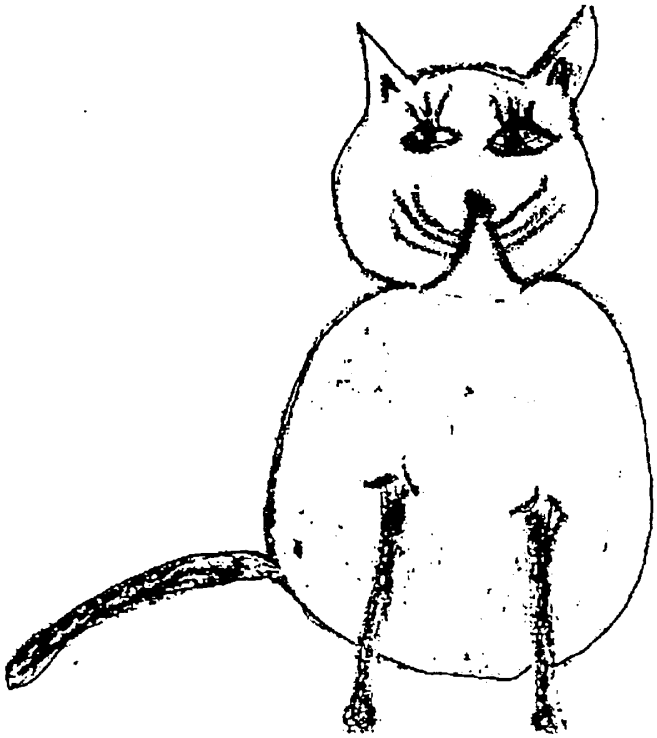


	T	DP	A	VG	FG	CF
pre-20	-1.2	-0.71	-0.64	1.62	-0.07	-0.95
20-40	-0.47	-0.18	-0.15	0.31	-0.34	-0.35
40-60	-0.01	-0.54	-0.9	0.14	-0.02	-0.48
pre-post	-1.26	-1.16	-1.15	1.62	-1.14	-1.41

POMS – Profile of Mood States, T – Tension-Anxiety, DP – Depression, A – Anger, VG – Vigor, FG – Fatigue, CF – Confusion, pre-20 – difference within group between pre-assessment and 20 half-hour sessions, 20-40 – difference within group between 20 and 40 half-hour sessions, 40 – 60 – difference within group between 40 and 60 half-hour sessions, pre-post – difference within group between pre- and post-assessment.

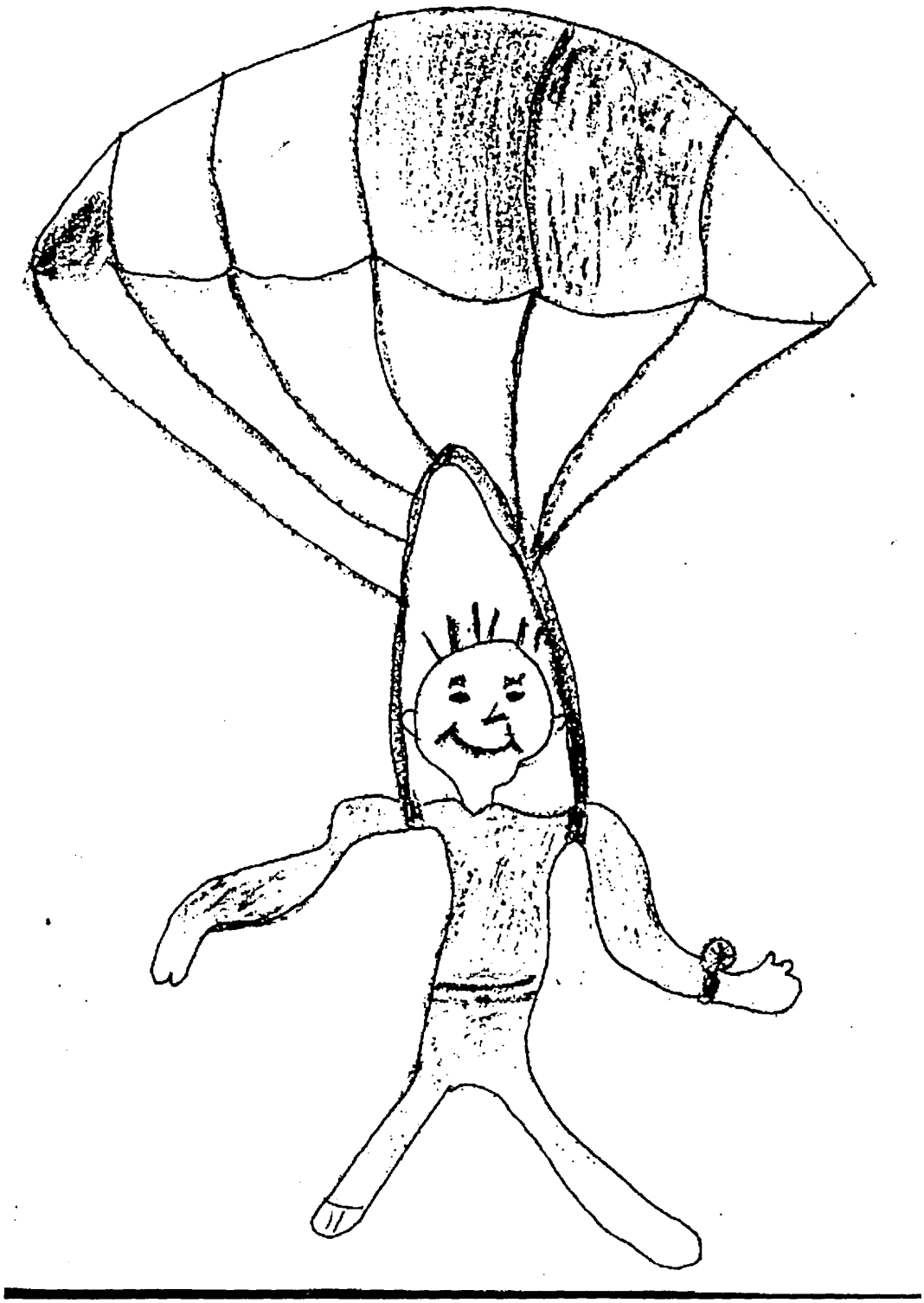
Note: Effect sizes below the 0-line (horizontal line, between divergent columns) changed practically significantly. The positive effect size for Vigor (V) indicated enhanced vigor/energy.

