The effect of the Tomatis Method on the psychological well-being and piano performance of student pianists

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SUMMARY

THE EFFECT OF THE TOMATIS METHOD ON THE PSYCHOLOGICAL WELL-BEING AND PIANO PERFORMANCE OF STUDENT PIANISTS

The literature on psychological well-being indicates that high levels of psychological well-being encourage a psychological loop that reinforces itself, lifting an individual on an 'upward spiral' of continued psychological flourishing, which may contribute to positive human functioning. In addition, the literature suggests that effective intervention can raise the levels of psychological well-being.

There are features inherent in the training of student pianists that can contribute to their psychological vulnerability, especially with regard to self-concept and anxiety. Therefore, they can benefit from an intervention that may raise their level of psychological well-being, thus contributing to their resilience in coping with the challenges presented by their training as well as their piano performance.

Clinical observations as well as research indicate that the Tomatis Method can enhance psychological well-being and improve academic functioning. Furthermore, Tomatis' theories and observations suggest that this programme can also enhance music performance, especially with regard to self-listening skills. However, although Tomatis indicates that he observed the same results with instrumentalists as with singers, his writings mostly refer to singers. Except for a single case study by Madaule in 1976, there seems to be no other scientific evidence that the Tomatis Method has benefited student pianists. Therefore, the purpose of this exploratory study was to investigate the effect of the Tomatis Method on student pianists' psychological well-being and piano performance.

The empirical study consisted of a two-group pre-post assessment mixed-method design, involving thirteen 2nd year to postgraduate student pianists from the School of Music and Conservatory, of the North-West University (Potchefstroom Campus). These students were randomly assigned to an experimental group (n = 7) which was exposed to the Tomatis Listening Programme, and a non-intervention control group (n = 6).

Quantitative data were obtained by means of a battery of tests, which included self-report inventories regarding psychological well-being and music performance anxiety, as well as scales regarding piano performance. The levels of the participants' psychological well-being were measured with the Scales of Psychological Well-Being (Ryff, 1989), the Affectometer 2 (Kammann & Flett, 1983), and the Profile of Mood States (Mc Nair *et al.*, 1992). Participants' levels of music performance anxiety were measured with the Music Performance Anxiety Inventory for Adolescents (Osborne & Kenny, 2005), and the Kenny Music Performance Anxiety Inventory (Kenny *et al.*, 2004). The quality of the students' piano performances was assessed by means of a general impression expressed as a percentage, Mills' constructs (1987) for the assessment of music performance, and Piano Performance Rating Scale (PPRS) which was developed for this study. Qualitative data were acquired by means of interviews, group discussions, projective drawings, written reports, personal observations and the Tomatis Listening Test.

Results indicated improvement regarding some aspects related to student pianists' psychological well-being and piano performance. Further research with regard to these aspects is required.

Keywords: Tomatis Method, Tomatis Listening Programme, audio-psycho-phonology, sound stimulation, psychological well-being, self-confidence, self-listening, piano performance, student pianist, music performance anxiety

OPSOMMING

DIE EFFEK VAN DIE TOMATIS-METODE OP DIE PSIGOLOGIESE WELSYN EN KLAVIERVOORDRAG VAN KLAVIERSTUDENTE

In die literatuur word aangedui dat hoë vlakke van psigologiese welsyn bydra tot 'n opwaartse spiraal van voortgesette welsyn wat optimale funksionering by individue kan bevorder. Daar word verder gesuggereer dat vlakke van psigologiese welsyn verhoog kan word deur middel van effektiewe intervensie.

Sekere aspekte wat intrinsiek deel vorm van klavierstudente se opleiding kan bydra tot hulle psigologiese kwesbaarheid, veral ten opsigte van self-konsep en angs. Gevolglik kan hulle voordeel trek uit 'n intervensie wat die potensiaal het om hulle vlakke van psigologiese welsyn te verhoog, wat dan dien as 'n buffer wat hulle in staat stel om die uitdagings van hulle opleiding en klaviervoordrag beter te hanteer.

Kliniese waarnemings sowel as navorsing dui aan dat blootstelling aan die Tomatis-metode kan bydra tot die versterking van psigologiese welsyn en die verbetering van akademiese funksionering. Verder suggereer Tomatis se teorieë en waarnemings ook dat die program kan bydra tot verbeterde musiekvoordrag, veral met betrekking tot self-luister vaardighede. Hoewel Tomatis aandui dat hy dieselfde resultate by instrumentaliste as by sangers waargeneem het, verwys hy in sy geskrifte meestal na sangers. Met die uitsondering van 'n gevallestudie deur Madaule in 1976, blyk daar geen ander wetenskaplike bewyse te wees dat die Tomatis-metode klavierstudente tot voordeel gestrek het nie. Gevolglik was die doel van hierdie verkennende studie om die effek van die Tomatis-metode op die psigologiese welsyn en klaviervoordrag van klavierstudente te bestudeer.

Die empiriese studie is ontwerp as 'n twee-groep voor-natoetsing gemengde metode. Die deelnemers was dertien 2de jaar tot nagraadse klavierstudente van die Skool vir Musiek en Konservatorium van die Noord-Wes Universiteit (Potchefstroom kampus). Hierdie studente is ewekansig verdeel in 'n eksperimentele (n = 7) groep wat aan die Tomatis Luisterprogram blootgestel is en 'n kontrole groep (n = 6) sonder intervensie.

Die kwantitatiewe toetsbattery het meetinstrumente met betrekking tot psigologiese welsyn, voordragsangs, en klaviervoordrag ingesluit. Deelnemers se psigologiese welsyn is gemeet met behulp van die Scales of Psychological Well-Being (Ryff, 1989), Affectometer 2 (Kammann & Flett, 1983), en die Profile of Mood States (Mc Nair *et al.*, 1992). Deelnemers se voordragsangs is gemeet deur middel van die Music Performance Anxiety Inventory for

Adolescents (Osborne & Kenny, 2005), en die Kenny Music Performance Anxiety Inventory (Kenny *et al.*, 2004). Die kwaliteit van die studente se klaviervoordrag is gemeet met behulp van 'n algemene indruk uitgedruk in persentasie, Mills (1987) se konstrukte vir die evaluering van musiekvoordrag, en die Piano Performance Rating Scale (PPRS), wat ontwerp is vir gebruik in hierdie studie. Kwalitatiewe data is ingesamel deur middel van onderhoude, groepbesprekings, skriftelike verslae, projektiewe tekeninge, persoonlike waarnemings en die Tomatis Luistertoets.

Resultate het 'n verbetering ten opsigte van sommige aspekte van klavierstudente se psigologiese welsyn en klaviervoordrag getoon. Verdere navorsing met betrekking tot hierdie aspekte is nodig.

Sleutelterme: Tomatis-metode, Tomatis-luisterprogram, oudiopsigofonologie, klankstimulasie, psigologiese welsyn, selfvertroue, self-luister, klaviervoordrag, klavierstudente, voordragsangs.

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CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

The purpose of this introductory chapter is to present the research problem and motivation for the study, the objectives of the study, hypothesis, and method of investigation. It further contains a description of the terminology of the four main concepts of the investigation as it is used in this study. An overview of the research report concludes the chapter.

1.2 PROBLEM STATEMENT AND MOTIVATION

Musical training requires discipline and dedication which can result in social deprivation and psychological problems. This view is confirmed in a literature review on the personality aspects of the performing musician (Temmingh, 1992:3,5). As she also mentions, musical training "extracts a heavy toll from the emotional life of the individual" (Temmingh, 1992:5)

As the high demands of musical training intensify in tertiary education, it can be assumed that the toll on the emotional life of the individual also intensifies. Persson (2000:25) observes that "although research into the training of performers in music conservatories is scarce, clinical psychology and performance art medicine report evidence that musicians may suffer from the expectations, psychological paradoxes, and traditions inherent in the so-called conservatory culture". This concurs with Temmingh's statement (1992:2), that "although this does not imply that the musician's environment is solely responsible for his/her personality, it undoubtedly influences its development".

Dews and Williams (1989), in a study on student musicians, agree that certain characteristics may result in psychological vulnerabilities. Stress, anxiety and depression (Persson, 2000:31; Temmingh, 1992:12; Dews & Williams, 1989:39; Nagel, 1988:140; Kemp, 1982:3) may arise from a self-esteem revolving around musical achievement (Temmingh, 1992:12; Dews & Williams, 1989:45), a harsh and rigid conscience (Temmingh, 1992:12), perfectionism (Dews & Williams, 1989:46; Nagel, 1988:140), introversion and "a crippling capacity for socialization" (Temmingh, 1992:8; Kemp,1982:3). This could have a debilitating effect on their quality of life and even their careers.

Many musicians apparently have an aversion to traditional psychotherapy and counselling (Brodsky & Sloboda, 1997:2, 3; Dews & Williams, 1989:37). This aversion, combined with the

demands of training on the emotional life of the individual, can have an adverse effect on the musician's psychological well-being. Brodsky and Sloboda (1997:2, 3) mention that "music-enhanced therapeutic regimes" can be a potentially attractive therapeutic option for musicians. In a study on professional symphony orchestra musicians, these authors found that "music-enhanced" therapies, based on cognitive-behavioural therapy, may be as effective as standard traditional counselling and psychotherapy at reducing career stress and performance anxiety among musicians (Brodsky and Sloboda, 1997:27). However, according to them, only a few intervention studies have been reported describing the use of music-based therapy with musicians (Brodsky and Sloboda, 1997:8).

Music-based therapy forms part of the field of sound training. According to Thompson and Andrews (1999:89), the emerging field of sound training involves a group of professionals who are trained to work with the technology and methods of sound stimulation for the purposes of enhancing, amongst others, aspects of psychological functioning. One of these sound-training methods is known as the Tomatis Method, a non-invasive programme consisting of three parts: sound stimulation, audio-vocal activities, and consultation (Thompson & Andrews, 1999:90). It was developed during the 1940s by Alfred Tomatis, a French ear, nose and throat specialist who focused on hearing and language difficulties. As his father was an opera singer, some of the first clients in Alfred Tomatis' private practice were opera singers suffering from voice problems. Hearing of his success in the treatment of opera singers, instrumentalists also came to him for treatment. Today the Tomatis Method is used with success in approximately 250 centres throughout the world – involving children and adults – to enhance abilities or overcome listening related problems. These include, among others, speech and language, learning, attention, and communication (Thompson & Andrews, 1999:90).

The effect of the Tomatis Method has been studied, amongst others, with regard to psychological well-being. Although cases involving musicians are mentioned in literature (Tomatis, 2005:23-26, 126-128; Madaule, 1994:32; Du Plessis *et al.*, 2001:36), little research has been done with musicians as subjects. As Du Plessis *et al.* state "... Tomatis' seminal work with musicians, spanning several decades, has attracted virtually no research attention" (Du Plessis *et al.*, 2001:36).

As far as could be determined, no research has been done regarding pianists, except for a single case study, reported by Madaule (1976:24-27), concerning a male student. From Madaule's description of the student's experience, the student, after forty sessions of the Tomatis listening programme, became aware of not only an improvement in his psychological well-being, but also of an improvement in his piano performance. One can but speculate on

these observations, because no measuring instrument concerning these two aspects was applied.

Therefore, this study will focus on exploring more systematically the influence of the Tomatis Method on the psychological well-being and performance of student pianists. The main research question is: What will the effect of exposure to the Tomatis Method be on student pianists' psychological well-being and piano performance?

Secondary questions arising from the main question are:

- What will the state of the student pianists' psychological well-being be before and after exposure to the Tomatis Method?
- How do the student pianists, their lecturers and other independent professionals evaluate the students' piano performance before and after exposure to the Tomatis Method?
- What will the difference be, if any, between the results of the experimental (A) and control (B) groups after group A's exposure to the Tomatis Method?
- What will the correspondence be, if any, between the qualitative and quantitative results?

1.3 OBJECTIVES

One general and four specific objectives were set for this study.

1.3.1 General Objective

The main purpose of this exploratory study was to investigate the influence of the Tomatis Method on student pianists' psychological well-being and piano performance.

1.3.2 Specific Objectives

The four specific objectives of this study were to determine:

- the state of the student pianists' psychological well-being before and after exposure to the Tomatis Method;
- how the students' piano performance is experienced by themselves, their lecturers and other independent professionals before and after exposure to the Tomatis Method;
- the difference in results, if any, between the experimental (A) and control (B) groups after group A's exposure to the Tomatis Method;
- the correspondence, if any, between the qualitative and quantitative results.

1.4 HYPOTHESIS

The Tomatis Listening Programme can significantly enhance the psychological well-being and piano performance of student pianists.

1.5 METHOD OF INVESTIGATION

The empirical study consisted of a two-group pre-post assessment mixed-method design, involving thirteen 2nd year to postgraduate student pianists from the School of Music and Conservatory of the North-West University (Potchefstroom Campus). These students were randomly assigned to an experimental group who was exposed to the Tomatis Listening Programme, and a non-intervention control group.

Quantitative as well as qualitative measurements were used in order to construct a more comprehensive picture of a multifaceted situation. A detailed description of the empirical study is given in Chapter 5.

1.6 TERMINOLOGY

The brief description of the terms *Tomatis Method*, *psychological well-being*, *piano performance* of student pianists, and *student pianist* serves to orientate the reader with regard to the meaning of the four main concepts used in this study.

1.6.1 Tomatis Method

Tomatis Method refers to the sound stimulation programme developed by Alfred Tomatis. This programme involves listening sessions, audio-vocal activities, and consultation. Sound stimulation is achieved by means of specialised equipment, and the programme is designed to train the ear and restore it to its full listening potential. The Tomatis Method is also referred to as the Tomatis Listening Programme or as Audio-Psycho-Phonology. A full description of the Tomatis Method will follow in Chapter 4.

1.6.2 Psychological Well-Being

Psychological well-being focuses on the optimal functioning of the human psyche. In the literature, the optimal functioning of the human psyche is also referred to as mental health, psychological wellness, and psychological health. Chapter 2 describes what psychological well-being entails.

1.6.3 Piano Performance of Student Pianists

The piano performance of student pianists is considered to be all those activities that students pursue at the piano in order to prepare themselves for a career as musicians and that are required from students in tertiary music degree programmes. It especially involves those activities that are aimed at displaying the level (in terms of quality) that they have attained as compared to expectations in the tertiary environment.

1.6.4 Student Pianists

Student pianists refer to piano students in tertiary education who are busy preparing for a career in which music and their proficiency as pianists play an important role.

1.7 Overview of the Research Report

Chapter 1 serves as an introduction to this exploratory study and describes the research problem and motivation for the study. It also states the objectives of the study, the hypothesis, and the method of investigation. Chapters 2, 3, and 4 present the literature study.

Chapter 2 places psychological well-being within the context of the recent 'positive psychology movement' and gives an overview of what psychological well-being entails. It further indicates the significance of psychological well-being for positive human functioning, and shows that enhancement of psychological well-being through intervention is possible.

Chapter 3 describes the skills student pianists need to develop in order to obtain proficiency in piano performance. It further indicates the challenges presented by their training and shows how features of their training environment can contribute to their psychological vulnerability.

Chapter 4 provides a historical background of the development of the Tomatis Method, and describes the Method itself, as well as its underlying theoretical principles. It also indicates the potential benefits of the Tomatis Method, including influences on psychological well-being, supported by research and clinical observations. It further points to the ways in which the Tomatis Method can benefit student pianists, and takes note of existing criticism of the Tomatis Method.

Chapter 5 presents information on the empirical investigation. It contains information regarding the research design, the participants, the measuring instruments, the procedure and the data analysis.

Chapters 6, 7 and 8 contain the results of the investigation. Chapter 6 describes the statistical results, while Chapters 7 and 8 describe the qualitative results. Chapter 7 describes the qualitative results with regard to psychological well-being, and Chapter 8 those regarding piano performance.

In Chapter 9 the results from the statistical and qualitative analyses are discussed and compared. Chapter 10 contains a summary of the results, submits the conclusions of this exploratory study and presents recommendations for future research.

CHAPTER 2
PSYCHOLOGICAL WELL-BEING

2.1 INTRODUCTION

Since one of the aims of this study is to investigate the effect of the Tomatis Method on the psychological well-being of student pianists, it is necessary to know what psychological well-being entails. Thus, the purpose of this chapter is to give an overview of the field of psychological well-being.

Psychological well-being consists of more than just a feeling of well-being in the conventional sense. The field of psychological well-being is concerned with the optimal functioning of the human psyche. Research on positive human functioning has gained momentum during the last few decades, and has been amplified through the recent 'positive psychology movement'.

In this chapter an overview will be given of the history, aim and field of positive psychology. Then the two general perspectives from which research on well-being has been conducted, namely the hedonic and eudaimonic approaches, will be described. This will be followed by a discussion of what is seen as general psychological well-being, the advantages of high levels of psychological well-being, and an overview of existing interventions to enhance psychological well-being. A summary will conclude the chapter.

2.2 POSITIVE PSYCHOLOGY

The term 'positive psychology' was coined by Martin Seligman and refers to a movement in the field of psychology where attention is turned to positive human functioning. According to Seligman (2002a:265) "Positive Psychology grew from a gleam in the eyes of three people in the Yucatan during the first week in January 1998 to a scientific movement." These three people were Martin Seligman, Mihaly Csikszentmihalyi and Ray Fowler (Seligman, 2002a:265).

The positive psychology movement officially started off with Seligman's presidential address to the American Psychological Association (APA) during the same year (Linley *et al*, 2003:126), and was given impetus in 2000 with a special issue of the APA journal, *American Psychologist*, dedicated to the topic of positive psychology (Linley *et al*, 2003:126; Strümpfer, 2005:23). That the positive psychology movement gained momentum in recent years is proved by the appearance of books such as *Handbook of Positive Psychology* (Snyder & Lopez, 2002), *A*

Psychology of Human Strengths (Aspinwall & Staudinger, 2003a), and *Flourishing* (Keyes & Haidt, 2003).

Although Seligman is seen as a founder of the positive psychology movement (Joseph & Linley, 2005:5), he well recognises that positive psychology is not a new idea, and that it has many distinguished ancestors (Seligman & Csikszentmihalyi, 2000:13). This view corroborates with those of other authors (Ryff & Singer, 1998:1; Aspinwall & Staudinger, 2003b:9; Eisenberg & Wang, 2003:117; Strümpfer, 2005:22)

2.2.1 History

Throughout history, philosophers, religious leaders and visionaries, from both the East and the West, have been concerned with the nature of human thriving and flourishing, the question of what makes a good life, and the cardinal elements of a fulfilled existence (Ryff & Singer, 1998:2-3; Ryan & Deci, 2001:142; Diener *et al*, 2002:63; Strümpfer, 2005:24; Waterman, 2005:166-167). Psychology, although a relatively young discipline, is no exception.

Seligman and Csikszentmihalyi (2000:6) observe that psychology's three distinct missions before World War II were: curing mental illness, making the lives of all people more productive and fulfilling, and identifying and nurturing high talent. However, since World War II, for various reasons, psychology's empirical focus has shifted mainly to pathology by largely devoting itself to curing mental illness and, as Seligman (2003a:126) remarks, "has done fairly well with it". A fair amount was discovered about these disorders – how they develop across life, their genetics, neurochemistry and psychological underpinnings – and how some of these disorders can be relieved (Seligman, 2004:80). Although interest in relieving mental disorders has overshadowed the promotion of well-being and personal growth, there has always been within psychology and its subfields a persistent interest in the positive (Ryff & Singer, 2003a:273; Eisenberg & Wang, 2003:117; Seligman, 2004:80; Strümpfer, 2005:21).

Over the past century, many aspects of positive human functioning have been examined and much has been written about human virtues, strengths, and the meaning of well-being (Eisenberg & Wang, 2003:117; Ryff & Singer, 2003a:273). Among the most outstanding early contributions made to the positive in psychology and its subfields were the work of James, Jung, Terman, Allport, Erikson, Jahoda, Rogers and Maslow. Some of the roots of positive psychology can certainly be found in humanistic psychology (Linley & Joseph, 2003:143). But Seligman and Csikszentmihalyi (2000:7) point out that, although the so called 'third way' heralded by Maslow, Rogers and other humanistic psychologists promised to add a new perspective to the entrenched clinical and behaviourist approaches and held enormous

promise, humanistic psychology did not attract much of a cumulative empirical base. Still, beginning in the 1960's, there was a shift in focus towards prevention which continues to the present (Ryan & Deci, 2001:142). This shift in focus was analysed by Fernández-Ballesteros (2003:134 -135) by doing a search on selected constructs, seen as part of the field of positive psychology. He surveyed all the publications in PsycLIT from 1930 to February 2000, showing that the total number of articles on these constructs increased drastically from 1970 onwards.

Thus, it is clear that a so called 'paradigm shift', away from the almost exclusive focus on pathology, started to emerge. This confirms Strümpfer's (1990:265) observation more than a decade before Fernández-Ballesteros' study that "a new paradigm is strongly in the ascent". Strümpfer further argues that, following Antonovsky, this paradigm can best be named 'salutogenesis' (from Latin: *salus* = health; Greek: *genesis* = origins) as it emphasizes the origins of health or wellness, thus referring to Antonovsky's seminal work *Health, Stress and Coping*.

In 1995 Strümpfer, basing his reasoning on Antonovsky's own work, argues that Antonovsky's concept of 'salutogenesis' should be broadened to 'fortigenesis' (from Latin: *fortis* = strong), which refers to the origins of psychological strength in general (Strümpfer, 1995:81-82). According to Strümpfer (2005:23), the construct of psychofortology was introduced by Wissing and Van Eeden in 1997. The concept of 'fortigenesis' was thus broadened to include the study of the nature and manifestations of psychological well-being, as well as ways to enhance psychological strengths and develop human capacities. Strümpfer (2005:23-24) also points to the correspondence between the concept of 'fortology' and positive psychology's approach of studying and classifying strengths. He further mentions that psychofortology is an alternative designation for positive psychology, and fortology an antonym for pathology (Strümpfer, 2005:21).

Strümpfer (2005:37) points out that those who contributed to the positive in psychology did not co-operate in the development of a paradigm, nor are the various theories and constructs identical. He further suggests "it might be more appropriate to think metaphorically of rivulets of insight, running into tributaries, joining others to form streams of thought and beginning to converge in the last two decades of the twentieth century into a flowing, emerging consilience, even though retaining rich internal diversity" (Strümpfer, 2005:38). Although this interest in salutogenesis, mental health, and maturity and growth is certainly not new in the history of psychological science, the widespread use of the term 'positive psychology' is new, and the current revival may be of a larger scale than ever before (Aspinwall & Staudinger, 2003b:9; Eisenberg & Wang, 2003:117).

2.2.2 Defining Positive Psychology

Authors differ in their descriptions of the meaning of the term 'positive psychology'. For Seligman *et al.* (2005:410) "Positive psychology is an umbrella term for the study of positive emotions, positive character traits and enabling institutions". According to Pointon (2006:4), Linley, founder member of the European Network for Positive Psychology, sees positive psychology as "the science of optimal functioning". In an article by Sheldon and King (2001:216), positive psychology is described as "nothing more than the scientific study of ordinary human strengths and virtues". This observation made by Sheldon and King is supported by Harris *et al.* (2007:3) who describe positive psychology as the study of human strengths. Although descriptions differ, the underlying meaning of the term 'positive psychology' seems to be the same. This shows that 'positive psychology' is indeed an umbrella term for scientific studies in this relatively young branch of psychology.

2.2.3 Aims of Positive Psychology

"Positive psychology is an attempt to urge psychologists to adopt a more open and appreciative perspective regarding human potentials, motives, and capacities" (Sheldon & King, 2001:216), thus reminding the field of the other two fundamental missions of psychology – making the lives of all people better and nurturing genius. The purpose includes therefore redressing the previous imbalance of psychology's preoccupation only with repairing the worst in life, by bringing the building of strengths to the forefront in the treatment and prevention of mental illness (Seligman, 2002b:3).

It is not the aim of positive psychology to replace what is known about human suffering, weakness and disorder, but to supplement it with research findings from positive psychology (Seligman *et al.*, 2005:410). Consequently, psychology will have a fuller picture and a more complete and balanced scientific understanding of human nature, which will be invisible if viewed from an exclusively negative or positive focus (Linley & Joseph, 2003:143; Seligman *et al.*, 2005:410). Therefore, positive psychology does not deny the advances made by psychology through its study of human pathology; it rather seeks to ensure that health and fulfilment are not neglected (Linley & Joseph, 2003:143).

Seligman (2003b:xviii) identifies four long-term aims of positive psychology and describes them as follows:

> The first is fostering better prevention by buffering. The second is supplementing the available techniques for therapy by training practitioners to identify and build strengths explicitly and systematically. The third is to curtail

the promiscuous victimology that pervades the social sciences. The fourth aim involves moving psychology from the egocentric to the philanthropic.

2.2.4 The Field of Positive Psychology

Aspinwall & Staudinger (2003b:9) observe that "a growing number of scholars are interested in investigating positive aspects of well-being and health". In this relatively new field of research and enquiry (Fernández-Ballesteros, 2003:131), positive psychology serves as a beacon around which these scholars may gather (Linley & Joseph, 2003:143). As Seligman *et al.* (2005:411) point out – literally hundreds of articles have recently appeared in the scholarly and popular press on the topics of positive psychology. As mentioned earlier, several books dedicated to positive psychology research and theory have also appeared. In these books, the empirical findings and methods used in the field are summarised (Seligman *et al.*, 2005:411; Harris *et al.* 2007:3).

Seligman (2003b:xvi) parses the science of positive psychology into three pillars – positive subjective experience of the past, present and future, positive individual characteristics, and the study of positive institutions and communities. Topics included in the field of positive psychology corresponds with these three pillars and are, among others, the study of subjective experiences (e.g. well-being, satisfaction, hope, optimism, flow, happiness), positive individual traits (e.g. capacity for love, courage, gratitude, interpersonal skill, creativity, perseverance, forgiveness, future mindedness, spirituality, wisdom, humour), and group level virtues (e.g. sense of community, nurturance, altruism, civility) (Seligman & Csikszentmihalyi, 2000:5, Seligman, 2002b:3, Harris *et al.* 2007:3). The three types of lives distinguished by Seligman (2003a:127; 2004:80) can be seen as another way of naming these three pillars: The Pleasant Life is about positive emotions, The Good Life is about positive traits and The Meaningful Life about positive institutions. According to Seligman, positive institutions support the positive traits, which in turn support the positive emotions.

The topics included in the field of positive psychology also represent research topics on well-being in general. Ryan and Deci (2001:141) observe that current research on well-being has been derived from two general perspectives, namely the hedonic and eudaimonic approaches.

2.3 Hedonic and Eudaimonic Well-Being

In the psychological literature on well-being, human nature and what constitutes a good society stem from two philosophical traditions – hedonism and eudaimonism (Waterman, 1993:679; Ryan & Deci, 2001:143, Ryff *et al.*, 2004:1383). As observed by Ryan and Deci (2001:141) in a review of research on hedonic and eudaimonic well-being, "these two views have given rise to

different research foci and a body of knowledge that is in some ways divergent and in others complimentary".

2.3.1 Hedonic Well-Being

Hedonic well-being has its roots in ancient Greek philosophy. Aristippus of Cyrene, a Greek philosopher from the 4th century B.C., held that pleasure is the sole good, to experience the maximum amount of pleasure is the goal of life, and the vitality of one's hedonic moments is happiness (Waterman 1993:678; Ryan & Deci, 2001:143). In the present era, the field of hedonic well-being is concerned with the experience or attainment of pleasure and avoidance of pain, as well as the experience of positive feelings, and happiness (Ryan & Deci, 2001:141-144; Ryff *et al.*, 2004:1383-1384; Keyes, 2005:88; 2006:4). Hedonic well-being is usually associated with subjective well-being and the research of Diener and colleagues (Ryan & Deci, 2001:144; Ryff *et al.*, 2004:1384; Temane, 2006:3). Diener *et al.* (1998:35) mentions that subjective well-being should not be confused with physical hedonism.

Diener *et al.* (2002:63) define subjective well-being as "a person's cognitive and affective evaluations of his or her life". Since experiences of emotions can be positive or negative, research is mostly focused on three components[1] of subjective well-being: life satisfaction, the presence of positive affect, and the absence of negative affect (Ryan & Deci, 2001:144; Diener *et al.,* 2002:63; Biswas-Diener *et al.*, 2004:19; Ryff *et al.*, 2004:1384). These three components are often summarised as happiness (Ryan & Deci, 2001:144). Therefore, according to Biswas-Diener *et al.* (2004:19), "a happy person is someone who is frequently cheerful, only occasionally sad, and generally satisfied with his or her life".

Although Diener and his colleagues point out that subjective well-being is essential in the search for positive well-being (Diener *et al.*, 1998:34), they acknowledge that there are additional features of mental health and a valuable life (Diener, 2000:34), and that subjective well-being is just one pursuit amongst many (Biswas-Diener *et al.*, 2004:24).

2.3.2 Eudaimonic Well-Being

Although in contemporary usage, the term *happiness* usually refers to hedonic happiness, it is the usual English translation for *eudaimonia* in Aristotle's *Nicomachean Ethics* (Waterman, 1993:678). Aristotle, in the 4th century B.C., viewed eudaimonia as the highest of all good, and

[1] According to Christopher (1999:143) subjective well-being consists of only two general components namely life satisfaction and affective balance. Affective balance is "the extent to which the level of positive affect outweighs the level of negative affect" (Christopher, 1999:143). Thus, positive and negative affect both form part of the second component. Although this view makes sense, the rest of the literature that I consulted describe subjective well-being as consisting of three components, and I will subscribe to this view in my report.

wrote about eudaimonia as the realisation of one's true potential (daimon) (Ryff, 1989:1070). The daimon refers to those potentials and unique capacities with which each individual is born (Waterman, 1993:678; Ryff *et al.*, 2004:1383). According to McMahon (2004:6), happiness for Aristotle is the product of a life well lived, rather than a fleeting feeling or ephemeral passion. It is the summation of a full, flourishing existence, sustained until the end of one's life.

Eudaimonic well-being emphasises growth, purpose, self-realisation, and meaning in life (Waterman, 1993:679; Ryan & Deci, 2001:141; Ryff *et al.*, 2004:1383; Temane 2006:3). These facets of well-being "may or may not be accompanied by feeling good" (Urry *et al.*, 2004:367). Eudaimonic theories further maintain that, as some outcomes are not good for people, not all desires, even though they might be pleasure producing, would yield well-being when achieved (Ryan & Deci, 2001:145). Eudaimonic well-being is often associated with the term *psychological well-being* and, amongst others, the work of Ryff and colleagues (Ryan & Deci, 2001:161; Urry, *et al.,* 2004:367).

Building upon the work of Maslow, Rogers, Jung, Allport, Erikson, Bühler, Neugarten and Jahoda, Ryff focuses on the primary points of convergence of these multiple frameworks of positive psychological functioning (Ryff, 1989:1070). This convergence serves as a theoretical foundation for a multidimensional model of well-being with six key dimensions of positive psychological functioning (Ryff & Keyes, 1995:720; Ryff *et al.*, 2004:1384). Her structured self-report scales are designed to measure self-acceptance, personal growth, purpose in life, autonomy, positive relations with others and environmental mastery (Ryff & Keyes, 1995:720).

2.3.3 Positive Mental Health Includes Hedonia and Eudaimonia

Ryff (1989:1077) claims that certain dimensions showed convergence with indexes of subjective well-being. Self-acceptance and environmental mastery were strongly correlated, amongst others, with measures of life satisfaction and affect balance. On the other hand, Diener *et al.* (1998:36) are of the opinion that the positive characteristics listed by Ryff and colleagues are, like subjective well-being, a subset of values held by humans. These characteristics are likely to lead to subjective well-being. In their view, a view that downplays the importance of subjective well-being is "seriously lacking" (Diener *et al.* 1998:37).

Keyes (2005:88; 2006:1) states that mental health is a complete state consisting of facets of both hedonia (positive feelings toward life) and eudaimonia (positive functioning in life), and suggests that more scientific focus on the integration of hedonic and eudaimonic measures and theory is needed. Thus, although the debate between hedonic and eudaimonic theorists is both ancient and contemporary (Ryan & Deci, 2001:148), Keyes (2006:1) is of the opinion that

these two traditions "form the basis for much of the 'third generation' of research that is now flourishing".

Wissing and Van Eeden (2002:42) point out that this newly developing sub-discipline in psychology, Keyes' third generation of research, whether it's called positive psychology, psychofortology or whatever it will be called in the future, focuses on psychological well-being/health. They further remark that it should not be confused with 'health psychology', which is a field that concentrates on (positive and negative) psychological aspects concerning physical health.

2.4 General Psychological Well-Being

From the literature it is clear that well-being has been conceptualised in many different ways (Urry *et al*, 2004:367) and that these conceptualisations differ greatly and vary in their degree of abstraction (Wissing & Van Eeden, 2002:32). Furthermore, from an analysis of the literature, Wissing and Van Eeden (2002:32) conclude that the dimensions and/or nature of psychological well-being are still unclear.

Their subsequent investigation revealed a general psychological well-being factor, thus establishing that such a factor does exist on an empirical data level (Wissing & Van Eeden, 2002:32). They further point out that "(sub)scales representing conceptualizations from both the hedonic and the eudaimonic perspective loaded on this factor" (Wissing & Van Eeden, 2002:40).

According to Wissing and Van Eeden (2002:40), this general psychological well-being factor seems to combine particular affective, cognitive, behavioural and interpersonal characteristics, including various functioning subsystems of the person as a whole. They distinguished six facets, namely affect, cognition, behaviour, self-concept, interpersonal relationships, and absence of general symptoms of mental disorder. Wissing and Van Eeden (2002:40) further describe the characteristics of each of these facets, as indicated in table 2.1.

Table 2.1 General psychological well-being factor as described by Wissing and Van Eeden

GENERAL PSYCHOLOGICAL WELL-BEING FACTOR	
Facet	**Characteristics**
Affect	Positive feelings predominate over negative feelings
Cognition	Life is viewed as comprehensible and meaningful There is a general belief and expectation that demands will be met and coped with Global life satisfaction is experienced as judged by own criteria
Behaviour	There is an acceptance of challenges without avoidance of problems Interest in work or activities Management of own (also financial) affairs
Self-Concept	An experience of self-worth and an ability to affirm oneself exist
Interpersonal relationships	Perceive support Feel trusting towards others Enjoy the company of others Feel needed
Absence of general symptoms of mental disorder such as:	Intense anxiety Severe depression Negative affect Somatic symptoms.

(Wissing & Van Eeden, 2002:40)

Antonovsky (1987:3) posits that, since we all are in some measure healthy, health should be seen as a "health ease/dis-ease continuum", and that we should study the location of a person, at any time, on this multidimensional continuum (Antonovsky, 1987:4, 12). Keyes and Lopez (2002:48) expand on this idea by arguing that "mental health and mental illness are not at opposite ends of a single health continuum". They also state that psychological health does not simply mean not being mentally ill, nor does it simply imply the presence of high well-being (Keyes & Lopez, 2002:48). Keyes and Lopez (2002:49) propose a model of complete mental health where the mental health and mental illness dimensions are combined. This combination yields two states of mental health and two of mental illness. They describe these states respectively as *flourishing, languishing, floundering* and *struggling*.

Adults with high levels of well-being and the absence of recent mental illness are *flourishing*. Those with low levels of well-being and the absence of recent mental illness are *languishing*.

These are the two states of mental health. The two states of mental illness, *floundering* and *struggling*, are exhibited by adults who have had recent mental illnesses and have, respectively, low- or moderate to high levels of well-being (Keyes & Lopez, 2002:50).

2.4.1 Significance of Psychological Well-Being

Biswas-Diener *et al.* (2004:24) conclude that longitudinal research suggests that happiness may indeed lead to desirable qualities, instead of just being caused by them. Thus, these 'symptoms' of happiness have more long-term value than just feeling good, happy or positive at a specific moment in time.

One of the advantages of high levels of psychological well-being is that it may be instrumental in constructive coping with life's challenges and adversities (Antonovsky, 1987:148; Seligman & Csikszentmihalyi, 2000:8, Lyubomirsky, 2001:239), as is shown by the growing literature on human resilience (Ryff & Singer, 2003b:15). It may also serve as a buffer against mental illness (Antonovsky, 1987:151; Seligman & Csikszentmihalyi, 2000:7,12; Fava & Mangelli, 2001:47; Fredrickson 2003:333). Seligman & Csikszentmihalyi (2000:7) point out that research on prevention has shown that human strengths such as courage, optimism, interpersonal skill, hope, honesty, perseverance, future mindedness, faith, and the capacity for flow and insight, may act as buffers against mental illness. Sheldon *et al.* (2002:22) also show that increased growth relevant outcomes, such as increased vitality, affect balance, psychosocial well-being and personality integration may result from high levels of psychological well-being.

Fredrickson and Branigan (2005:313), referring to Fredrickson's broaden-and-build theory, posit that "positive emotions broaden the scope of attention and thought-action repertoires". Broadened thought-action repertoires, in turn, can build a variety of personal resources that can be drawn upon later (Fredrickson & Branigan, 2005:314). They further declare that since they last longer than the passing emotions that caused their acquirement, these resources are durable (Fredrickson & Branigan, 2005:315).

The possibility of a change in levels of psychological well-being is implied in much of the literature on positive human functioning. Biswas-Diener *et al.* (2004:21) posit that well-being levels can vary with life circumstances, activities, and thought patterns. Ryff and Singer (2003b:25) further mention that the literature on post traumatic growth points to many ways in which the self-evaluation, life philosophy, relationships, and spirituality of a person can be notably changed, even enhanced by negative ordeals.

Results from a study by Fredrickson and Joiner which tested whether positive affect and broadened thinking mutually enhance each other, suggest that people who often experience positive feelings are in some ways "lifted on an 'upward spiral' of continued growth and thriving" (Fredrickson, 2003:335). Biswas-Diener *et al.* (2004:24) concur with this view when they state that "it is likely that there is a psychological loop that reinforces itself, with success in marriage, work, and other life domains leading to continued happiness that, in turn, leads to more successes."

Conversely, researchers also mention that according to the hedonic treadmill theory, which has gained widespread acceptance, people briefly react to good and bad events but then return (adapt) to baseline levels of happiness and satisfaction (hedonic neutrality) over time. Thus, every desirable experience is transitory (Lucas *et al.*, 2004:8; Diener *et al.*, 2006:305: Sheldon & Lyubomirsky, 2006:57). This theory seems somewhat gloomy and implies that any positive change in levels of psychological well-being would be fruitless (Sheldon & Lyubomirsky, 2006:57).

However, on the basis of empirical data collected over the last decade, Diener *et al.* (2006:305) suggest that this theory of adaptation should be revised in order to reflect the notion, supported by research, that effectively intervening to increase happiness is possible (Diener *et al.*, 2006:312). They propose the four following important modifications:

Firstly, regarding the neutrality of baseline levels of happiness and satisfaction, Diener *et al.* (2006:306-307) declare that most people tend to experience positive emotions most of the time. Since people thus tend to return to a positive rather than a neutral baseline (Diener *et al.*, 2006:307), "individuals' set points are not hedonically neutral" (Diener *et al.*, 2006:305).

Secondly, the set points of individuals vary (Diener *et al.*, 2006:305, 307). These individual differences are partly due to personality factors. Thus, personality factors may prompt an individual's experience of different levels of well-being (Diener *et al.*, 2006:307).

Thirdly, Diener *et al.* (2006:305) propose that "a single person might have multiple happiness set points". This is contrary to the idea of a unitary set point (Diener *et al.*, 2006:307). Sometimes the separable variables of well-being may move in different directions (Diener *et al.*, 2006:305). For example, both negative and positive emotions might decline, or positive emotions might decrease while life satisfaction increases (Diener *et al.*, 2006:307).

Fourthly, and perhaps most importantly, Diener *et al.* (2006:305) state that some conditions can cause these well-being set points to change, and that individuals differ in their adaptation to events, even the same event (Diener *et al.*, 2006:305, 310). The set points of some individuals change while the set points of others do not change (Diener *et al.*, 2006:305). Diener *et al.* (2006:310) also found that individuals differ in how fast and how much they can adapt. Thus, these findings oppose the implicit assumption of the hedonic treadmill theory that all individuals adapt to circumstances similarly (Diener *et al.*, 2006:310).

2.4.2 Enhancement of Psychological Well-Being

Although research on the enhancement of psychological well-being is still in its infancy (Lyubomirsky, 2001:246), based upon the positive results of the few existing experiments there is good reason to believe that techniques that contribute to the enhancement of psychological well-being work and can be quite effective (Seligman and Csikszentmihalyi, 2000:12; Diener *et al.* 2002:69; Diener *et al.* 2006:312). According to Keyes and Lopez (2002:50) the objective of positive treatments is "to promote levels of well-being or build upon or draw out a person's existing strengths".

Existing interventions for the enhancement of psychological well-being have different foci. These interventions include positive treatments, exercises or programs focussing on goal-training (Sheldon *et al.*, 2002:27), optimism training (Keyes and Lopez, 2002:53, Seligman 2002b:5), hope training (Snyder *et al.*, 2002:263-265), cultivating emotional intelligence (Salovey *et al.*, 2002:165-167), increasing the frequency of positive emotions (Fredrickson, 2002:128-130), fostering and finding flow (Nakamura & Csikszentmihalyi, 2002:99-100), building gratitude, increasing awareness of the positive and finding new ways of using signature strengths (Seligman *et al.*, 2005:415-416). Keyes and Lopez (2002:54) also describe a psycho-therapeutic treatment called *well-being therapy*, designed by Fava. According to them, the six dimensions of psychological well-being, as conceptualised by Ryff, served as foundation for the development of this treatment. In this eight-session treatment the therapist helps the client to cognitively restructure her or his views on central concepts to well-being, raise consciousness of health, identify and highlight episodes of well-being, identify processes that disrupt well-being, promote progression beyond the baseline and thus induce greater psychological well-being (Keyes & Lopez, 2002:54).

The above mentioned treatments, exercises and programs seem to share the aim to purposefully make clients aware of positive psychological functioning, and thereby lift them on an 'upward spiral'. However, this is by no means an exhaustive list of existing interventions aspiring to enhance psychological well-being. Authors concur that more research on

interventions to develop or enhance psychological well-being is needed (Lyubomirsky, 2001:246; Keyes & Lopez, 2002:55; Diener *et al.*, 2002:69; Salovey *et al.*, 2002:167; Seligman *et al.*, 2005:419; Sheldon & Lyubomirsky, 2006:55). Diener *et al.* (2006:312) caution that although research shows the possibility for change, the "processes of adaptation must still be carefully considered when designing and assessing well-being interventions". Since the lasting effect of interventions differ, Seligman *et al.* (2005:419-420) suggest that a combination of positive treatments might have more beneficial effects than any single intervention.

2.5 SUMMARY

The overview on psychological well-being has shown that, although the empirical focus of psychology has shifted mainly to pathology since World War II, interest in positive human functioning has always formed part of this relatively young discipline. Furthermore, beginning in the 1960's, there was a shift in focus towards prevention which continues to the present, and has gained momentum in recent years. From this increasing interest in prevention through the building of human strengths, it is clear that research contributing to this knowledge is valuable.