Drawing 1



Note: Outline enhanced for clarity of reproduction

Drawing 2



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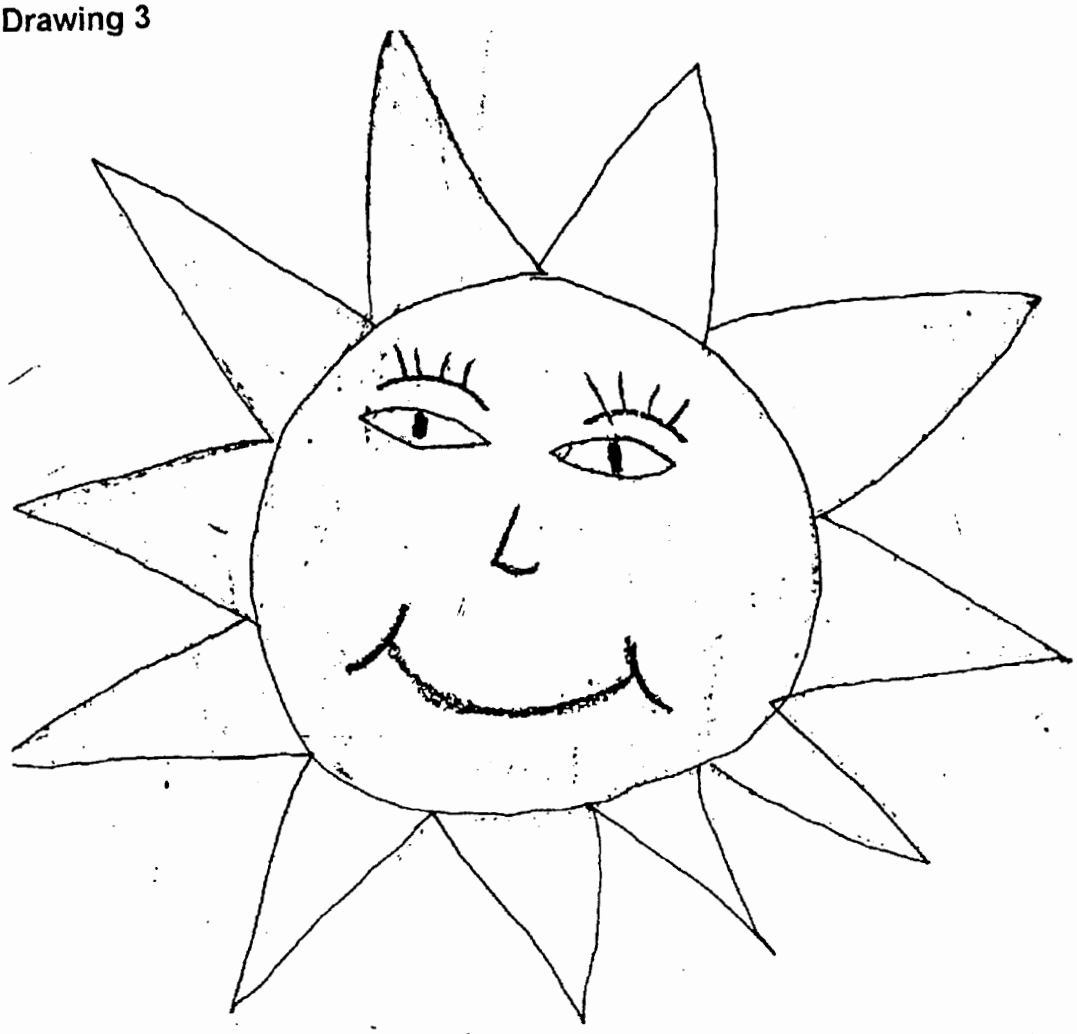
Drawing 3



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