Initially in the psychological literature on well-being, research stemmed from the two philosophical traditions of hedonism and eudaimonism. Since research from these two views is in some ways contradictory and complimentary in others, it has given a fuller picture of the different dimensions of positive human functioning. Wissing and Van Eeden (2002:32, 40) established that a general psychological well-being factor, consisting of both hedonic and eudaimonic aspects, exists on an empirical level. Their description of the six facets of this general psychological well-being factor, namely affect, cognition, behaviour, self-concept, interpersonal relationships, and absence of general symptoms of mental disorder, shows how psychological well-being can contribute to positive human functioning.

The literature further reveals that high levels of psychological well-being seem to have long-term value and may be instrumental in constructive coping, may buffer against mental illnesses such as intense anxiety and depression, may contribute to better work performance and interpersonal relationships, may increase vitality and may also contribute to personality integration. If it was true that levels of psychological well-being only depended on genetic coding, and that any changes that may occur is definitely going to be only temporary, all these benefits of psychological well-being would be meaningless for the purpose of this study.

Much of the literature on positive human functioning implies that levels of psychological well-being can change. Although the hedonic treadmill theory, which has gained widespread acceptance, posits that people briefly react to good and bad events but quickly return to

hedonic neutrality, research supports the notion that effective intervention can raise the levels of psychological well-being. However, certain core features of the adaptation model stay intact, and thus the processes of adaptation must still be considered when well-being interventions are assessed.

Most of the existing interventions, through various techniques, purposefully make clients aware of positive psychological functioning, and thereby aim to lift them on an 'upward spiral' of continued psychological flourishing. Since the lasting effect of interventions differ, Seligman *et al.* (2005:419-420) suggest that a package of positive interventions may be more beneficial than a single technique.

The implication for the current study, therefore, is that high levels of psychological well-being are beneficial and that a positive change in levels of psychological well-being through intervention is possible. High levels of well-being may further encourage a psychological loop that reinforces itself and thereby lifts an individual on an 'upward spiral' of continued psychological flourishing, which may have a positive influence on other areas of human existence.

Since certain factors inherent in the training of student pianists can contribute to their psychological vulnerability, especially with regard to self-concept and anxiety, they could benefit from an intervention that may raise their level of psychological well-being, thus contributing to their resilience in coping with the challenges presented by their training as well as their piano performance. The next chapter will describe the demands of their training environment as well as the skills student pianists need to develop in order to obtain proficiency in piano performance.

CHAPTER 3
STUDENT PIANISTS AND PIANO PERFORMANCE

3.1 INTRODUCTION

The purpose of this chapter is to provide an overview of the challenges student pianists face in their pursuit of a musical career. Therefore, this chapter consists of an overview of the skills student pianists need to develop in order to become proficient in piano performance, an overview of the demands of training, as well as an overview of the symptoms and causes of music performance anxiety, which is a concern for many student pianists. A summary will conclude the chapter.

3.2 PIANO PERFORMANCE

According to Neuhaus (1993:1), an artistically satisfying music performance requires complete mastery of the three fundamental elements of performance, namely the music, the instrument and the performer. Davidson (2002b:150) agrees that such mastery also implies a significant knowledge of the "music, the instrument and the self". Clarke (2002:59) remarks that a blend of exceptional physical and mental skills is characteristic of high standards of musical performance. In relation to this remark, Dunsby (2002:225) points out that in addition to being a physically strenuous activity, music performance demands mental skills such as concentration and memorisation, as well as emotional control. Authors concur that the development of such skills entails preparation that takes time, effort and a high degree of training (Davidson, 2002b:150; Clarke, 2002:59; Dunsby, 2002:225).

Davidson (2002a:97-98) identifies five elements which seem to form the basis for the development of performance skills. These elements are structure, notation and reading skills; aural skills; technical and motor skills; expressive skills; and presentation skills.

3.2.1 Structure, Notation and Reading Skills

The most basic requirement for performance is the execution of the notational symbols for pitch, rhythm, dynamics, etc. of a music composition (Clarke, 2002:59). An understanding of structure, of notation and reading skills also include sight-reading which enables the musician to learn more music, to memorise, and to develop a "knowledge base for the rules of musical structure" (Davidson, 2002a:97).

3.2.2 Aural Skills

Since self-listening is an essential skill in music study, the development of good aural skills is essential for making progress (Gieseking & Leimer, 1972:10). The art of pedalling is one aspect of piano performance that depends on attentive listening, because a good pedal technique is not just a matter of muscular response or following printed directions (Gordon, 2000:322).

Gieseking and Leimer (1972:5) point out that trained ears are also a prerequisite for noticing inexact execution of notation and unevenness in playing. They further maintain that tone quality, duration, and strength are even more important to pianists than the exact pitch (Gieseking & Leimer, 1972:10). Given the importance of working on tone in a musical performance (Neuhaus, 1993:54), aural skills are necessary to enable students to develop good tone quality on an instrument (Davidson, 2002a:97).

Bernstein's (1981:118) statement that "each tone functions in a specific way, fulfilling its part of the whole concept", concurs with Rosen's (2004:25) view that tone quality on the piano depends on the balance of sound, which can be horizontal as well as vertical. The pianist must rely on aural skills to achieve a beautiful tone quality by exploiting the overtones, "shaping the melody and moulding the harmony and counterpoint" (Rosen, 2004:25). Since the variation and balance of sound responsible for tone quality further depends on specific motor skills (Rosen, 2004:27), focused hearing also influences technique by initiating the appropriate physical reactions (Bernstein, 1981:126).

However, many pianists lack good self-listening skills and are unaware of the actual quality of their performance (Gieseking & Leimer, 1972:10; Rosen, 2004:34). Some pianists show their understanding of the composition through their gestures and facial expression without conveying it through their sound production, and since they often rely on their sense of touch, "slight rhythmic irregularities and unpleasant thickness of sound" may escape their attention (Rosen, 2004:34-35).

Because their instrument is already tuned, students can play piano without being forced to listen by having to attend to intonation (Lang, 1998:33; Rosen, 2004:33). Piano performance also involves the whole body (Uszler, 2000:239; Rosen, 2004:19), resulting in pianists being able to experience the music with their entire body without being obliged to listen to it (Rosen, 2004:19). Rosen (2004:35) points out that since pianists can often feel the various lines through touch and through shoulder and back nerves, they can show their understanding of rhythm and voice-leading in complex passages without conscious listening. Therefore, in

contrast to wind and string players whose self-listening becomes second nature, pianists have to be reminded to listen to themselves, since they tend to forget this important facet of their performance (Rosen, 2004:36).

According to Bernstein (1981:116), the development of "the technique of tuning in and out" will enable musicians to exercise deliberate control over their listening ability. However, many student pianists as well as teachers tend to focus their attention on the development of motor skills, which leads to insufficient development of the ear, especially with regard to self-listening (Neuhaus, 1993:54).

3.2.3 Technical and Motor Skills

According to Davidson (2002a:97), her identification of technical and motor skills refers to agility and fluency achieved by automatism of the physical process of note-playing through training of the body. This automatism is also associated with the development of "mental structures for understanding music" (Davidson, 2002a:97).

In Neuhaus' (1993:87) view, technical skills are linked to confidence. He expands on this view by mentioning that an inherent timidity in many inexperienced pianists manifests itself in unnecessary movements, stiffness and general technical insecurity (Neuhaus, 1993:88). Therefore, "greater musical confidence" results in less "technical insecurity" (Neuhaus, 1993:89). Although this insecurity may seem to be merely physical, Neuhaus (1993:88) is of the opinion that its origin is psychological, and that such a pianist needs psychological re-education in addition to help with technical skill.

3.2.4 Expressive Skills

Expressive skills demand knowledge of manipulating the structural rules in order to create music with a perceived emotional content (Davidson, 2002a:98). Clarke (2002:59) points out that for a so-called expressive performance it is expected of performers "to go beyond what is explicitly provided by the notation". He further posits that although musical structure is an important component in the shaping of musical expression, it is only one element in a whole network of interactions (Clarke, 2002:68). Other factors include the intentions and mood of the performer, influence of teachers, performances and recordings by others, cultural and stylistic norms, as well as the performing environment (Clarke, 2002:66, 68).

3.2.5 Presentation Skills

Presentation skills include the confident presentation of the music and the performer in a performance situation (Davidson, 2002a:98). Since a performance situation involves a

performer and an audience, Clarke (2002:68) alludes to its social context and points out that music performance anxiety is an example of the dramatic interaction that might occur between the individual and social elements of performance. The effects caused by the presence of an audience may disrupt a performer's concentration and disturb the balance between automatic and mental structures used while performing (Davidson, 2002b:144-145).

According to Caldwell (1990:10-11), performers should be free of conflict during a performance in order to focus their attention and energy on their performance. Internal interruptions, which might stem from concern about memory, insufficient preparation, dislike for an aspect of the performance situation, and music performance anxiety, will influence concentration and have a negative effect on the performance (Caldwell, 1990:10-11). Since the audience echoes the performer's level of concentration, they sense these internal interruptions or conflicts through the performer's audible and visible presentation, and will be unable to appreciate the performance (Caldwell, 1990:13-14).

3.3 Training Environment

Nagel (2009:15) points out that unlike other professions which can be chosen later in life, the musician's training usually starts during childhood. She further indicates that since learning to play an instrument starts at an early age, social and physical maturation as well as ego development occur simultaneously with the development of the musician's technical skill on the instrument (Nagel, 2009:16). Consequently, various factors that could be adaptive or maladaptive have coalesced by the time the learner pursues a career in music (Nagel, 2009:16).

3.3.1 Psychological and Social Factors

Becoming skilled in playing a musical instrument is a demanding task that presents special challenges to any young learner (McPherson & McCormick, 2006:332). Since "practice is a solitary activity, and lessons are typically on a one-to-one basis", training mostly takes place in isolation (Davidson, 2002a:99). Training further demands emotional, physical and mental effort, as well as persistence and resilience for sustaining long-term engagement, given that progress is not always evident and it can take weeks or months to master a repertoire (McPherson & McCormick, 2006:332). Musicians' professional and personal development is influenced by a combination of the importance of emotional self-expression through playing an instrument, and how they are guided and taught (Nagel, 2009:16).

3.3.1.1 Motivation for learning

Various interrelated factors, which constitute the motivation for learning, influence the manner in which students approach the task of learning music (Davidson, 2002a:95; Hallam, 2002:232). According to Hallam (2002:235), motivation is dependent on the complex interactions between the musician's characteristics and those of the training environment. The internalisation of some environmental influences eventually affects the musician's functioning in a consistent manner (Hallam, 2002:235). Related to Hallam's view, Austin *et al.* (2006:213) broadly describe motivation as "a dynamic process involving the self-system (perceptions, thoughts, beliefs, emotions), the social system (e.g., teachers, peers, parents and siblings), actions (motivated behaviours including learning investment and regulation), and outcomes (learning achievement)".

Hallam (2002:225) points out that the history of the study of human motivation shows the attempt of theorists to explain it from different perspectives, thereby demonstrating its complexity. O'Neill and McPherson (2002:32-38) review five key theoretical perspectives and research relevant to music performance achievement. These theories are: expectancy-value theory, self-efficacy theory, flow theory, attribution theory, and mastery-motivation theory.

Expectancy-value theory

Expectancy-value theory shows that the successful mastering of tasks depends on the individual's anticipation of success and the value he or she puts on the activity (Davidson, 2002a:43; O'Neill & McPherson, 2002:32). Attainment value, intrinsic motivation, extrinsic utility value, and perceived cost are the four components described by this model (O'Neill & McPherson, 2002:32). According to O'Neill and McPherson (2002:32), these components have implications regarding the importance students attach to performing music, the usefulness of musical training to their future goals and career choices, and the amount of practice needed to achieve the necessary performance standard. The authors further show that research in music corresponds with findings in academic disciplines in this regard (O'Neill & McPherson, 2002:32).

Self-efficacy

Self-efficacy constructs refer to the degree to which one believes in one's own capability to accomplish a task in a specific situation (O'Neill & McPherson, 2002:34; Nielsen, 2004:427; McPherson & McCormick, 2006:323). According to McCormick and McPherson (2003:39-40), self-efficacy also includes the musician's ability to judge which skills are necessary for a competent performance. Research in music supports these claims.

Findings of two separate studies by McCormick and McPherson demonstrate the importance of self-efficacy as a predictor of achievement in graded music performance examinations (McCormick & McPherson, 2003:48; McPherson & McCormick, 2006:322). McCormick and McPherson (2003:48) are of the opinion that the major role played by students' self-efficacy perceptions is possibly caused by the importance of performance as an "image-forming component of an individual's identity as a musician".

Results of a study by Nielsen indicate a positive relationship between self-efficacy and various learning strategies during advanced music students' instrumental practice (Nielsen, 2004:418, 427). Nielsen (2004:419) suggests that since students in higher music education spend their study time mostly on instrumental practising, their self-efficacy perceptions regarding learning may play a crucial role in promoting their practice strategies and is therefore fundamental to successful practice sessions.

According to McPherson and McCormick (2006:332), resilient self-efficacy is, amongst others, a prerequisite for achievement since it enables students to persevere in spite of difficulties. It also facilitates students' ability to assess setbacks and determine new strategies to ensure a better future performance (McPherson & McCormick, 2006:333).

Flow theory

Flow is a subjective experience characterised by intense concentration, a distorted sense of the passage of time, "merging of action and awareness", a sense of control, a losing of self-consciousness, and experiencing the activity as intrinsically rewarding (Nakamura & Csikszentmihalyi, 2002:90). Conditions for the flow experience include clear goals and immediate feedback regarding progress, as well as an optimal balance between a person's skill levels and the challenge of the task (Nakamura & Csikszentmihalyi, 2002:90, O'Neill & McPherson, 2002:35). Nakamura and Csikszentmihalyi (2002:91) point out that the quality of a person's experience is influenced by the subjective perception of skills and challenge rather than the objective ones. Anxiety develops when challenges exceed skills and boredom when a person's skills exceed the challenge of the task (O'Neill & McPherson, 2002:35; Nakamura & Csikszentmihalyi, 2002:90).

Since the flow experience is intrinsically rewarding, it leads to a desire to replicate the experience, encourages persistence, and thereby fosters a continuous growth of skills (Nakamura & Csikszentmihalyi, 2002:92, 95-96). According to O'Neill and McPherson (2002:36), research shows that flow experiences influence the quality of students' instrumental practising sessions.

Attribution theory

Attribution theory addresses the various reasons musicians give to explain the quality of their performances and is therefore important for understanding the differences in students' performance (O'Neill & McPherson, 2002:36, 43). Research shows that although luck and task difficulty are also given as reasons, music students mostly attribute the success and failure of their performances to ability or effort (O'Neill & McPherson, 2002:36; Schmidt, 2005:135).

O'Neill and McPherson (2002:37) point out that students who ascribe success to internal reasons, such as effort, tend to have a higher self-esteem than students who attribute their success to external reasons such as luck. The authors further indicate that research suggests that students who attribute their success or failure to effort and those who associate it with ability tend to approach tasks differently. Research findings reveal that since low achievers are more likely to ascribe success to luck and to associate failure with ability, they tend to discount the possibility that an increase in effort might lead to better achievement (O'Neill & McPherson, 2002:37).

Mastery motivation

O'Neill and McPherson (2002:38) point out that since learning to play a musical instrument presents many challenges, difficulties and failure are already experienced during the initial stages of instrumental training. Therefore, it is possible that children's skill development during training in playing a musical instrument will be much sooner influenced by motivational patterns than in other subject areas (O'Neill & McPherson, 2002:37). According to O'Neill and McPherson (2002:38), research shows that although learners may be equal in ability, their behaviour, practising strategies, and music performance are influenced by different motivational patterns when they encounter obstacles or failure. The mastery motivation theory distinguishes between "adaptive mastery-oriented patterns" and "maladaptive helpless patterns" (O'Neill & McPherson, 2002:38).

According to O'Neill (2002:82), learners who display mastery-oriented patterns tend to choose learning goals. Since these goals place emphasis on the need to improve skills, failure is usually considered part of the learning process (O'Neill, 2002:82). Therefore, learners who display mastery-oriented patterns tend to remain focused on task mastery despite the occurrence of obstacles or failure (O'Neill & McPherson, 2002:38). O'Neill and McPherson (2002:38) posit that these learners are also inclined to seek challenges and adjust their practicing strategies to facilitate an increase in their competence.

In contrast, students who display helpless patterns tend to establish performance goals where the displaying of competence and avoidance of failure and negative judgement are prominent (O'Neill, 2002:82). Consequently, the behaviour of these students is characterised by giving up, avoidance of further challenges, experiencing of negative emotions, and a lowering of expectations, which result in poor future performance (O'Neill & McPherson, 2002:38). Additionally, helpless students are inclined to practise inefficiently by using strategies detrimental to their performance and spending more time on parts already mastered while avoiding those with particular difficulties (O'Neill & McPherson, 2002:38).

3.3.1.2 Influence of parents and teachers

Research by Davidson *et al.* (1997:203) demonstrates that supportive parents and teachers is a common feature in the backgrounds of successful musicians. Therefore, parents and teachers play an important role in providing a nurturing environment to the musician in training. This might contribute to a musician's self-confidence as well as belief in his or her own abilities (Kemp & Mills, 2002:14; Moore *et al.*, 2003:545).

Although most children initially have an intrinsic motivation for music (Kemp & Mills, 2002:10), research indicates the importance of parents and teachers in supplying initial extrinsic motivation (Sloboda & Davidson, 1996:182). Kemp and Mills (2002:10) point out that young learners' initial intrinsic motivation could easily be drowned by improper forms of extrinsic motivation resulting from parents' and teachers' forceful labours toward the attainment of further knowledge and skills.

Some teachers do so much for their students and work in such detail that these learners "become passive spectators to their own learning" and "dependent on the teacher for all creative thinking" (Smith, 2000:150). Many musicians' biographies report the occurrence of personal problems in adult life caused by parents' and teachers' overprotection, projection of too much of their own ambition onto the young musician, and sometimes living through the young musician's accomplishments (Kemp & Mills, 2002:13).

Pressure and unrealistic expectations from parents and teachers may contribute to some of the high anxiety levels in a number of children (O'Neill & McPherson, 2002:40). According to Bernstein (1981:266), such parents may unknowingly cause their children to feel incapable of fulfilling their parents' expectations.

Lang (1998:7) indicates that the absence of a piano teacher's praise, when such praise is warranted, may cause sensitive students to feel that their performance can never reach a

satisfactory level. Extending this observation, Sternbach (2008:44) posits that too much criticism could follow students into the practice room in the shape of disproportionate self-criticism, and could lead to excessive performance anxiety. He further points out that teaching learners to be self-responsible by demanding that they correct their errors through harder practice, can make students susceptible to unwarranted self-blame (Sternbach, 2008:44).

3.3.1.3 Music performance examinations and competitions

Formal evaluation of their piano performance is an inevitable part of piano students' training process, and takes the form of performance examinations and competitions, including eisteddfodau. Berenson (2008:4) points out that some students thrive on public performances, and tend to give their best performances in these situations. Although these events can serve as motivation for meticulous study, and could provide "a healthy outcome of the learning process", they also have a downside (Smith, 2000:149). Smith (2000:149) points out that a constant focus on measurable results in piano study may cause inefficient establishment of technical foundations, the neglect of other areas important for studying the piano, and a limited repertoire.

Unfortunately, because of parents' ill-considered desire for their children to make swift progress, learners are often prematurely entered for external graded music performance examinations and drawn into a "grade race" where proceeding to the next grade immediately follows completion of the last (Kemp & Mills, 2002:13). In addition to having a narrowing effect on students' repertoire, entering learners for a performance examination before they are adequately prepared may reduce the examination to an "anxiety-inducing event" (Kemp & Mills, 2002:13).

Contributing to the stressfulness of a performance examination is the fact that students only have one opportunity to perform at their best, which is in contrast to academic examinations where students can return to and correct their mistakes (McCormick & McPherson, 2003:48). According to Bernstein (1981:49), performers are under pressure to pursue perfection because people are exposed to the high standard performances on mistake-free recordings, which contribute to a perception that mistakes are unacceptable. Consequently, evaluations of performance hold the potential that students may view mistakes occurring during their performance as failure to meet high standards, which can result in lower self-confidence and perceived rejection by others, such as disillusioned parents or teachers (Bernstein, 1981:49; O'Neil & McPherson, 2002:42; Berenson, 2008:4). Therefore, it is important that the compositions selected for public performance should be within a student's technical capability, to ensure a performance without any likelihood of public humiliation (Lang, 1998:44). In

addition, a successful public performance enhances a student's self-esteem, and leads to the adage that success breeds success (Lang, 1998:44).

3.3.2 Practice

It is generally acknowledged that practice is indispensable for the acquisition and improvement of performance skills (Kostka, 2002:145; Davidson, 2002b:144; Smith, 2005:36; Miksza, 2006:308). Therefore, practice is crucial to students' development as musicians, and they devote many hours to individual practice (Jørgensen, 2002:105; Leon-Guerrero, 2008:91; Duke *et al.*, 2009:310).

Since practice is a primary expectation of music lessons (Leon-Guerrero, 2008:91), at some point music teachers usually berate their students for not practising enough (Reid, 2002:103). Johnston (2002:19) points out that the age-old tension between the teacher's desire for students to prepare well for lessons and the student's desire to practise as little as possible will always exist. Sufficient preparation also comes into question when a student receives poor grades (Bernstein, 1981:49).

Although it seems as if the amount of practice plays a vital role during student training, there is a lack of unanimity between suggestions in pedagogical works on the amount of practice needed for obtaining musical success (Reid, 2002:103). Researchers in music have tried to address this matter, and research findings suggest that the ultimate goal of the musician determines the amount of practice required (Reid, 2002:103).

Reid (2002:104) further points out that recurring emphasis on the quality of practice throughout the pedagogical literature suggests that, although the amount of practice is important for musical success, the effectiveness of the hours spent on practising depends on the quality and nature of practice activities. This is in line with Jørgensen's observation that although research indicates a positive relationship between achievement level and the amount of practice, there are usually certain reservations and qualifications pointing to the effectiveness of the practice (Jørgensen, 2002:107).

Mills (2003:333) mentions that much of the early research focused on the quantity of practice rather than its quality and content, while more recent research has addressed the quality of practice. Therefore, research suggests that the quantity as well as the quality and content of practice are determinants of musical skill (Gabrielsson, 2003:242). Mills (2003:333) summarises these findings by stating that a large amount of inefficient practice will still keep the novice performer from turning into an expert performer, and that plenty of practice is rather

a symptom than a cause of the learning process. Her statement relates to Johnston's observation that there will be no outcomes without time spent practising (Johnston, 2002:19).

3.3.2.1 Features of efficient practice

According to Bernstein (1981:9-10), productive practice encourages self-integration, which builds self-confidence. Efficient practice consists of various interrelated features besides the amount of time spent practising. These features include the setting of attainable goals, knowledge of practising techniques, effective self-evaluation, skilled self-listening, and sound concentration.

Without specific goals, students' practice veers towards being aimless and fruitless (Bernstein, 2001:47; Johnston, 2002:57, 59). Research has shown that practice is most effective when the student has clear, attainable goals and is able to select the necessary practice strategies to fulfil these goals (Chaffin & Imreh, 2001:40; Reid, 2002:110; Kostka 2002:146; Miksza, 2006:309). Self-evaluation is another important element of practice, since it enables students "to effectively evaluate their own performances while using various practice strategies" (Hewitt, 2001:308). Bernstein (1981:115) points out that objective self-listening enables students to compare their sound production on the piano with their own musical concept, and therefore contributes to productive practice.

Objective self-listening requires that students should be aware of every sound they produce to ensure that nothing escapes their attention during practice (Bernstein, 1981:116). Therefore, effective self-listening involves intense concentration (Bernstein, 1981:116), which in turn is important for ensuring accuracy and sustaining efficiency (Reid, 2002:106).

Since students usually only have one practical lesson per week, they are mostly responsible for their own learning (Johnston, 2002:14; Nielsen, 2008:243), which demands planning (Miksza, 2006:320) and much discipline (Bernstein, 2001:45). Therefore, careful scheduling (Friedberg, 1993:49), as well as development of the necessary tools to enable them to be efficient "self-instructive learners" (Leon-Guerrero, 2008:103) is a necessity to student musicians.

3.3.2.2 Reasons for inefficient practice

Although it is expected of students in higher education to show expertise in their practising behaviour (Jørgensen, 2002:106), practice is usually the item that tends to disappear from a busy, unplanned programme (Friedberg, 1993:49). This might lead to practising a lot at the last moment instead of over an extended period, resulting in inadequate preparation for a lesson

(Bernstein, 1981:49). Ineffective planning could also cause an inefficient distribution of the workload among practice sessions, and although they practised every day and applied all the practice techniques shown to them, students still end up inadequately prepared for the next lesson (Johnston, 2002:260-261).

Students' lack of improvement in performance from one week to the next, in spite of having practised, might also be an indication that they are using inefficient practice methods (Johnston, 2002:36). The use of inefficient practice methods could stem from setting the amount of time spent practising as the most important daily goal because of the belief that daily repetition will lead to satisfactory improvement (Johnston, 2002:17; Duke *et al.* 2009:311-312). This belief often originates from teachers who were more interested in how much their students practised than in how productively the time was spent, even to the degree where they acknowledged when learners played well, but still made them feel that they were failing by berating them for not practising enough (Johnston, 2002:16,18).

Other possible reasons for students' use of inefficient practising methods are a lack of clear goals and an inadequate knowledge of appropriate practising techniques to realise these goals (Johnston, 2002:39). Hewitt (2001:318-319) ascribes his research findings "that students were unable to improve their performance through self-evaluation" to the possibility that while they might have been able to identify their weaknesses and strengths, students were unable to prescribe the necessary solutions.

Leon-Guerrero (2008:91,103) points out that teachers are often more concerned with the outcome than with the learning process, and assume their students take enough information from the lesson to enable them to practise the assigned work efficiently. Therefore, teachers neglect to provide their students with the necessary guidance to become efficient self-instructors (Leon-Guerrero, 2008:103).

According to Duke *et al.* (2009:311), informal reviews of practice instructions disclose that teachers tend to give little attention to specific goals needed to be accomplished each day, but mostly "assign only what to practice and how long to practice". This observation concurs with the results from research conducted in connection to the practice of students in tertiary music education, which reveal that many students and teachers fail to discuss practising strategies during lessons (Kostka, 2002:149; Koopman *et al.*, 2007:380), and that teachers assume their students know how to practise effectively and are following a practice routine (Kostka, 2002:152).

Johnston (2002:63-64) points out that even when students receive clear goals for their practice, the absence of rigorous criteria might cause them to determine their own, which could lead to premature declarations of competence resulting in inadequate preparation for the next lesson. According to Johnston (2002:64), this is a recipe for a clash between reality and students' expectations.

On the other hand, some students practise without giving attention to the teacher's guidelines, thereby often adding new problems to existing ones through careless errors (Johnston, 2002:84-85). Impaired concentration could also lead to inefficient practice.

Bernstein (1981:11) indicates that since practice is a solitary activity, it might lead to such a feeling of loneliness that it crowds out concentration. He further posits that although concentration is a prerequisite for effective practice, forced concentration may create barriers that impede progress (Bernstein, 1981:39-40), and that a lack of concentration causes students to end up making more mistakes than when they started their practice sessions (Bernstein, 1981:49).

Once realising that their practice is ineffective, irrespective of the reason thereof, students might tend to avoid practising (Johnston, 2002:93). They could feel that the effort put into practice seems to produce limited improvement in performance, and conclude that it is not worth it to invest so much time (Duke *et al.* 2009:312).

3.3.3 Tertiary Education

Tertiary education demands a dedication of energy and time. This may be part of the reason why students at this level of education no longer display the social and psychological problems of early adolescence (Smith, 2000:146). Piano students at this advanced level are usually emotionally and physically more mature than their non-musician peers and younger students, and have the ability to set and work towards long-term goals, although they can also sometimes be irresponsible in spite of a sense of self-determination and independence (Smith, 2000:146-147).

3.3.3.1 Students' expectations and apprehensions

In addition to their hope of being taught by highly competent musicians, students who want to pursue a musical career perceive that there will be many available opportunities at university and thus look forward to their tertiary education (Burt & Mills, 2006:55). However, some students are disillusioned when they find that the tertiary environment does not meet their expectations (Burt & Mills, 2006:56).

According to Pitts (quoted by Burt & Mills, 2006:52), some undergraduates experience insecurity and a lessening of their enthusiasm for music study as it ceased to be a subject amongst many others in which they participate as a minority. This statement concurs with an observation by Kingsbury (quoted by Burt & Mills, 2006:67) that when students realise they are now one of several music students instead of being exceptional, they find the tertiary environment challenging.

Although many pre-university music students are looking forward to studying alongside others who are passionate and enthusiastic about their music, they are concerned about how their standard will compare with those of their peers, and are apprehensive about performing in their presence (Burt & Mills, 2006:56, 67). Since the majority of student musicians entering university strive to become performers or composers, they feel that there is a lot at stake and tend to build up feelings of inadequacy and anxiety when performing for their peers (Burt & Mills, 2006:70). However, many students overcome their feelings of inadequacy (Burt & Mills, 2006:58).

Although the majority of students' initial ambition is the pursuing of a career in music performance, it changes as they become aware of other options more suitable to their individual strengths and priorities (Burt & Mills, 2006:66). Smith (2000:149) points out that some students need assistance in forming a realistic perception of their musical capabilities and themselves "in relation to the world". Burt and Mills (2006:67) indicate that although first year students are usually more negative towards music teaching as a career choice, third year students tend to be willing to include teaching as a career option.

3.3.3.2 Demands of tertiary music education

Since music study at tertiary level is very demanding with regard to students' expertise and time, careful scheduling is a necessity for the student musician (Friedberg, 1993:49; Smith, 2000:145). Therefore, workload and time management are a concern of numerous students, which leads to a tendency to experience conflict between instrumental and academic work, and a feeling that the demands of the academic work leaves little time for practice (Burt & Mills, 2006:62). According to Nielsen (2004:426), research shows that tertiary music students seem to forego practice planning. This concurs with Bernstein's (2001:46) observation that most students in tertiary music education practise an average of two hours per day and sometimes not at all when examinations are pending or assignments are due.

Given that even advanced students have difficulty finding enough time for sufficient practice between attending classes, writing assignments, studying and preparing for examinations,

students whose technique as well as their ability to process musical notation are deficient will be unable to keep up with the demands of tertiary education (Bernstein, 2001:46). According to Bernstein (2001:46), many such students are admitted to degree programmes because, as high school seniors, they concentrated on only a few pieces for a whole year, which they perform for admission to conservatories, and although they passed the required audition with flying colours, they are mostly unequipped to meet the demands of these programmes. Bernstein bases his opinion on the reports of several faculty members at tertiary institutions who are disillusioned when they discover the results of inadequate training in students who impressed them the most during auditions (Bernstein, 2001:46).

Because of the evaluation system inherent in the nature of tertiary education, students have to play a recital in order to test their proficiency in piano playing, and if they meet the requirements, they move on to the next year (Rosen, 2004:94-95). This system could be problematic for students who ought to develop their technique more slowly, extend their familiarity with the repertoire possibilities, and free themselves from poor habits acquired from previous teaching (Rosen, 2004:95). Thus, students lack the freedom to develop at their own pace (Rosen, 2004:96), and in the need to acquire a repertoire they immediately start learning new compositions after examinations without necessarily having mastered the previous ones (Neuhaus, 1993:207).

3.3.3.3 Health concerns

Research indicates that performance-related health problems are common among student musicians (Williamon & Thompson, 2006:427; Bruno *et al.*, 2008:855; Kreutz *et al.*, 2008:7-8). Although it is generally assumed that the tertiary environment causes these problems, most students who choose to major in piano have started lessons by the age of 10, and do not arrive at university with a clean slate (Brandfonbrener, 2009:30, 34). Since the duration of piano playing during the early stages of training is insufficient to produce discomfort or pain, harmful technical habits may be overlooked for many years before it causes stiffness, tension or pain when pianists perform more advanced repertoire and practise for longer periods (Uszler, 2000:242). Therefore, most of these problems are cumulative and do not stem from a particular incident (Brandfonbrener & Kjelland, 2002:90).

Brandfonbrener and Kjelland (2002:92-93) are of the opinion that excessive muscular as well as emotional tension, regardless of its origins, are the roots of most musicians' injuries, and therefore the most important risk factor. When students enter undergraduate music education, their training intensifies and in addition to the necessity for immense discipline and the pressure to succeed, they experience the physical tension of practising, as well as the stress

of performance situations, which has the potential to trigger music-related health problems (Guptill *et al.*, 2005:5; Spahn *et al.*, 2005:256; Barton *et al.*, 2008:72).

According to Kreutz *et al.* (2008:3), existing literature shows that the physical demands of instrumental performance can be compared to those of sport participation. This statement is in accordance with that of Rosen (2004:4-7) who equates piano performance with athletic performance and points to the similarity between the two regarding the occurrence of injuries resulting from intense training and practising demands. In contrast to athletes, music students are often physically unfit, making them more vulnerable to practice-related strain (Sternbach, 2008:44).

The literature suggests that interrelated extrinsic and intrinsic factors contribute to the potential health risk and playing-related injuries of musicians. These factors include the musician's features, the demands of the instrument, repertoire performed, technique, as well as amount and intensity of practice (Brandfonbrener & Kjelland, 2002:90; Barton & Feinberg, 2008:47; Barton *et al.*, 2008:72; Ranelli *et al.*, 2008:179).

Brandfonbrener and Kjelland (2002:91) point out that although the body's proportions or the demands of technique might dictate a pianist's seating distance from the keyboard, the distance could also "affect the medical biomechanics". Furthermore, the modern piano requires more muscle power and contributes to overuse hand problems among pianists since its action is stiffer and heavier, and it has a larger keyboard span than the earlier instruments that much of the piano literature was written for (Rosen, 2004:81-82; Sakai, 2008:169). Therefore, risk factors for pianists also include technically challenging repertoire with long series of octaves and difficult chords (Brandfonbrener & Kjelland, 2002:92).

Unusual posture and repetitive movements are aspects of technique that frequently lead to injury because of the demands placed on the musculoskeletal system through intensive practice (Barton *et al.*, 2008:72; Bruno *et al.*, 2008:859; Kreutz *et al.*, 2009:48). Therefore, performance-related pain and injuries are mainly attributed to poor posture and overuse (Spahn *et al.*, 2005:256; Williamon & Thompson, 2006:411). Musculoskeletal problems mostly involve the neck, shoulders and spine, as well as the upper extremities (Guptill *et al.*, 2005:5; Williamon & Thompson, 2006:423; Barton *et al.*, 2008:73; Bruno *et al.*, 2008:859), while non-musculoskeletal problems include severe headaches, concentration problems, unusual fatigue, and sleep disturbance (Kreutz *et al.*, 2008:6).

Although students seem to be aware of the health-risks, they struggle to find a balance between their need to practise in order to meet the demands of their training and strengthen their musical identity, and the need to take care of their health (McReady & Reid, 2007:143-144). In their pursuit of continual improvement, they tend to neglect their health and often tolerate pain in order to realise their short-term goals (McReady & Reid, 2007:144; Park *et al.*, 2007:93-94; Kreutz *et al.*, 2009:47). Therefore, undergraduate music students are particularly at risk for developing playing-related problems (Park *et al.*, 2007:89; Barton & Feinberg, 2008:47).

Since playing-related problems can impair the quality of tertiary music students' practice and performance (Kreutz *et al.*, 2008:11), they may impede their academic progress (Park *et al.*, 2007:92; Barton *et al.*, 2008:76), which can be emotionally distressing (Guptill & Golem, 2008:308). In addition to frustration and concern over lack of progress, student musicians tend to feel lost and isolated when their playing is disrupted by injuries (McReady & Reid, 2007:142-144). Several students also experience an identity crisis since their sense of identity and self-worth is linked to being musicians (McReady & Reid, 2007:142; Park *et al.*, 2007:91-92).

3.4 Music Performance Anxiety

Authors concur that music performance anxiety, commonly known as 'stage fright', is a serious problem for many amateur as well as professional musicians (Neuhaus, 1993:205; Wilson, 1997:243; Steptoe, 2001:293; Valentine, 2002:168; Wilson & Roland, 2002:47; Osborne & Kenny, 2005:725). Wilson (1997:229) defines music performance anxiety as "the exaggerated and sometimes incapacitating fear of performing in public".

Music performance anxiety occurs in evaluative and exposed situations such as lessons, examinations, auditions, competitions and concerts, and frequently develops progressively over days preceding the event (Wilson, 1997:243; Steptoe, 2001:292). Although being nervous is part of performing (Bernstein, 1981:261), and a moderate degree of tension is often necessary to produce an inspiring performance, excessive tension can result in anxiety, impair the quality of the performance, and have a debilitating effect on the performer (Wilson, 1997:243; Steptoe, 2001:291-292; Valentine, 2002:170; Wilson & Roland, 2002:47; Kirchner *et al.*, 2008:59-60).

3.4.1 Symptoms and Consequences of Music Performance Anxiety

Most of the physiological symptoms perceived by musicians in their experience of music performance anxiety are the result of fear, leading to an excessive activation of the autonomic nervous system (Wilson, 1997:229; Steptoe, 2001:296; Valentine, 2002:168). Well-known

symptoms include 'butterflies' in the stomach, trembling, palpitations, perspiration, breathing disturbance, dry mouth, and muscle tension (Wilson, 1997:229-230; Steptoe, 2001:294-295; Wilson & Roland, 2002:47-48; Valentine, 2002:168; Yoshie, *et al.*, 2008:120, 131).

Since excessive perspiration, trembling and muscle tension can have a negative effect on the performer's fine motor skills, they may be detrimental to performance (Lehrer, 1987:145; Davidson, 2002b:150; Valentine, 2002:168; Kirchner *et al.*, 2008:60). When performers make mistakes because of these symptoms, they often become distracted by the physiological reactions and try to calm themselves, thereby losing concentration, which in turn increases anxiety and the chance of further errors, resulting in a vicious circle where performance can collapse completely (Lehrer, 1987:147; Wilson, 1997:235; Steptoe, 2001:299; Valentine, 2002:169; Kirchner *et al.*, 2008:63).

3.4.2 Causes of Music Performance Anxiety

Inadequate preparation frequently causes the experience of music performance anxiety (Sternbach, 2008:47; Whitcomb, 2008:36). The unpredictability of an inadequately prepared performance could cause paralysing fear (Bernstein, 1981:262), which may be a representation of the performer's recognition of insufficient preparation for the expected performance level (Wilson, 1997:234). However, music performance anxiety is a multifaceted phenomenon (Lehrer, 1987:143; Steptoe, 2001:294; Kemp & Mills 2002:13), and feelings of anxiety might also stem from a fear of judgement, failure, or humiliation, as well as from worrying about the effects of anxiety (Steptoe, 2001:299; Valentine, 2002:169; Wilson & Roland, 2002:48; Kirchner *et al.*, 2008:63; Sternbach, 2008:47).

Since musicians invest much of themselves in their music, they often find it difficult to separate their musical identity from their personal identity (Kemp & Mills 2002:8). Therefore, their self-esteem is often intertwined with their identity as a musician, resulting in them perceiving setbacks such as criticism, examination failure or poor performance ratings as a personal attack (Kemp & Mills 2002:8). When self-esteem and self-worth are closely identified with a successful performance, performance situations present the possibility of negative evaluation and subsequent loss of self-esteem, thus triggering performance anxiety (Valentine, 2002:169).

Concern about the evaluation of others could also be tied to perfectionism and high internal standards (Steptoe, 2001:299). Wilson and Roland (2002:48) point out that perfectionists tend to have unrealistically high expectations of themselves, are inclined towards heavy self-criticism, and consequently suffer low self-esteem. These performers often engage in a self-

critical monologue during a performance and focus on the negative aspects of their playing, which results in diminishing self-confidence and the individual feeling flustered (Kirchner *et al.*, 2008:64; Whitcomb, 2008:36). Research findings support the notion that perfectionism and destructive self-criticism is associated with music performance anxiety (Kenny, *et al.*, 2004:772; Kirchner *et al.*, 2008:62).

Another variation of negative thinking is the exaggeration of the probability of disaster during a performance (Steptoe, 2001:298; Valentine, 2002:169). Musicians with this tendency are inclined to exaggerate the consequences of mishaps, believe these occurrences will ruin their performance, and fear a resulting loss of control over the situation (Wilson, 1997:235; Steptoe, 2001:299).

According to Kemp and Mills (2002:13), the possibility that debilitating music performance anxiety is a learned response should also be considered. A performance situation may have become associated with fear because of previous experiences that produced music performance anxiety with its accompanying somatic symptoms (Valentine, 2002:168; Kenny, 2005:184). Caldwell (1990:107-108) points out that one unpleasant experience because of music performance anxiety could be enough to start a stimulus-response pattern where even the thought of performing might trigger the anxiety. When the anxiety is triggered, the performer moves into "a self-evaluative attention state" where perceived inability to deal with the performance situation becomes prominent, and concentration is disrupted by the performer's "focus on catastrophic cognitive self-statements" (Kenny, 2005:184).

Although anything that heightens the musician's sense of exposure can contribute to increased levels of performance anxiety (Wilson, 1997:232), some individuals are more susceptible to music performance anxiety than others (Valentine, 2002:172). Performers with high trait anxiety are especially vulnerable (Kenny, *et al.*, 2004:758; Yoshie, *et al.*, 2008:131-132), as well as introverts and performers who are prone to social phobias (Wilson, 1997:231).

3.4.3 Treatments for Music Performance Anxiety

Different treatments are used for music performance anxiety (Wilson & Roland, 2002:58; Sternbach, 2008:47). These treatments include the following

- Psychoanalysis (Wilson & Roland, 2002:52)
- Behavioural therapy (Wilson, 1997:239; Wilson & Roland, 2002:52; Kenny, 2006:60),
- Cognitive-behavioural therapy (Wilson & Roland, 2002:52; Kenny, 2006:60)
- Alexander Technique (Wilson, 1997:241; Wilson & Roland, 2002:54; Kenny, 2006:61; Sternbach, 2008:47)

- Biofeedback (Kenny, 2006:62; Sternbach, 2008:47)
- Music therapy (Kenny, 2006:62)
- Hypnotherapy (Wilson, 1997:242; Wilson & Roland, 2002:54; Kenny, 2006:63)
- Meditation (Kenny, 2006:63)
- Medication (Wilson, 1997:238; Wilson & Roland, 2002:51; Kenny, 2006:63; Sternbach, 2008:47)

3.5 SUMMARY

This overview shows that the physical and mental skills pianists need to develop in order to pursue a career in music requires much discipline, effort and intensive training, which starts at an early age and places high physical and psychological demands on students. The literature on music performance and the training of musicians further indicates that, in addition to the necessary performance skills, aspects such as time management, goal setting, efficient practice, self-evaluation, self-listening, concentration, self-confidence, self-esteem, self-efficacy beliefs, self-criticism, emotions, stress and anxiety levels, as well as the consequences of injuries influence the success of piano performance.

It thus seems as if, in addition to the development of performance skills, enhanced psychological well-being could contribute to student pianists' psychological resilience and the success of their piano performance. Therefore, the next chapter will discuss the Tomatis Method as a possible intervention to enhance student pianists' psychological well-being, as well as their self-listening skills, which is crucial to their practice and piano performance.

CHAPTER 4
TOMATIS METHOD

4.1 INTRODUCTION

The aim of this chapter is to give an overview of the Tomatis Method and to indicate how it may affect the psychological well-being and piano performance of student pianists. Therefore, this chapter defines the Tomatis Method and provides historical background. The principles underlying the Tomatis Method, the Method itself, benefits of the Tomatis Method, the ways in which the Tomatis Method can benefit student pianists, and criticism of the Tomatis Method are discussed. This is followed by a summary.

4.2 DEFINING THE TOMATIS METHOD

In his autobiography, *The Conscious Ear*, Tomatis (1991:88) described that which is now simply known as the Tomatis Method, as Audio-Psycho-Phonology. This term indicates the interaction between a human being's listening and hearing potential, psychological attitudes, and control over speech and language (Van Jaarsveld & Du Plessis, 1988:136).

The Tomatis Method is a non-invasive sound stimulation program, which also includes audio-vocal activities and is further complemented by consultation (Thompson & Andrews, 1999:90). It is a therapeutic intervention that is used to enhance listening skills, which may contribute to the enhancement of other skills and help to overcome problems that are related to listening (Madaule, 1994:32; Thompson & Andrews, 1999:90; Neysmith-Roy, 2001:19).

4.3 HISTORICAL BACKGROUND

Alfred A. Tomatis (1920-2001), a French ear, nose and throat specialist, developed the Tomatis Method during the last half of the twentieth century (Thompson, 2004b:43). Since Tomatis was the son of an opera singer, some of the first clients in his private practice were opera singers suffering from voice problems (Madaule, 1994:34, Tatum, 2004:38).

These singers found that they were starting to sing off key when their voices rose beyond a certain pitch. These were notes that they previously could produce without any problems. When traditional medical treatments of their vocal cords failed to help, Tomatis did a hearing test on the singers. He found that their audiograms looked similar to those of factory workers who suffered hearing loss from exposure to loud industrial noise. He further noticed that the

loss in the range of frequencies the singers could produce corresponded with the frequencies they were having trouble hearing (Tomatis, 1991:41-44).

Tomatis concluded that the voice could only produce what the ear is capable of hearing (Tomatis, 1991:44). This phenomenon was scientifically verified, independently of Tomatis, at the Sorbonne University in 1957, presented to the French Academy of Medicine as well as the French Academy of Science, and became known as the Tomatis Effect. The Tomatis Effect forms the basis of the Tomatis Method (Madaule, 1994:34; Tatum, 2004:39; Thompson, 2004b:44).

By filtering the sound of his patients' voices in various ways while they listened to themselves, Tomatis observed that their vocal production changed according to the filtering. He realised that the ear controls the voice, and concluded he only had to train the ear to restore the voice (Tatum, 2004:38). Tomatis created an electronic device, known as the Electronic Ear, to help opera singers recover their voice. He improved the Electronic Ear over the years and this ear-training device is now the centrepiece of the Tomatis Method (Madaule, 1994:35-36).

Hearing of his success in the treatment of opera singers, other musicians as well as actors came to Tomatis for treatment. In addition to improvements in voice and sound production, they felt more energised, slept better, and found that they learned and memorised better. Some of them asked Tomatis to work with their children in order to see whether their schoolwork would improve. It worked well, and led to a process of discovering various applications of the Tomatis Method (Tatum, 2004:39; Tomatis, 2005:x). Tomatis' clinical investigations spread to social adjustment, emotional problems, and communication disorders such as autism (Madaule, 1994:37).

Andrews (2004:16) points out that although independent researchers have not studied the Tomatis Method extensively, evidence of its effectiveness was founded on close observation of a considerable number of clients treated by Tomatis and his associates (Andrews, 2004:16). Tomatis integrated his findings into a gradually evolving theory and science, and continually refined the Method. To follow the evolution of the theory, one can study the fifteen books written by Tomatis. It stretches from the initial observation that improved listening causes improved voice quality, to a variety of other theories and observations related to the role of listening in foetal development, improved communication, sensory integration, balance and posture, motor control, studying of a second language, spiritual growth, development of consciousness, and rehabilitation, (Thompson, 2004a:4).

The first issue of *Ricochet: International Journal of Tomatis Method Research* contains a detailed account of the historical development of the Tomatis Method. The following timeline summarises this account.

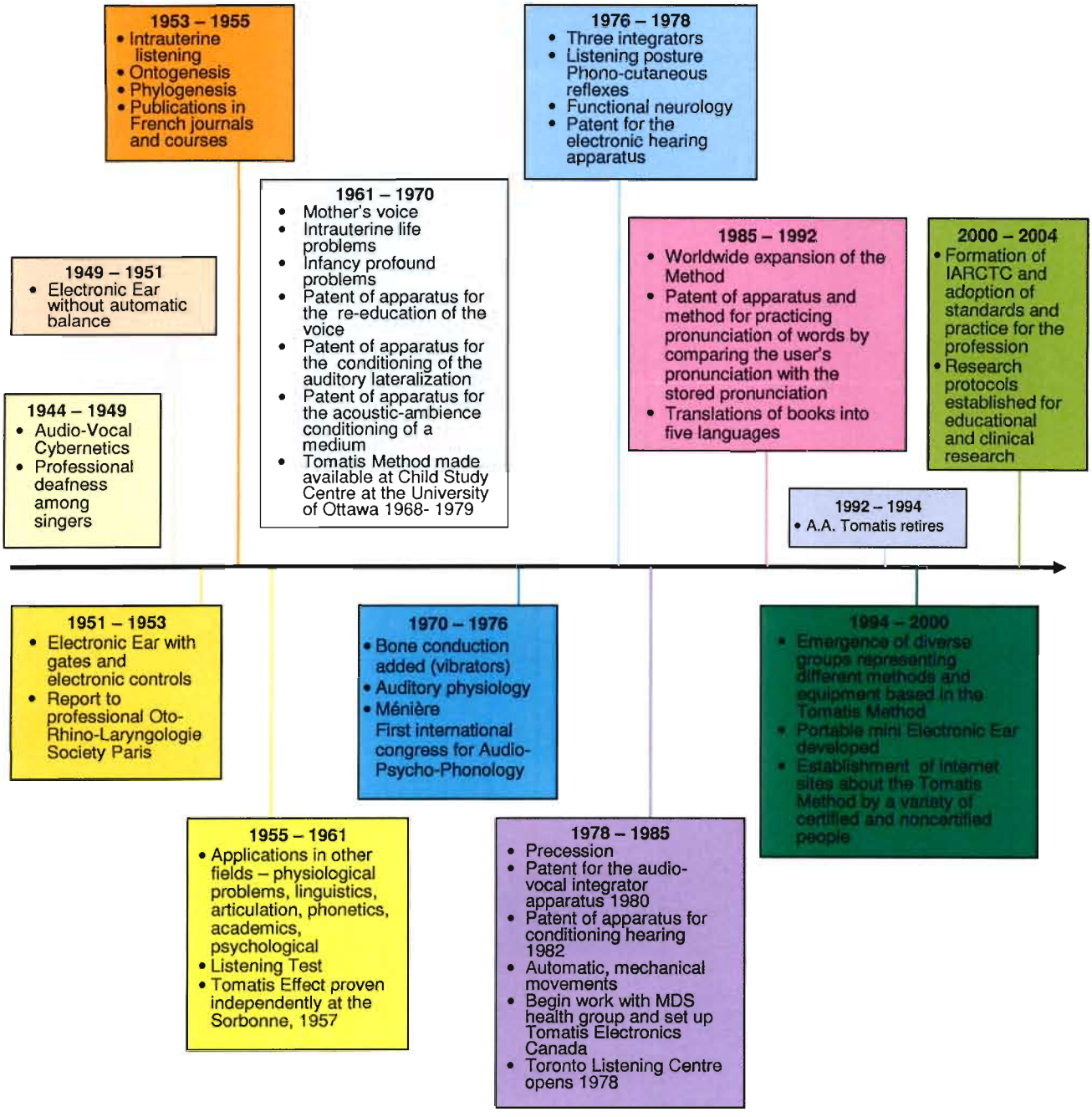

Figure 4.1 Timeline of the historical development of the Tomatis Method (Anon, 2004:49-50)

4.4 THEORETICAL PRINCIPLES

Certain theoretical principles underlie the Tomatis Method. These principles include Tomatis' view on the functions of the human ear, the so-called Tomatis laws, and the concepts of the leading ear, the musical ear, and listening.

4.4.1 Functions of the Human Ear

Tomatis' observations brought him to the conclusion that — since there seems to exist a continuous dialogue between them — the ear, brain, and nervous system are all connected (Tomatis, 2005:6, 68, 85). This conclusion differed from traditional theories of auditory perception, and in his search, Tomatis found an explanation for this difference in his study of the phylogenetic and ontogenetic development of the ear (Van Jaarsveld, 1974:140, 142).

Since his "discovery of the audio-vocal loops in 1947" (Tomatis, 1996:168), he also discovered other circuits, which led him to the study of what he termed the 'integrators'. Tomatis identified three integrators, namely the vestibular or somatic integrator, cochlear or linguistic integrator, and the visual or spatial integrator (Tomatis, 1996:168, 179; 2005:55; Thompson & Andrews, 2000:180, 181). Therefore, besides hearing and listening, the ear has an influence on the regulation of various seemingly unrelated human activities. These activities include balance, posture, gait, movement of body parts, spatial awareness, as well as eye movements (Thompson & Andrews, 2000:178; Tomatis, 2005:21).

Madaule (1994:37) maintains that Tomatis' view of the ear as an active system is a divergence from the traditional description of the ear as essentially passive. He further points out that although the interpretation is new, Tomatis' description of the ear's mechanisms is based on known facts.

4.4.1.1 Development of the ear

According to Tomatis (1996:175; 2005:45), the ear is completely formed by four and a half months of pregnancy, and the inner ear is functioning and able to process sound after five and a half months. Investigations carried out by other researchers support Tomatis' theory of the early functioning of the ear of the foetus (Van Jaarsveld & Du Plessis, 1988:137; Tomatis, 1991:213). Tomatis further points out that the auditory-temporal lobe of the brain is fully developed at birth (Tomatis, 1991:217). Since the ear is fully active at birth, its development is in advance of the other sensory organs (Tomatis, 1996:177).

Tomatis (1991:131) posits that although it is a fact that the foetus hears, it differs from the way hearing takes place after birth. During the prenatal period, the ear is adapted to perceive those frequencies that water can conduct, including the high frequencies of speech (Tomatis, 1991:131). After birth, the ear gradually opens and the external as well as the middle ear adapts itself to the air around them, while the inner ear still contains fluid (Tomatis, 1991:131).

4.4.1.2 The inner ear

According to Tomatis (1991:59), the analysis of sound information by the brain starts in the inner ear. In addition to the analysis of sound, the inner ear also analyses body movement (Tomatis, 2005:46, 51).

The inner ear contains the membranous labyrinth consisting of the vestibule and cochlea, which according to Tomatis are interdependent (Tomatis, 2005:46, 52). He points out that because there are many connections between the vestibular and cochlear systems, they function as a single unit (Tomatis, 2005:85). He also maintains that these two systems work together to realise the so-called listening posture, which enables attentive reception of information coming from one's own body, the environment, and the universe (Tomatis,1996:170). To attain this posture, the cochlea summons the vestibule to adjust the body's position to receive as much stimulation through postural responses as possible (Tomatis, 2005:48). According to Tomatis (1996:170), this readjustment enables the easy expression of thoughts.

The vestibule

Tomatis (2005:47) maintains that the vestibule, which is the oldest part of the ear, detects, organises, and enables body movement. On the surface of the cerebellum is an active network of cells causing several connections that link every point on the vestibule with a point on the body, thereby initiating a direct interaction between the body and the vestibule (Tomatis, 2005:56). Through this neural structure, the vestibule controls the movement and tension of the various muscles, and thus also gesture and posture (Tomatis, 1991:206; 1996:169; 2005:84). Temporal-spatial awareness, which is a prerequisite for rhythm and balance, is also controlled by the vestibular system (Thompson, 2004c:58).

Thompson and Andrews (2000:181) point out that the motor nerve function of the eye also leads back to the vestibule. Therefore, the vestibule is closely associated with the so-called visual integrator, implying that there is a connection between the ear and the eye, which starts "with vestibular information to the vestibular nuclei" (Thompson & Andrews, 2000:181).

The cochlea

Tomatis (2005:45, 52) posits that although the cochlea is made of the same material as the vestibule, it focuses on the analysis of sound, and records sounds through its connection to the brain. He maintains that the differentiation of sound takes place in the cochlear duct (organ of Corti). Specific locations along the duct each perceive a specific frequency, from where it is distributed to the hair cells, which are again specialised for perceiving a certain pitch. Only

then is the information sent to the cerebral cortex (Tomatis, 2005:84). Tomatis further points out that the auditory area in the left temporal lobe, which is important for concentration and memory, shows the "same localized differentiation" (Tomatis, 2005:84).

Tomatis explains that the cochlea's initial response to low tones, caused by the cells at the base of the cochlea which mature first, changes as the hair cells become sensitive towards the higher frequencies (Tomatis, 2005:45). The reception of lower frequencies then takes place through newly maturing hair cells closer to the apex of the cochlea (Tomatis, 2005:45). Therefore, only a few dozen cells of the organ of Corti appear in the area responding to low frequencies, a few hundred in the middle range, while most of the cells (24,000) appear in the area responding to high frequencies (Thompson, 2004c:57; Tomatis, 2005:6).

According to Tomatis, the perception of sound can provide energy to the brain, and causes the ear to act as "a sort of generator that charges the cortex with electric power" (Tomatis, 1991:164). He posits that since there are only a few receptors for low frequency sounds, these sounds result in the brain losing energy (Tomatis, 2005:6), while high frequency sounds enable thinking by stimulating the cortex (Tomatis, 1991:186).

Tomatis (1991:186) points out that the cochlea as well as the vestibule plays an important part in providing the brain with cortical energy, which contributes to the healthy functioning of the brain. The vestibule contributes by controlling and organising equilibrium and verticality, and the cochlea to the extent it is able to detect sound (Tomatis, 1991:186). According to Tomatis, the mechanisms of the inner ear are linked to the middle ear's adaptive responses (Tomatis, 2005:86).

4.4.1.3 The middle ear

The middle ear, located between the external and inner ear, consists of three ossicles called the hammer, anvil and stirrup. These three bones connect the eardrum with the inner ear (Tomatis, 1996:35). The hammer and anvil adjust the tympanic pressure in reaction to the sounds that one wishes to perceive, while the stirrup and its muscle maintain a constant pressure of the fluid within the inner ear (Tomatis, 2005:57).

According to Tomatis, the listening posture is dependent on "good posture in the ear itself", which demands a mastering of the tension of the stirrup and hammer muscles since they form a cybernetic control system that regulates the inner ear and adjusts the tension of the eardrum (Tomatis, 2005:86). Tomatis indicates that since the muscles of the hammer and the stirrup

control the listening function by regulating the ear (Tomatis, 2005:49). The fitness of these two muscles is very important for the optimal functioning of the inner ear (Tomatis, 2005:52).

Tomatis (2005:52) points out that, under optimal conditions, the muscle of the hammer, which is a flexor muscle, and the muscle of the stirrup, which is an extensor, act synergistically. He further states that this interplay, which balances the tension between these two muscles, influences the auditory response curve (Tomatis, 2005:52, 86). Tomatis posits that the Listening Test shows an ideal curve when the tension of the two is balanced, and an interrupted curve as soon as one of the muscles dominates (Tomatis, 2005:52).

According to Tomatis, domination by the muscle of the stirrup results in too much absorption of endolymph fluid, thus causing muffling of the high frequencies (Tomatis, 2005:52). He adds that this muting of high frequency sounds influences the movement of the hammer-stirrup block, which further decreases keen perception of high frequencies while increasing reception of low frequencies (Tomatis, 2005:53). Tomatis maintains that the exaggerated action of the stirrup muscle affects all the extensor muscles in the body, and therefore causes an imbalance in the reciprocal action and reaction of the antagonistic flexor-extensor pairs, resulting in a somewhat overcorrected, stiff posture, which prohibits good vocal emission (Tomatis, 2005:53).

Tomatis further explains that domination by the muscle of the hammer results in the elimination of too many low frequencies, thus reducing auditory control (Tomatis, 2005:53). According to Tomatis, too much tension of the muscle of the hammer also has a negative influence on posture and the integration of body image, resulting in a person seeming clumsy and lethargic (Tomatis, 2005:53).

4.4.1.4 The external ear

The external ear includes the auricle and the external auditory canal, sealed by the tympanic membrane, and stretches from the auricle to the eardrum (Tomatis, 1996:35, 51). According to Tomatis (2005:54), it serves as an amplifier as well as a filter, which especially favours the diffusion of high frequencies into the inner ear.

Tomatis points out that several cranial nerves, including the vagus, also called the pneumogastric nerve, innervate the eardrum (Tomatis, 2005:61). He further describes how the vagus nerve, whose right branch is shorter than the left, spreads over a large area of the body and, through its significant influence on the parasympathetic system, has control over the pharynx, larynx, and other organs (Tomatis 2005:61, 62). Tomatis maintains that the vagus

nerve helps one "to consciously rediscover the correct respiratory rhythm as well as the cardiac and visceral rhythms so that a synergy is created between this internal network and the larynx, posture, attitude, etc." (Tomatis, 2005:63).

Tomatis explains that the parasympathetic system balances the sympathetic nervous system, whose main function is to maintain balance in the body's vital rhythms (Tomatis, 2005:62). His view is that certain individual behaviours could disturb these rhythms through the action of the parasympathetic system (Tomatis, 2005:62). He adds that the parasympathetic system is often overloaded by excessive information, which prevents optimal balance between these two systems (Tomatis, 2005:63). Tomatis further argues that this imbalance might result in inefficient respiration or altering of the cardiac and other body rhythms (Tomatis, 2005:63).

4.4.1.5 Cybernetic loops

According to Tomatis (2005:65), cybernetics is the science of automatic control systems or mechanisms. Thus, a cybernetic loop is a circular route where the end returns to the beginning (Tomatis, 2005:65). He further explains that in the case of physiological mechanisms, there has to be a commanding organ, transmitters responding to that central organ's commands, and a control center to monitor whether the emission conforms to the commanding organ's requirements (Tomatis, 2005:67).

Tomatis posits that the different elements of the auditory control loops are the brain, the nerves that stimulate various muscle groups and nerves that transfer sensory information to the brain, confirming a level of proprioceptive control. The auditory control gathers and coordinates sensory information, and organises stimuli conducted through both air and bone (Tomatis, 2005:67).

Tomatis (2005:69-75) describes 11 auditory control loops. These loops are the:

- Audio-Mandibular Loop
- Audio-Larynx Loop
- Audio-Pharyngeal Loop
- Audio-Lingual Loop
- Audio-Thoracic Loop
- Audio-Mouth Loop
- Audio-Nasal Loop
- Audio-Recurrential Loop
- Audio-Lumbar-Sacral Loop
- Audio-Cervical Loop

- Audio-Corporeal Loop

The number of loops identified by Tomatis shows the extent of the ear's connections to the whole body.

4.4.2 Tomatis Laws

The three so called 'Tomatis Laws' were developed from Tomatis' discovery of the links between hearing and speech. According to Tomatis, his discovery of the audio-laryngeal loop, which he has started as a law, namely "the voice only contains what the ear can hear" (Tomatis, 2005:72), was the starting point of all his observations and subsequent discoveries (Tomatis, 1991:44). Tomatis (2005:72) emphasises that this 'law' applies, without exception, exclusively to the right ear.

The discovery of the 'first law' led Tomatis to investigate whether there was a means to restore auditory capability. He found that the ear could electronically be re-educated to hear the missing frequencies correctly. As soon as these frequencies were restored to the ear, they were also unconsciously restored to the voice. This finding became known as the 'second law' (Thompson & Andrews, 2000:176; Tatum, 2004:39).

The results from the reconditioning of the ear gave rise to the 'third law', which concerns self-listening (Thompson & Andrews, 2000:176). With sufficient controlled auditory stimulation, where one listens to one's own voice heard with a good quality, the changes in one's self-listening behaviour, and consequently one's phonation will be maintained (Van Jaarsveld & Du Plessis, 1988:137, Thompson & Andrews, 2000:176; Tatum, 2004:39).

These three laws form the scientific basis for the Tomatis Method. It was also the driving force behind the development of the Electronic Ear (Thompson & Andrews, 2000:176).

4.4.3 The Leading Ear

Tomatis (1996:129) points out that the term 'leading ear' implies that one of the two ears plays a dominant role. Experiments led Tomatis to the conclusion that a person has a chosen, preferential ear. According to Tomatis (1991:52), the dominant ear focuses on a specific sound, while the other ear provides an overall image of the sonic background. Therefore, he decided to call the dominant ear the 'leading ear' (Tomatis, 1996:115).

During their experiments concerning the hearing of singers, Tomatis and his co-workers discovered that the two ears differ with regard to vocal control. When the singers listened with both ears, there seemed to be no change in vocal control. Suppressing left ear input and

leaving the right ear in control resulted in a slight improvement in the quality of the singing. By placing the left ear in control, the singers' professional skill and qualities vanished, and there seemed to be an involuntary slowing down of the tempo (Tomatis, 1996:112-113; 2005:23-24). In addition, the singers became slow, moved robot-like, and seemingly lost their capacity for carrying out voluntary acts (Tomatis, 1996:115). Tomatis reproduced the experiment with instrumentalists, and obtained the same results with regard to their instrument playing (Tomatis, 2005:24).

From these experiments, Tomatis realised that an excellent performance depends on right-ear dominance (Tomatis, 2005:22). He further concluded that only the right ear, never the left, coordinates phonation and all musical capabilities (Tomatis, 2005:25). He also observed that the right ear is dominant and acts as the directing ear in all great singers and musicians (Tomatis, 1991:50). This observation correlates with research in the United States, which statistically proved right-ear dominance in people with long and intensive musical training (Madaule, 1976:3).

Tomatis' explanation for this phenomenon is based on his conception of the working of the various nerve pathways. According to Tomatis (1991:50), the right auditory circuit consists of five stages, while the left auditory circuit involves six stages. The extra step in the transfer of information of the left auditory circuit causes a measurable delay. Thus, the right ear receives the information more quickly, and therefore takes control. Consequently, good auditory lateralisation implies that the right ear becomes the 'leading ear' (Tomatis, 1991:104; Madaule, 1994:44).

Madaule (1994:44) points out that when the right ear failed to develop as the leading ear, it often results in language and learning problems. Various reasons, one of which might be ear infection at the vital stage of language development, may be responsible for the right ear's failure to assume control. The avoidance of using the shortest path might also be a way of self-protection against an environment with too much noise, conflict, or tension. Without cutting listening off completely, the avoidance of the most direct route creates a distance between the child and the outside world (Madaule, 1994:44).

Madaule's observation coincides with Tomatis' theory that individuals who are left-ear dominant find themselves distanced by their ears (Tomatis, 1991:52). Since the right ear gauges the high frequencies and processes shorter wavelengths (35 – 70 centimetres), and the left ear the low frequencies and longer wavelengths (35 – 140 centimetres), a left-eared individual experiences difficulty to attune himself to the higher frequencies of his own voice.

Therefore, he feels a long way from his own body, uneasy, and somewhat clumsy (Tomatis, 1991:52). Thus, right-ear dominance is important for the optimal realisation of human potential (Tomatis, 1991:117).

Tomatis also posits that the 'musical ear' is characterised by right-ear dominance (Tomatis, 2005:122). He further maintains that training could develop right-ear dominance when it is not fully present (Tomatis, 2005:122).

4.4.4 The Musical Ear

Having discovered the correlation between the loss in auditory frequencies and the voice quality of professional singers, Tomatis and his co-workers wanted to determine the auditory curve of an ear which would be capable of exceptional musical talent. Therefore, they systematically examined the audiograms of professional musicians who, according to Tomatis, "loved and were able to reproduce high-quality music" (Tomatis, 1996:83). From these audiograms, they discovered an average auditory curve that always has the same profile, and named it 'the musical ear'. According to Tomatis, this profile allows a gifted person to appreciate music, and satisfies the requirements for good quality musical performance (Tomatis, 1996:38).

4.4.4.1 The audiometric description of the 'musical ear'

Tomatis (1996:83) describes the ideal response curve as ascending, without a break, from 500 Hz (C above middle C) to 4000 Hz (C four octaves above middle C). It forms a dome from 2000 Hz to 4000 Hz, with a slight drop between 4000 Hz and 6000 Hz. This auditory curve implies less sensitivity for low frequency tones and greater sensitivity for tones above 1000 Hz (Van Jaarsveld & Du Plessis, 1988:138).

Figure 4.2 represents the typical profile of the 'musical ear' as determined by Tomatis. It shows the frequency spectrum measured in hertz, as well as the volume threshold measured in decibels.

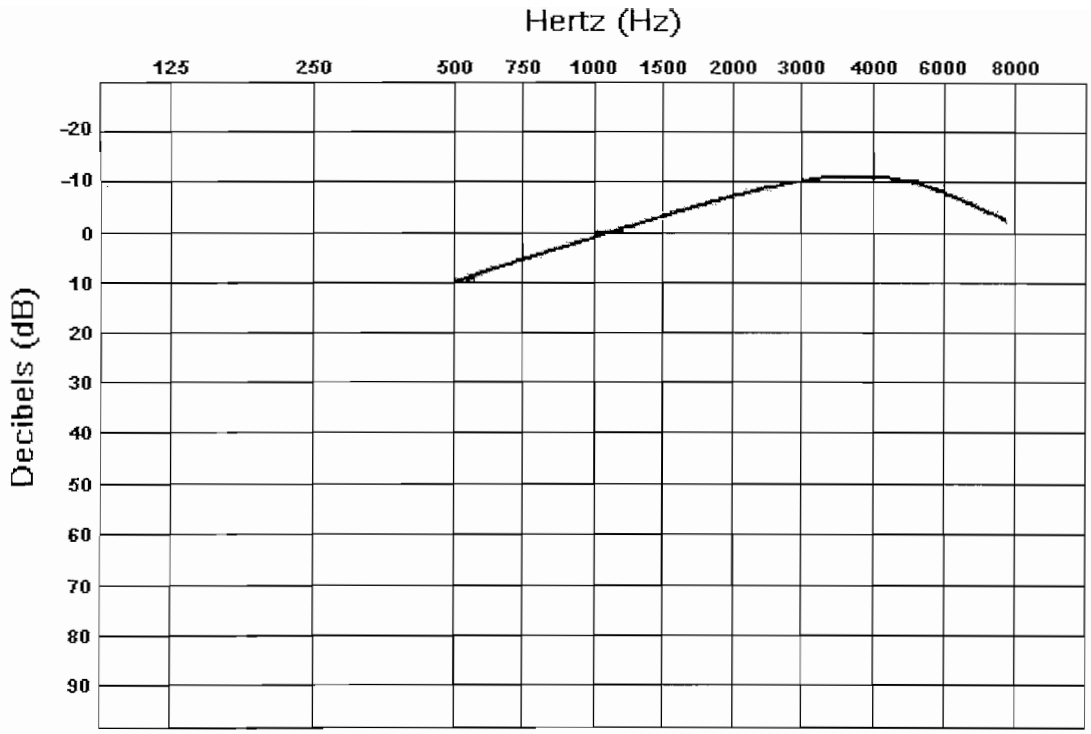

Figure 4.2 **Typical profile of the 'musical ear'** (Tomatis, 2005:122)

Tomatis points out that this is also the profile of good hearing. He further maintains that, under normal circumstances and from a physiological viewpoint, anyone with normal hearing has the potential for acquiring such a profile (Tomatis, 2005:122). However, physical or psychological causes might influence the shape of this ideal auditory curve, which in turn affects the vestibule and cochlea. The action of the vestibule modifies the body dynamic, and the frequency analysis by the cochlea can be disturbed (Tomatis, 2005:122).

According to Tomatis (2005:122), profiles of the thresholds imply diverse response patterns to sound. Some of these profiles are particularly significant with regard to musicians.

4.4.4.2 Significance of variances in the curve of the 'musical ear' to musicians

Tomatis posits that when the typical curve is devoid of its treble beyond 2,000 Hz, tonal reproduction is still secure, but difficulties are experienced in the control of quality (Tomatis, 1996:84). Figure 4.3 represents this profile.

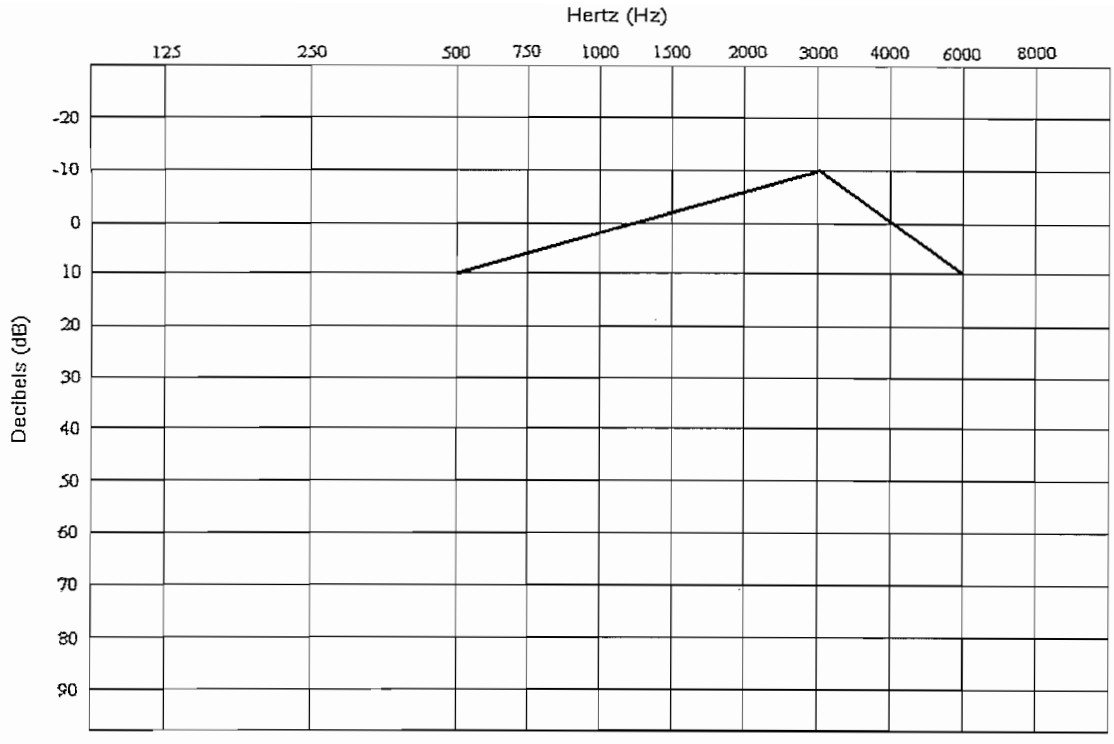

Figure 4.3 **Auditory profile: Difficulties in the regulation of quality** (Tomatis, 2005:124)

A variation in the curve between 1000 Hz and 2000 Hz (see figure 4.4) results in faulty intonation (Tomatis, 1996:85; 2005:123). Musical receptivity and the appreciation of quality is, however, retained (Tomatis, 1996:85).

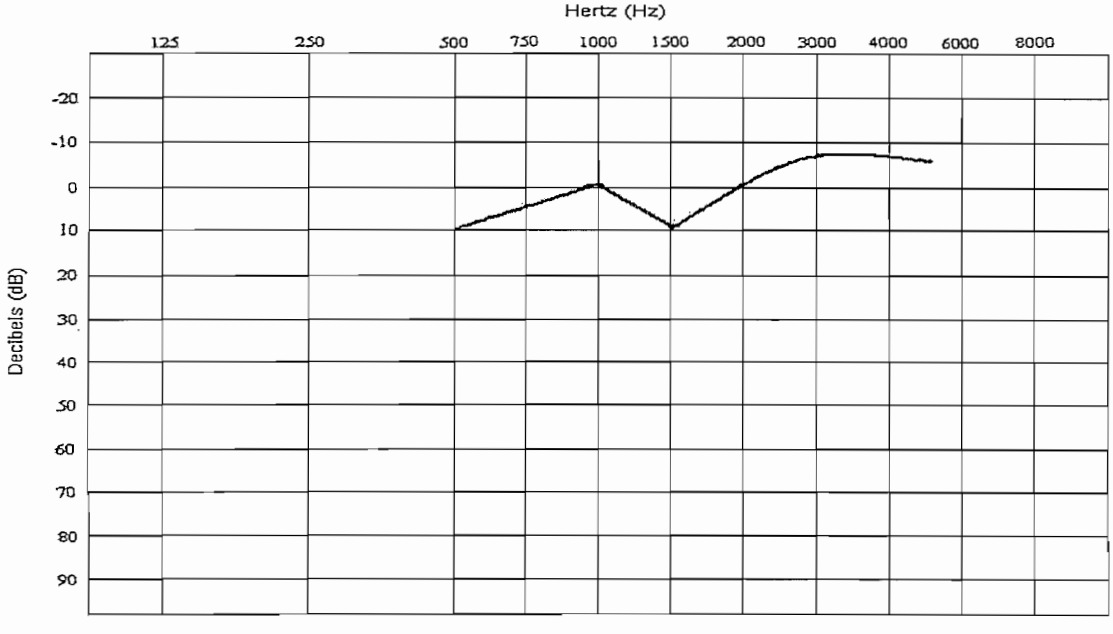

Figure 4.4 **Auditory profile: Faulty intonation** (Tomatis, 2005:124)

A disjointed curve above 1000 Hz (see figure 4.5), results in difficulties in reproducing music, although the affinity for music still exists (Tomatis, 2005:125).

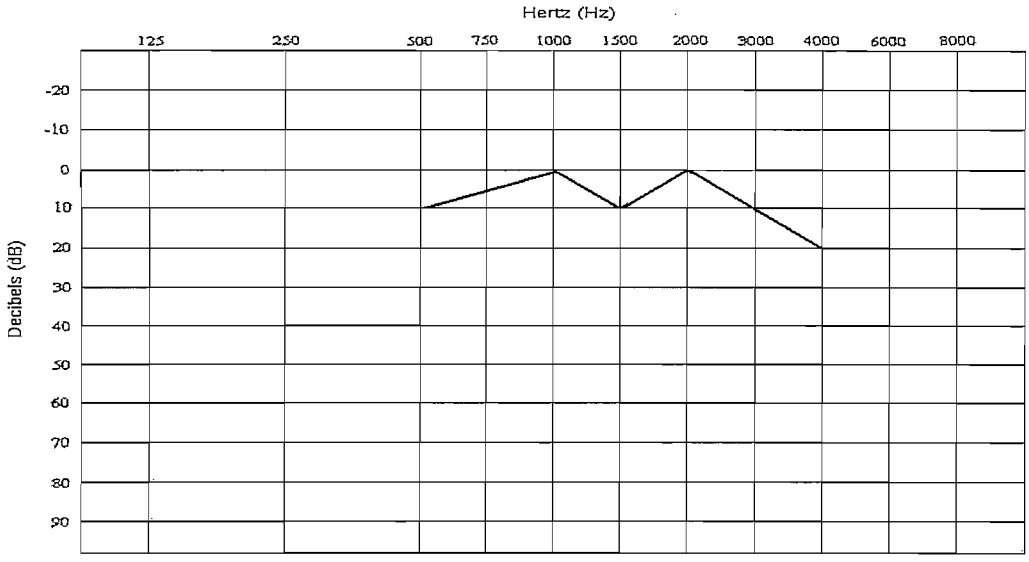

Figure 4.5 Auditory profile: Difficulty in reproducing music (Tomatis, 2005:125)

A dip between 500 Hz and 1000 Hz (figure 4.6) suggests insensitivity to music (Tomatis, 2005:123).

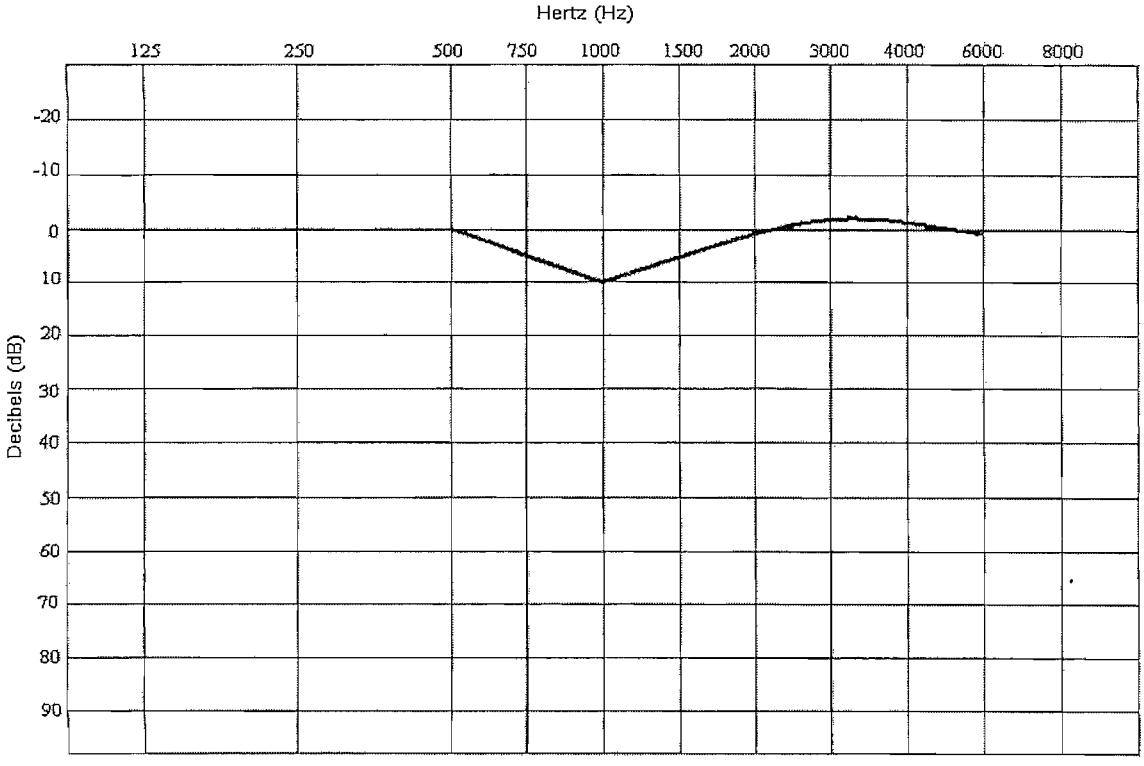

Figure 4.6 Auditory profile: Insensitive to music (Tomatis, 2005:123)

When the curve is completely disjointed (figure 4.7) or flat (fig 4.8), it represents an 'unmusical ear' (Tomatis, 1996:85; 2005:125).

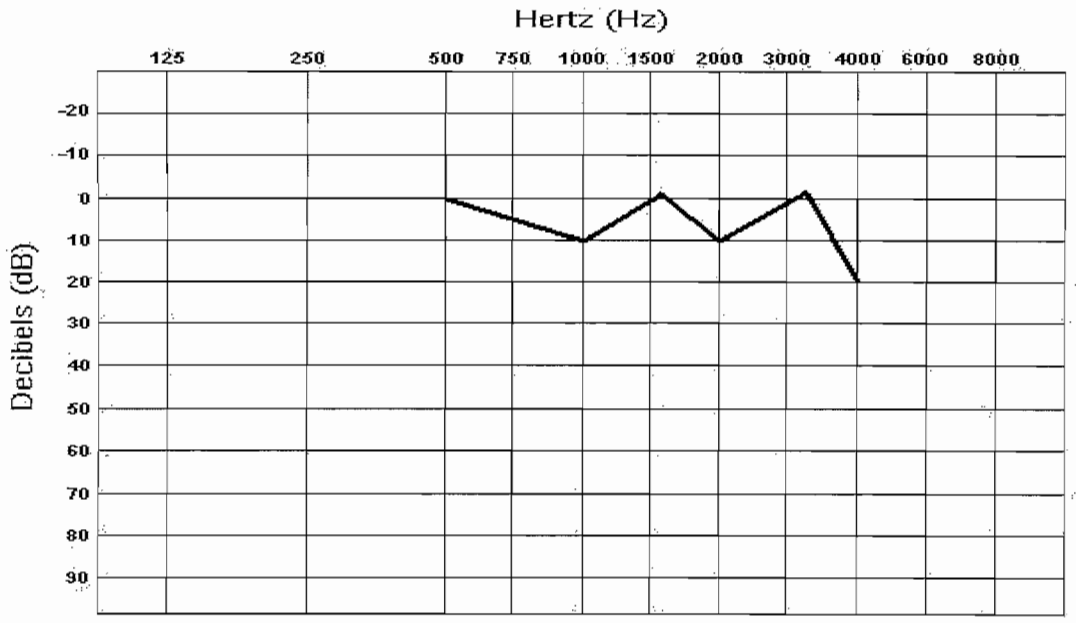

Figure 4.7 Unmusical ear: Auditory profile with completely disjointed curve (Tomatis, 2005:125)

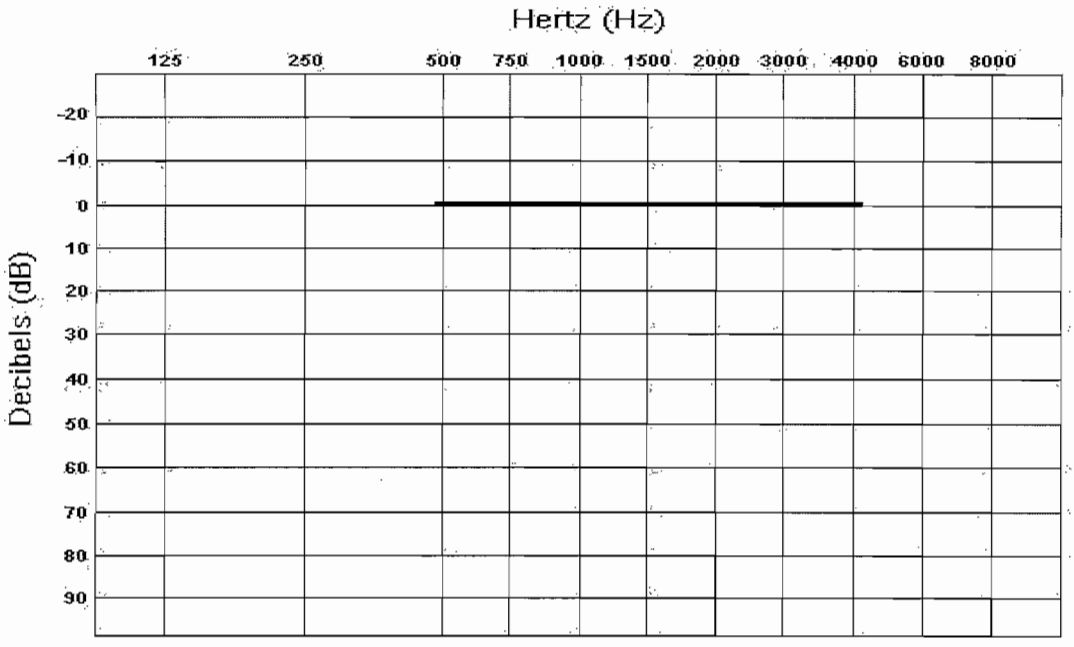

Figure 4.8 Unmusical ear: Auditory profile with flat curve (Tomatis, 2005:126)

Although the profile of 'the musical ear' is to a musician's advantage, it does not guarantee excellence. Tomatis (2005:122) points out that a student with the profile of the 'musical ear' is easier to teach. He further remarks that although a 'musical ear' enables the musician to execute the score correctly, such a musician still has to make adjustments that depend on mental state, technique, and the quality of the instrument (Tomatis, 2005:126).

4.4.5 Listening

According to Van Jaarsveld and Du Plessis (1988:137), Tomatis emphasises that optimal hearing is a process consisting of three overlapping actions namely hearing, listening and integration. It is, however, possible for a person to have good hearing but poor listening, or to listen without integrating.

4.4.5.1 Hearing versus listening

Tomatis distinguishes between hearing and listening by indicating that hearing is a passive, automatic and purely sensory act, while listening is an active, voluntary act (Tomatis, 1991:206; 1996:97; 2005:43). He states that listening is a transition from mere awareness to perception (Tomatis, 1991:206).

Good listening implies that through an act of will a person can tune into sounds across the entire sound spectrum, and perceive and analyse these sounds with speed and precision (Thompson, 2004c:55). According to Tomatis, "the ability to listen is rare", and "listening is a very high-level perceptual functioning" (Tomatis, 2005:25, 43).

4.4.5.2 Importance of listening

Since listening is a voluntary act and involves the passage from reception to perception, listening affects communication, motivation, rhythm and coordination, and learning potential (Thompson & Andrews 2000:176, Thompson, 2004b:44). In this respect, Tomatis also emphasises the importance of self-listening.

Tomatis (1991:49) indicates that good self-listening is needed in addition to good auditory receptivity in order to enable the voice to reproduce what the ear perceives. Self-listening also has other benefits besides becoming aware of one's own voice quality. It enables one to recognise the quality of the content of one's communication, facilitates the evaluation of speech volume or intensity, and ensures the continuity of one's speech (Tomatis, 1996:72). Tomatis maintains that the desire to communicate is the key to the listening process (Van Jaarsveld & Du Plessis 1988:137; Tomatis, 1991:125).

4.4.5.3 Origin of the listening function and desire to communicate

Since the inner ear is fully developed and able to process sound around the fifth month of pregnancy, the foetus is exposed to an environment rich in sound (Tomatis, 1991:127; 2005:45). These sounds range from external sounds on the abdominal wall, sounds of the mother's body and of the foetus itself, to the most important sound, namely that of the mother's voice (Tomatis, 1991:127, 214). Tomatis is of the opinion that this continuous dialogue

provides the foetus with a feeling of security (Tomatis, 1991:127). He further maintains that the desire to listen starts with hearing the mother's voice and nowhere else (Tomatis, 1991:217). Tomatis' investigations showed that besides the ability to hear, the foetus is also capable of integrating sounds and that it therefore knows how to listen (Tomatis, 1991:209). Therefore, listening starts in the womb (Thompson & Andrews, 2000:178).

Tomatis (1991:214) also claims that the "absorption of the mother's voice is the major factor that influences all subsequent affective and emotional structure". Therefore, this sonic experience may have psychological effects during post-natal life (Tomatis, 1991: 214).

4.4.5.4 Poor listening

According to Tomatis (1996:97), poor listening is often the consequence of emotional or physical trauma, which may occur for any number of reasons. Amongst others, these reasons might include a disconnection from the natural mother's voice, stress, a major lifestyle disruption, an accident, or health problems. Thus, poor listening can start at any age when a person decides to tune out some sounds in self-defence, and listening is then replaced by hearing (Tomatis, 1996:97; Thompson & Andrews, 1999:92; 2000:179).

At the physiological level, this tuning out of sounds manifests itself by a relaxation of the muscles of the middle ear, thereby considerably impeding the passage of sound. If the muscles of the middle ear are inactive for too long, they lose their tension and thus inhibit listening (Madaule, 1976:3).

Tomatis (1991:53) posits that since everything involves dialogue, and therefore listening, poor listening causes disharmony in one's total integration, which might manifest against some other person or one's own self. Symptoms of impaired listening include problems in areas of attention span, learning, motor control, receptive and expressive language, self-esteem, and behaviour or attitude (Tomatis, 1996:97; Thompson, 2004:55).

Although it takes some effort, it is possible to recover one's listening skill if a listening problem is not the result of 'bad hearing', caused by a physical abnormality (Tomatis, 2005:128). According to Tomatis (1991:189), a normalised listening function should harmonise relationships with one's social milieu and family.

4.5 THE METHOD

The Tomatis Method consists of an initial assessment, followed by listening sessions designed to train the ear and restore it to its full listening potential. This sound stimulation is achieved by

means of the Electronic Ear, and is complemented by counselling (Van Jaarsveld & Du Plessis, 1988:136).

4.5.1 The Listening Test

The Listening Test resulted from Tomatis' distinction between hearing and listening (Du Plessis *et al.*, 2001:36). It is an auditory perception test that combines information on hearing, and information on the utilisation of the desire to listen (Du Plessis *et al.*, 2001:36). Therefore, it differs from the audiogram, which only measures hearing.

Thompson (2004b:43; 2004c:55) points out that listening strengths and weaknesses are revealed by comparing "a person's listening to the ideal good functioning ear" (Thompson, 2004c:55). Since the Listening Test shows distortions in relation to the ideal auditory curve, it reveals impaired listening and provides insight into how a person relates to the environment (Tomatis, 1991:189; Thompson, 2004c:56). It thus enables the therapist to make a diagnosis and individualise the listening programme to suit an individual's needs. The Listening Test also serves as a tool to observe changes that might occur during and after a person's exposure to the listening programme (Thompson, 2004b:43; 2004c:56).

4.5.2 The Electronic Ear and Related Equipment

The equipment used during the Tomatis Listening Program consists of the Electronic Ear, specialised headphones, specific recordings, CD player, and a microphone. Tomatis (1991:59) emphasises that all the equipment must be of very good quality. Tomatis designed the Electronic Ear and the headphones in accordance with his theories on the working and primary functions of the ears, as well as the influences of the ears on the neurological system (Thompson & Andrews, 2000:177).

4.5.2.1 The Electronic Ear

The Electronic Ear — consisting of filters, amplifiers, and electronic gates — is a listening device, developed by Tomatis in order to assist the human ear in regaining its full listening potential (Madaule, 1976:4; Van Jaarsveld & Du Plessis, 1988:138; Thompson, 2004c:56; Tomatis, 2005:127). This listening device, used during the audio training as well as the audio-vocal training, sets complimentary systems in motion (Madaule, 1976:4).

A set of filters regulates the sound input to simulate the prenatal environment (Van Jaarsveld & Du Plessis, 1988:137). The filters can also be set to extend the listening and speech range as widely as possible, and improve the listening curve to reflect as closely as possible that of the ideal listening ear (Thompson & Andrews, 2000:177).

An electronic gating mechanism exercises the muscles of the middle ear in order to allow the experience of the ideal listening curve (Tomatis, 2005:127). According to Tomatis (2005:127), the muscle of the stirrup is exercised through bone conduction, and the muscle of the hammer through air conduction. In order to support a more rapid response to incoming information, the Electronic Ear allows for the timing delay of sound reception between bone and air conduction to be controlled (Thompson & Andrews, 2000:177). The stimulation of the middle ear is achieved by continuously relaxing and tensing the muscles of the hammer and the stirrup by means of an electronic gate. This continuous exercise improves the client's responsiveness to sound, and enables the ear through conditioning to perceive and analyse sounds efficiently (Madaule, 1976:5; Tomatis, 1991:108; Thompson & Andrews, 2000:177).

In accordance to Tomatis' theory that the right ear should be the leading ear in order to ensure efficient listening and vocal emission (Tomatis, 2005:72), the Electronic Ear provides a control to prepare the right ear for becoming the dominant ear (Thompson, 2004c:56). In order to effect the development of right ear dominance without the client being aware of it and developing a resistance, the sound intensity fed via headphones to the left ear is progressively reduced (Madaule, 1976:5; Van Jaarsveld & Du Plessis, 1988:138; Tomatis, 1991:109; Thompson, 2004c:56).

4.5.2.2 The headphones

The specialised headphones are designed to allow the client to hear sounds through bone as well as air conduction. In addition to the normal air conduction through the ears, a small vibrator added to the headphones produces bone conduction through the skull (Tomatis, 2005:127).

4.5.3 Filtered Sounds

To simulate intrauterine listening, high quality recordings of the mother's voice, as well as music, are sent through a system of electronic filters, which modifies it in such a way that only high frequencies remain (Tomatis, 1991:149, Madaule, 1994:22). Madaule points out that these filtered sounds build a bridge between the prenatal and postnatal worlds and "is like a return to the very roots of the listening ear" (Madaule, 1994:22).

According to Madaule (1976:6), the filtered sounds have the effect of opening the ear's 'auditory diaphragm'[2], thereby increasing the selective power of the ear. This stimulation of the focusing potential of the ear enables the client to perceive sound with less distortion and to

[2] According to Tomatis, the ear has a so-called diaphragm which can close as a result of extensive external threats.

analyse it more precisely over the whole frequency range (Madaule, 1976:6; Van Jaarsveld & Du Plessis, 1988:138; Thompson, 2004c:56).

Madaule (1976:6) as well as Thompson (2004c:57) posits that the fundamental frequency of a sound often masks its harmonic spectrum to the non-trained ear. This results in musicians being unable to adjust their listening to the harmonics of the sounds emitted by their instruments. Consequently, instrumentalists find it difficult to shape the melodic line, and singers have a problem with voice timbre (Madaule, 1976:7). By listening to filtered music through the Electronic Ear, the muscles of the middle ear are trained to perceive the higher harmonics of any sound source. This training enables musicians to control and improve the tone quality of their instruments (Madaule, 1976:7).

In addition, exposure to filtered sounds provides cortical charge to the brain, affects body image and temporal-spatial awareness, and effects relaxation (Madaule, 1976:9-11; Thompson, 2004c:57-58). Tomatis posits that the choice of music for filtration is important, since not all music causes the same reactions (Tomatis, 1991:150).

4.5.4 The Music

According to Tomatis (1991:150), music rich in high frequencies are the most effective for reaching the area of the cortex where the cells intended for cortical recharge are most concentrated. After testing the music of various composers over a period of 25 years in his practice, Tomatis and his co-workers selected and retained works by Mozart as well as Gregorian chants, because of the good results obtained (Tomatis, 1991:150, Madaule, 1994:65).

4.5.4.1 Music by Mozart

Since works by Mozart provided consistent results during the sound stimulation program, Tomatis concluded that Mozart's music was uniquely suited to the purpose of the program (Madaule, 1994:66; Tomatis, 2005:x). Tomatis chose music from certain symphonies and violin concertos. The criteria was that the music should be at a tempo of 120 beats per minute, should be rich in high harmonics, and should not have any intense emotional content which may lead to internal dialogue which distracts the listener (Tomatis, 2005:x).

According to Madaule, the music of Mozart used during the listening program produces a perfect balance between the energising effect and a feeling of well-being and calmness (Madaule 1994:66). Thompson and Andrews (1999:91) further claim that the development of thinking is stimulated by Mozart's music.

4.5.4.2 Gregorian chant

According to Madaule (1994:63), Tomatis found recordings from the abbey of St. Pierre de Solesmes to be the most effective. Besides possessing stimulating overtones that are energising (Madaule, 1994:63; Thompson & Andrews, 1999:91), Gregorian chant also has other qualities.

Madaule states that it is devoid of a specific beat, and simulates the rhythm of the respiration and heartbeat of a rested, relaxed person. Therefore, when listening to Gregorian chant, the body and mind are kept "in a state of calm awakening" (Madaule, 1994:63). Consequently, Gregorian chant is used at times to lower the heart rate and induce calm breathing (Tomatis, 2005:x).

4.5.5 The Phases

The Tomatis programme consists of a phase of auditory training (passive phase) followed by a phase of audio-vocal training (active phase). According to Madaule (1994:19), these phases are designed to simulate the main stages of the development of the ear, starting with the prenatal environment and continuing until language integration.

During the listening sessions, individuals do activities such as drawing, building puzzles, playing games, conversing, or just relaxing. Thompson and Andrews (1999:91) indicate that many of these activities enhance the integration of the reflex and tactile sensory systems.

4.5.5.1 The passive phase (auditory training)

The aim of the passive phase is to stimulate the focusing potential of the ear (Van Jaarsveld & Du Plessis, 1988:138; Thompson, 2004c:56), and to re-activate the desire to communicate (Tomatis, 1991:153; Madaule, 1994:22). This phase starts with the so-called sonic return (Tomatis, 1991:148) where the music of Mozart is progressively filtered by means of the Electronic Ear. This stage gradually prepares the ear for the next stage of listening to electronically filtered sounds, which simulates intrauterine listening (Tomatis, 1991:148).
The passive phase ends with the gradual defiltering of sounds. This reproduces the passage from prenatal listening to listening after birth, and is called the 'sonic birth' (Tomatis, 1991:153; Madaule, 1994:23).

The sound stimulation during the passive phase usually consists of music by Mozart, Gregorian chants, and recordings of the maternal voice (Thompson & Andrews, 1999:91). According to Madaule (1994:22), the maternal voice is seldom used for adults.

4.5.5.2 The active phase (audio-vocal training)

The aim of the active phase is to initiate the self-listening process, and thereby improve audio-vocal control (Tomatis, 1991:163). Therefore, the active phase involves audio-vocal exercises where clients use their own voice to stimulate their listening, which results in improved control of voice production (Madaule, 1994:25). Tomatis further indicates that this phase brings about "an encounter with the self", which enables individuals to adapt to environmental conditions, to reality, and to their own objectives (Tomatis, 1991:164). Active sessions, lasting 30 minutes each, alternate with sessions of listening to filtered music or Gregorian chants to allow the client to relax between exercises while the ear is still stimulated (Madaule, 1994:25; Thompson, 2004c:58).

During the audio-vocal sessions, the client listens to recorded sound, interspersed by silence, and tries to reproduce the sound as precisely as possible during the silences (Madaule, 1976:14). The client hears the recorded sounds, which are modified by the Electronic Ear, through the headphones and repeats it into a microphone. The Electronic Ear immediately adjusts the client's voice and feeds it back to the client via the headphones so that it is heard with good quality (Madaule, 1994:25; Thompson, 2004c:58).

The active phase starts with singing and chanting exercises. Some of these exercises include humming, which produces bone-conducted sounds dense in high frequencies and thus highly energising (Madaule, 1994:25). Gregorian chant is used for the singing exercises because of its richness in overtones, which allows the voice to exploit its potential. Because of its intrinsic rhythmic characteristics, these chants also enable clients to improve the rhythm of their breathing, which is important for musicians (Madaule, 1976:14).

The next stage introduces speech through word and sentence repetition. These words and sentences are rich in sibilants and thus in high frequencies (Madaule, 1994:25). Lower frequencies are progressively filtered out, thereby conditioning the ear to analyse the sound more efficiently, which in turn enables the client to emit the sound with greater control (Madaule, 1994:25; Thompson, 2004c:58).

Reading aloud follows, thereby introducing written language (Madaule, 1994:25). Since the emphasis is on voice quality, clients have to read relatively slowly and are encouraged to apply the principles learned during the previous exercises. During the reading exercise, the Electronic Ear monitors the client's voice (Madaule, 1994:26).

Since listening involves the whole body, clients are encouraged to develop a good listening posture during the active phase of the program in order to enhance their listening potential (Madaule, 1976:7; 1994:25; Thompson, 2004c:57; Tomatis, 2005:86). Thompson (2004c:57) sums the ideal listening posture up as follows: "an erect but not stiff spine, a slight forward tilt of the head with eyes closed, a relaxed neck and jaw, and open chest to allow ample breathing".

Tomatis indicates that there is an interaction between body alignment and listening. Since the listening act is activated by efficient body alignment, the shift from passive awareness to active listening takes place through the listening posture, which is under control of the ear (Tomatis, 1991:86; 2005:83, 85). According to Tomatis (2005:86), a good listening posture reflects excellent listening, which is the result of optimal functioning of the muscles of the hammer and stirrup. He further states that someone with unskilled listening will have to make an effort to procure it (Tomatis, 2005:86). Therefore, in order to augment listening potential, the acquisition of a good listening posture is an important part of the Tomatis program.

4.5.6 Consultation

Regular interviews with the client are necessary to ensure optimum progress, and form an integral part of the Tomatis Method (Van Jaarsveld & Du Plessis, 1988:138; Thompson & Andrews, 2000:177). Madaule (1994:28) points out that these interviews may take the form of individual interviews and/or group sessions, but are never left out.

These consultations allow the therapist and the client to monitor changes (Madaule, 1994:28, Neysmith-Roy, 2001:20). Since change usually goes hand in hand with fear, tension and resistance (Madaule, 1994:19), the consultations provide the client with the necessary support, explanations and recommendations (Madaule, 1994:28; Thompson & Andrews, 1999:91; Neysmith-Roy, 2001:20).

4.5.7 Length of the Program

Tomatis states, "Training over time is necessary for permanent results" (Tomatis, 2005:128). Therefore, the listening program, which consists of an average of 60 hours of sound stimulation, is divided into two phases of approximately 30 hours each (Thompson & Andrews, 1999:91; Madaule, 1994:21). Each of the phases consists of 15 days of listening sessions that lasts from one to two and a half hours per day (Thompson & Andrews, 1999:91). The two phases are separated by at least three weeks to allow for the integration of changes (Thompson & Andrews, 1999:91; Neysmith-Roy, 2001:20).

The length of the program can be adapted to suit individual needs (Tomatis, 2005:128). Madaule (1994:21) indicates that the length of the program depends on the client's age and the severity of the problem. Thompson and Andrews (1999:91) concur with this statement and add that the Tomatis Method trains the ear "until the individual is capable of retaining the benefits without the training" (Thompson & Andrews, 1999:91). Tomatis (2005:128) posits that integration continues and happens gradually after training.

4.6 BENEFITS OF THE TOMATIS METHOD

Madaule (1994:32) states that individuals can improve and enrich their lives by working on their listening. He further claims that the "clinical implications of this ear-body relationship and of the effects of sound stimulation are endless" (Madaule, 1994:53). Claims concerning the benefits of the Tomatis Method, resulting from enhanced listening skills, are supported by the reports of various authors.

According to Du Plessis *et al.* (2001:35, 36), there are continuous confirmation from professionals as well as clients that the Tomatis Method has a positive effect on communication, learning, psychological well-being, reduction of psychological symptoms, and the enhancement of musical skills. Improvement of physiological aspects is also reported (Madaule, 1994:32; Gilmor, 1999:13). It further seems as if various other therapies produce quicker results when used in combination with the Tomatis Method (Van Jaarsveld & Du Plessis, 1988:38; Trumps, 2004:23; Nicoloff, 2004:33; Tatum, 2004:42).

4.6.1 Communication

Studies mentioned by Van Jaarsveld and Du Plessis (1988:141) seem to support the premise of Tomatis that enhanced listening skills facilitate the desire to communicate. In addition, research and clinical observations suggest an improvement in:

- speech fluency (Van Jaarsveld & Du Plessis, 1988:41; Du Plessis *et al.*, 2001:36)
- the use of body language (Madaule, 1994:53)
- the ability to express feelings and thoughts (Van Jaarsveld & Du Plessis, 1988:138; Nicoloff, 2004:35)
- general communication skills (Gilmor, 1999:13; Nicoloff, 2004:35).

4.6.2 Academic Functioning

Clinical observations as well as research studies report improved academic functioning after exposure to the Tomatis Method (Van Jaarsveld & Du Plessis, 1988:138; Madaule, 1994:31, 48; Gilmor, 1999:13; Du Plessis *et al.*, 2000:36; Thompson, 2004c:57). *Specific aspects* mentioned include:

- reading and writing skills (Van Jaarsveld & Du Plessis, 1988:138; Madaule, 1994:31; Gilmor, 1999:13)
- comprehension and perceptual processing (Van Jaarsveld & Du Plessis, 1988:138; Nicoloff, 2004:35)
- attention, concentration, and memory (Madaule, 1976:25; 1994:31; Thompson, 2004c:57; Tomatis, 2005:129).

4.6.3 Enhanced Psychological Well-Being

Research done at the North-West University (Potchefstroom), indicate that exposure to the Tomatis Method enhances psychological well-being (Rolf, 1998:175; Akakios, 2001:25; Coetzee, 2001:17; Du Plessis *et al.* 2001:41; Tunmer, 2002:36; Nel, 2005:33). Various other studies, mentioned by Van Jaarsveld and Du Plessis (1988:41), also indicate positive outcomes with regard to aspects coinciding with the field of psychological well-being. Research by Nicoloff (2004:35) and Gilmor (1999:13, 14), as well as clinical observations by Tomatis (1991:166) and Madaule (1994:27, 48), yielded similar results. These aspects include:

- emotional modification (Nicoloff, 2004:35)
- interpersonal relations (Van Jaarsveld & Du Plessis, 1988:141; Nicoloff, 2004:35)
- enhanced self-esteem (Du Plessis *et al.*, 2004:65)
- self-concept (Van Jaarsveld & Du Plessis, 1988:141)
- self-confidence (Van Jaarsveld & Du Plessis, 1988:141; Nicoloff, 2004:35)
- self-control (Van Jaarsveld & Du Plessis, 1988:141)
- behavioural functioning (Tomatis, 1991:166; Nicoloff, 2004:35)
- general adjustment (Van Jaarsveld & Du Plessis, 1988:141; Gilmor, 1999:13, 14)
- organisational skills (Madaule, 1994:48)
- achievement functioning (Van Jaarsveld & Du Plessis, 1988:141)
- direction and meaning in life (Madaule, 1994:27)

4.6.4 Reduction of Psychological Symptoms

Du Plessis *et al.* write that evidence that the Tomatis Method is effective in reducing pathology is increasing (Du Plessis *et al.*, 2001:36). Amongst others, it includes reduction of:

- stuttering (Van Jaarsveld 1974:362; Madaule, 1994:30)
- anxiety (Peché, 1975:163; Du Plessis, 1982:429; Madaule, 1994:31)
- hyperactive tendencies (Madaule, 1994:31)
- depression (Coetzee, 2001:18)

4.6.5 Physiological Effects

Apparently, the Tomatis Method also benefits certain physiological aspects. Both Madaule (1994:48) and Gilmor (1999:13) report that in some cases exposure to the Tomatis programme seems to result in improved hand-eye coordination. Madaule further mentions that he observed improved balance, coordination, and motor function in clients (Madaule, 1994:48). According to him, clients also report improvement in energy levels (Madaule, 1994:32).

4.7 Benefit of the Tomatis Method to Student Musicians

Madaule reports that the Tomatis Method is often applied to music students who want to improve their musical performance (Madaule, 1994:32). He indicates that the effects of cortical charge, which include improved energy levels, motivation, concentration and memory, could aid the student to acquire musical expertise (Madaule, 1976:10).

Madaule (1976:14; 1994:53) posits that sound stimulation can also help with the improvement of posture and breathing, which are important considerations for musicians. He further maintains that after completion of a Tomatis programme, music students experience new energy reserves, that they are more interested in their studies and that they can learn a piece of music faster and easier (Madaule, 1976:10).

4.7.1 Improvement of Technique

Madaule writes that the Tomatis Method can help musicians to improve their accuracy and dexterity in instrumental performance (Madaule, 1994:53). He explains that the connection between the ear, nervous system, and brain allows the musician to better control motor functions, especially regarding the upper limbs (Madaule, 1976:11). Therefore, the improvement of motor function, as well as improved spatial awareness, will enable the musician to produce sounds with improved accuracy and dexterity (Madaule, 1976:11).

4.7.2 Establishment of Right-Ear Dominance

According to Tomatis (2005:22, 122), right-ear dominance is a prerequisite for the 'musical ear' and thus for an excellent performance. He maintains that right-ear dominance enables a musician to realise his/her potential, and that training through the Tomatis Method could accomplish this dominance (Tomatis, 1991:52, 108; 2005:24, 122). Thus, the establishment of right-ear dominance might lead to an improvement in the overall quality of a student's music performance.

4.7.3 Improved Control over Sound Production

Tomatis (1991:49) emphasises the importance to the musician of the rigorous control of the production of sound through self-listening. He points out that the musician needs to focus on the colour and quality of each sound to ensure "that nothing passes without strict verification" (Tomatis, 2005:21). Listening to filtered sounds through the Electronic Ear trains the muscles of the middle ear to attune to the high harmonics of a sound source. Consequently, the musician becomes more aware of the harmonics of the sound produced on his/her instrument, which enables the musician to control tone colour and to regulate the melody (Madaule, 1976:7; Thompson, 2004c:57).

4.7.4 Reduction of Music Performance Anxiety

Madaule (1976:13) maintains that exposure to the Tomatis Method might lead to a reduction in music performance anxiety. He points out that without the debilitating effects of music performance anxiety, the dread of performing in public changes to a positive awareness.

According to Madaule (1976:11), dominant vagus activity leads to anguish phenomena, such as music performance anxiety. He maintains that, since the tympanic membrane and the vagus nerve are connected, the enhancement of the tension of the tympanic membrane will moderate the action of the vagus (Madaule, 1976:13). Madaule (1976:13) further explains that because of the regulatory effect of the vagus nerve, the individual generally experiences a sensation of well-being. This leads to enhanced self-confidence, deeper breathing, the disappearance of muscular contractions, and thus the debilitating effects of music performance anxiety (Madaule, 1976:13).

4.7.5 Pianists

Tomatis (2005[3]:126) writes that he often found that pianists learn their music primarily through their eyes and hands. He mentions that he has met a few pianists "who were not musicians", and whose "listening tests show an important lack of musicality "(Tomatis, 2005:126). Tomatis ascribes their apparent success as pianists to effort, intelligence, and to the fact that the piano is already tuned.

To illustrate the success of the Tomatis Method with such a pianist, Tomatis (2005:126) relates the case of a pianist who gave up an international music career to become a monk. Apparently, when singing, this pianist had trouble with memorisation and intonation (Tomatis, 2005:126). However, after being trained through the Electronic Ear, the pianist discovered a

[3] The 2005 edition is an English translation by Roberta Prada of *L'Oreille et la Voix* which was originally published in 1988. Alfred Tomatis died in 2001.

love for music and that he could sing (Tomatis, 2005:126). Tomatis does not relate though, what the effect of the listening programme was on this pianist's piano performance.

A case study, reported by Madaule (1976:24-27), of a male student pianist, is, as far as could be determined, the only research regarding pianists. According to Madaule, this student pianist noted "progress in his singing ability" and remarked "on a more subtle manner of piano playing" (Madaule, 1976:26). The student further reported an improvement in his appreciation and understanding of music, his self-confidence, as well as motivation for his studies (Madaule, 1976:26).

4.8 CRITICISM OF THE TOMATIS METHOD

According to Stutt (quoted by Van Jaarsveld & Du Plessis, 1988:136), criticism of the Tomatis Method includes that it "seems to promise too much". Van Jaarsveld and Du Plessis (1988:136) further indicate that the theoretical principles of the Tomatis Method are questioned because of it lacks rigorous empirical support.

Since most investigations of the effectiveness of the Tomatis Method have been on a smaller scale, without all the proper precautions and controls, the findings, although impressive, are scientifically less convincing (Van Jaarsveld & Du Plessis, 1988:137). Furthermore, methodological problems preclude a definite conclusion about the value of the Tomatis Method, and limit the degree to which gains can be ascribed to the Tomatis Method alone (Van Jaarsveld & Du Plessis, 1988:141).

According to Stutt (quoted by Van Jaarsveld & Du Plessis, 1988:136), another criticism is that evidence "is usually clinical rather than experimental". Van Jaarsveld and Du Plessis (1988:136) point out that this criticism may, however, be opposed by arguing that the clinical deductions made by Tomatis, which were later integrated into a comprehensive theory of human development, were made possible by his large scale experiments on occupational deafness and expertly designed laboratory experiments. The scientific community does not, however, see Tomatis' experiments as 'independent'.

Much of the research that has been done is not considered to be 'independent', because researchers trained in the Tomatis Method implemented most of the research (Andrews, 2004:16). Therefore, the scientific credibility of research findings is often questioned. The problem of adequate research is further compounded by the fact that most Listening Centres lack research-related infrastructure (Du Plessis *et al.*, 2001:36).

Since the acceptability and respectability of a method is judged by its prominence in current scientific literature, the scarcity of research on the effect of the Tomatis Method on musicians has increasingly invalidated its position in the eyes of its biggest critics (Du Plessis *et al.*, 2001:36). In spite of the heavy criticism and pleas to refrain from involvement in the Tomatis Method, musicians still attend Tomatis programmes. This sustained attendance by musicians suggests that practitioners still observe the positive results claimed by Tomatis (Du Plessis *et al.*, 2001:36).

4.9 SUMMARY

This overview of the Tomatis Method shows that, although it evokes warranted criticism, the method is well conceptualised and was developed over several years through experimentation and clinical observation. Alfred Tomatis' years of experimentation and observation, as well as his knowledge, gave birth to the underlying theoretical principles of this sound stimulation programme, of which many rest upon known facts.

Observations as well as research indicate that the Tomatis Method can enhance psychological well-being and improve academic functioning. Because of the demands of student pianists' training environment, the indications that the programme could contribute to a reduction of anxiety and the enhancement of self-confidence, self-esteem and concentration can be especially beneficial to them.

Tomatis' theories and observations suggest that this programme can also enhance music performance. However, although Tomatis indicates that he observed the same results with instrumentalists and with singers, his writings mostly refer to singers. Except for a single case study by Madaule, there seems to be no other scientific evidence that the Tomatis Method has benefited instrumentalists.

In spite of a lack of scientific evidence on the influence of the Tomatis Method on instrumental performance, the possible enhancement of student pianists' self-listening skills may contribute to improvement of their accuracy as well as their control over tone production, which also influences the shaping of the melodic line and the balance between voices. There are also indications that exposure to the Tomatis Method could lead to improvement of motor skills as well as reduction of music performance anxiety. All these aspects are important considerations for student pianists.

Since there are indications that the Tomatis Listening Programme can benefit student pianists, and can be applied over a relatively short period, it is a suitable intervention for student

pianists who have a very full schedule. The next chapter will describe the empirical study conducted in order to determine the effect of the Tomatis Method on the psychological well-being and piano performance of student pianists.

CHAPTER 5
EMPIRICAL STUDY

5.1 INTRODUCTION

This chapter presents information on the empirical study. This includes information regarding the research design, the participants, the measuring instruments, the procedure and the data analysis.

5.2 RESEARCH DESIGN

A two-group pre-post assessment mixed-method design, involving an experimental and control group was used. According to Leedy and Ormrod (2005:105), a combination of quantitative and qualitative methods can enhance many research studies. Onwuegbuzie *et al.* (2009:114-139) further provide philosophical justification for using qualitative and quantitative data in the same study. They further suggest that a mixed-method design can be fruitful when it "is likely to provide superior research findings and outcomes" (Onwuegbuzie *et al.* 2009:129).

Because of the absence of scientific evidence regarding the effect of the Tomatis Method on student pianists, and because of an absence of theories concerning student pianists' psychological well-being and piano performance, a mixed-method exploratory study was deemed most suitable for this research. Since participants' profiles regarding psychological well-being and piano performance differed, controlling dependent variables was not possible, and for this reason the research could not depend upon the possibility of statistically significant results. In addition, since the study only involved student pianists from the Potchefstroom Campus of the North-West University only a small sample of participants was available, because very few students studied piano performance at that time. Furthermore, the Tomatis Method lends itself to qualitative research methods. By using quantitative as well as qualitative research methods, the effect of the Tomatis Method on the psychological well-being and piano performance of student pianists could be studied from different perspectives. This was done in order to develop a more comprehensive picture of this new and important field of study.

5.3 PARTICIPANTS

The sample size depended on the availability of participants. Thirteen student pianists ranging from 2nd year to postgraduate students from the School of Music and Conservatory of the North-West University (Potchefstroom Campus) have been solicited and randomly assigned to:

- an experimental group: Exposure to the Tomatis Listening Program (n = 7), and

- a control group: Non-intervention control group (n = 6).

The student pianists were recruited for participation on a voluntary basis. Participants had to be enrolled for the B.Mus. degree or postgraduate music studies at North-West University (NWU) during the research. Participants could also have been enrolled for another degree at NWU but had to be taking piano lessons at the School of Music and Conservatory, and with at least 10 years of piano tuition. Student pianists who had previously attended the Tomatis Method were excluded from the study. Consistent with ethical considerations, participants were free to withdraw should they at any point wish to do so.

The majority of the participants (11) were enrolled for the B.Mus. degree, one participant was studying for a Masters degree, and one participant was enrolled for another degree but was taking piano lessons at the School of Music and Conservatory, and had 16 years of piano tuition. Six of the seven participants in the experimental group completed the Tomatis programme. The other participant completed only 90 of the 120 half hour sessions, but was willing to participate in the post-treatment assessments.

During recruitment, one of the piano lecturers expressed a desire to be part of the experiment. It was thought that this lecturer's inclusion in the programme could be beneficial since it could serve as a motivation for the student pianists to not only complete the programme, but also immerse themselves in it. Since it seemed as if the lecturer had a constructive relationship with the students, it was also thought that the lecturer's inclusion could contribute to the participants' peace of mind regarding any disturbances that might occur during the programme with regard to their studies, and thus, the lecturer could be experienced as supportive. Therefore, it was decided to include this piano lecturer in the Tomatis programme. To maintain the homogeneity of the group of participants the data obtained from the participating lecturer were excluded from any data analysis. Thus, the number of participants in the experimental group is indicated as seven and not eight.

5.4 MEASURING INSTRUMENTS

A variety of measuring instruments were employed to determine the effect of the Tomatis Method on the psychological well-being and piano performance of student pianists. These instruments included a biographical questionnaire, a battery of tests, qualitative interviews, projective drawings, group discussions, written reports, personal observations and the Tomatis Listening Test. Using quantitative as well as qualitative measurements provided a means to examine the data from different angles to construct a picture of a multifaceted situation.

5.4.1 Biographical Questionnaire

The principal consideration for using a biographical questionnaire was to acquire personal details of the participants. The information acquired for this study included gender and age, music education and background, general health, and family background.

This information is relevant for the following reasons. Firstly, it provides a biographical profile of both groups of participants and can be used to determine pre-treatment group equivalence. Furthermore, background information is provided against which the rest of the data can be interpreted. It also provides important information regarding participants in the experimental group, which might be relevant during the participants' exposure to the Tomatis programme.

5.4.2 Battery of Tests

The battery of tests includes self-report inventories regarding psychological well-being and music performance anxiety, as well as scales / tests regarding piano performance. All of these tests were scored by computer. Only raw scores were used and Cronbach alpha coefficients were determined.

5.4.2.1 Psychological well-being

Psychological self-report questionnaires were used to measure and monitor the students' psychological well-being. The level of the participants' psychological well-being was measured with the Scales of Psychological Well-Being (Ryff, 1989), the Affectometer 2 (Kammann & Flett, 1983), and the Profile of Mood States (McNair *et al.*, 1992).

These tests have been standardised internationally and possess adequate psychometric properties. They have been used with good effect in previous research and are available at the NWU. They represent the hedonic and the eudaimonic concepts of psychological well-being.

Scales of Psychological Well-Being (SPWB) (Ryff, 1989)

The SPWB is a self-report inventory that measures an individual's psychological well-being on six different dimensions.

Development and rationale

The SPWB was developed by Ryff to consolidate previous conceptualisations of eudaimonic well-being. Ryff identified and operationalized six theory-guided dimensions of well-being (Ryff, 1989:1077). The SPWB conceptualise psychological well-being as consisting of the dimensions of autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. These self-report scales assess an individual's

well-being on each of the different dimensions.

Properties, application and interpretation

The SPWB consists of 84 sentence items describing and measuring an individual's current feelings about her/himself and her/his life. Each of the six dimensions of well-being is operationalized with a 14 item scale which contains positively and negatively phrased items. Items for the separate scales are mixed to produce a single self-report inventory.

Respondents are requested to indicate their present agreement or disagreement with each statement on a six point scale which range from strongly disagree (1) to strongly agree (6). Each of the six dimensions of well-being is scored separately. A higher score indicates a higher level of psychological well-being.

Reliability and validity

In the initial validation study, Ryff (1989) operationalized each of the six dimensions with a 20-item scale. Ryff (1989:1072) reports internal consistency (alpha) coefficients for the scales, ranging from 0.86 to 0.93. Test-retest reliability over a six-week period ranged from 0.81 to 0.88. Ryff (1989:1074) also presents preliminary evidence for the validity of the SPWB. Validity of the SPWB was confirmed by other studies (Ryff & Singer, 2006:1106-1113).

In a South-African study, Botha (2006:23) reported reliability indices of 0.71, 0.69 and 0.77 for Positive Relations, Environmental Mastery and Purpose in Life, respectively. In the current study the following Cronbach alpha reliability indices were obtained: Autonomy = 0.88; Environmental Mastery = 0.89; Personal Growth = 0.58; Purpose in Life = 0.81; Positive Relations = 0.79; and Self-Acceptance = 0.88. These indices confirm the reliability of the SPWB.

Relevance for the current study

The SPWB is a proven test for measuring psychological well-being, and thus relevant for the current study. The SPWB reliably measures six different dimensions of psychological well-being and the scales correlated modestly and positively with other existing measures of positive functioning and negatively with existing measures of negative functioning (Ryff, 1989:1074). Thus, one measuring instrument instead of several could be used with good effect, thereby lessening the possibility of 'test fatigue'.

Affectometer 2 (AFM 2) (Kammann & Flett, 1983)

The AFM 2 is a self-report inventory that measures an individual's current level of general happiness or sense of well-being (Kammann & Flett, 1983:259). Since it measures psychological well-being on a current emotional level, and measures positive and negative affect, as well as the balance between the two, the AFM 2 can be seen as a measuring instrument for hedonic well-being.

Development and rationale

The AFM 2 is derived from the Affectometer 1, and was developed by Kammann and Flett to measure "the balance of positive and negative feelings in recent experience" (Kammann & Flett, 1983:259). Therefore, it was carefully constructed to measure basic dimensions of affective experience at the negative as well as the positive end of the continuum (Kammann & Flett, 1983:259).

Properties, application and interpretation

The AFM 2 consists of 20 sentence items measuring positive feelings (10 items) and negative feelings (10 items). According to Kammann and Flett (1983:263), these 20 items reflect "10 qualities of happiness". These 10 categories are described as confluence, optimism, self-esteem, self-efficacy, social support, social interest, freedom, energy, cheerfulness, and thought clarity. Individuals are asked how often a feeling occurred during the past few weeks and are requested to report their answers on a five-point scale. This scale is graded as not at all, occasionally, some of the time, often, all the time. It takes approximately five minutes to complete this self-report inventory.

Subscales measure Positive Affect (PA = 10 items), Negative Affect (NA = 10 items) and Positive-Negative Affect- Balance (PNB = PA – NA). The overall level of well-being is reflected in the PNB which indicates the extent to which positive feelings predominate over negative feelings (Kammann & Flett, 1983:259). Thus, the more positive affect predominates over negative affect, the higher the overall level of well-being.

Reliability and validity

Kammann and Flett (1983:263) report Cronbach alpha coefficients of 0.88, 0.93 and 0.95 for the respective subscales, and indicate validity. South-African studies by Rolf (1998), Botha (2006), and Wissing and Van Eeden (2002) also reported good reliability and validity.

Rolf (1998:84) reports alpha-reliabilities of 0.84 (PA), 0.82 (NA) and 0.89 (PNB). Botha (2006:22) found reliability indices of 0.78, 0.82 and 0.85 for the respective subscales. These

reports and the Cronbach alpha reliability indices of 0.67 (PA), 0.84 (NA) and 0.87 (PNB), found in the current study, confirm the reliability of the AFM 2. In another South-African study, Wissing and Van Eeden (2002:35) also report good construct validity for the AFM 2, thus confirming its validity.

Relevance for the current study

The Affectometer 2 is a proven test for measuring psychological well-being, and thus relevant for the current study. Since individuals are requested to report their feelings over the past few weeks, the period is amenable to reasonably accurate recall. Kammann and Flett (1983:263) also mention that the AFM 2 was used in the evaluation of treatment programmes where its sensitivity to changes had been noted.

Profile of Mood States (POMS) (McNair, Lorr & Droppleмann, 1992)

The POMS is a self-report inventory designed to reflect the intensity of various current mood states.

Development and rationale

The POMS was developed by McNair *et al.* to meet "the need for a rapid, economical method of identifying and assessing transient, fluctuating affective states" (McNair *et al.*, 1992:1). They declare that this "factor analytically derived inventory" measures six identifiable mood states (McNair *et al.*, 1992:1). These affective states are Tension-Anxiety; Depression-Dejection; Anger-Hostility; Vigor-Activity; Fatigue-Inertia; and Confusion-Bewilderment.

A friendliness factor was also found but considered too weak for valid scoring, and "may be a trait or semantic factor rather than a mood factor" (McNair *et al.*, 1992:4). The seven items loaded on this factor are still included in the POMS, but are not taken into consideration when scoring it.

Properties, application and interpretation

The POMS consists of 65 adjective items describing and measuring various mood states. Individuals are requested to describe the intensity of their feelings during the past week, including the day of the test, by rating it on a five point scale. This scale is graded as 0 = not at all, 1 = a little, 2 = moderately, 3 = quite a bit, 4 = extremely. According to McNair *et* al. (1992:3), it takes approximately five minutes to complete.

Each of the six mood factors is scored by obtaining the sum for the adjectives defining the relevant factor (McNair *et al.*, 1992:3). The compositions of the six subscales vary with regard

to the number of items they contain.

Tension-Anxiety is defined by nine adjectives describing musculoskeletal tension; Depression-Dejection is defined by 15 adjectives representing a mood of depression and a sense of personal inadequacy; Anger-Hostility is defined by 12 adjectives representing a mood of antipathy and anger towards others; Vigor-Activity is defined by 8 adjectives suggesting a mood of vigorousness, ebullience, and high energy; Fatigue-Inertia is defined by seven adjectives representing a mood of weariness, inertia, and low energy level; and Confusion-Bewilderment is defined by seven adjectives representing bewilderment and muddle-headedness (McNair *et al.*, 1992:4-5).

A total mood disturbance score is obtained by subtracting the score of Vigor-Activity from the sum of the other five mood factors (McNair *et al.*, 1992:3). With the exception of Vigor-Activity, a lower score indicates a lower level of mood disturbance. Thus, an individual's scores should ideally display a high level of Vigor-Activity and a low level with regard to the other mood factors as well as the total mood disturbance score.

Reliability and validity

McNair *et al.* (1992:7) report Cronbach alpha coefficients of near 0.90 or above. They also report test-retest reliability and construct validity (McNair *et al.*, 1992:7-8). Reliability is also reported in South-African studies by Coetzee (2001), Du Plessis *et al.* (2001) and Akakios (2001). In a study by Coetzee (2001:12), the following Cronbach alphas were found: Tension-Anxiety = 0.87, Depression-Dejection = 0.89, Anger-Hostility = 0.89, Vigor-Activity = 0.49, Fatigue-Inertia = 0.88, and Confusion-Bewilderment = 0.64. Du Plessis *et al.* (2001:36) report a mean Cronbach alpha of 0.72. Akakios (2001:14) reports indices between 0.71 and 0.91. Reliability indices in the current study are: 0.82 for Tension-Anxiety; 0.88 for Depression-Dejection; 0.90 for Anger-Hostility; 0.64 for Vigor-Activity; 0.43 for Fatigue-Inertia; 0.78 for Confusion-Bewilderment; and 0.95 for the POMS total mood disturbance score. These indices confirm the reliability of the POMS.

Relevance for the current study

McNair *et al.* declare that the Profile of Mood States (POMS) "has proved to be a sensitive measure of the effects of various experimental manipulations upon normal subjects" (McNair *et al.*, 1992:1). This presumed sensitivity of the POMS can be useful to detect mood changes associated with the Tomatis programme (Du Plessis *et al.*, 2001:36), thus making the POMS relevant for the current study. Another reason for inclusion is that Vigor-Activity is an indication of psychological well-being. Since individuals are requested to report the intensity of their

feelings during the past week as well as the day of assessment, the time period is amenable to reasonably accurate recall.

5.4.2.2 Music performance anxiety

"Music performance anxiety (MPA) is a distressing experience for musicians of all ages" (Osborne & Kenny, 2005:725), and often has a debilitating effect on an individual's music performance. According to Kenny *et al.* (2004:758) and Osborne and Kenny (2005:726), evidence suggests a relationship between music performance anxiety and psychological functioning. Thus, if the debilitating effect of music performance anxiety on piano performance can be lessened by reducing levels of music performance anxiety, there is reason to believe that the quality of an individual's piano performance could increase. Therefore, the use of music performance anxiety inventories is appropriate for the current study.

The participants' level of music performance anxiety were measured with the Music Performance Anxiety Inventory for Adolescents (Osborne & Kenny, 2005), and the Kenny Music Performance Anxiety Inventory (Kenny *et al.*, 2004). These tests seem to possess adequate psychometric properties and since they have been published, they were easily available. Permission to use them was obtained from the authors.

Music Performance Anxiety Inventory for Adolescents (MPAI-A) (Osborne & Kenny, 2005)

The MPAI-A is a self-report inventory measuring three components of music performance anxiety.

Development and rationale

Osborne and Kenny developed the MPAI-A to provide an empirically validated measure specifically targeting music performance anxiety in adolescents (Osborne and Kenny, 2005:725). Since music performance anxiety consists of cognitive, physiological and behavioural symptoms, the chosen items represent each of these domains (Osborne and Kenny, 2005:730). Three components of music performance anxiety are measured by the MPAI-A. These three components are Somatic and Cognitive Features, Performance Context, and Performance Evaluation. Special care was taken with the wording of the items for the sake of readability and comprehensibility to adolescents (Osborne and Kenny, 2005:730).

Properties, application and interpretation

The MPAI-A consists of 15 sentence items describing, with the exception of one item, negative feelings an individual may experience while performing music. Respondents are requested to report their feelings on a seven point scale which range from not at all (0) to all of the time (6).

Each of the three anxiety factors is scored by obtaining the sum for the items defining the relevant factor. The compositions of the three subscales vary with regard to the number of items they contain.

Somatic and Cognitive Features are defined by eight items describing "physical manifestations of performance anxiety immediately prior to, and during a performance" (Osborne & Kenny, 2005:732). Performance Context is defined by three items describing the performer's preference "for either solo or group contexts and the nature of the audience" (Osborne & Kenny, 2005:732). Performance Evaluation is defined by four items "relating to the evaluation that both the audience and performer may make of a performance, the consequences stemming from these evaluations (particularly when a mistake is made), and difficulty concentrating in front of an audience when performing" (Osborne & Kenny, 2005:732).

A total music performance anxiety score is obtained by the sum of the three anxiety factors. Higher scores indicate higher levels of music performance anxiety.

Reliability and validity

Osborne and Kenny report moderate to high reliability indices for the MPAI-A. They report a Cronbach alpha coefficient of 0.91 for the total of the MPAI-A, 0.90 for Somatic and Cognitive Features, 0.77 for Performance Context and 0.69 for Performance Evaluation (Osborne & Kenny, 2005:733). According to Osborne and Kenny (2005:725) the MPAI-A also demonstrated construct validity, as well as convergent and discriminant validity.

As far as could be determined, the MPAI-A has not been used in previous South-African studies. In the current study, the following Cronbach alpha reliability indices were obtained: Somatic and Cognitive Features = 0.68; Performance Context = 0.88; Performance Evaluation = 0.53; and the MPAI-A Total = 0.86. These indices confirm the reliability of the MPAI-A for the current study.

Relevance for the current study

Osborne and Kenny (2005:746) indicate that the MPAI-A can be useful to researchers in the assessment of music performance anxiety in young performers. Since the wording of the items

is the main reason for this instrument's accessibility to adolescents, and music performance anxiety as measured by the MPAI-A is relevant to all performers, irrespective of age, it is also relevant to tertiary piano students.

The MPAI-A assesses the somatic, cognitive and behavioural components directly associated with music performance anxiety. According to Osborne and Kenny (2005:746), these components are also related to aspects of psychological functioning. Therefore, the use of the MPAI-A is relevant for the current study.

Kenny Music Performance Anxiety Inventory (K-MPAI) (Kenny et al., 2004)

The K-MPAI is a self-report inventory measuring the level of an individual's music performance anxiety.

Development and rationale

The K-MPAI was developed by Kenny *et al.* to assess the relevance "of the emotion-based theory of anxiety proposed by Barlow", to music performance anxiety (Kenny *et al.* 2004:762). These theoretical components include "evocation of anxious propositions (e.g. uncontrollability, unpredictability, negative affect, situational cues); attentional shift (e.g. task or self-evaluative focus, fear of negative evaluation); physiological arousal; and memory bias" (Kenny *et al.* 2004:762). According to Kenny *et al.*, items for the inventory were specially constructed or were selected from other scales in order to address each of Barlow's proposed components (Kenny *et al.* 2004:762).

Properties, application and interpretation

The K-MPAI-A consists of 26 sentence items, 20 negatively and six positively phrased, describing feelings an individual might feel in general, as well as before and during his/her music performance. Respondents are requested to indicate their agreement or disagreement with each statement on a seven point scale which range from strongly disagree (-3) to strongly agree (+3). A higher score indicates greater anxiety and psychological distress (Kenny & Osborne, 2006:105).

Reliability and validity

Kenny *et al.* (2004:763) report a Cronbach alpha coefficient of 0.94, which demonstrates excellent internal reliability for the K-MPAI. Although the K-MPAI was not, as far as could be determined, used in previous South-African studies, the Cronbach alpha of 0.81 obtained in the current study confirms its reliability.

According to Kenny *et al.* (2004:761-762, 765), scores for the K-MPAI scale were significantly positively correlated with both sub-scales of Spielberger's State Trait Anxiety Inventory, which is a standard research measure used to assess state and trait anxiety, and the Cox and Kenardy Music Performance Anxiety (CK-MPA) inventory that was modified for their study. Therefore, the validity of the K-MPAI is confirmed.

Relevance for the current study

With 14 statements relating to aspects of psychological functioning (e.g. "I find it easy to trust others"; I often feel I'm not worth much as a person"; I rarely feel in control of my life"), The K-MPAI not only measures feelings of music performance anxiety, but also combines it with feelings related to psychological well-being. Therefore, this measuring instrument combines aspects of music performance anxiety and psychological well-being, which might have a direct influence on the students' piano performance. Kenny and Osborne (2006:4) also state that the K-MPAI "shows much promise as both a predictor of MPA and as an outcome measure following treatment for MPA". Thus, the use of the K-MPAI is relevant for the current study.

5.4.2.3 Piano performance

Since the assessment of music performance always has an element of subjectivity to it, the quality of the students' piano performances were determined through qualitative interviews, as well as a rating scale, a holistically constructed questionnaire and a general impression expressed as a percentage. Thus, both the possibilities of an overall change in performance and/or subtle changes regarding one or more aspects of piano performance could be determined.

Piano Performance Rating Scale (PPRS)

Since no standardised rating scale for measuring the quality of piano performance could be obtained, the researcher developed a seven point rating scale for measuring the students' piano performance. This inventory measures three broader concepts of piano performance namely Accuracy, continuity and fluency; Technique; and Interpretation.

Development and rationale

The PPRS was designed by the researcher to satisfy the need for an interval scale measuring the quality of aspects of the participants' piano performance in the current study. A factor analysis was not used to develop this rating scale. The following procedure was followed in the development of the PPRS.

Literature with regard to assessment criteria, constructs, and rating scales in music performance adjudication was examined. This literature also included information on piano performance. Assessment criteria from music examination bodies were obtained. These examination bodies included the Associated Board of the Royal Schools of Music, Trinity-Guildhall and the Gauteng Education Department. Unfortunately, assessment criteria from UNISA could not be obtained since it is not publicised and because the head of the Department of Music Examinations was not willing to disclose the criteria they use for assessing music performance, and more specifically piano performance. Two of the piano lecturers from the School of Music and Conservatory of the North-West University (Potchefstroom Campus) were also consulted on assessment criteria.

A set of items describing assessment criteria for music performance, including piano performance, was compiled. This was done by comparing the criteria obtained from the various sources and eliminating items that did not correspond with the criteria occurring in the majority of sources. The remaining items were compared to principles of piano performance as described in literature on piano tuition and piano performance. Items addressing clearly distinct performance aspects were selected and redundant items were eliminated. The remaining 15 items were grouped under three broad categories that seemed best for describing the items. The same procedure as for the identification of criteria-items was used to define the three categories and to divide the 15 items into these categories.

The three broad categories were defined as Accuracy, continuity and fluency; Technique; and Interpretation. Each of the three categories consists of five criteria-items that were regarded as most representative in defining the respective subscales. The fact that the items were divided evenly between the three categories was not intentional. Items were modified for clarity where necessary. The three categories with the 15 criteria-items were then evaluated by members of the piano faculty of the School of Music and Conservatory of the North-West University (Potchefstroom Campus) as well as the supervisor of the current study, who examined them for appropriateness and completeness.

For quantification and in an attempt to increase the sensitivity of the scale to subtle changes, response categories were converted to a seven point scale (Exceedingly poor = 1 to Excellent = 7). An assessment form with instructions to the respondents was created, and the sources used in the development of the PPRS were appended (see Addendum A).

Properties, application and interpretation

The PPRS consists of 15 criterion items naming and measuring aspects of an individual's piano performance. Each of the three broader concepts of piano performance is operationalized with a five-item scale. Items for the separate scales are grouped together beneath headings which define the respective concepts.

Respondents are requested to indicate their current assessment of each of the aspects of piano performance on a seven-point scale. This scale is graded as 1 = exceedingly poor, 2 = poor, 3 = average, 4 = satisfactory, 5 = good, 6 = very good, and 7 = excellent.

Each of the three broader concepts of piano performance is scored separately. A higher score indicates a higher level of control with regard to the relevant aspect.

The instructions to the respondents depend on whether the PPRS is used for self-evaluation or assessment by somebody else. The instructions also depend on whether the assessment is with regard to a specific piano performance or an individual's piano performance in general. In the current study participants were requested to assess their own piano performance in general. The participants' piano lecturers were also requested to assess each participant's piano performance in general. The external adjudicators were requested to assess each participant's piano performance with regard to a specific composition as recorded on CD.

Reliability and validity

The reliability indices indicate high reliability for the current study. The following Cronbach alpha indices were obtained:

- Accuracy, continuity and fluency = 0.95: Participants' self-evaluation; 0.94: Piano lecturers; 0.96: External adjudicators.
- Technique = 0.94: Participants' self-evaluation; 0.95: Piano lecturers; 0.94: External adjudicators.
- Interpretation = 0.98: Participants' self-evaluation; 0.97: Piano lecturers; 0.96: External adjudicators.

Since the scale was only used for a small number of respondents (participants = 13, piano lecturers = 4, external adjudicators = 5), the high reliability indices only indicate reliability for the current study.

Since a factor analysis was not used in the development of the PPRS, validity was not determined in this regard. Further research, with larger samples, is required regarding the reliability and validity of this measuring instrument before it can be recommended for use in

other settings.

Relevance for the current study

Music performance rating scales "yield particularized information and encourage attention to all relevant performance aspects" (Bergee, 2000:139). The PPRS provides a means to not only discover whether an overall change regarding piano performance has taken place, but also whether a change with regard to certain aspects of piano performance has taken place. Since the PPRS is an interval scale, it should be sensitive to subtle changes, which might be of value for the current study. Therefore, the PPRS is relevant for the current study.

Mills's Constructs (Mills, 1987)

Mills conducted a study in 1987 where twelve constructs of musical performance were identified.

Development and rationale

Mills (1987) identified twelve constructs of musical performance in an attempt to elicit and verbalise elements or constructs common to individuals' holistic assessment of musical performance (Mills, 1991:176). A list of these constructs, "expressed as alternative statements relating to a performance", was compiled (Mills, 1987:121). Mills used these twelve constructs to demonstrate the merit and reliability of holistic assessment. This list of constructs was, therefore, not designed and developed as a measuring instrument in itself. It is meant to serve as "a framework for holistic assessment of performance in music" (Mills, 2005:179).

Properties, application and interpretation

In the current study, Mills's constructs were treated as a bipolar inventory consisting of twelve alternative statements relating to piano performance. These statements refer to: the confidence with which a performance is executed; whether the performer seems to enjoy playing; the performer's familiarity with the piece; whether the performer makes sense of the piece as a whole; appropriate use of dynamics; appropriate use of tempi; appropriate use of phrasing; whether the performer's technical problems are distracting; fluency of the performance; sensitivity of the performance; 'cleanness' of the performance; and whether the performance is found to be interesting.

Respondents were requested to underline the part in each statement, written in capital letters, which best describes their perception of the piano performance in question. Participants were requested to assess their own piano performance in general. The participants' piano lecturers were also requested to assess each participant's piano performance in general. The external

adjudicators were requested to assess each participant's piano performance, recorded on DVD, with regard to a specific composition.

A few respondents specifically indicated their response to be somewhere between the two poles. Although the likelihood of these few responses having a significant influence on the outcome of the group of participants was almost non-existent, it was decided to accommodate these responses by treating the inventory as a three-point scale with 1 indicating the negative statement and 3 the positive statement. Each of the statements is scored independently and no total score is determined.

Reliability and validity

Mills reports positive correlations between each of the constructs (Mills, 1987:122-123). Mills also declares that the results from the study indicate, "that the holistic assessment could be accounted for in terms of common constructs to a substantial extent" (Mills 2005:181). Since the results from the alternative statements are treated independently and no total score is obtained, no Cronbach alpha reliability indices were determined.

Relevance for the current study

Since this bipolar inventory measures specific aspects of musical performance on two extreme levels, change with regard to specific aspects should be obvious. Results from this inventory may provide information against which the rest of the data on the participants' piano performance might be interpreted. The exclusion of aspects of accuracy and instrument specific techniques contributes to an assessment of the successfulness of an overall performance without concentrating on these aspects.

General impression

A general impression is employed to assess overall piano performance. In the current study, this general impression is expressed as a percentage.

Rationale

Fiske (1975:196;1977b:24) recommends that, since a rating for overall performance shows significant correlation for all trait items tested in research studies, judges should be required to only rate overall performance. Results from a study by Wapnick *et al.* (1993:282) endorse this observation by showing that the use of rating scales did not improve consistency when compared to their non-use. Mills, referring to Fiske's recommendation and her own study, also makes a good argument for a more holistic assessment of musical performance (Mills, 2005:176-181).

In her argument, Mills uses the example of attending a concert. She mentions that when leaving a concert, an individual usually has a clear notion of the quality of the performance just heard, without first having dissected the performance into its components (Mills, 2005:176). She posits: "A performance is much more than a sum of skills and interpretation" (Mills, 2005:177). Mills further argues that there might be a bigger difference in individuals' perceptions of a specific component of a performance than in their perceptions of the quality of an overall performance (Mills, 2005:178). She further points out that the reliability of holistic assessment stems partly from practice in everyday situations (Mills, 2005:178).

Properties, application and interpretation

Respondents are required to assess the relevant overall piano performance by using a percentage, with the maximum indicated as 100%. No scale is provided with regard to the overall impression. Respondents are also requested to go with their first impression. The overall assessment of the relevant piano performance is done before the performance is rated by using the PPRS and Mills's constructs. A higher percentage indicates a higher quality of piano performance.

In the current study, participants were requested to assess their own piano performance in general. The participants' piano lecturers were also requested to assess each participant's piano performance in general. The external adjudicators were requested to assess each participant's piano performance with regard to a specific composition, as was recorded on CD and DVD. The overall piano performance on CD and DVD was rated separately.

Reliability and validity

Since the general impression is a single item, no Cronbach alpha reliability indices were obtained.

Relevance for the current study

For the current study, it is also interesting whether there was a perceptible change in the overall piano performance of a group or an individual. A change regarding an individual aspect of piano performance does not necessarily suggest a change in the perception of the quality of an individual's overall piano performance. When a general impression, expressed as a percentage, is required for the assessment of an individual's overall piano performance, attention is more focussed on the quality of the overall performance than on individual components. Thus, this instrument is relevant for the current study.

5.4.3 Instruments for Collection of Qualitative Data

The small number of participants provided the opportunity to use qualitative methods of data collection as well. Using qualitative methods provides a means to access data that might not be obvious from quantitative measurements, and may also provide a background for interpreting the rest of the data. Therefore, the collection of qualitative data was relevant to the current study. The qualitative methods used in the current study include interviews, group discussions, projective drawings, written reports and personal observations.

5.4.3.1 Interviews[4]

The researcher conducted semi-structured as well as informal interviews. The semi-structured interviews with the participants and with their piano lecturers were recorded on tape. Notes were taken with regard to the informal interviews.

Semi-structured interviews

The researcher conducted individual semi-structured interviews with the participants, the participants' piano lecturers, and other lecturers who knew the participants.

Interviews with the participants

The pre-treatment interviews had two purposes. The first purpose was getting to know the participants, establish an initial relationship, and build rapport. The other purpose was to collect data regarding participants' views of themselves, how they experienced their relationships with others, their purpose in life, how they experienced themselves as pianists and students, and how they saw their future.

Post-treatment interviews related to the participants' experience of the sound stimulation and any changes with regard to how they experienced themselves and their piano performance. These interviews only involved the participants in the experimental group. The reason for this decision was that the aim of the project was to study the effect of the Tomatis Method on the psychological well-being and piano performance of student pianists. The focus was thus on the experiences of the participants in the experimental group. Therefore, the purpose of these interviews was to collect data that might have been related to exposure to the Tomatis Method. This data was compared to data gleaned from the lecturers.

Interviews with the participants' piano lecturers

Both the pre and post-treatment interviews with the piano lecturers concerned all thirteen participants. Interviews with the respective piano lecturers only concerned the participants that

[4] Questions asked during interviews are included in Addendum C.

were taking lessons with the relevant lecturer. With the exception of the lecturer who took part in the Tomatis programme, piano lecturers mostly did not know whether the respective participants were in the experimental or control group. All the piano lecturers were aware of the importance of remaining as objective as possible and were trained and experienced in objective assessment. Therefore, when a lecturer unintentionally came to knowledge in this regard, this lecturer's objectivity was not perceived as being compromised. Although the personal experiences of the lecturer who took part in the Tomatis programme might have influenced this lecturer's observations regarding the participants, experience in objective assessment contributed to the lecturer's objectivity.

The pre and post-treatment interviews related to the piano lecturers' experience of the relevant participant as a person as well as the participant's piano performance. During the post-treatment interview, piano lecturers were also asked whether they observed any changes with regard to the way the relevant participant conducts himself or herself, the participant's self-confidence, efficiency and concentration, the participant's piano performance, and any other observation that seemed relevant to the lecturer. When lecturers reported changes, they were requested to define them.

Interviews with other lecturers

Personal interviews were also conducted with lecturers who knew the participants before and after the experimental group's exposure to the Tomatis programme. These interviews were conducted approximately six months after the experimental group's completion of the Tomatis programme. Since the decision to interview these lecturers was made after the completion of the Tomatis programme, no measures were taken to withhold information with regard to whether a participant was in the experimental group. Therefore, the lecturers were asked to disclose any knowledge in this regard. In the few instances where a lecturer knew whether a participant was in the experimental group, it was again felt that this knowledge did not compromise objectivity.

The purpose of these interviews was to discover whether the lecturers observed perceptible changes with regard to any of the thirteen participants, and to compare these observations with the rest of the data. Interviews related to the lecturers' observation on the way the relevant participant conducts himself or herself, the participant's self-confidence, concentration and participation in classes, efficiency with regard to assignments, and any other observation that seemed relevant to the lecturer. When lecturers reported changes, these changes were discussed.

Informal interviews

During the listening sessions of the Tomatis programme, informal interviews were conducted with each of the participants in the experimental group. The purpose of these interviews was to monitor the participants' progress and experiences, and to provide support when necessary. These interviews were confidential and took place daily and in private.

The regularity of these interviews contributed to the establishment of a trusting relationship between the researcher and the respective participants. By often sharing past experiences with the researcher, participants gave a background for interpreting some of the other data. Interviews related to participants' feelings, experiences and concerns.

5.4.3.2 Group discussions

Weekly group discussions took place during the Tomatis programme. These discussions form part of the standard procedure within the Tomatis Method. The co-supervisor who is a registered clinical psychologist and qualified with regard to the Tomatis Method facilitated the group discussions. All the participants in the experimental group were involved.

The purpose of the group discussions was to provide an opportunity for participants to share experiences they think might be related to the Tomatis programme. These discussions also provided the opportunity to address participants' concerns regarding the intervention, and informed them of what could be expected during certain stages of the programme. It further provided the researcher with an opportunity to observe the participants as a group, to observe each individual's interaction with the group, and to collect data with regard to shared experiences.

5.4.3.3 Projective drawings

As part of the Tomatis Method, participants are encouraged to draw during listening sessions (Madaule, 1994:6). Du Plessis *et al.* point out that "participants of the TM appear to enjoy spontaneous drawings especially using wax crayons" (Du Plessis *et al.*, 2001:36).

Projective drawings that tap participants' inner experiences during the program were used with good effect in previous South-African studies (Coetzee, 2001:9; Du Plessis *et al.*, 2001:36). In these studies, participants used wax crayons to draw pictures expressing their thoughts and feelings at the time. Participants could use a metaphor to express these thoughts and feelings. Brief, explanatory notes accompanied the drawings. The results from these studies as well as the comment by Du Plessis *et al.* that instructions with regard to these drawings could "evoke

aspects of participants' experiences and attitudes activated by the entire process" (Du Plessis *et al.*, 2001:36), served as a rationale for using projective drawings in the current study.

At certain stages during the Tomatis programme, participants in the experimental group were requested to "draw a picture which reflects your present experience of yourself as a thinking, feeling, communicating and music making person" (Burger, 1999:208). As in the previous studies, participants could use a metaphor. Brief, explanatory notes accompanied the drawings. Participants were provided with white A3 paper, coloured wax crayons as well as coloured pencils for this assignment.

According to Du Plessis *et al.*, "Subtle changes in subsequent drawings", such as "new colour preferences" and "specific features like openings in drawings of structures, would be perceived as indicators of growth or change" (Du Plessis *et al.*, 2001:37).

5.4.3.4 Written reports

Participants in the experimental group related their experiences during and after the Tomatis programme by writing a report after completing the programme. These written reports provided data related to the participants' experiences, feelings, and own observations during and after the Tomatis programme in their own words. The written reports could also be used as a starting point in the follow-up interviews. Therefore, these reports are relevant for the current study.

5.4.3.5 Personal observations

The researcher made personal observations during semi-structured and informal interviews, as well as during group discussions. These observations were written in a journal and included participants' reported experiences, the way in which they conducted and portrayed themselves, as well as observations with regard to their emotional states and general well-being.

5.4.4 Tomatis Listening Test

The Listening Test is a diagnostic tool that forms an integral part of the Tomatis Method (Van Jaarsveld, 1974:219; Madaule, 1994:46; Du Plessis *et al.*, 2001:36). In addition to information regarding the utilisation of listening potential, this test can provide valuable information with regard to body-related functions such as posture, muscle tensions, balance, motor functions, energy level, etc. Since test results could vary with emotional states, the Listening Test also has a psychological dimension (Madaule, 1994:46)

5.4.4.1 Development and rationale

According to Madaule (1994:46), "Tomatis has realised that an audiogram offered much more information than just the nature and severity of a hearing loss". Tomatis also became aware that there are people whose hearing was normal but who seemed to have listening problems. Consequently, he continuously modified the audiogram to respond to new diagnostic needs until it gave way to what is now known as the Tomatis Listening Test (Madaule 1994:46).

5.4.4.2 Properties and application

The Tomatis Listening Test evaluates the extent to which an individual is utilising his/her listening potential, by revealing listening strengths and listening weaknesses (Du Plessis *et al.*, 2001:36; Thompson, 2004c:55). The Listening Test consists of four evaluations. These subtests respectively measure curves of the threshold in air and bone conduction of sounds, auditory spatial orientation (directivity), auditory selectivity, and auditory laterality (Van Jaarsveld, 1974:220-221; Madaule, 1976:25; Du Plessis *et al.*, 2001:36). The results are indicated on a listening diagram.

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The threshold curves for the respective ears are indicated on the diagram of the Listening Test. The evaluation of the curve of the threshold in air conduction ranges from 125 to 8000 Hz, and the threshold in bone conduction from 500 to 2000 Hz (Van Jaarsveld, 1974:220). The auditory spatial orientation (directivity) test evaluates an individual's ability to identify the direction from which a sound is coming, and thus the extent to which the individual "has integrated the notions of space and time in the perception of sounds" (Tomatis, 2005:122). Problems regarding directivity are indicated opposite the relative frequencies at the bottom of the diagram (Van Jaarsveld, 1974:221). The selectivity test assesses the "ability to recognize pitch differences in neighbouring sounds" (Du Plessis *et al.*, 2001:36). Problems regarding selectivity are indicated opposite the relative frequencies at the top of the diagram (Van Jaarsveld, 1974:221). The laterality test assesses "whether ear dominance has been established" (Tomatis, 2005:122). A number, indicating the dynamic relationship between the ears, is written on the diagram of the Listening Test (Van Jaarsveld, 1974:223).

5.4.4.3 Interpretation

According to Van Jaarsveld (1974:234), observations led Tomatis to the hypothesis that 'peaks' and 'dips' in a hearing curve provide diagnostic possibilities. However, Tomatis emphasises that his interpretation of the Listening Test only represents hypotheses and not a proven theory, thus warning against a rigid interpretation (Van Jaarsveld, 1974:241). Van Jaarsveld also points out that Tomatis emphasises an overall approach in the interpretation of the Listening Test. Therefore, it is necessary to interpret all parameters for both ears

simultaneously when analysing the Listening Test, thereby avoiding the danger of a one-sided interpretation (Van Jaarsveld, 1974:241).

In the interpretation of the Tomatis Listening Test, various parameters are taken into consideration. These parameters are:

- air conduction
- bone conduction
- the relationship between air and bone conduction within each ear
- the relationship between air and bone conduction between the two ears

(Rolf, 1998:65; Burger, 1999:67).

Tomatis concluded that a listening problem that is not the result of an organic lesion has a psychological origin (Madaule, 1976:3; Thompson, 2004c:56). Therefore, in addition to the examination of relationships, similarities and differences between these parameters, the symbolism of the left and right ear diagrams, as well as three frequency ranges, is also taken into account (Van Jaarsveld, 1974:232-240; Rolf, 1998:67; Burger, 1999:68-69).

Air conduction

The air conduction curve indicates an individual's external relations (Van Jaarsveld, 1974:233). It specifies how the individual listens to other people and therefore, any distortions in the air conduction curve would indicate problems the individual may have in this regard (Rolf 1998:66; Burger, 1999:67-68).

Bone conduction

Since the bone conduction curve is connected to the self-listening process, Tomatis is of the opinion that this curve represents an individual's inner world, how the person reacts to his/her own voice and how he/she experiences him or herself (Van Jaarsveld, 1974:233). The bone conduction curve also indicates somatic responses corresponding to different frequencies, thereby providing information with regard to posture, especially the spinal column and the head (Rolf 1998:66; Burger, 1999:68).

The relationship between air and bone conduction within each ear

The relationship between the air and bone conduction is important since it reveals social and external behaviour against internal experience and reaction. Ideally, the two curves should be parallel to each other without any distortions, indicating integration in both the milieu and the self (Rolf 1998:66; Burger, 1999:68).

The relationship between air and bone conduction between the two ears

The curves of the two ears can be compared to each other, and the balance of the use of the two ears can be determined (Van Jaarsveld, 1974:234). The relationship of the curves between the two ears also reflects the affective fluctuations of the past on the present. Therefore, any distortions may indicate an internal (inner) problem and contradictions or conflict in character (Rolf 1998:66; Burger, 1999:68).

According to Van Jaarsveld (1974:234-235), distortions in the left ear may represent affective anomalies. If the distortions are repeated in the right ear, it may indicate an affect that is still experienced and may be chronic. If the distortions are not repeated in the right ear, it may indicate a past problem, which is still active but is presently effectively managed. When the curves of the left ear appear to be normal but distortions appear in the right ear, the symptom may indicate an acute temporary condition with no connection to the past and no affective origin.

Symbolism of the left and right ear diagrams

In the interpretation of the Listening Test, a certain symbolism is allocated to the respective ears. The left ear represents the past, affectivity, and the connection with the mother. The right ear, on the other hand, represents the present, vision for the future, and spiritual intuition (Rolf 1998:67; Burger, 1999:69).

Symbolism of the three frequency ranges

According to Rolf (1998:67) and Burger (1999:69), the interpretation of the Listening Test is further broadened by attention to three frequency ranges. Both ears are taken into consideration in this respect. A certain symbolism is also allocated to the respective ranges.

Low frequency range (125 Hz – 1000 Hz)

This zone refers to the individual's visceral responses. This includes the individual's ego, subconscious and bodily responses (Rolf 1998:67; Burger, 1999:69).

Medium frequency range (1000 Hz – 3000 Hz)

This zone represents the individual's language area. Therefore, it is representative of the individual's speech and communication with others (Rolf 1998:67; Burger, 1999:69).

High frequency range (3000Hz – 8000 Hz and above)

This zone concerns the individual's spirituality. It also includes the individual's intuition, ideals and aspirations (Rolf 1998:67; Burger, 1999:69).

5.4.4.4 Relevance for the current study

The Listening Test forms an integral part of the Tomatis Method, and is therefore relevant for the current study. It also serves as a measure to monitor and determine the extent of changes in a participant's utilisation of her/his listening potential. Information obtained from the interpretation of the Listening Test can further be valuable for comparison with the rest of the data. This information can also be useful in the interpretation of a participant's other test results with regard to piano performance and psychological well-being.

5.5 PROCEDURE

The recruitment, assessments and exposure to the Tomatis programme had to be scheduled so as not to interfere with the students' preparation for examinations, and to have a minimal impact on their studies. Events had also to be scheduled in order to cause as little as possible inconvenience to other people involved in the project. This time schedule is presented in table 5.1

Table 5.1 Time schedule of the project

TIME SCHEDULE			
Event	**When**		**People involved**
Briefing of piano lecturers	August 2006		• Piano lecturers • Director of the School of Music and Conservatory of the North-West University (Potchefstroom Campus)
Recruitment of participants	August 2006		• 1st year – post graduate piano students from the School of Music and Conservatory of the North-West University (Potchefstroom Campus) • Supervisor • Co-supervisor • Researcher
Assessments before and after the Tomatis programme	**October 2006 – November 2007**		
	Pre Test	**Post Test**	
Sound and video recordings of participants' piano performances	11 October 2006	18 May 2007	• All participants • Sound engineer • Researcher
Biographical questionnaire	11 October 2006	-	• All participants • Researcher
Semi-structured interviews with participants	16 – 27 October 2006 (all participants)	21 – 25 May 2007 (only the experimental group)	• Participants • Researcher
Semi-structured interviews with participants' piano lecturers	November 2006	August 2007	• Piano lecturers • Researcher
Assessment of participants' piano performance in general by the participants' piano lecturers	November 2006	August 2007	Piano lecturers

TIME SCHEDULE (CONTINUED)			
Event	**When**		**People involved**
Assessments before and after the Tomatis programme (continued)	**October 2006 – November 2007**		
	Pre Test	**Post Test**	
Tomatis Listening Test	15 & 16 February 2007	8 & 10 May 2007	• Speech therapist • All participants • Researcher
Test battery	15 & 16 February 2007	8 & 10 May 2007	• All participants • Researcher • Co-supervisor
Written reports after the experimental group's exposure to the Tomatis programme	Collected 8 & 10 May 2007		Participants in the experimental group
Assessment of pre and post-treatment recordings of participants' piano performances on CD and DVD	July – August 2007		Panel of external adjudicators
Semi-structured interviews with other lecturers who knew the participants	November 2007		• Lecturers • Researcher
Tomatis programme and assessments during the programme	**20 February 2007 – 27 April 2007**		
	Passive Phase	**Active Phase**	
Meeting with participants in the experimental group to finalise days and times for the programme	15 February 2007	-	• Participants in the experimental group • Researcher • Co-supervisor • Supervisor
Duration of the phase	20 February – 9 March 2007	10 – 27 April 2007	• Participants in the experimental group • Researcher • Co-supervisor
Daily informal interviews with participants in the experimental group	20 February – 9 March 2007	10 – 27 April 2007	• Participants in the experimental group • Researcher
Group discussions	22 February and 1 & 8 March 2007	12, 19 & 26 April 2007	• Participants in the experimental group • Researcher • Co-supervisor
POMS	26 – 30 sessions & 57 – 55 sessions	61 – 65 sessions, 86 – 90 sessions & 111 – 115 sessions	• Participants in the experimental group • Researcher
Projective drawings	22 February & 8 March 2007	12 & 26 April 2007	• Participants in the experimental group • Researcher
Tomatis Listening Test between the phases	19 & 20 February 2007		• Participants in the experimental group • Speech therapist

5.5.1 Recruitment

Once permission from the relevant authorities had been obtained for the project, student pianists who were to be in their 2nd—4th year of study when exposure to the Tomatis programme took place, as well as post-graduate students from the School of Music and Conservatory of the North-West University (Potchefstroom Campus), were informed of the

project during a group meeting. This meeting took place in August 2006. The researcher covered information regarding the Tomatis programme and its possible value to pianists, the time frame of the project, the pre and post-treatment assessments and what they consist of, and the degree of involvement of the experimental and control group respectively. The supervisor and co-supervisor also attended the meeting to assist and address any concerns from the students regarding the project. A follow-up meeting was arranged with the 16 students who indicated their interest in taking part in the project.

During the follow-up meeting the supervisor and co-supervisor addressed any remaining concerns of the students regarding the project. It was agreed that anonymity and confidentiality would be maintained at all times. The would-be participants were also randomly assigned to the experimental and control group, and were provided with a detailed, written time schedule. Participants were assured that they were free to withdraw from the project should they at any point wish to do so. Participants in the control group were informed that although they would only be involved in pre and post-treatment assessments they would, upon completion of the research project, be offered the opportunity to participate in the Tomatis programme. Written informed consent was obtained from the participants and, where applicable, from their parents. Participants were requested to not inform their lecturers on whether they were in the experimental or control group.

Two of the male participants and one female participant withdrew from the project before the start of the experimental group's exposure to the Tomatis programme. One male participant was assigned to the control group. The other two participants were in the experimental group. Since the control group was now larger than the experimental group, it was decided that it would be more beneficial to the project to reassign one of the participants in the control group to the experimental group. One of the participants in the control group (Vicky[5]) expressed a desire to be in the experimental group, and was thus reassigned.

5.5.2 Assessments

The participants' piano lecturers were briefed, regarding the project, by the director of the School of Music and Conservatory of the North-West University (Potchefstroom Campus). This briefing took place in August 2006. The piano lecturers were later contacted by the researcher to arrange a period of time which would be convenient to the lecturers for the assessment of the participants' piano performances in general, and to make an appointment with each lecturer for a semi-structured interview. It was agreed that confidentiality would be maintained at all times. Lecturers were requested to not ask participants whether they were in the

[5] Pseudonyms are employed to protect the participants' identity.

experimental or control group. The purpose of this request was to ensure the necessary objectivity.

Time tables were drawn up with regard to recordings of the participants' piano performances, semi-structured interviews and Tomatis Listening Tests. The participants had the opportunity to book a convenient time slot on the timetable for a particular assessment. Participants were regularly reminded of upcoming assessments.

Some of the pre-treatment assessments were conducted during 2006 and others during 2007. All post-treatment assessments took place during 2007.

5.5.2.1 Recorded piano performances

The same venue, piano, composition, procedure, recording equipment and sound engineer were used for the pre and post-treatment recordings.

Self-study

The composition *Le Sapin* by Jean Sibelius was given to each of the participants as a self-study. The participants could collect their copy of the composition at a central point. All the participants received the composition on the same day. The participants had eight days to prepare for the recording of each of their solo performance of this composition. The participants' copies of the composition were collected after the pre-treatment recording of their piano performances. They received these copies again eight days before the post-treatment recording.

Recording

The pre-treatment recording took place on 11 October 2006, and the post-treatment recording on 18 May 2007. The order in which the participants performed differed during the two recordings. The recordings took place in the Pretorius room at the School of Music and Conservatory of the North-West University (Potchefstroom Campus). The participants played on a grand piano. A qualified sound engineer, using his own specialised equipment, did the sound recording of the students' piano performance of the composition. A video recorder and microphone of good quality, often used for recording music performances at the School of Music and Conservatory, were used for the video recording. The video recorder, mounted on a tripod and connected to the microphone placed in a suitable position on the piano, stayed in the same stationary position for all the recordings. The audio and video recordings took place simultaneously.

The audio and video recordings were copied on CD and DVD for assessment by the panel of external adjudicators. The sound engineer who did the audio recording copied these recordings on CD. The media department (d-Media) at NWU copied the video recordings on DVD.

Panel of external adjudicators

Eight experienced piano teachers/lecturers, who did not know any of the participants, were contacted by the researcher and informed about the project. These individuals were asked whether they would be willing to assess an audio as well as a video recording of the participants' piano performance. Six of them (two males and four females) indicated their willingness in this regard. All six adjudicators have experience in adjudicating eisteddfodau. Two of them are also regular examiners for the UNISA piano exams. The six adjudicators had an average experience of 25.5 years in the evaluation of piano performance, and 28 years of teaching experience. It was agreed that confidentiality would be maintained at all times.

Assessment of the participants' pre and post-treatment recorded piano performances took place during July and August 2007. Each of the external adjudicators received a copy of each of the recordings (two CD's and two DVD's), copies of the Piano Performance Rating Scale and Mills's Constructs for each of the participants' pre and post-treatment recordings, a copy of the composition being performed, and an accompanying letter which explained what was expected from them. Although the covers of the CD and DVD of the participants' piano performance recorded after the experimental group's exposure to the Tomatis programme was marked as 2, the adjudicators were not formally informed in this regard. The adjudicators also did not know whether the performances on the CD and DVD appeared in the same order.

The adjudicators assessed the recordings of the participants' piano performances in their own time, on their own equipment, and in any order. Each adjudicator contacted the researcher as soon as he or she was finished with the assessments. As soon as an adjudicator contacted the researcher, these assessments were collected personally.

The results of an inter-judge reliability test showed that one of the adjudicator's assessments did not concur with those of the other five adjudicators. Therefore, only the remaining five adjudicators' assessments were used during the statistical data analysis. The median of the five adjudicators' assessments was determined with regard to all components of the respective measuring instruments. After the medians were determined, the same statistical procedures as for the rest of the quantitative data were used.

5.5.2.2 Test battery

The participants' piano lecturers assessed the participants' piano performance in general by completing the Piano Performance Rating Scale (PPRS) and the questionnaire containing Mills's constructs. In addition, the lecturers gave a general impression of each participant's overall piano performance, expressed as a percentage. Pre-treatment assessment took place during November 2006, and post-treatment assessment during August 2007. The completed assessment forms were collected before the start of the semi-structured interview with the lecturer concerned.

The participants completed a battery of written tests consisting of a biographical questionnaire and the measuring instruments regarding psychological well-being, music performance anxiety, and their own piano performance. Each of the participants completed the biographical questionnaire on the same day after his/her pre-treatment piano performance was recorded. The rest of the tests were completed on the same day that the Tomatis Listening Test was conducted. The same procedure was followed during pre and post-treatment assessments.

The participants made provision to spend a maximum of one hour at the venue where the Listening Test was conducted so that they could also complete a battery of tests. Each participant completed the battery of tests before or after her/his Tomatis Listening Test was conducted. Each participant received his/her copies of the tests attached with a paper clip. Although the copies of the tests were arranged in a specific order, the participants had permission to complete them in any order. Participants were provided with a pencil and eraser. The researcher was present to go through the instructions of the questionnaires with each participant, and to clear up any uncertainties. The co-supervisor was nearby to assist when necessary.

The Profile of Mood States (POMS) was also used to monitor the experimental group's progress during the Tomatis programme. The experimental group completed the POMS twice during each of the two phases (passive and active phase) as well as at the start of the active phase, thus bringing it to a total of five assessments during the Tomatis programme. The POMS was administered between 26-30 sessions, 51-55 sessions, 61-65 sessions, 86-90 sessions, and 111-115 sessions.

5.5.2.3 Tomatis Listening Test

The Tomatis Listening Test was administered by a registered speech therapist, trained to conduct the test, at the Tomatis Listening Center at the North-West University in Potchefstroom. All the participants were involved in the pre and post-treatment listening tests.

The pre-treatment tests were conducted in February 2007, four days before the start of the experimental group's exposure to the Tomatis programme.

The co-supervisor interpreted the results and made an appointment with each of the participants in the experimental group, during which the result of the relevant participant's pre-treatment Listening Test was discussed. These appointments were arranged within the first two weeks of the Tomatis programme. To monitor their progress, the experimental group also conducted a Tomatis Listening Test approximately a week after the passive phase. The post-treatment test was conducted on 8 and 10 May 2007, approximately a week after the experimental group's completion of the Tomatis programme.

5.5.2.4 Semi-structured interviews

Individual semi-structured interviews were conducted with the participants and with the participants' piano lecturers. Interviews were also conducted with other lecturers, indicated by the participants, who were familiar with the participants before and after the experimental group's exposure to the Tomatis programme.

A semi-structured interview was arranged with each of the participants to take place within the two weeks following the recording of their piano performances. Before the start of an interview, the relevant participant was asked for permission to record the interview on tape. All the participants gave permission. Pre-treatment interviews were conducted with all the participants during October 2006. Post-treatment interviews were conducted with participants in the experimental group during May 2007, also a few weeks before their practical examinations. The reason for the decision to only involve participants in the experimental group in post-treatment interviews was mentioned in 5.4.3.1.

A semi-structured interview, with regard to the participants, was arranged with each of the piano lecturers. These interviews only concerned the participants taking lessons with the relevant piano lecturer. Pre-treatment interviews took place during November 2006, less than a month after the participants' piano examination. Post-treatment interviews took place during August 2007. Although this was also after the participants' piano examination, there was a longer time lapse since this examination took place in June. Before the start of an interview, the relevant lecturer was asked for permission to record the interview on tape. All the piano lecturers gave permission in this regard.

After the post-treatment recording of their piano performances, permission was obtained from the participants to contact at least two other lecturers who knew them before and after the

experimental group's exposure to the Tomatis programme. These lecturers were contacted and asked whether they were willing to grant an interview with the researcher concerning their experience of the participants in general. It was agreed that anonymity and confidentiality would be maintained at all times. A semi-structured interview was arranged with each of these lecturers. These interviews took place during November 2007. Instead of recording these interviews on tape, the researcher kept record of the interviews by taking notes.

5.5.2.5 Informal interviews and group discussions

Informal interviews and group discussions were conducted with the participants in the experimental group in order to monitor their progress and experiences during the Tomatis programme. The researcher kept a journal in which these experiences and her own observations of the participants were recorded.

The individual interviews, conducted by the researcher, took place on a daily basis during the listening sessions of the Tomatis programme. The group discussions took place once a week and were facilitated by the co-supervisor. During these discussions participants shared experiences which they thought might be related to the Tomatis programme. The co-supervisor also addressed participants' concerns regarding the programme during these discussions, and informed them of what could be expected during certain stages of the programme.

5.5.2.6 Projective drawings and written reports

At certain stages during the Tomatis programme, participants in the experimental group were requested to draw pictures according to the ways described in section 5.4.3.3. These drawings were done on the third day during the first and third weeks of each phase, thus bringing it to a total of four drawings. By providing wax crayons, coloured pencils and white A4 paper to each participant prior to the daily listening sessions, participants were encouraged to draw freely during the other listening sessions.

Participants in the experimental group were also requested to write a report relating their experiences during the Tomatis programme. These reports were written after their exposure to the Tomatis programme, and were collected when they reported for their post-treatment Listening Tests.

5.5.3 Tomatis Programme

The experimental group's exposure to the Tomatis programme started on 20 February 2007 and lasted until 27 April 2007. A meeting with the participants in the experimental group was arranged beforehand to discuss and decide on days and times that would suit them best.

5.5.3.1 Equipment

The following equipment was used during the Tomatis programme:

- Electronic ear (TAP3 and Al New Tec)
- Specialised headphones that facilitate bone and air conduction
- CD players
- Tomatis CD's with Mozart violin concertos, Gregorian chant and English sibilants
- White A3 and A4 paper, wax crayons and coloured pencils for drawing during listening sessions.

5.5.3.2 Venue and environmental circumstances

The Tomatis programme was administered at the Tomatis Listening Center at the NWU (Potchefstroom Campus), where a private cubicle was allocated to each of the participants. Each of these cubicles contains a table and chair, and since there were only four cubicles containing a bed, participants were rotated between the cubicles on a daily basis. Each of the cubicles is also equipped with a set of special headphones that facilitate bone and air conduction.

If they wished to, participants could close their cubicle doors and be totally private and undisturbed. Since the cords of the headphones are long enough, participants could also communicate with each other during listening sessions by sitting in the corridor. Although participants were allowed to study during listening sessions, they were encouraged to use this time to relax and thus allowing themselves the full benefit of the programme.

5.5.3.3 Content of the listening programme

The full Tomatis programme consists of a passive phase and an active phase, with a break of at least three weeks between the two phases. Each of the phases comprises 60 half-hour sessions. The experimental group completed a full program of 120 sessions. The passive phase was followed by a four week break, which was followed by the remaining sixty half-hour sessions of the active phase. Listening sessions were conducted at a rate of five half-hours per day (17:00 – 19:30), four days a week (Tuesday – Friday). When necessitated by personal circumstances, participants were allowed to do some of the listening sessions at other times.

The researcher was present during all the listening sessions, and the co-supervisor was available.

Passive phase

During the passive phase, participants were initially exposed to recordings of unfiltered Mozart violin concertos, alternated by Gregorian chants. From session 13 onwards, the participants were exposed to Mozart violin concertos which were progressively filtered more extensively. The filtered music was alternated by unfiltered Gregorian chants, unfiltered Mozart violin concertos, and densified music from the Mozart violin concertos.

Active phase

The active phase constitutes audio-vocal training. During this phase participants sang, spoke and read into a microphone, and listened to their own voices via the Electronic Ear. The voice feedback via the Electronic Ear was enriched in the middle and high frequencies. Participants were regularly encouraged to adopt the correct listening position during active sessions. This position is similar to the position learned by singers with regard to the position of the head and torso, and similar to the sitting position of pianists. Active sessions were alternated by unfiltered and filtered Mozart violin concertos and Mozart symphonies, and unfiltered Gregorian chants.

Participants were initially exposed to unfiltered Gregorian chants, alternated by filtered Mozart violin concertos. After approximately six of these listening sessions, participants started to repeat phrases of Gregorian chants via the Electronic Ear. Participants tried to reproduce the sounds and phrases as precisely as possible during the silences.

After four of these 'singing' sessions, the participants started to repeat recorded English words and phrases, rich in sibilants, via the Electronic Ear. The recorded voice was progressively filtered and therefore, became progressively 'softer'. This compelled the participants to listen more carefully and with more focus in order to be able to repeat the words and phrases. This also serves to train the participant "to listen for the entire harmonic range of the sonorous information" (Madaule, 1976:13) Participants were also reminded by the recorded voice to assume the correct listening position, and were encouraged to concentrate on the clear and precise articulation of words. The researcher monitored the participants to make sure that the correct position and clear articulation were maintained.

After 10 of these 'speaking' sessions, participants started to read aloud via the Electronic Ear. Participants read from the English or Afrikaans version of *The Little Prince*. At this stage of the

programme, participants were encouraged to apply the principles learned from repeating the recorded words and phrases. Each participant completed five of these 'reading' sessions.

The male participant decided to withdraw from the listening programme after 90 half-hour sessions, thus completing the passive phase and half of the active phase. The reason given for his withdrawal was that he experienced the programme as too time consuming. Since he completed most of the programme and expressed his willingness to take part in the post-treatment assessments, it was decided to include him in those assessments.

5.5.4 Contact with Participants

Initial contact with the participants was made via the information sessions. The semi-structured interviews provided the opportunity to establish an initial relationship with the participants. Contact with all the participants (experimental and control group) was maintained throughout the project.

When seeing anyone of the participants around, the researcher tried to have at least a short conversation with that participant. Participants were further contacted by sms to congratulate them on their birthdays and wish them success with upcoming examinations. After completion of the post-treatment assessments, the researcher tried to maintain informal contact with the participants, especially the experimental group, without intruding into their lives. The reason for this was partly to monitor their progress and let them know that she was available should they want to share any experiences or problems that they felt were related to the Tomatis programme.

After completion of the post-treatment assessments each participant received a personal letter thanking her/him for participating in the project. Participants in the control group were also offered the opportunity to participate in a Tomatis programme, the offer extending to the end of 2008. Although most of the participants in the control group indicated a desire to participate in such a programme, only one made use of the offer.

5.6 Data Analysis

Data were analysed quantitatively as well as qualitatively. Quantitative and qualitative data analyses were conducted separately, thus making use of parallel mixed analysis (Onwuegbuzie *et al.* 2009:118). Information regarding the techniques used for the statistical analysis will be followed by information regarding methods used for qualitative analysis.

5.6.1 Statistical Analysis

The statistical data analysis was conducted by the statistical consultation services at North-West University (Potchefstroom Campus). SAS for Windows release 9.1 (2006) was used for the statistical analyses. Descriptive statistics and Cronbach alpha reliability indices were computed with regard to each of the quantitative measuring instruments.

Since the sample was small, parametric as well as nonparametric tests were conducted to determine significances of differences within and between the randomly selected groups. The parametric tests consisted of the two sample t-test and the paired t-test, and the nonparametric tests were the signed rank test and the Mann-Whitney test. A p-value of 0.05 or smaller ($p \leq 0.05$) was regarded as indicating a statistical significance.

The Profile of Mood States (POMS) was used to monitor the experimental group's progress during the Tomatis programme. The one way analysis of variance (ANOVA) with repeated measures over time was used to analyse the results from these five assessments.

5.6.2 Qualitative Analysis

Leedy and Ormrod (2005:150) point out that qualitative data analysis typically starts with a large body of information which must, through inductive reasoning, be sorted and categorised in order to identify underlying themes. This is done by breaking the data down into smaller units, identifying general categories or themes, then classifying the pieces of data accordingly and finding meanings in the data (Leedy & Ormrod, 2005:150). Coding is one of the standard approaches of qualitative data analysis, and is used for reducing the large amount of data into smaller units (Neuman, 2006:460, 467). This was, therefore, the technique used to identify common themes, related to the topic, in the qualitative data. Leedy and Ormrod (2005:141) as well as Neuman (2006:461-464) define three stages of coding, namely open coding, axial coding and selective coding.

Open coding brings themes from deep inside the data to the surface, and is the first attempt to condense the data into categories (Neuman, 2006:461). According to Neuman (2006:462-463), open coding is followed by axial coding where related categories or concepts are identified and combined to form a more general concept, category or theme, or are divided into subcategories. The last stage in coding qualitative data is known as selective coding (Neuman, 2006:464). During this stage, the researcher identifies data that will illustrate and support the coded categories or themes (Neuman, 2006:464).

Data collected from interviews, projective drawings, group discussions, written reports and observations were analysed independently to identify recurring themes. Thereafter, it was determined whether any of the themes from the various data collections overlapped. This included data gleaned from the participants, the participants' piano lecturers, other lecturers conversant with the participants, and the researcher's own written observations.

5.7 SUMMARY

The present chapter contains details regarding the empirical investigation. It presents details with regard to the research design, participants, quantitative as well as qualitative measuring instruments, procedure used, and the data analysis. In the next chapter, the quantitative results of the empirical investigation will be presented.

CHAPTER 6
STATISTICAL RESULTS

6.1 INTRODUCTION

Statistical techniques, as described in Chapter 5, were used to analyse the data obtained from the relevant measuring instruments. In this chapter, the results from the statistical analyses will be presented.

The results regarding the biographical profile of the participants will be presented first. This will be followed by the results regarding the participants' level of psychological well-being, level of music performance anxiety, and the assessments of the participants' piano performance. A summary of results will appear at the end of each of the sections. A synopsis at the end of the chapter will summarise the results from all the sections.

6.2 BIOGRAPHICAL PROFILE OF PARTICIPANTS

In this section data regarding the participants' gender and age, family background, general health, and music education and background will be presented. In order to give a clear picture of the distribution, the data will be presented in terms of the group as a whole as well as in terms of the experimental and control groups individually.

6.2.1 Gender and Age

The data regarding gender and age of the participants are presented in Table 6.1 and 6.2.

Table 6.1 Gender and age of the participants

BIOGRAPHICAL PROFILE PARTICIPANTS' GENDER AND AGE								
	PARTICIPANTS (n = 13)		EXPERIMENTAL GROUP (n = 7)			CONTROL GROUP (n = 6)		
	Frequency	%	% of Total*	Frequency	% of Group	% of Total*	Frequency	% of Group
Gender								
Male	2	15.38	50.00	1	14.29	50.00	1	16.67
Female	11	84.62	54.55	6	85.71	45.45	5	83.33
Age								
19	2	15.38	50.00	1	14.29	50.00	1	16.67
20	4	30.77	75.00	3	42.86	25.00	1	16.67
21	5	38.46	60.00	3	42.86	40.00	2	33.33
22	1	7.69	0	0	0	100.00	1	16.67
27	1	7.69	0	0	0	100.00	1	16.67

* Total of the specific gender or age

Table 6.2 Mean age of the participants

BIOGRAPHICAL PROFILE PARTICIPANTS' MEAN AGE		
TOTAL (n = 13)	**EXPERIMENTAL GROUP (n = 7)**	**CONTROL GROUP (n = 6)**
Mean Age	**Mean Age**	**Mean Age**
20.92	20.29	21.67

From the data it can be seen that the group of 13 student pianists who took part in this research project consisted of two males and eleven females. The males were evenly distributed between the experimental and control groups. Since the number of females was uneven, six of them were in the experimental group and five in the control group. Thus, regarding gender, the group was divided as evenly as possible between the experimental and control group. This almost even distribution is illustrated by Figure 6.1.

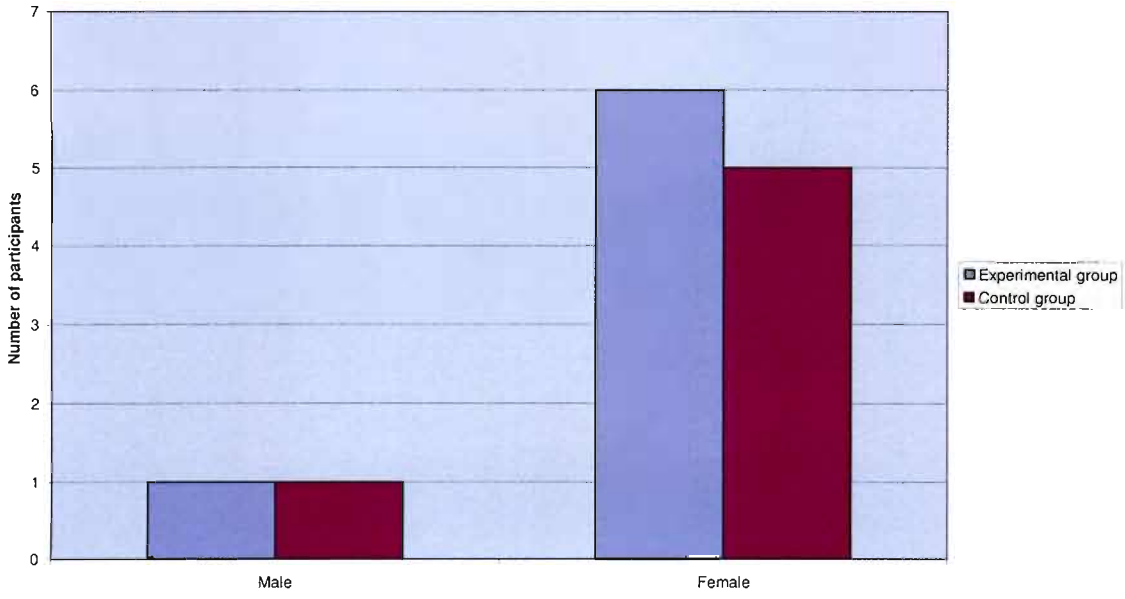


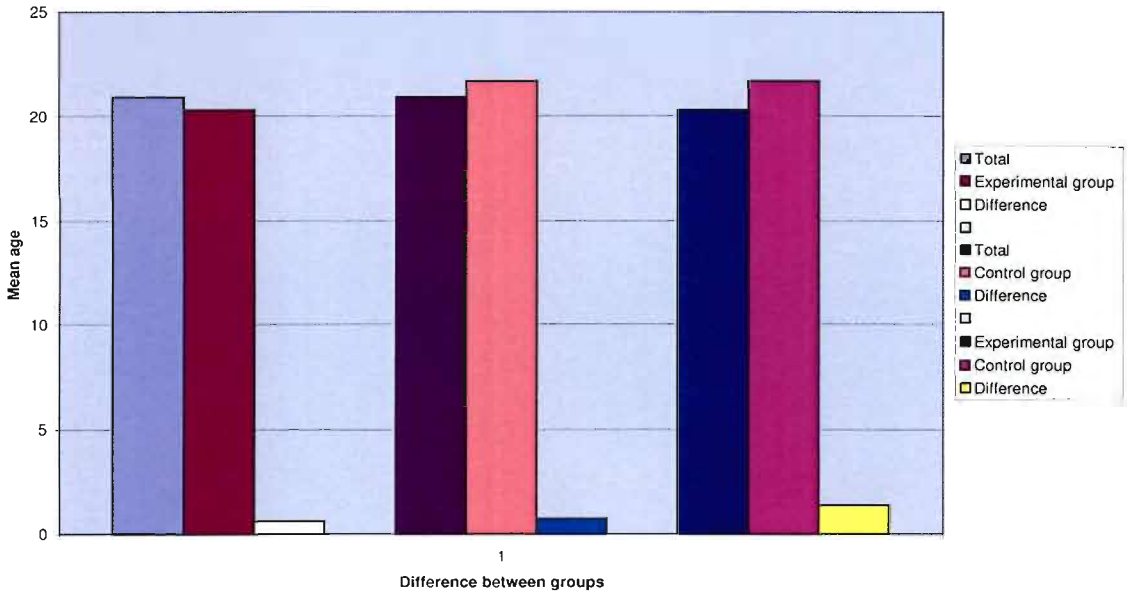
Figure 6.1 Gender distributions between groups

The age of the participants varied between 19 and 27. Since most of the participants (nine of the 13) were concentrated in the age group 20 – 21, this age group represented the largest part of the participants. This distribution was also reflected in the composition of the experimental group, but not in that of the control group.

From the nine participants in this age group, six were in the experimental group and three in the control group. Thus, the experimental group represented a larger part of this age group than the control group. The remaining participants were respectively aged 19, 22 and 27 years.

Two of these participants were 19 years of age, with one participant in the experimental group and the other one in the control group. The 22 and 27 year old participants were both in the control group, causing the mean age of the control group to be somewhat higher than the mean age of the experimental group.

The mean age of the participants was 20.92. The mean age of the participants in the experimental group was 20.29, and in the control group 21.67. The difference between the groups regarding their mean age is illustrated in Figure 6.2. The mean age of the experimental and control groups are respectively compared to the mean age of the total group of participants. The mean age of the experimental and control groups are also compared with each other.



* Total refers to the mean age of the group of thirteen participants

Figure 6.2 Comparison between the mean ages of participants in the groups

From Figure 6.2 it can be seen that, although there is a difference between the mean age of the experimental and control group, the difference is small, especially when compared to the mean age of the total group consisting of all the participants.

6.2.2 Family Background

The data which will be presented consist of the participants' ordinal position in the household and their domestic situation.

6.2.2.1 Ordinal position

The data regarding the participants' ordinal position in the household are presented in Table 6.3.

Table 6.3 Participants' ordinal position in family

BIOGRAPHICAL PROFILE PARTICIPANTS' ORDINAL POSITION IN FAMILY								
	Participants (n = 13)		Experimental group (n = 7)			Control group (n = 6)		
	Frequency	%	% of Total*	Frequency	% of Group	% of Total*	Frequency	% of Group
1st born	4	30.77	75	3	42.86	25.00	1	16.67
Last born	6	46.15	66.67	4	57.14	33.33	2	33.33
Middle of 3	1	7.69	0	0	0	100.00	1	16.67
2nd of four	1	7.69	0	0	0	100.00	1	16.67
3rd of four	1	7.69	0	0	0	100.00	1	16.67

* Total of participants in the ordinal position concerned

The distribution of the data in Table 6.3 shows the largest percentage (76.92%) of the participants to be either first or last born. Most of these participants (six out of ten) were last born. This distribution is also reflected in the structure of the experimental group, but not in the control group.

Of the six participants who were last born, four were in the experimental group and two in the control group. Of the four participants who were first born, three were in the experimental group and one in the control group. The remaining three participants were equally divided between middle of three, 2nd of four, and 3rd of four and were all in the control group. Thus, regarding ordinal position in the household, the participants were not evenly distributed between the experimental and control groups. This uneven distribution is illustrated in Figure 6.3.

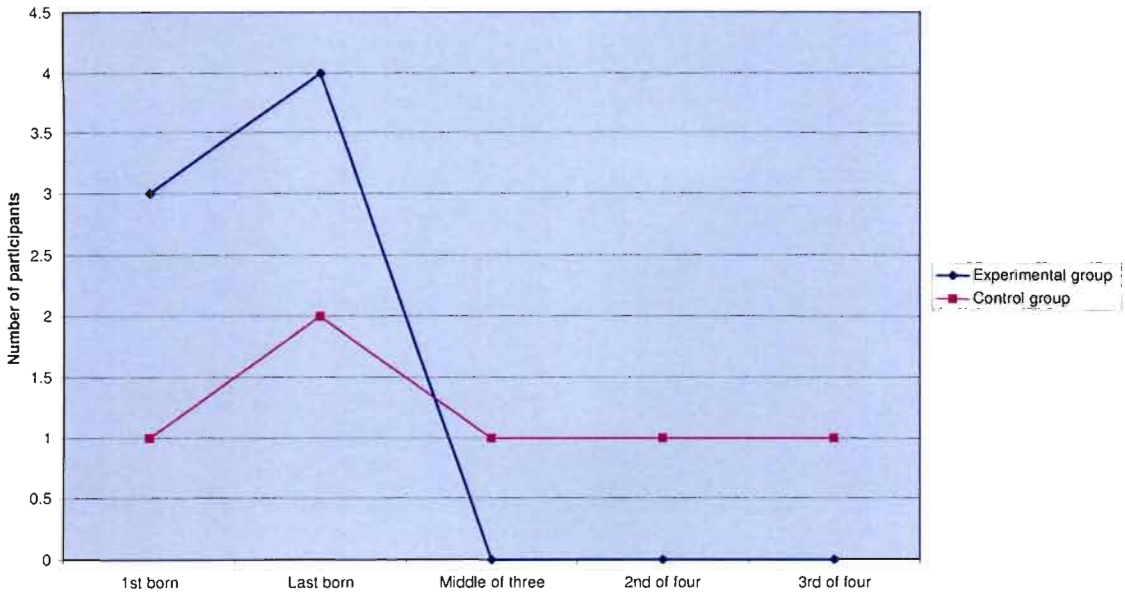


Figure 6.3 Ordinal position in family

6.2.2.2 Domestic situation

Data regarding the domestic situation present information about the intactness of the family which include whether the parents were divorced and whether both parents were still alive. The data is presented in Table 6.4

Table 6.4 Intactness of the family

BIOGRAPHICAL PROFILE INTACTNESS OF THE FAMILY								
	Participants (n = 13)		Experimental group (n = 7)			Control group (n = 6)		
	Frequency	%	% of Total*	Frequency	% of Group	% of Total*	Frequency	% of Group
Family intact	9	69.23	55.56	5	71.42	44.44	4	66.67
Parents divorced	2	15.38	50.00	1	14.29	50.00	1	16.67
Father deceased	1	7.69	0	0	0	100.00	1	16.67
Both parents deceased	1	7.69	100.00	1	14.29	0	0	0

* Total of participants regarding the aspect of family intactness

The distribution of the data in Table 6.4 shows most of the participants' families as intact with both parents still alive at the time when the experiment took place. This distribution is reflected in the structure of both the experimental and control group.

From the nine participants whose families were still intact, five were in the experimental group and four in the control group. From the two participants whose parents were divorced, one was in the experimental group and one in the control group. The one participant whose father was deceased was in the control group. The participant who lost both parents was in the experimental group. Thus, regarding the intactness of the family, the group of participants was divided rather evenly between the experimental and control group. This almost even distribution is illustrated in Figure 6.4.

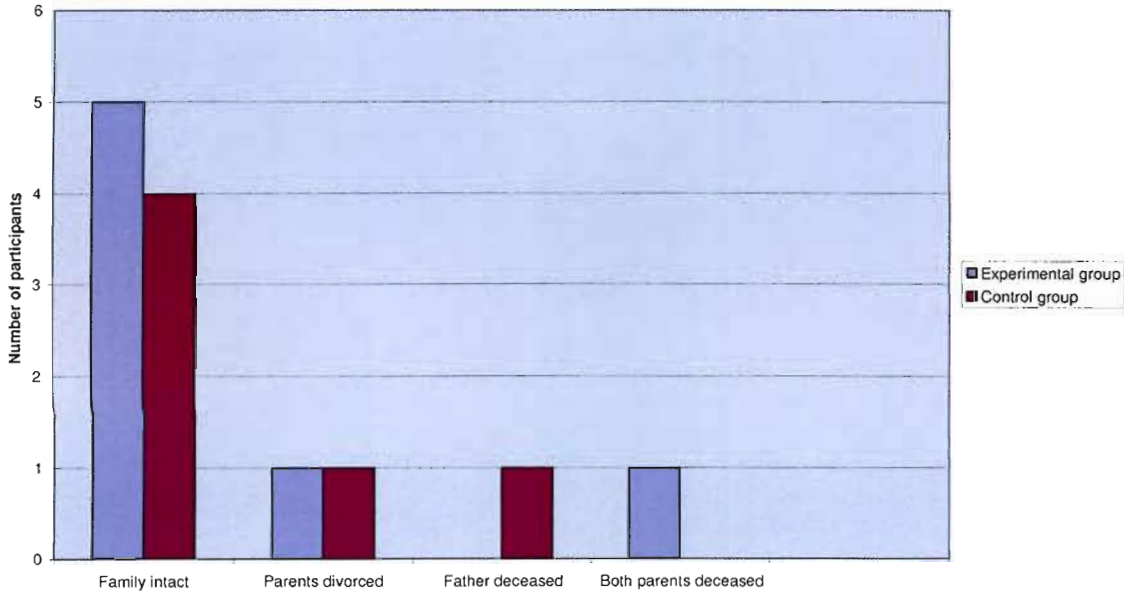


Figure 6.4 Intactness of the family

6.2.3 General Health

The data concerning the general health of the participants consist of information regarding the use of chronic medication as well as any history regarding middle ear infection or severe earache.

6.2.3.1 Chronic medication

Participants indicated whether they used chronic medication and specified the condition. The data are presented in Table 6.5

Table 6.5 Use of chronic medication

BIOGRAPHICAL PROFILE USE OF CHRONIC MEDICATION								
	Participants (n = 13)		Experimental group (n = 7)			Control group (n = 6)		
	Frequency	%	% of Total*	Frequency	% of Group	% of Total*	Frequency	% of Group
Participants	5	38.46	40.00	2	28.57	60.00	3	50.00
Amount								
One medication	3	23.08	33.33	1	14.29	66.67	2	33.33
Two medications	2	15.38	50.00	1	14.29	50.00	1	16.67
Condition								
Asthma	2	15.38	50.00	1	14.29	50.00	1	16.67
Depression	1	7.69	0.00	0	0.00	100.00	1	16.67
Cholesterol	1	7.69	0.00	0	0.00	100.00	1	16.67
Blood pressure	1	7.69	100.00	1	14.29	0.00	0	0.00
Blood sugar	1	7.69	100.00	1	14.29	0.00	0	0.00
Reflux	1	7.69	0.00	0	0.00	100.00	1	16.67

* Total of participants regarding the specific aspect

From the data it can be seen that five of the thirteen participants were on chronic medication. Two of these five participants were in the experimental group and three in the control group. The five participants were respectively treated for asthma, depression, cholesterol, blood pressure, blood sugar and reflux. Two of the five participants received medication for asthma. One of these participants was in the experimental group and one in the control group.

Two of the five participants on chronic medication received medication for two different conditions. One of these two participants was in the experimental group and received medication for blood pressure and blood sugar. The other participant was in the control group and received medication for asthma and depression.

Figure 6.5 shows the distribution of the five participants who used chronic medication between the experimental and control group. This distribution is expressed in percentages relating to the total group of 13 participants.

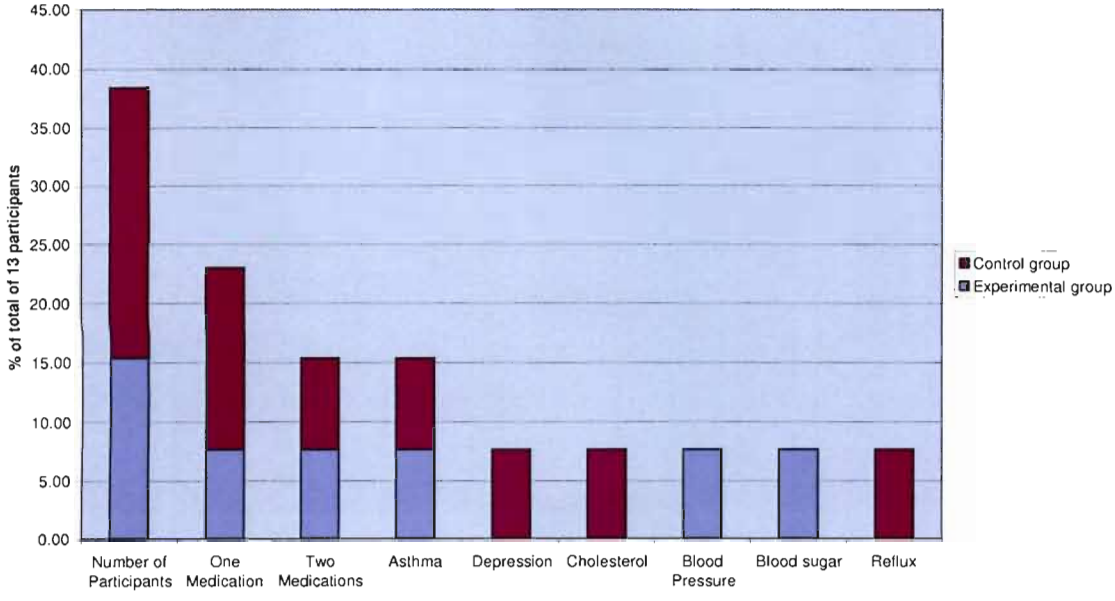


Figure 6.5 Percentage of participants using chronic medication

6.2.3.2 Middle ear infection or severe earache

Participants indicated whether they regularly suffered from middle ear infection or severe earache, or had ever suffered from it at any time during their lives. The data is presented in Table 6.6.

Table 6.6 History of middle ear infection or severe earache

BIOGRAPHICAL PROFILE HISTORY OF MIDDLE EAR INFECTION OR SEVERE EARACHE								
	Participants (n = 13)		Experimental group (n = 7)			Control group (n = 6)		
	Frequency	%	% of Total*	Frequency	% of Group	% of Total*	Frequency	% of Group
Regularly	3	23.08	66.67	2	28.57	33.33	1	16.67
Sometimes	4	30.77	50.00	2	28.57	50.00	2	33.33

* Total of participants regarding this aspect

From the data it can be seen that three of the thirteen participants suffered regularly from middle ear infection or severe earache. Two of these three participants were in the experimental group and one in the control group. Although not regularly, four of the thirteen participants had suffered from middle ear infection or severe earache at least once during their lives. These four participants were distributed equally between the experimental group and the control group.

Figure 6.6 illustrates the distribution of participants who have a history of middle ear infection or severe earache between the experimental and control group. This distribution is expressed in percentages relating to the total group of 13 participants.

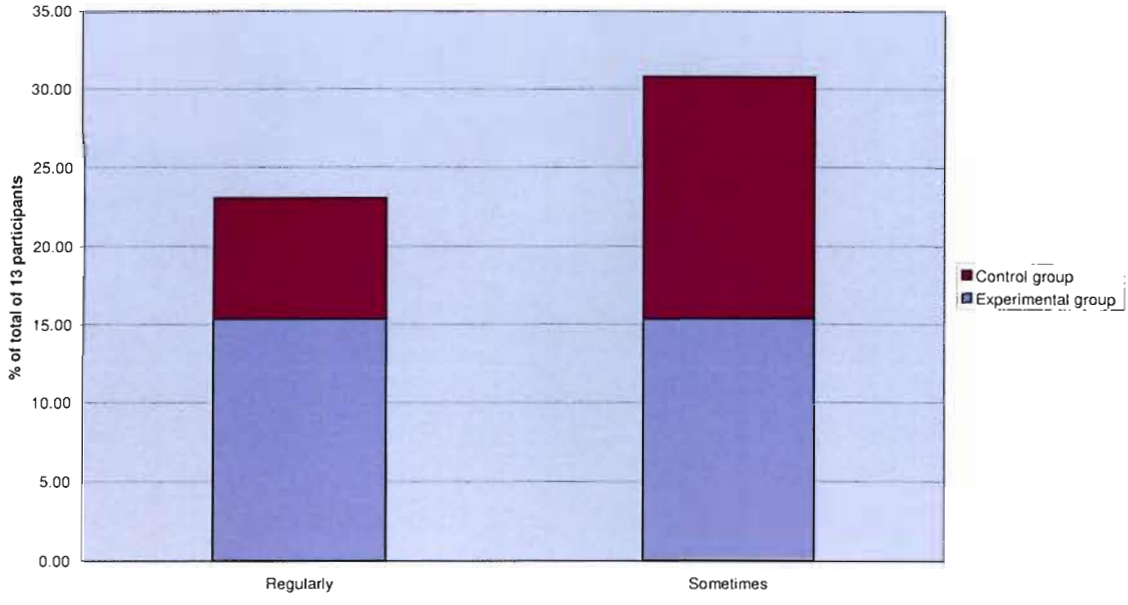


Figure 6.6 Percentage of participants with a history of middle ear infection or severe earache

6.2.4 Music Education and Background

The data concerning the participants' music education and background consist of information regarding their music education, whether they played or have played any other instruments in addition to piano, and the music background of their parents.

6.2.4.1 Music education

Participants indicated the age they started with their individual music lessons, whether piano was the first instrument they were taught, and the number of years of piano tuition. The data is presented in Table 6.7.

Table 6.7 Participants' music education

BIOGRAPHICAL PROFILE PARTICIPANTS' MUSIC EDUCATION								
	Participants (n = 13)		Experimental group (n = 7)			Control group (n = 6)		
	Frequency	%	% of Total*	Frequency	% of Group	% of Total*	Frequency	% of Group
Age when music lessons started								
Aged 4	1	7.69	0.00	0	0.00	100.00	1	16.67
Aged 5	1	7.69	0.00	0	0.00	100.00	1	16.67
Aged 6	1	7.69	100.00	1	14.29	0.00	0	0.00
Aged 7	3	23.08	66.67	2	28.57	33.33	1	16.67
Aged 8	2	15.38	50.00	1	14.29	50.00	1	16.67
Aged 9	3	23.08	66.67	2	28.57	33.33	1	16.67
Aged 10	1	7.69	0.00	0	0.00	100.00	1	16.67
Aged 11	1	7.69	100.00	1	14.29	0.00	0	0.00
First instrument taught								
Piano	12	92.31	58.33	7	100.00	41.67	5	83.33
Recorder	1	7.69	0.00	0	0.00	100.00	1	16.67
Number of years of piano tuition								
3 years	1	7.69	100.00	1	14.29	0.00	0	0.00
9 years	1	7.69	100.00	1	14.29	0.00	0	0.00
10 years	2	15.38	50.00	1	14.29	50.00	1	16.67
11 years	3	23.08	33.33	1	14.29	66.67	2	33.33
12 years	1	7.69	100.00	1	14.29	0.00	0	0.00
13 years	2	15.38	100.00	2	28.57	0.00	0	0.00
14 years	1	7.69	0.00	0	0.00	100.00	1	16.67
16 years	1	7.69	0.00	0	0.00	100.00	1	16.67
20 years	1	7.69	0.00	0	0.00	100.00	1	16.67

* Total of participants regarding the concerned aspect.

The participants' age when they started with music lessons ranged from age four to age eleven. There is a concentration of participants who started their music lessons on the ages of seven, eight and nine. Eight of the 13 participants started with music lessons between these ages. Five of these eight participants were in the experimental group and three in the control group. From the three participants who started their music lessons between the ages of four and six, one was in the experimental group and two were in the control group. The two remaining participants respectively started their music lessons at the age of 10 and 11. The participant who started at the age of 10 was in the control group, and the participant who started at the age of 11 was in the experimental group.

For the majority of the participants (12 of the 13) piano was the first instrument they were taught. All seven participants who were in the experimental group started with piano. Five of the six participants who were in the control group started with piano, and one participant started with recorder.

The number of years the participants received piano tuition at the time when the experiment took place ranged from three to 20 years. A concentration of eight participants received between 10-13 years of piano tuition. Five of these eight participants were in the experimental group and three in the control group. Both the participants who received respectively three and nine years of piano tuition were in the experimental group. The three participants who received respectively 14, 16 and 20 years of piano tuition were in the control group.

The distribution of participants between the experimental and control group regarding these three aspects of their music education is illustrated in Figure 6.7.

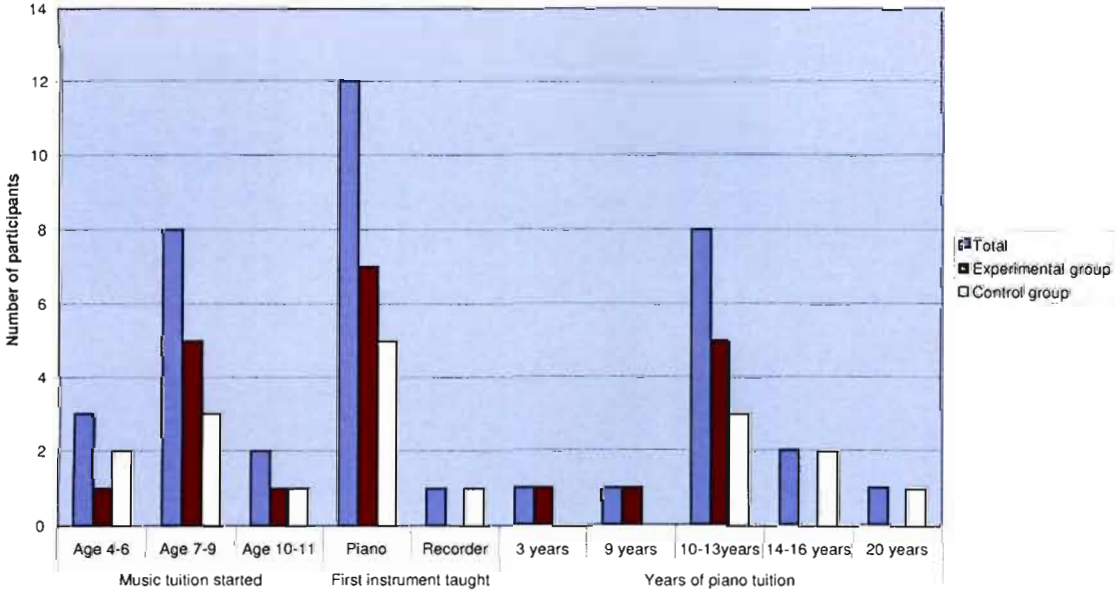


Figure 6.7 Participants' music education

6.2.4.2 Other instruments played

Participants indicated whether they played or have played any other instrument in addition to piano. They also indicated how many and which other instruments were involved. The data is presented in Table 6.8.

Table 6.8 Other instruments played by the participants

BIOGRAPHICAL PROFILE OTHER INSTRUMENTS PLAYED BY THE PARTICIPANTS								
	Participants (n = 13)		Experimental group (n = 7)			Control group (n = 6)		
	Frequency	%	% of Total*	Frequency	% of Group	% of Total*	Frequency	% of Group
Participants also playing other instruments	10	76.92	50.00	5	71.43	50.00	5	83.33
Number of other instruments played								
One	2	15.38	0.00	0	0.00	100.00	2	33.33
Two	5	38.46	80.00	4	57.14	20.00	1	16.67
Three	2	15.38	50.00	1	14.29	50.00	1	16.67
Four	1	7.69	0.00	0	0.00	100.00	1	16.67
Instrument								
Recorder	6	46.15	50.00	3	42.86	50.00	3	50.00
Flute	5	38.46	60.00	3	42.86	40.00	2	33.33
Clarinet	1	7.69	100.00	1	14.29	0.00	0	0.00
Saxophone	1	7.69	0.00	0	0.00	100.00	1	16.67
Violin	1	7.69	100.00	1	14.29	0.00	0	0.00
Church organ	1	7.69	100.00	1	14.29	0.00	0	0.00
Electronic keyboard	1	7.69	0.00	0	0.00	100.00	1	16.67
Guitar	4	30.77	25.00	1	14.29	75.00	3	50.00
African drums	2	15.38	50.00	1	14.29	50.00	1	16.67

* Total of participants regarding the concerned aspect.

From these data it can be seen that the majority of participants (10 of 13) played or have played another instrument in addition to piano. These 10 participants were equally distributed between the experimental and control group with five participants in each group.

Two of these 10 participants played one other instrument. Both these participants were in the control group. From the five participants who played two other instruments, four were in the experimental group and one in the control group. From the two participants who played three other instruments, one was in the experimental group and one in the control group. The participant who played four other instruments was in the control group.

More than one participant indicated that they also played the recorder, flute, guitar or African drums in addition to the piano. From the six participants who also played the recorder, three were in the experimental group and three in the control group. Three of the five participants who also played the flute were in the experimental group and two in the control group. From the four participants who also played the guitar, one was in the experimental group and three

in the control group. One of the two participants who also played African drums was in the experimental group and one in the control group.

Some participants indicated that they also played the clarinet, saxophone, violin, church organ or electronic keyboard in addition to playing the piano. Each of these instruments was played by no more than one participant.

Figure 6.8 illustrates the distribution of the participants playing other instruments in addition to playing the piano. This distribution is expressed in percentages relating to the total group of 13 participants.

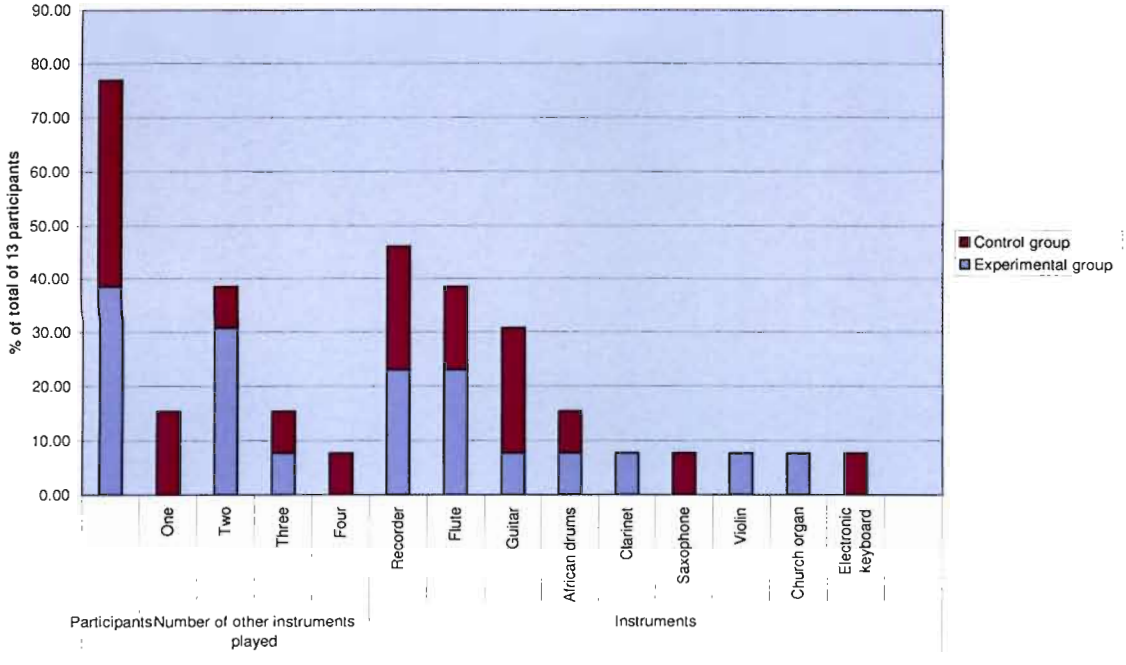


Figure 6.8 Percentage of participants playing other instruments in addition to piano

6.2.4.3 Music background of parents

Participants indicated whether their parents (one or both) had received any formal music education and whether either one of their parents was or had been a music teacher. They also indicated whether one or both parents played an instrument and whether this instrument is piano. The data is presented in Table 6.9.

Table 6.9 Music background of the participants' parents

BIOGRAPHICAL PROFILE MUSIC BACKGROUND OF THE PARTICIPANTS' PARENTS								
	Participants (n = 13)		Experimental group (n = 7)			Control group (n = 6)		
	Frequency	%	% of Total*	Frequency	% of Group	% of Total*	Frequency	% of Group
Participants whose parents had some formal music education	8	61.54	37.50	3	42.86	62.50	5	83.33
Parent who had some formal music education								
Father only	3	23.08	33.33	1	14.29	66.67	2	33.33
Mother only	4	30.77	50.00	2	28.57	50.00	2	33.33
Both	1	7.69	0.00	0	0.00	100.00	1	16.67
Parent was or had been a music teacher								
Mother	1	7.69	100.00	1	14.29	0.00	0	0.00
Participants whose parents played a musical instrument	9	69.23	33.33	3	42.86	66.67	6	100.00
Parent who played a musical instrument								
Father only	2	15.38	50.00	1	14.29	50.00	1	16.67
Mother only	5	38.46	40.00	2	28.57	60.00	3	50.00
Both	2	15.38	0.00	0	0.00	100.00	2	33.33
Parent played piano								
Father	2	15.38	0.00	0	0.00	100.00	2	33.33
Mother	6	46.15	33.33	2	28.57	66.67	4	66.67
Parent played another instrument								
Father	2	15.38	50.00	1	14.29	50.00	1	16.67
Mother	1	7.69	0.00	0	0.00	100.00	1	16.67

* Total of participants regarding the concerned aspect.

According to the data, eight of the 13 participants' parents had some formal music education. Three of these eight participants were in the experimental group and five in the control group. From the three participants whose father had some formal music education, one was in the experimental group and two in the control group. From the four participants whose mother had some formal music education, two was in the experimental group and two in the control group. The participant whose parents both had a music education was in the control group. The participant whose mother is a music teacher was in the experimental group.

Nine of the 13 participants' parents played a musical instrument. Three of these nine participants were in the experimental group and six in the control group. The two participants whose fathers played piano were both in the control group. From the six participants whose mothers played piano, two were in the experimental group and four in the control group. Two of the participants' fathers did not play piano but did play another instrument. One of these two participants was in the experimental group and one in the control group. The one participant whose mother played another instrument was in the control group.

Figure 6.9 illustrates the distribution of the participants regarding their parents' music background. This distribution is expressed in percentages relating to the total group of 13 participants.

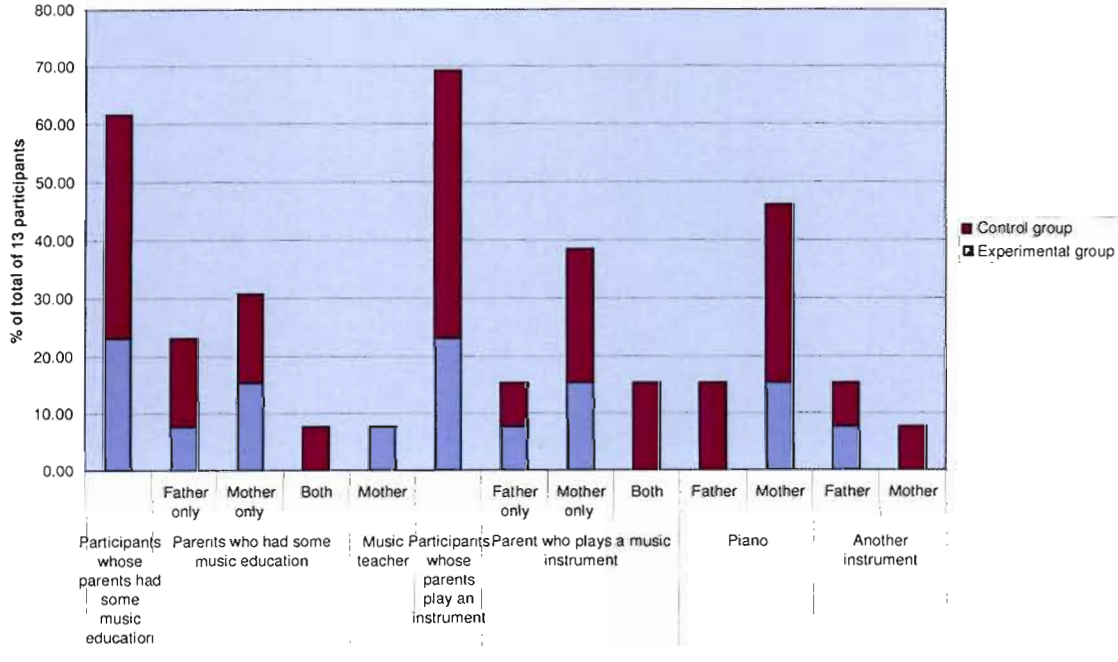


Figure 6.9 Distribution of the participants regarding their parents' music background

6.2.5 Summary

In this section data regarding the group of 13 participant's biographical profiles are presented. One of the purposes of this summary is to present the biographical profile of the majority of the group of 13 participants in short. A second purpose is to show whether the biographical profile of the experimental group and control group, respectively, reflects the profile of the majority of the group of 13 participants. A third purpose is thus to show that the groups can be considered as similar enough for the purposes of this study.

With regard to gender and age, the majority of the participants (11) were female and most of the participants (nine) were between the age of 20 and 21 at the time when the experiment took place. Both the experimental and control groups consisted of a majority of female participants, and therefore both groups reflect the composition of the whole group of 13 participants with regard to gender. Concerning the concentration of participants between the age of 20 and 21, the composition of the experimental group reflected this concentration. With only 50 percent of the control group in this age group, the control group did not truly reflect this concentration.

Concerning family background, most of the participants were either first or last born (10) and the majority of the participants' families (nine) were still intact. With regard to being either first or last born, the experimental group reflected the composition of the whole group of 13 participants. Once again, the control group did not truly reflect this concentration, since only 50 percent of this group was either first or last born. Regarding the intactness of the family, both groups reflected the composition of the whole group of 13 participants.

With regard to general health, the majority of the participants (eight) did not use any chronic medication, and this was also reflected by the composition of the experimental group. However, half of the participants in the control group used chronic medication. Seven of the 13 participants had a history of middle ear infection or severe earache, from which only three of these seven suffered regularly. This composition was reflected by both the experimental and control group to an extent.

Most of the participants' (eight) music tuition started between the ages of seven and nine. This concentration is reflected by the experimental and only partially by the control group. Piano was the first instrument taught to 12 of the 13 participants, and this distribution of the majority of the participants was reflected by the composition of both the experimental and control group. Most of the participants (eight) indicated their number of years of piano tuition to be between 10 and 13 years. This concentration was reflected in the composition of the

experimental group, but only to a certain extent by that of the control group, since only 50 percent of the control group was represented in this concentration.

The majority of the participants (10) indicated playing another instrument in addition to piano. Most of these participants (8) played more than one other instrument. This distribution was also reflected in the composition of both the experimental and the control group.

Regarding the music background of the participants' parents, the majority of the participants (8) indicated that one or both parents had some formal music education. This distribution was reflected by the composition of the control group, but not by that of the experimental group. Nine of the 13 participants indicated that one or both parents played a music instrument, and that most of these parents played piano. Once again, this distribution was reflected by the composition of the control group, but not by the composition of the experimental group.

Thus, it can be seen that the experimental group mostly reflected the biographical profile of the majority of the whole group of 13 participants. Although to a lesser degree than the experimental group, the control group also mostly reflected this biographical profile. Thus, the groups were considered as similar enough for the purposes of this study.

6.3 PSYCHOLOGICAL WELL-BEING

The level of the participants' psychological well-being was measured with the Scales of Psychological Well-Being (Ryff, 1989) and the Affectometer 2 (Kammann & Flett, 1983). With the exception of Vigor-Activity, which refers to an aspect of psychological well-being, the Profile of Mood States (Mc Nair *et al.*, 1992) indicated the participants' mood states.

A higher score with regard to all the subscales of the Scales of Psychological Well-Being (SPWB) indicates a higher level of psychological well-being. This also applies to a higher score in Positive Affect and Positive-Negative Balance, as measured by the Affectometer 2 (AFM 2), but not to Negative Affect. A higher score in Negative Affect indicates a lower level of psychological well-being with regard to this aspect. A higher score regarding the participants' mood states, as measured by the Profile of Mood States (POMS), as well as in the POMS total, indicate higher levels of negative moods. The only exception is Vigor-Activity, as measured by the POMS, where a higher score is a positive indication of the level of Vigor-Activity, which is related to psychological well-being. Statistical techniques were used to analyse data obtained from these instruments.

In this section the statistical results regarding the participants' psychological well-being will be presented. The results of the pre assessment will be presented first to show pre-treatment group equivalence. Since the Profile of Mood States (POMS) was employed to monitor the experimental group's progress during the Tomatis programme, these results will follow that of the pre assessment. Lastly, the differences between the pre-treatment and post-treatment assessments will be presented.

The presentation of the differences between the pre-test and post-test consists of the differences between and within groups. The differences between groups will be presented first, followed by the differences within groups. Differences between and within groups are seen as statistically significant at $p \leq 0.05$.

6.3.1 Pre-Test

The results regarding the participants' level of psychological well-being during pre-treatment assessment are presented in Table 6.10. The results of the Scales of Psychological Well-Being (SPWB) are presented first, followed by the results of the Affectometer 2 (AFM2) and then the results of the Profile of Mood States (POMS).

Table 6.10 Psychological well-being: Pre-test differences between groups

PSYCHOLOGICAL WELL-BEING PRE-TEST DIFFERENCES BETWEEN GROUPS							
	EXPERIMENTAL GROUP (n = 7)		CONTROL GROUP (n = 6)		T-TEST		MANN-WHITNEY TEST
Measuring Instrument	Mean	Std Dev	Mean	Std Dev	t Value	p Value	p Value
SPWB							
Autonomy	56.29	16.56	62.67	6.44	-0.94	0.3748	0.4744
Environmental Mastery	55.57	12.90	63.33	10.01	-1.22	0.2481	0.1520
Personal Growth	70.43	6.99	75.67	3.72	-1.72	0.1187	0.2227
Positive Relations	5.00	1.15	5.50	0.84	-0.90	0.3867	0.4337
Purpose in Life	5.29	0.76	5.50	1.23	-0.37	0.7194	0.3249
Self-Acceptance	64.14	11.54	61.50	14.32	0.36	0.7249	0.6678
AFM 2							
Positive Affect	38.71	3.90	39.00	4.98	-0.11	0.9118	1.0000
Negative Affect	17.29	5.50	19.67	6.22	-0.73	0.4844	0.4301
Positive-Negative-Balance	21.43	9.02	19.33	10.48	0.38	0.7097	0.8299
POMS							
Tension-Anxiety	13.86	5.84	15.00	7.40	-0.31	0.7667	0.9430
Depression-Dejection	9.00	7.09	15.17	12.48	-1.07	0.3167	0.4301

PSYCHOLOGICAL WELL-BEING PRE-TEST DIFFERENCES BETWEEN GROUPS (CONTINUED)							
	EXPERIMENTAL GROUP (n = 7)		CONTROL GROUP (n = 6)		T-TEST		MANN-WHITNEY TEST
Measuring Instrument	Mean	Std Dev	Mean	Std Dev	t Value	p Value	p Value
POMS (continued)							
Anger-Hostility	5.29	6.78	12.83	10.65	-1.50	0.1719	0.0718
Vigor-Activity	24.57	2.76	22.67	4.18	0.95	0.3673	0.3901
Fatigue-Inertia	5.86	3.34	6.83	1.72	-0.68	0.5157	0.6131
Confusion-Bewilderment	13.00	5.99	11.00	5.22	0.65	0.5315	0.4720
Total	22.43	73.71	38.17	33.87	-0.92	0.3784	0.3531

From the results of the pre-test it can be seen that the differences that occurred between the groups regarding their psychological well-being, as measured by the relevant measuring instruments, were statistically insignificant. The two groups were thus comparable.

6.3.2 Experimental Group's Mood States during the Tomatis Programme

The Profile of Mood States (POMS) was used to monitor the experimental group's progress during the Tomatis programme. This was done twice during each of the two phases (passive and active phase) as well as at the start of the active phase, thus bringing it to a total of five assessments during the Tomatis programme. Since one of the participants did not complete the programme and, therefore, did only three of the five assessments during the programme, this participant's results were not included in the statistical analysis. Thus, the statistical analysis with regard to the experimental group's mood states during the Tomatis programme considered only six participants in the experimental group.

The results with regard to statistically significant differences will be presented first. This will be followed by the results indicating the participants' fluctuating mood states during the Tomatis programme.

6.3.2.1 Statistically significant differences

The one way analysis of variance (ANOVA) with repeated measures over time was used to analyse these results. This analysis indicated no statistically significant differences between the five assessments. Each of the five assessments was also compared to the pre-test. These analyses indicated significant differences between the pre-test and the fourth and fifth assessment with regard to Vigor-Activity. These results are presented in Table 6.11

Table 6.11 Significant differences regarding Vigor-Activity between the pre-test and fourth to fifth assessments during the Tomatis programme

DIFFERENCES REGARDING VIGOR-ACTIVITY DURING THE PROGRAMME EXPERIMENTAL GROUP (N = 6)					
POMS	Pre-Test	4th Assessment	Pre-test v. 4th Assessment	5th Assessment	Pre-test v. 5th Assessment
Subscale	**Mean (SD)**	**Mean (SD)**	**p Value**	**Mean (SD)**	**p Value**
Vigor-Activity	24.17 (2.79)	13.67 (5.50)	0.013	18.00 (4.60)	0.016

When the 4th and 5th assessments are compared to the pre-test, the results indicate that the experimental group experienced significantly lower levels of Vigor-Activity during the programme.

6.3.2.2 Fluctuation of mood states during the Tomatis programme

Since the statistical analysis indicated no statistically significant differences between the five assessments, only the mean of each of the five assessments will be used to show the experimental group's fluctuation of mood states during the Tomatis programme. In addition to the five assessments that took place during the Tomatis programme, the pre-test will also be used to give an indication of the experimental group's fluctuation of mood states since the pre-test until the completion of 111-115 sessions (the 2nd last day) of the programme. These results are presented in Table 6.12

Table 6.12 Mood states of the experimental group during the Tomatis programme

PROFILE OF MOOD STATES DURING PROGRAMME EXPERIMENTAL GROUP (N = 6)						
Subscale	**Pre-test (SD)**	**26-30 Sessions (SD)**	**51-55 Sessions (SD)**	**61-65 Sessions (SD)**	**86-90 Sessions (SD)**	**111-115 Sessions (SD)**
Tension-Anxiety	15.33 (4.76)	14.33 (7.23)	17.33 (7.55)	14.33 (9.11)	17.00 (11.68)	14.67 (9.71)
Depression-Dejection	10.33 (6.74)	12.33 (10.61)	18.33 (9.63)	12.83 (11.96)	14.17 (16.01)	10.67 (12.29)
Anger-Hostility	5.83 (7.25)	15.83 (9.28)	18.33 (11.11)	10.50 (11.20)	8.33 (10.21)	9.50 (11.43)
Vigor-Activity	24.17 (2.79)	21.83 (3.66)	16.67 (3.72)	15.67 (6.31)	13.67 (5.50)	18.00 (4.60)
Fatigue-Inertia	6.33 (3.39)	12.83 (6.43)	14.83 (4.62)	11.17 (8.40)	13.00 (8.58)	10.50 (7.50)
Confusion-Bewilderment	14.50 (4.85)	14.50 (6.06)	17.50 (5.89)	13.33 (5.85)	13.83 (7.33)	11.33 (4.89)
POMS Total	28.17 (23.50)	48.00 (37.02)	69.67 (30.61)	46.50 (46.87)	52.67 (54.74)	38.67 (43.98)

Comparing the pre-test to each of the five assessments

From the results it can be seen that, when compared to the pre-test, the experimental group mostly experienced a negative change in mood states during the Tomatis programme, as measured by the POMS. The statistically significant changes are presented in Table 6.11. The rest of these changes were not statistically significant. However, the group also experienced positive changes with regard to Tension-Anxiety and Confusion-Bewilderment at certain stages during the programme, when compared to the pre-test.

Lower levels of Tension-Anxiety and Confusion-Bewilderment were indicated after 60 sessions and after 110 sessions. The group also indicated lower levels of Tension-Anxiety after 25 sessions and lower levels of Confusion-Bewilderment after 85 sessions. These changes were, however, not statistically significant.

Comparing the five assessments

Although there were no statistically significant changes between the five assessments during the Tomatis programme, it is interesting to note how the experimental group's mood states fluctuated during this period, as measured by the Profile of Mood States (POMS). We will discuss each assessment in comparison with the previous one.

The results from all the subscales as well as the POMS total indicate a negative change between the first (26-30 sessions) and the second (51-55 sessions) assessment. In contrast to this, the experimental group showed, with the exception of Vigor-Activity, a positive change with regard to all aspects, as measured by the POMS, between the second (51-55 sessions) and the third (61-65 sessions) assessment. Between the third (61-65 sessions) and the fourth (86-90 sessions) assessment there only occurred a positive change with regard to Anger-Hostility. With the exception of Anger-Hostility, the results indicate that the experimental group experienced a positive change in mood states between the fourth (86-90 sessions) and the fifth (111-115 sessions) assessment.

This fluctuation of mood states is illustrated in Figure 6.10. Since the totals of the subscales of the POMS vary, the mean of the group with regard to each subscale, as well as the POMS total, is expressed as a percentage.

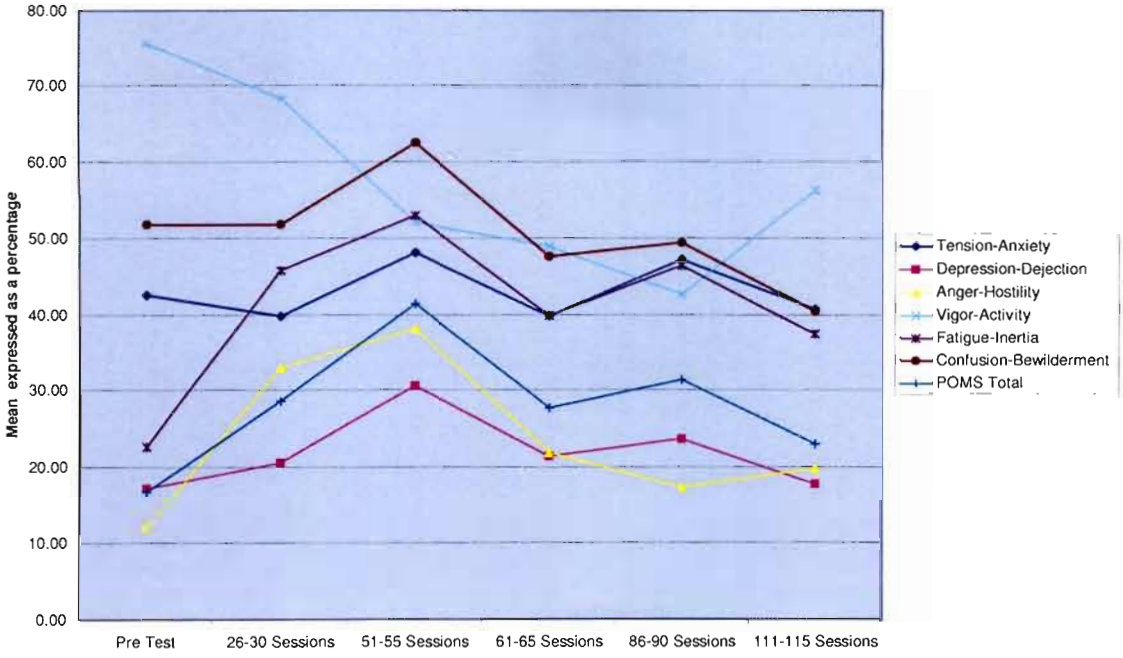


Figure 6.10 Experimental group's fluctuation of mood states during the Tomatis programme

6.3.3 Differences between the Pre-Test and Post-Test

The results of the differences between groups will be presented first, followed by the results of the differences within groups. The results of the Scales of Psychological Well-Being (SPWB) are presented first, followed by the results of the Affectometer 2 (AFM2) and then the results of the Profile of Mood States (POMS).

6.3.3.1 Differences between groups

The statistical results regarding the pre-post differences in psychological well-being between the groups are presented in Table 6.13.

Table 6.13 **Psychological well-being: Pre-post differences between the experimental and control group**

PSYCHOLOGICAL WELL-BEING PRE-POST DIFFERENCES BETWEEN GROUPS									
	GROUPS						DIFFERENCE BETWEEN GROUPS		
	EXPERIMENTAL GROUP (n = 7)			CONTROL GROUP (n = 6)			T-TEST		MANN-WHITNEY TEST
Measuring Instrument	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	t Value	p Value	p Value
SPWB									
Autonomy	56.29 (16.56)	57.14 (15.38)	0.86 (6.96)	62.67 (6.44)	61.50 (5.79)	-1.17 (5.71)	0.58	0.5763	0.6656
Environmental Mastery	55.57 (12.89)	57.14 (13.69)	1.57 (6.70)	63.33 (10.01)	60.67 (11.22)	-2.67 (8.38)	1.00	0.3441	0.1961
Personal Growth	70.43 (6.99)	72.43 (12.23)	2 (6.03)	75.67 (3.72)	77.17 (5.31)	1.5 (4.23)	0.17	0.8644	0.8856
Positive Relations	5.00 (1.15)	5.29 (1.25)	0.29 (0.49)	5.50 (0.84)	5.50 (0.55)	0 (0.63)	0.90	0.3904	0.4285
Purpose in Life	5.29 (0.76)	5.00 (1.15)	-0.29 (0.76)	5.5 (1.23)	5.67 (0.82)	0.17 (1.60)	-0.63	0.5467	0.5843
Self-Acceptance	64.14 (11.54)	64.14 (14.53)	0 (6.35)	61.5 (14.32)	66.83 (10.44)	5.33 (11.27)	1.03	0.3357	0.5192
AFM 2									
Positive Affect	38.71 (3.90)	37.86 (6.44)	-0.86 (3.24)	39.00 (4.98)	39.17 (3.43)	0.17 (4.83)	-0.44	0.6702	0.5645
Negative Affect	17.29 (5.50)	19.86 (9.12)	2.57 (4.92)	19.67 (6.22)	23.00 (6.20)	3.33 (6.15)	-0.24	0.8127	0.9428
Positive-Negative-Balance	21.43 (9.02)	18.00 (14.75)	-3.43 (6.53)	19.33 (10.48)	16.17 (7.39)	-3.17 (9.22)	-0.06	0.9549	1.0000
POMS									
Tension-Anxiety	13.86 (5.84)	16.71 (8.62)	2.86 (6.79)	15.00 (7.40)	20.17 (8.16)	5.17 (9.56)	-0.49	0.6213	0.9427
Depression-Dejection	9.00 (7.09)	17.14 (11.41)	8.14 (6.77)	15.17 (12.48)	24.17 (10.48)	9 (15.95)	-0.12	0.9062	1.0000
Anger-Hostility	5.29 (6.78)	12.43 (8.92)	7.14 (8.07)	12.83 (10.65)	15.33 (7.06)	2.5 (9.18)	0.96	0.3591	0.7195
Vigor-Activity	24.57 (2.76)	18.00 (6.73)	-6.57 (5.03)	22.67 (4.18)	18.17 (6.85)	-4.5 (7.42)	-0.58	0.5774	0.7191
Fatigue-Inertia	5.86 (3.34)	9.14 (8.25)	3.29 (7.61)	6.83 (1.72)	15.17 (4.96)	8.33 (4.93)	-1.39	0.1799	0.1146
Confusion-Bewilderment	13.00 (5.94)	13.00 (5.77)	0 (7.19)	11.00 (5.22)	17.50 (7.56)	6.5 (6.47)	-1.44	0.1144	0.1315
Total	22.43 (26.28)	50.43 (46.83)	28 (31.16)	38.17 (33.87)	74.17 (36.35)	36 (46.87)	-1.70	0.7305	1.0000

From these results it can be seen that, although both groups showed positive as well as negative changes regarding psychological well-being, no statistically significant differences between the groups occurred.

6.3.3.2 Differences within groups

The statistical results regarding the pre-post differences in psychological well-being of the experimental group will be presented first, followed by the results of the control group.

Experimental group

The results of the experimental group's pre-test and post-test, the differences between the tests, and the statistical significance of these differences are presented in Table 6.14.

Table 6.14 Psychological well-being: Pre-post differences within the experimental group

PSYCHOLOGICAL WELL-BEING PRE-POST DIFFERENCES WITHIN THE EXPERIMENTAL GROUP (N = 7)						
				T-TEST		SIGNED RANK TEST
Measuring Instrument	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**t Value**	**p Value**	**p Value**
SPWB						
Autonomy	56.29 (16.56)	57.14 (15.38)	0.86 (6.96)	0.33	0.7557	0.8594
Environmental Mastery	55.57 (12.89)	57.14 (13.69)	1.57 (6.70)	0.62	0.5580	0.8438
Personal Growth	70.43 (6.99)	72.43 (12.23)	2 (6.03)	0.88	0.4138	0.4688
Positive Relations	5 (1.15)	5.29 (1.25)	0.29 (0.49)	1.55	0.1723	0.5
Purpose in Life	5.29 (0.76)	5.00 (1.15)	-0.29 (0.76)	-1.00	0.3559	0.625
Self-Acceptance	64.14 (11.54)	64.14 (14.53)	0 (6.35)	0.00	1.0000	0.9063
AFM 2						
Positive Affect	38.71 (3.90)	37.86 (6.44)	-0.86 (3.24)	-0.70	0.5098	0.5156
Negative Affect	17.29 (5.50)	19.86 (9.12)	2.57 (4.92)	1.38	0.2166	0.4219
Positive-Negative-Balance	21.43 (9.02)	18.00 (14.75)	-3.43 (6.53)	-1.39	0.2140	0.4063
POMS						
Tension-Anxiety	13.86 (5.84)	16.71 (8.62)	2.86 (6.79)	1.11	0.3084	0.4531
Depression-Dejection	9.00 (7.09)	17.14 (11.41)	8.14 (6.77)	3.18	*0.0190	*0.0156
Anger-Hostility	5.29 (6.78)	12.43 (8.92)	7.14 (8.07)	2.34	0.0577	*0.0313
Vigor-Activity	24.57 (2.76)	18.00 (6.73)	-6.57 (5.03)	-3.46	*0.0135	*0.0313
Fatigue-Inertia	5.86 (3.34)	9.14 (8.25)	3.29 (7.61)	1.14	0.2968	0.5625
Confusion-Bewilderment	13.00 (5.94)	13.00 (5.77)	0 (7.19)	0.00	1.0000	0.875
Total	22.43 (26.28)	50.43 (46.83)	28 (31.16)	2.38	0.0549	*0.0313

* Difference between the pre-test and post-test is statistically significant at $p \leq 0.05$

From these results it can be seen that the experimental group showed no statistically significant differences regarding psychological well-being between pre-treatment and post-treatment, as measured by the SPWB and AFM 2. According to the statistical results of the

POMS, the experimental group showed a significant increase with regard to Depression-Dejection and Anger-Hostility, and a significant decrease with regard to Vigor-Activity. These statistically significant differences between the experimental group's pre-test and post-test are also reflected in the POMS Total, which shows a significant increase, indicating that the experimental group's negative mood states worsened. However, the statistically significant increases indicated by the non-parametric test regarding Anger-Hostility as well as the POMS Total, were not corroborated by the parametric test.

Control group

The results of the control group's pre-test and post-test, the differences between the tests, and the statistical significance of these differences are presented in Table 6.15.

Table 6.15 Psychological well-being: Pre-post differences within the control group

	PSYCHOLOGICAL WELL-BEING PRE-POST DIFFERENCES WITHIN THE CONTROL GROUP (N = 6)					
				T-TEST		SIGNED RANK TEST
Measuring Instrument	**Pre- Test Mean (SD)**	**Post- Test Mean (SD)**	**Mean Increase (SD)**	**t Value**	**p Value**	**p Value**
SPWB						
Autonomy	62.67 (6.44)	61.50 (5.79)	-1.17 (5.71)	-0.50	0.6378	0.8125
Environmental Mastery	63.33 (10.01)	60.67 (11.22)	-2.67 (8.38)	-0.78	0.4711	0.625
Personal Growth	75.67 (3.72)	77.17 (5.31)	1.5 (4.23)	0.87	0.4249	0.4375
Positive Relations	5.5 (0.84)	5.50 (0.55)	0 (0.63)	0.00	1.0000	1.0000
Purpose in Life	5.5 (1.23)	5.67 (0.82)	0.17 (1.60)	0.25	0.8090	1.0000
Self-Acceptance	61.5 (14.32)	66.83 (10.44)	5.33 (11.27)	1.16	0.2988	0.4375
AFM 2						
Positive Affect	39.00 (4.98)	39.17 (3.43)	0.17 (4.83)	0.08	0.9360	0.875
Negative Affect	19.67 (6.22)	23.00 (6.20)	3.33 (6.15)	1.33	0.2419	0.25
Positive-Negative-Balance	19.33 (10.48)	16.17 (7.39)	-3.17 (9.22)	-0.84	0.4385	0.4688
POMS						
Tension-Anxiety	15.00 (7.40)	20.17 (8.16)	5.17 (9.56)	1.32	0.2428	0.3125
Depression-Dejection	15.17 (12.48)	24.17 (10.48)	9 (15.95)	1.38	0.2255	0.3125
Anger-Hostility	12.83 (10.65)	15.33 (7.06)	2.5 (9.18)	0.67	0.5343	0.625
Vigor-Activity	22.67 (4.18)	18.17 (6.85)	-4.5 (7.42)	-1.48	0.1977	0.2188
Fatigue-Inertia	6.83 (1.72)	15.17 (4.96)	8.33 (4.93)	4.14	*0.0090	*0.0313

	PSYCHOLOGICAL WELL-BEING PRE-POST DIFFERENCES WITHIN THE CONTROL GROUP (CONTINUED) (N = 6)					
				T-TEST		SIGNED RANK TEST
Measuring Instrument	**Pre- Test Mean (SD)**	**Post- Test Mean (SD)**	**Mean Increase (SD)**	**t Value**	**p Value**	**p Value**
POMS (continued)						
Confusion-Bewilderment	11.00 (5.22)	17.50 (7.56)	6.5 (6.47)	2.46	0.0572	0.0625
Total	38.17 (33.87)	74.17 (36.35)	36 (46.87)	1.88	0.1186	0.2188

* Difference between the pre-test and post-test is statistically significant at $p \leq 0.05$

These results show that the control group displayed no statistically significant differences regarding psychological well-being between pre-treatment and post-treatment, as measured by the SPWB and AFM 2. With regard to Fatigue-Inertia as measured by the POMS, the control group showed a significant increase, indicating that this negative mood state has worsened.

6.3.4 Summary

The statistical analyses show that the two groups were equivalent regarding their psychological well-being before the experimental group's exposure to the Tomatis programme. There were also no statistically significant differences between the groups regarding changes in psychological well-being between pre-treatment and post-treatment as measured by the relevant measuring instruments.

Neither the experimental group nor the control group showed any statistically significant changes regarding aspects of psychological well-being as measured by the SPWB and AFM 2. Both groups showed statistically significant changes regarding mood states measured by the POMS. The experimental group showed significant negative change regarding Depression-Dejection, Anger-Hostility, Vigor-Activity, and the POMS total. The control group showed significant negative change regarding Fatigue-Inertia.

As far as the experimental group's mood states are concerned, as measured by the POMS during exposure to the Tomatis programme, there were significant negative changes between the pre-test and the fourth and fifth assessments with regard to Vigor-Activity. The experimental group showed mostly positive mood changes between the second and third, as well as between the fourth and fifth assessments, and mostly negative mood changes between the first and second, as well as between the third and fourth assessments. None of these changes were, however, statistically significant.

6.4 MUSIC PERFORMANCE ANXIETY

The level of the participants' music performance anxiety was measured with the Music Performance Anxiety Inventory for Adolescents (Osborn & Kenny, 2005) and the Kenny Music Performance Anxiety Inventory (Kenny, 2004). A lower score, with regard to both these measuring instruments, indicates a lower level of music performance anxiety. Statistical techniques were used to analyse the data obtained from these instruments.

In this section the results from the statistical analysis regarding the student pianists' music performance anxiety will be presented. The results of the pre assessment will be presented first to show pre-treatment group equivalence. This will be followed by the differences between the pre-treatment and post-treatment assessment.

The presentation of the differences between the pre-test and post-test consists of the differences between and within groups. The differences between groups will be presented first, followed by the differences within groups. Differences between and within groups are seen as statistically significant at $p \leq 0.05$.

6.4.1 Pre-Test

The results regarding the participants' level of music performance anxiety during pre-treatment assessment are presented in Table 6.16. The results of the Music Performance Anxiety Inventory for Adolescents (MPAI-A) will be presented first, followed by the results of the Kenny Music Performance Anxiety Inventory (K-MPAI).

Table 6.16 Music performance anxiety: Pre-test differences between groups

MUSIC PERFORMANCE ANXIETY PRE-TEST DIFFERENCES BETWEEN GROUPS							
	EXPERIMENTAL GROUP (n = 7)		CONTROL GROUP (n = 6)		T-TEST		MANN-WHITNEY TEST
Measuring Instrument	Mean	Std Dev	Mean	Std Dev	t Value	p Value	p Value
MPAI-A							
Somatic Cognitive	40.43	7.55	34.50	3.78	1.83	0.1005	0.1136
Performance Context	12.43	6.90	7.83	3.71	1.52	0.1604	0.1735
Performance Evaluation	18.29	1.80	11.67	5.43	2.86	*0.0109	*0.0094
Total	71.14	14.63	54.00	11.59	2.35	*0.0382	0.0626
K-MPAI							
Total	-8.57	16.50	-17.17	26.13	0.70	0.5060	0.4744

* Difference between groups is statistically significant at $p \leq 0.05$

With regard to the Somatic Cognitive and Performance Context subscales of the MPAI-A as well as the total of the K-MPAI, the results of the pre-test show that the differences that occurred between the groups were not statistically significant. There was, however, a statistically significant difference between the groups with regard to Performance Evaluation as measured by the MPAI-A, and, although not corroborated by the non-parametric test, the MPAI-A Total. The experimental group's level of music performance anxiety, regarding these aspects, was significantly higher than that of the control group during the pre-test.

6.4.2 Differences between the Pre-Test and Post-Test

The results of the differences between groups will be presented first, followed by the results of the differences within groups. The results regarding the two measuring instruments will be presented in the same order as before.

6.4.2.1 Differences between groups

The statistical results regarding the pre-post differences in levels of music performance anxiety between the groups are presented in Table 6.17.

Table 6.17 Music performance anxiety: Pre-post differences between the groups

MUSIC PERFORMANCE ANXIETY PRE-POST DIFFERENCES BETWEEN GROUPS									
	GROUPS						DIFFERENCE BETWEEN GROUPS		
	EXPERIMENTAL GROUP (n = 7)			CONTROL GROUP (n = 6)			T-TEST		MANN-WHITNEY TEST
Measuring Instrument	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	t Value	p Value	p Value
MPAI-A									
Somatic Cognitive	40.43 (7.55)	37.43 (6.32)	-3 (3.42)	34.50 (3.78)	34.17 (5.12)	-0.33 (5.96)	-0.97	0.3621	0.3491
Performance Context	12.43 (6.90)	12.14 (7.15)	-0.29 (1.25)	7.83 (3.71)	10.17 (4.26)	2.33 (2.58)	-2.27	0.0579	*0.0318
Performance Evaluation	18.29 (1.80)	15.43 (4.86)	-2.86 (5.18)	11.67 (5.43)	14.33 (4.68)	2.67 (3.88)	-2.19	0.0510	0.0817
Total	71.14 (14.63)	65 (17.99)	-6.14 (5.93)	54.00 (11.59)	58.67 (10.44)	4.67 (8.07)	-2.71	*0.0237	*0.0362
K-MPAI									
Total	-8.57 (16.50)	-8.86 (32.65)	-0.29 (18.68)	-17.17 (26.13)	-11.17 (30.20)	6 (12.76)	-0.72	0.4893	0.4738

* Difference between groups is statistically significant at $p \leq 0.05$ regarding changes in levels of music performance anxiety.

These results show that statistically significant differences in change between the two groups only occurred with regard to the subscale Performance Context (not corroborated by the parametric test) and the total of the MPAI-A. The control group showed a negative change while the experimental group showed a positive change regarding these aspects.

The differences in change between the groups are illustrated in Figure 6.11.

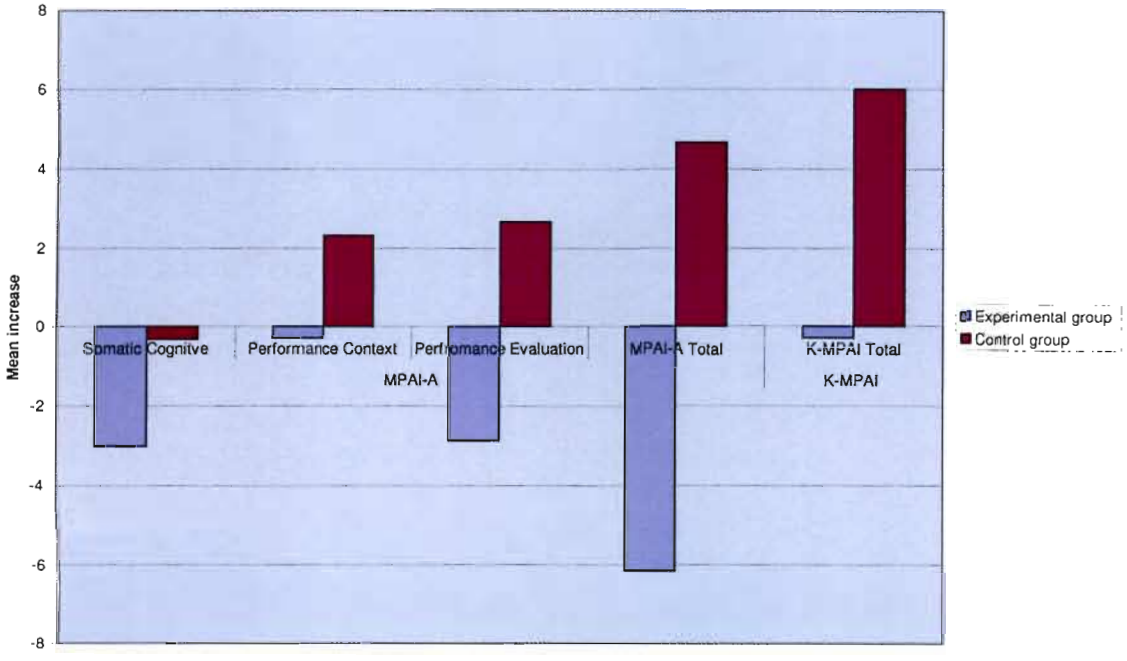


Figure 6.11 Music performance anxiety: Pre-post differences between groups with regard to change

It should be kept in mind that a decrease (indicated as a negative number in Figure 6.11) with regard to the MPAI-A as well as the K-MPAI indicates a reduction in levels of music performance anxiety.

6.4.2.2 Differences within groups

The results of the statistical analysis regarding the pre-post differences in levels of music performance anxiety of the experimental group will be presented first, followed by the results of the control group. The results of the two measuring instruments will be presented in the same order as before.

Experimental group

The results of the experimental group's pre-test and post-test, the differences between the tests, and the statistical significance of these differences are presented in Table 6.18

Table 6.18 **Music performance anxiety: Pre-post differences within the experimental group**

	MUSIC PERFORMANCE ANXIETY PRE-POST DIFFERENCES WITHIN THE EXPERIMENTAL GROUP (N = 7)					
	DIFFERENCE BETWEEN PRE-TEST AND POST-TEST			T-TEST		SIGNED RANK TEST
Measuring Instrument	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**t Value**	**p Value**	**p Value**
MPAI-A						
Somatic Cognitive	40.43 (7.55)	37.43 (6.32)	-3 (3.42)	-2.32	0.0591	0.0938
Performance Context	12.43 (6.90)	12.14 (7.15)	-0.29 (1.25)	-0.60	0.5686	0.75
Performance Evaluation	18.29 (1.80)	15.43 (4.86)	-2.86 (5.18)	-1.46	0.1946	0.3438
Total	71.14 (14.63)	65 (17.99)	-6.14 (5.93)	-2.74	*0.0337	*0.0313
K-MPAI						
Total	-8.57 (16.50)	-8.86 (32.65)	-0.29 (18.68)	-0.04	0.9690	0.9375

* Difference between the pre-test and post-test is statistically significant at $p \leq 0.05$

From these results it can be seen that the experimental group's positive change with regard to the MPAI-A Total was statistically significant. Although not statistically significant, positive changes also took place regarding the subscales of the MPAI-A. The significant positive change between pre-treatment and post-treatment tests regarding the MPAI-A Total reflects these positive changes, thus indicating a significantly lower level of music performance anxiety as measured by the MPAI-A.

Control group

The results of the control group's pre-test and post-test, the differences between the tests, and the statistical significance of these differences are presented in Table 6.19.

Table 6.19 Music performance anxiety: Pre-post differences within the control group

	MUSIC PERFORMANCE ANXIETY PRE-POST DIFFERENCES WITHIN THE CONTROL GROUP (N = 6)					
	DIFFERENCE BETWEEN PRE-TEST AND POST-TEST			T-TEST		SIGNED RANK TEST
Measuring Instrument	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	t Value	p Value	p Value
MPAI-A						
Somatic Cognitive	34.50 (3.78)	34.17 (5.12)	-0.33 (5.96)	-0.14	0.8963	0.875
Performance Context	7.83 (3.71)	10.17 (4.26)	2.33 (2.58)	2.21	0.0778	0.125
Performance Evaluation	11.67 (5.43)	14.33 (4.68)	2.67 (3.88)	1.68	0.1532	0.1875
Total	54.00 (11.59)	58.67 (10.44)	4.67 (8.07)	1.42	0.2156	0.125
K-MPAI						
Total	-17.17 (26.13)	-11.17 (30.20)	6 (12.76)	1.15	0.3015	0.3125

The results indicate that no statistically significant changes occurred between the control group's pre-test and post-test.

6.4.3 Summary

The statistical analysis shows that the two groups were not totally equivalent regarding their levels of music performance anxiety before the experimental group's exposure to the Tomatis programme. The experimental group's level of music performance anxiety, regarding Performance Evaluation as measured by the MPAI-A, as well as the MPAI-A total, was significantly higher than that of the control group during the pre-test.

There were also statistically significant differences between the groups regarding changes in levels of music performance anxiety between pre-treatment and post-treatment, as measured by the MPAI-A. These significant differences between the groups occurred with regard to the subscale Performance Context, as well as the MPAI-A total. The two groups' changes with regard to these aspects took place in opposite directions, with the experimental group showing a positive change, resulting in significant differences between the groups.

Only the experimental group showed a statistically significant change between pre-treatment and post-treatment testing regarding music performance anxiety as measured by the MPAI-A. The experimental group's results indicate a significantly lower level of music performance anxiety with regard to the MPAI-A Total. Neither the experimental group nor the control group

showed any statistically significant changes regarding the level of music performance anxiety as measured by the K-MPAI.

6.5 PIANO PERFORMANCE

The piano performance of the participants was assessed by a panel of external adjudicators, the participants' piano lecturers, and the participants themselves. Statistical techniques were used to analyse the data obtained from the following three measuring instruments:

- Piano Performance Rating Scale (PPRS)
- Twelve constructs for the assessment of music performance, identified by Mills (2005:179-180)
- General impression of the participants' piano performance indicated by using a percentage.

A higher score, with regard to all these measuring instruments, indicates a better piano performance.

The panel of external adjudicators, the participants' piano lecturers, as well as the participants themselves used these instruments to assess the participants' piano performance. The panel of external adjudicators assessed the participants' performances of *Le Sapin* by Jean Sibelius. The participants' performances of this composition were recorded on CD and on DVD. The PPRS was used by the panel for the assessment of the performances on CD, and Mills's constructs for the assessment of the performances on DVD. The piano lecturers assessed the participants' piano performance in general. The participants also completed a self-evaluation of their own piano performance in general.

In this section the results from the statistical analysis regarding the participants' piano performance will be presented. These results will include the assessment of the participants' piano performance by a panel of external adjudicators, the participants' piano lecturers, and the participants themselves. The results of the pre assessment will be presented first to show pre-treatment group equivalence. This will be followed by the differences between the pre-treatment and post-treatment assessment.

The presentation of the differences between the pre-test and post-test consists of the differences between and within groups. The differences between groups will be presented first, followed by the differences within groups. Differences between and within groups are seen as statistically significant at $p \leq 0.05$.

6.5.1 Pre-Test

The results from the assessment by the panel of external adjudicators will be presented first. This will be followed by the results of the assessment by the participants' piano lecturers, and then by the assessments done by the participants themselves.

6.5.1.1 Assessment by the panel of external adjudicators

The results of the General Impression of the participants' piano performance will be presented first, followed by the results of the Piano Performance Rating Scale (PPRS), and then the results of the Mills Constructs. The results from the assessments by the panel of external adjudicators of the pre-treatment recordings of the participants' piano performances are presented in Table 6.20.

Table 6.20 **Piano performance: Pre-test differences between groups as assessed by the panel of external adjudicators**

PIANO PERFORMANCE PRE-TEST DIFFERENCES BETWEEN GROUPS ASSESSMENT BY PANEL OF EXTERNAL ADJUDICATORS							
Measuring Instrument	**EXPERIMENTAL GROUP (n = 7)**		**CONTROL GROUP (n = 6)**		**T-TEST**		**MANN-WHITNEY TEST**
	Mean	**Std Dev**	**Mean**	**Std Dev**	**t Value**	**p Value**	**p Value**
General Impression							
CD %	42.00	15.99	46.33	11.08	-0.57	0.5779	0.4276
DVD %	39.29	12.74	50.50	12.86	-1.57	0.1447	0.1724
PPRS (CD)							
Accuracy, continuity and fluency	11.86	4.60	13.33	4.68	-0.57	0.5793	0.7117
Technique	12.57	4.65	14.33	3.98	-0.74	0.4772	0.5168
Interpretation	11.29	4.75	12.17	3.92	-0.37	0.7211	0.7184
Mills's Constructs (DVD)							
Confidence	1.57	0.98	2.33	1.03	-1.36	0.2024	0.2160
Enjoyment	1.57	0.98	2.00	1.10	-0.74	0.4764	0.4990
Familiarity	1.71	0.95	2.33	1.03	-1.12	0.2892	0.3015
Making sense	1.29	0.76	1.67	1.03	-0.75	0.4735	0.4945
Dynamics	1.00	0.00	1.50	0.84	-1.46	0.2031	0.1399
Tempi	1.00	0.00	1.33	0.82	-1.00	0.3632	0.3545
Phrasing	1.00	0.00	1.67	1.03	-1.58	0.1747	0.1385
Technical problems	1.29	0.76	2.00	1.10	-1.35	0.2123	0.2123
Fluency	1.29	0.76	1.67	1.03	-0.75	0.4735	0.4945
Sensitivity	1.29	0.76	1.33	0.82	-0.11	0.9157	1.0000
"Cleanness"	1.29	0.76	1.67	1.03	-0.75	0.4735	0.4945
Quality	1.00	0.00	1.33	0.82	-1.00	0.3632	0.3545

These results show pre-treatment equivalence between the experimental and control group with regard to the assessment of their piano performances by the external panel of adjudicators.

6.5.1.2 Assessment by the participants' piano lecturers

The results of the three measuring instruments will be presented in the same order as before. The results from the pre-treatment assessments of the participants' piano performances in general by their piano lecturers are presented in Table 6.21.

Table 6.21 **Piano performance: Pre-test differences between groups as assessed by the participants' piano lecturers**

PIANO PERFORMANCE PRE-TEST DIFFERENCES BETWEEN GROUPS ASSESSMENT BY PARTICIPANTS' PIANO LECTURERS							
Measuring Instrument	**EXPERIMENTAL GROUP (n = 7)**		**CONTROL GROUP (n = 6)**		**T-TEST**		**MANN-WHITNEY TEST**
	Mean	**Std Dev**	**Mean**	**Std Dev**	**t Value**	**p Value**	**p Value**
General Impression							
%	65.14	4.26	70.50	10.27	-1.19	0.2749	0.2800
PPRS							
Accuracy, continuity and fluency	19.14	5.05	21.83	9.00	-0.65	0.5349	0.4320
Technique	18.71	4.07	22.83	7.86	-1.16	0.2838	0.2498
Interpretation	18.71	6.21	23.17	8.04	-1.10	0.2972	0.2524
Mills's Constructs							
Confidence	1.29	0.76	2.33	1.03	-2.06	0.0696	0.0759
Enjoyment	3.00	0.00	3.00	0.00	-	-	1.0000
Familiarity	2.71	0.76	2.33	1.03	0.75	0.4735	0.4945
Making sense	2.43	0.98	2.33	1.03	0.17	0.8692	0.9290
Dynamics	2.71	0.76	2.67	0.82	0.11	0.9157	1.0000
Tempi	2.14	1.07	2.00	1.10	0.24	0.8172	0.8690
Phrasing	1.86	1.07	2.00	1.10	-0.24	0.8172	0.8690
Technical problems	1.29	0.76	2.00	1.10	-1.35	0.2123	0.2123
Fluency	1.86	1.07	2.00	1.10	-0.24	0.8172	0.8690
Sensitivity	2.14	1.07	3.00	0.00	-2.12	0.0781	0.0971
"Cleanness"	2.14	1.07	2.33	1.03	-0.33	0.7505	0.7998
Quality	2.29	0.95	2.67	0.82	-0.78	0.4535	0.4285

The experimental and control groups were equivalent with regard to the pre-treatment assessment of the participants' piano performance by their piano lecturers.

6.5.1.3 Participants' self-evaluation of their piano performance

The results of the three measuring instruments will be presented in the same order as before. The results from the participants' pre-treatment self-evaluation of their piano performance in general, are presented in Table 6.22.

Table 6.22 **Piano performance: Pre-test differences between groups as assessed by the participants themselves**

PIANO PERFORMANCE PRE-TEST DIFFERENCES BETWEEN GROUPS PARTICIPANTS' SELF-EVALUATION							
	EXPERIMENTAL GROUP (n = 7)		CONTROL GROUP (n = 6)		T-TEST		MANN-WHITNEY TEST
Measuring Instrument	**Mean**	**Std Dev**	**Mean**	**Std Dev**	**t Value**	**p Value**	**p Value**
General Impression							
%	61.43	6.90	71.50	6.92	-2.62	*0.0244	*0.0306
PPRS							
Accuracy, continuity and fluency	20.00	4.20	26.00	4.52	-2.47	*0.0325	0.0615
Technique	19.43	5.53	26.33	4.68	-2.44	*0.0329	0.0734
Interpretation	20.71	5.22	28.17	3.31	-3.12	*0.0106	*0.0317
Mills's Constructs							
Confidence	1.57	0.98	2.00	1.10	-0.74	0.4764	0.4990
Enjoyment	2.71	0.76	3.00	0.00	-1.00	0.3559	0.4404
Familiarity	2.43	0.98	3.00	0.00	-1.55	0.1723	0.2100
Making sense	1.86	1.07	2.67	0.82	-1.55	0.1508	0.1763
Dynamics	3.00	0.00	3.00	0.00	-	-	1.0000
Tempi	2.43	0.98	2.83	0.41	-1.00	0.3456	0.5612
Phrasing	2.14	1.07	3.00	0.00	-2.12	0.0781	0.0971
Technical problems	1.57	0.98	2.17	0.98	-1.09	0.2989	0.2965
Fluency	1.86	1.07	2.33	1.03	-0.82	0.4324	0.4579
Sensitivity	2.43	0.98	3.00	0.00	-1.55	0.1723	0.2100
"Cleanness"	1.29	0.76	2.67	0.82	-3.15	*0.0100	*0.0209
Quality	1.86	1.07	3.00	0.00	-2.83	*0.0300	*0.0405

* Difference between groups is statistically significant at $p \leq 0.05$

These results show a considerable number of statistically significant differences between the experimental and control group's self-evaluation of their piano performances before the experimental group's exposure to the Tomatis programme. Significant differences between the groups occurred with regard to all three the subscales (Accuracy, continuity and fluency; Technique; and Interpretation) as measured by the PPRS; "Cleanness", and Quality as measured by the Mills Constructs; and General Impression. In al these instances the control group's scores were significantly higher than that of the experimental group. However, the

statically significant difference between the groups with regard to Accuracy, continuity and fluency, and Technique, as measured by the PPRS, was indicated by the parametric test but not corroborated by the non-parametric test.

6.5.2 Differences between the Pre-Test and Post-Test

The results of the differences between groups will be presented first, followed by the results of the differences within groups. The results with regard to the three measuring instruments will be presented in the same order as before.

6.5.2.1 Differences between groups

The results from the different assessments will be presented in the same order as before.

Assessment by the panel of external adjudicators

The piano performance of one of the participants in the experimental group was, because of a technical problem, not recorded on DVD during the post-test. Therefore, only the data of the remaining six participants were used for the statistical analysis of the pre-post assessment of the experimental group's piano performances as recorded on DVD, and measured according to the Mills Constructs, as well as the General Impression of the DVD recording. All the participants' data were used with regard to the other measuring instruments. The statistical results from the assessments by the panel of external adjudicators regarding the pre-post differences in piano performance, between the groups, are presented in Table 6.23.

Table 6.23 **Piano performance: Pre-post differences between groups as assessed by the panel of external adjudicators**

PIANO PERFORMANCE PRE-POST DIFFERENCES BETWEEN GROUPS ASSESSMENT BY PANEL OF EXTERNAL ADJUDICATORS									
	GROUPS						DIFFERENCE BETWEEN GROUPS		
	EXPERIMENTAL GROUP (n = 7)			CONTROL GROUP (n = 6)			T-TEST		MANN-WHITNEY TEST
Measuring Instrument	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	t Value	p Value	p Value
General Impression									
CD %	42.00 (15.99)	36.86 (11.78)	-5.14 (9.19)	46.33 (11.08)	43.33 (15.71)	-3 (10.58)	-0.39	0.7072	1.0000
*DVD %	39.17 (12.74)	45.17 (13.95)	6.00 (6.23)	50.50 12.86	50.83 (17.15)	0.33 (8.04)	1.36	0.2041	0.3691

PIANO PERFORMANCE

PRE-POST DIFFERENCES BETWEEN GROUPS

ASSESSMENT BY PANEL OF EXTERNAL ADJUDICATORS (CONTINUED)

	GROUPS						DIFFERENCE BETWEEN GROUPS		
	EXPERIMENTAL GROUP (n = 7)			CONTROL GROUP (n = 6)			T-TEST		MANN-WHITNEY TEST
Measuring Instrument	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**t Value**	**p Value**	**p Value**
PPRS (CD)									
Accuracy, continuity and fluency	11.86 (4.60)	11.71 (3.20)	-0.14 (2.55)	13.33 (4.68)	13.00 (6.16)	-0.33 (3.67)	0.11	0.9172	1.0000
Technique	12.57 (4.65)	12.86 (2.79)	0.29 (3.30)	14.33 (3.98)	14.00 (4.00)	-0.33 (2.34)	0.39	0.7013	0.5589
Interpretation	11.29 (4.75)	9.68 (2.67)	-1.43 (2.44)	12.17 (3.92)	12.17 (5.42)	0 (2.97)	-0.94	0.3707	0.3827
Mills's Constructs (DVD)*									
Confidence	1.67 (0.98)	1.67 (1.03)	0 (1.27)	2.33 (1.03)	2.00 (1.10)	-0.33 (0.82)	0.54	0.6014	0.6733
Enjoyment	1.66 (0.98)	1.33 (0.82)	-0.33 (0.82)	2.00 (1.10)	2.67 (0.82)	0.67 (1.03)	-1.86	0.0940	0.1138
Familiarity	1.84 (0.95)	2.67 (0.82)	0.83 (0.98)	2.33 (1.03)	2.67 (0.82)	0.33 (0.82)	0.96	0.3612	0.3359
Making sense	1.00 (0.76)	1.83 (0.90)	0.5 (0.84)	1.67 (1.03)	2.00 (1.10)	0.33 (0.82)	0.35	0.7342	0.6733
Dynamics	1.00 (0.00)	1.33 (0.82)	0.33 (0.82)	1.50 (0.84)	2.00 (1.10)	0.50 (0.84)	-0.35	0.7342	0.6733
Tempi	1.00 (0.00)	1.33 (0.82)	0.33 (0.82)	1.33 (0.82)	1.67 (1.03)	0.33 (0.82)	0.00	1.0000	1.0000
Phrasing	1.00 (0.00)	1.67 (1.03)	0.67 (1.03)	1.67 (1.03)	2.33 (1.03)	0.67 (1.03)	0.00	1.0000	1.0000
Technical problems	1.33 (0.76)	1.33 (0.98)	0 (0)	2.00 (1.10)	2.33 (1.03)	0.33 (0.82)	-1.00	0.3632	0.4047
Fluency	1.33 (0.76)	1.00 (0.00)	-0.33 (0.82)	1.67 (1.03)	2.00 (1.10)	0.33 (0.82)	-1.41	0.1877	0.2184
Sensitivity	1.33 (0.76)	2.33 (1.03)	1.00 (1.10)	1.33 (0.82)	2.33 (1.03)	1.00 (1.10)	0.00	1.0000	1.0000
"Cleanness"	1.33 (0.76)	1.00 (0.00)	-0.33 (0.82)	1.67 (1.03)	2.00 (1.10)	0.33 (0.82)	-1.41	0.1877	0.2184
Quality	1.00 (0.00)	1.00 (0.00)	0 (0)	1.33 (0.82)	1.67 (1.03)	0.33 (0.82)	-1.00	0.3632	0.4047

* Experimental group: n = 6 for assessment of DVD only

There were no statistically significant differences in change between the piano performances of the two groups as assessed by the panel of external adjudicators.

Assessment by the participants' piano lecturers

The statistical results from the assessments by the participants' piano lecturers regarding the pre-post differences in piano performance between the groups are presented in Table 6.24.

Table 6.24 **Piano performance: Pre-post differences between groups as assessed by the participants' piano lecturers**

PIANO PERFORMANCE PRE-POST DIFFERENCES BETWEEN GROUPS ASSESSMENT BY PARTICIPANTS' PIANO LECTURERS									
	GROUPS						DIFFERENCE BETWEEN GROUPS		
	EXPERIMENTAL GROUP (n = 7)			CONTROL GROUP (n = 6)			T-TEST		MANN-WHITNEY TEST
Measuring Instrument	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**t Value**	**p Value**	**p Value**
General Impression									
%	65.14 (4.26)	63.86 (7.34)	-1.29 (5.02)	70.50 (10.27)	69.50 (9.97)	-1 (2.90)	-0.13	0.9010	0.9426
PPRS									
Accuracy, continuity and fluency	19.14 (5.05)	19.71 (6.10)	0.57 (4.83)	21.83 (9.00)	22.00 (7.90)	0.17 (3.13)	0.18	0.8592	0.6156
Technique	18.71 (4.07)	21.00 (4.65)	2.29 (2.21)	22.83 (7.86)	22.33 (7.34)	-0.5 (2.07)	2.34	*0.0394	0.0611
Interpretation	18.71 (6.21)	19.14 (7.29)	0.43 (1.99)	23.17 (8.04)	24.17 (7.73)	1 (2.68)	-0.43	0.6771	0.7169
Mills's Constructs									
Confidence	1.29 (0.76)	1.57 (0.98)	0.29 (0.76)	2.33 (1.03)	2.23 (1.03)	0 (1.27)	0.48	0.6414	0.6985
Enjoyment	3.00 (0.00)	2.71 (0.76)	-0.29 (0.76)	3.00 (0.00)	3.00 (0.00)	0 (0)	-1.00	0.3559	0.4404
Familiarity	2.71 (0.76)	2.43 (0.98)	-0.29 (0.76)	2.33 (1.03)	2.33 (1.03)	0 (0)	-1.00	0.3559	0.4404
Making sense	2.43 (0.98)	2.71 (0.76)	0.29 (1.38)	2.33 (1.03)	3.00 (0.00)	0.67 (1.03)	-0.57	0.5816	0.6784
Dynamics	2.71 (0.76)	2.71 (0.76)	0 (1.15)	2.67 (0.82)	2.33 (1.03)	-0.33 (0.82)	0.61	0.5565	0.6282
Tempi	2.14 (1.07)	1.86 (1.07)	-0.29 (1.38)	2.00 (1.10)	2.33 (1.03)	0.33 (0.82)	-1.00	0.3411	0.3810
Phrasing	1.86 (1.07)	2.71 (0.76)	0.85 (1.07)	2.00 (1.10)	2.33 (1.03)	0.33 (0.82)	1.00	0.3390	0.3730
Technical problems	1.29 (0.76)	1.57 (0.98)	0.29 (0.76)	2.00 (1.10)	2.33 (1.03)	0.33 (0.82)	-0.11	0.9157	1.0000
Fluency	1.86 (1.07)	2.00 (1.00)	0.14 (0.90)	2.00 (1.10)	2.33 (1.03)	0.33 (0.82)	-0.40	0.6969	0.6282
Sensitivity	2.14 (1.07)	2.71 (0.76)	0.57 (1.51)	3.00 (0.00)	3.00 (0.00)	0 (0)	1.00	0.3559	0.3332
"Cleanness"	2.14 (1.07)	2.14 (1.07)	0 (0)	2.33 (1.03)	2.00 (1.10)	-0.33 (0.82)	1.00	0.3632	0.3545
Quality	2.29 (0.95)	2.43 (0.98)	0.14 (0.90)	2.67 (0.82)	2.67 (0.82)	0 (0)	0.42	0.6891	1.0000

* Difference between groups is statistically significant at $p \leq 0.05$

There was only one statistically significant difference between the two groups' piano performance, as assessed by the participants' piano lecturers. This significant difference occurred with regard to the subscale Technique, as measured by the PPRS. The experimental group showed a positive change and the control group showed a negative change in this regard. This statistically significant difference between the two groups was indicated by the result of the parametric test, but not corroborated by the non-parametric test.

Participants' self-evaluation of their piano performance

The statistical results from the participants' self-evaluation regarding the pre-post differences in piano performance between the groups are presented in Table 6.25

Table 6.25 **Piano performance: Pre-post differences between groups as assessed by the participants themselves**

PIANO PERFORMANCE PRE-POST DIFFERENCES BETWEEN GROUPS PARTICIPANTS' SELF-EVALUATION									
	GROUPS						DIFFERENCE BETWEEN GROUPS		
	EXPERIMENTAL GROUP (n = 7)			CONTROL GROUP (n = 6)			T-TEST		MANN-WHITNEY TEST
Measuring Instrument	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	t Value	p Value	p Value
General Impression									
%	61.43 (6.90)	57.43 (12.80)	-4 (16.11)	71.50 (6.92)	73.67 (4.84)	2.17 (2.64)	-1.00	0.3551	0.6116
PPRS									
Accuracy, continuity and fluency	20.00 (4.20)	20.14 (4.81)	0.14 (1.77)	26.00 (4.52)	26.17 (6.31)	0.17 (3.71)	-0.01	0.9889	1.0000
Technique	19.43 (5.53)	19.43 (4.61)	0 (2.77)	26.33 (4.68)	26.50 (5.32)	0.17 (5.04)	-0.07	0.9443	0.9428
Interpretation	20.71 (5.22)	20.71 (4.31)	0 (3.32)	28.17 (3.31)	26.83 (4.58)	-1.33 (2.58)	0.81	0.4330	0.3119
Mills's Constructs									
Confidence	1.57 (0.98)	1.57 (0.98)	0 (1.15)	2.00 (1.10)	1.67 (1.03)	-0.33 (0.82)	0.61	0.5565	0.6282
Enjoyment	2.71 (0.76)	2.43 (0.98)	-0.29 (0.76)	3.00 (0.00)	3.00 (0.00)	0.00 (0)	-1.00	0.3559	0.4404
Familiarity	2.43 (0.98)	2.71 (0.76)	0.29 (1.38)	3.00 (0.00)	2.33 (1.03)	-0.67 (1.03)	1.42	0.1837	0.2177
Making sense	1.86 (1.07)	2.43 (0.98)	0.57 (0.97)	2.67 (0.82)	3.00 (0.00)	0.33 (0.82)	0.48	0.6414	0.6963
Dynamics	3.00 (0.00)	2.71 (0.76)	-0.29 (0.76)	3.00 (0.00)	3.00 (0.00)	0 (0)	-1.00	0.3559	0.4404
Tempi	2.43 (0.98)	2.43 (0.98)	0 (1.15)	2.83 (0.41)	3.00 (0.00)	0.17 (0.41)	-0.36	0.7309	0.6992

PIANO PERFORMANCE PRE-POST DIFFERENCES BETWEEN GROUPS PARTICIPANTS' SELF-EVALUATION (CONTINUED)									
	GROUPS						DIFFERENCE BETWEEN GROUPS		
	EXPERIMENTAL GROUP (n = 7)			CONTROL GROUP (n = 6)			T-TEST		MANN-WHITNEY TEST
Measuring Instrument	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**t Value**	**p Value**	**p Value**
Mills's Constructs (continued)									
Phrasing	2.14 (1.07)	3.00 (0.00)	0.86 (1.07)	3.00 (0.00)	2.83 (0.41)	-0.17 (0.41)	2.34	*0.0475	0.0647
Technical problems	1.57 (0.98)	1.57 (0.98)	0 (0)	2.17 (0.98)	2.33 (1.03)	0.17 (0.41)	-1.00	0.3632	0.3545
Fluency	1.86 (1.07)	1.57 (0.98)	-0.29 (0.76)	2.33 (1.03)	2.67 (0.82)	0.33 (0.82)	-1.41	0.1878	0.2116
Sensitivity	2.43 (0.98)	2.71 (0.76)	0.29 (0.76)	3.00 (0.00)	3.00 (0.00)	0 (0)	1.00	0.3559	0.4404
"Cleanness"	1.29 (0.76)	1.57 (0.98)	0.29 (0.76)	2.67 (0.82)	3.00 (0.00)	0.33 (0.82)	-0.11	0.9157	1.0000
Quality	1.86 (1.07)	2.43 (0.98)	0.57 (0.98)	3.00 (0.00)	2.50 (0.84)	-0.5 (0.84)	2.13	0.0565	0.0664

* Difference between groups is statistically significant at $p \leq 0.05$

There was one statistically significant difference between the two groups piano performance, as assessed by the participants' themselves. This significant difference occurred with regard to one of the Mills Constructs, namely Phrasing. The experimental group changed positively regarding the appropriateness of their use of phrasing and experienced their piano performances as more interesting. The control group, on the other hand, changed negatively with regard to this construct. This statistically significant difference between the two groups was indicated by the result of the parametric test, but without corroboration by the non-parametric test.

6.5.2.2 Differences within groups

The results of the statistical analysis regarding the pre-post differences in the piano performance of the experimental group will be presented first, followed by the results of the control group. The results from the different assessments will be presented in the same order as before.

Experimental group

The results of the experimental group's pre-test and post-test, the differences between the tests, and the statistical significance of these differences will be presented.

Assessment by the panel of external adjudicators

The statistical results from the assessments by the panel of external adjudicators regarding the pre-post differences in piano performance, within the experimental group, are presented in Table 6.26.

Table 6.26 Piano performance: Pre-post differences within the experimental group as assessed by the panel of external adjudicators

PIANO PERFORMANCE PRE-POST DIFFERENCES WITHIN THE EXPERIMENTAL GROUP ASSESSMENT BY PANEL OF EXTERNAL ADJUDICATORS (N = 7)						
	DIFFERENCE BETWEEN PRE-TEST AND POST-TEST			T-TEST		SIGNED RANK TEST
Measuring Instrument	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**t Value**	**p Value**	**p Value**
General Impression						
CD %	42.00 (15.99)	36.86 (11.78)	-5.14 (9.19)	-1.48	0.1893	0.2969
*DVD %	39.17 (12.74)	45.17 (13.95)	6.00 (6.23)	2.36	0.0648	0.125
PPRS (CD)						
Accuracy, continuity and fluency	11.86 (4.60)	11.71 (3.20)	-0.14 (2.55)	-0.15	0.8868	0.9688
Technique	12.57 (4.65)	12.86 (2.79)	0.29 (3.30)	0.23	0.8265	0.625
Interpretation	11.29 (4.75)	9.68 (2.67)	-1.43 (2.44)	-1.55	0.1723	0.25
Mills's Constructs (DVD)*						
Confidence	1.67 (0.98)	1.67 (1.03)	0 (1.27)	0.00	1.0000	1.0000
Enjoyment	1.66 (0.98)	1.33 (0.82)	-0.33 (0.82)	-1.00	0.3632	1.0000
Familiarity	1.84 (0.95)	2.67 (0.82)	0.83 (0.98)	2.08	0.0925	0.25
Making sense	1.00 (0.76)	1.83 (0.90)	0.5 (0.84)	1.46	0.2031	0.50
Dynamics	1.00 (0.00)	1.33 (0.82)	0.33 (0.82)	1.00	0.3632	1.0000
Tempi	1.00 (0.00)	1.33 (0.82)	0.33 (0.82)	1.00	0.3632	1.0000
Phrasing	1.00 (0.00)	1.67 (1.03)	0.67 (1.03)	1.58	0.1747	0.50
Technical problems	1.33 (0.76)	1.33 (0.98)	0 (0)	-	-	-

PIANO PERFORMANCE

PRE-POST DIFFERENCES WITHIN THE EXPERIMENTAL GROUP

ASSESSMENT BY PANEL OF EXTERNAL ADJUDICATORS (CONTINUED)

(N = 7)

	DIFFERENCE BETWEEN PRE-TEST AND POST-TEST			T-TEST		SIGNED RANK TEST
Measuring Instrument	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**t Value**	**p Value**	**p Value**
Mills's Constructs (DVD)* (continued)						
Fluency	1.33 (0.76)	1.00 (0.00)	-0.33 (0.82)	-1.00	0.3632	1.0000
Sensitivity	1.33 (0.76)	2.33 (1.03)	1.00 (1.10)	2.24	0.0756	0.25
"Cleanness"	1.33 (0.76)	1.00 (0.00)	-0.33 (0.82)	1.00	0.3632	1.0000
Quality	1.00 (0.00)	1.00 (0.00)	0 (0)	-	-	-

* Experimental group: n = 6 for assessment of DVD only

None of the changes that occurred between the experimental group's pre-test and post-test, as assessed by the panel of external adjudicators, were statistically significant.

Assessment by the participants' piano lecturers

The statistical results from the assessments by the participants' piano lecturers regarding the pre-post differences in piano performance within the experimental group are presented in Table 6.27.

Table 6.27 **Piano performance: Pre-post differences within the experimental group as assessed by the participants' piano lecturers**

PIANO PERFORMANCE PRE-POST DIFFERENCES WITHIN THE EXPERIMENTAL GROUP ASSESSMENT BY PARTICIPANTS' PIANO LECTURERS (N = 7)						
	DIFFERENCE BETWEEN PRE-TEST AND POST-TEST			T-TEST		SIGNED RANK TEST
Measuring Instrument	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	t Value	p Value	p Value
General Impression						
%	65.14 (4.26)	63.86 (7.34)	-1.29 (5.02)	-0.68	0.5236	0.6875
PPRS						
Accuracy, continuity and fluency	19.14 (5.05)	19.71 (6.10)	0.57 (4.83)	0.31	0.7647	0.6563
Technique	18.71 (4.07)	21.00 (4.65)	2.29 (2.21)	2.73	*0.0342	*0.0469
Interpretation	18.71 (6.21)	19.14 (7.29)	0.43 (1.99)	0.57	0.5891	0.7188
Mills's Constructs						
Confidence	1.29 (0.76)	1.57 (0.98)	0.28 (0.76)	1.00	0.3559	1.0000
Enjoyment	3.00 (0.00)	2.71 (0.76)	-0.29 (0.76)	-1.00	0.3559	1.0000
Familiarity	2.71 (0.76)	2.43 (0.98)	-0.28 (0.76)	-1.00	0.3559	1.0000
Making sense	2.43 (0.98)	2.71 (0.76)	0.28 (1.38)	0.55	0.6036	1.0000
Dynamics	2.71 (0.76)	2.71 (0.76)	0 (1.15)	0.00	1.0000	1.0000
Tempi	2.14 (1.07)	1.86 (1.07)	-0.28 (1.38)	0.55	0.6036	1.0000
Phrasing	1.86 (1.07)	2.71 (0.76)	0.85 (1.07)	2.12	0.0781	0.25
Technical problems	1.29 (0.76)	1.57 (0.98)	0.28 (0.76)	1.00	0.3559	1.0000
Fluency	1.86 (1.07)	2.00 (1.00)	0.14 (0.90)	0.42	0.6891	1.0000
Sensitivity	2.14 (1.07)	2.71 (0.76)	0.57 (1.51)	1.00	0.3559	0.625
"Cleanness"	2.14 (1.07)	2.14 (1.07)	0 (0)	-	-	-
Quality	2.29 (0.95)	2.43 (0.98)	0.14 (0.90)	0.42	0.6891	1.0000

* Difference between the pre-test and post-test is statistically significant at $p \leq 0.05$

There was only one statistically significant change between the pre-treatment and post-treatment assessments of the experimental group's piano performance as assessed by the participants' piano lecturers. Both the parametric and non-parametric tests indicated a significant positive change with regard to Technique, as measured by the PPRS.

Participants' self-evaluation of their piano performance

The statistical results from the participants' self-evaluation regarding the pre-post differences in piano performance, within the experimental group, are presented in Table 6.28.

Table 6.28 Piano performance: Pre-post differences within the experimental group as assessed by the participants themselves

PIANO PERFORMANCE PRE-POST DIFFERENCES WITHIN THE EXPERIMENTAL GROUP PARTICIPANTS' SELF-EVALUATION (N = 7)						
	DIFFERENCE BETWEEN PRE-TEST AND POST-TEST			T-TEST		SIGNED RANK TEST
Measuring Instrument	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	t Value	p Value	p Value
General Impression						
%	61.43 (6.90)	57.43 (12.80)	-4 (16.11)	-0.66	0.5357	0.75
PPRS						
Accuracy, continuity and fluency	20.00 (4.20)	20.14 (4.81)	0.14 (1.77)	0.21	0.8382	0.9375
Technique	19.43 (5.53)	19.43 (4.61)	0 (2.77)	0.00	1.0000	1.0000
Interpretation	20.71 (5.22)	20.71 (4.31)	0 (3.32)	0.00	1.0000	1.0000
Mills's Constructs						
Confidence	1.57 (0.98)	1.57 (0.98)	0 (1.15)	0.00	1.0000	1.0000
Enjoyment	2.71 (0.76)	2.43 (0.98)	-0.28 (0.76)	-1.00	0.3559	1.0000
Familiarity	2.43 (0.98)	2.71 (0.76)	0.28 (1.38)	0.55	0.6036	1.0000
Making sense	1.86 (1.07)	2.43 (0.98)	0.57 (0.97)	1.55	0.1723	0.5
Dynamics	3.00 (0.00)	2.71 (0.76)	-0.29 (0.76)	-1.00	0.3559	1.0000
Tempi	2.43 (0.98)	2.43 (0.98)	0 (1.15)	0.00	1.0000	1.0000
Phrasing	2.14 (1.07)	3.00 (0.00)	0.86 (1.07)	2.12	0.0781	0.25
Technical problems	1.57 (0.98)	1.57 (0.98)	0 (0)	-	-	-
Fluency	1.86 (1.07)	1.57 (0.98)	-0.29 (0.76)	-1.00	0.3559	1.0000
Sensitivity	2.43 (0.98)	2.71 (0.76)	0.28 (0.76)	1.00	0.3559	1.0000
"Cleanness"	1.29 (0.76)	1.57 (0.98)	0.28 (0.76)	1.00	0.3559	1.0000
Quality	1.86 (1.07)	2.43 (0.98)	0.57 (0.98)	1.55	0.1723	0.5

None of the changes that occurred between the experimental group's pre-test and post-test, as assessed by the participants themselves, were statistically significant.

Control group

The results of the control group's pre-test and post-test, the differences between the tests, and the statistical significance of these differences will be presented.

Assessment by the panel of external adjudicators

The statistical results from the assessments by the panel of external adjudicators regarding the pre-post differences in piano performance, within the control group, are presented in Table 6.29.

Table 6.29 **Piano performance: Pre-post differences within the control group as assessed by the panel of external adjudicators**

PIANO PERFORMANCE PRE-POST DIFFERENCES WITHIN THE CONTROL GROUP ASSESSMENT BY PANEL OF EXTERNAL ADJUDICATORS (N = 6)						
	DIFFERENCE BETWEEN PRE-TEST AND POST-TEST			T-TEST		SIGNED RANK TEST
Measuring Instrument	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**t Value**	**p Value**	**p Value**
General Impression						
CD %	46.33 (11.08)	43.33 (15.71)	-3 (10.58)	-0.69	0.5184	0.5625
DVD %	50.50 12.86	50.83 (17.15)	0.33 (8.04)	0.10	0.9231	0.75
PPRS (CD)						
Accuracy, continuity and fluency	13.33 (4.68)	13.00 (6.16)	-0.33 (3.67)	-0.22	0.8327	1.0000
Technique	14.33 (3.98)	14.00 (4.00)	-0.33 (2.34)	-0.35	0.7412	1.0000
Interpretation	12.17 (3.92)	12.17 (5.42)	0 (2.97)	0.00	1.0000	1.0000
Mills's Constructs (DVD)						
Confidence	2.33 1.03	2.00 (1.10)	-0.33 (0.82)	-1.00	0.3632	1.0000
Enjoyment	2.00 1.10	2.67 (0.82)	0.67 (1.03)	1.58	0.1747	0.50
Familiarity	2.33 1.03	2.67 (0.82)	0.34 (0.82)	1.00	0.3632	1.0000
Making sense	1.67 1.03	2.00 (1.10)	0.33 (0.82)	1.00	0.3632	1.0000
Dynamics	1.50 0.84	2.00 (1.10)	0.50 (0.84)	1.46	0.2031	0.50
Tempi	1.33 0.82	1.67 (1.03)	0.34 (0.82)	1.00	0.3632	1.0000
Phrasing	1.67 1.03	2.33 (1.03)	0.66 (1.03)	1.58	0.1747	0.50
Technical problems	2.00 1.10	2.33 (1.03)	0.33 (0.82)	1.00	0.3632	1.0000

PIANO PERFORMANCE PRE-POST DIFFERENCES WITHIN THE CONTROL GROUP ASSESSMENT BY PANEL OF EXTERNAL ADJUDICATORS (CONTINUED) (N = 6)						
	DIFFERENCE BETWEEN PRE-TEST AND POST-TEST			T-TEST		SIGNED RANK TEST
Measuring Instrument	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	t Value	p Value	p Value
Mills's Constructs (DVD) (continued)						
Fluency	1.67 1.03	2.00 (1.10)	0.33 (0.82)	1.00	0.3632	1.0000
Sensitivity	1.33 0.82	2.33 (1.03)	1.00 (1.10)	2.24	0.0756	0.25
"Cleanness"	1.67 1.03	2.00 (1.10)	0.33 (0.82)	1.00	0.3632	1.0000
Quality	1.33 0.82	1.67 (1.03)	0.34 (0.82)	1.00	0.3632	1.0000

The results show that none of the changes that occurred between the control group's pre-test and post-test, as assessed by the panel of external adjudicators, were statistically significant.

Assessment by the participants' piano lecturers

The statistical results from the assessments by the participants' piano lecturers regarding the pre-post differences in piano performance within the control group are presented in Table 6.30.

Table 6.30 Piano performance: Pre-post differences within the control group as assessed by the participants' piano lecturers

PIANO PERFORMANCE PRE-POST DIFFERENCES WITHIN THE CONTROL GROUP ASSESSMENT BY PARTICIPANTS' PIANO LECTURERS (N = 6)						
	DIFFERENCE BETWEEN PRE-TEST AND POST-TEST			T-TEST		SIGNED RANK TEST
Measuring Instrument	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	t Value	p Value	p Value
General Impression						
%	70.50 (10.27)	69.50 (9.97)	-1 (2.90)	-0.85	0.4366	0.50
PPRS						
Accuracy, continuity and fluency	21.83 (9.00)	22.00 (7.90)	0.17 (3.13)	0.13	0.9012	1.0000
Technique	22.83 (7.86)	22.33 (7.34)	-0.5 (2.07)	-0.59	0.5805	0.75
Interpretation	23.17 (8.04)	24.17 (7.73)	1 (2.68)	0.91	0.4032	0.5937

PIANO PERFORMANCE

PRE-POST DIFFERENCES WITHIN THE CONTROL GROUP

ASSESSMENT BY PARTICIPANTS' PIANO LECTURERS (CONTINUED)

(N = 6)

	DIFFERENCE BETWEEN PRE-TEST AND POST-TEST			T-TEST		SIGNED RANK TEST
Measuring Instrument	**Pre-Test Mean (SD)**	**Post-Test Mean (SD)**	**Mean Increase (SD)**	**t Value**	**p Value**	**p Value**
Mills's Constructs						
Confidence	2.33 (1.03)	2.33 (1.03)	0 (1.27)	0.00	1.0000	1.0000
Enjoyment	3.00 (0.00)	3.00 (0.00)	0 (0)	-	-	-
Familiarity	2.33 (1.03)	2.33 (1.03)	0 (0)	-	-	-
Making sense	2.33 (1.03)	3.00 (0.00)	0.67 (1.03)	1.58	0.1747	0.5
Dynamics	2.67 (0.82)	2.33 (1.03)	-0.34 (0.82)	-1.00	0.3632	1.0000
Tempi	2.00 (1.10)	2.33 (1.03)	0.33 (0.82)	1.00	0.3632	1.0000
Phrasing	2.00 (1.10)	2.33 (1.03)	0.33 (0.82)	1.00	0.3632	1.0000
Technical problems	2.00 (1.10)	2.33 (1.03)	0.33 (0.82)	1.00	0.3632	1.0000
Fluency	2.00 (1.10)	2.33 (1.03)	0.33 (0.82)	1.00	0.3632	1.0000
Sensitivity	3.00 (0.00)	3.00 (0.00)	0 (0)	-	-	-
"Cleanness"	2.33 (1.03)	2.00 (1.10)	-0.33 (0.82)	-1.00	0.3632	1.0000
Quality	2.67 (0.82)	2.67 (0.82)	0 (0)	-	-	-

None of the changes that occurred between the control group's pre-test and post-test piano performance, as assessed by the participants' piano lecturers, were statistically significant.

Participants' self-evaluation of their piano performance

The statistical results from the participants' self-evaluation regarding the pre-post differences in piano performance within the control group are presented in Table 6.31.

Table 6.31 **Piano performance: Pre-post differences within the control group as assessed by the participants themselves**

PIANO PERFORMANCE PRE-POST DIFFERENCES WITHIN THE CONTROL GROUP PARTICIPANTS' SELF-EVALUATION (N = 6)						
	DIFFERENCE BETWEEN PRE-TEST AND POST-TEST			T-TEST		SIGNED RANK TEST
Measuring Instrument	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Increase (SD)	t Value	p Value	p Value
General Impression						
%	71.50 (6.92)	73.67 (4.84)	2.17 (2.64)	2.01	0.1006	0.125
PPRS						
Accuracy, continuity and fluency	26.00 (4.52)	26.17 (6.31)	0.17 (3.71)	0.11	0.9167	1.0000
Technique	26.33 (4.68)	26.50 (5.32)	0.17 (5.04)	0.08	0.9385	1.0000
Interpretation	28.17 (3.31)	26.83 (4.58)	-1.33 (2.58)	-1.26	0.2617	0.50
Mills's Constructs						
Confidence	2.00 (1.10)	1.67 (1.03)	-0.33 (0.82)	-1.00	0.3632	1.0000
Enjoyment	3.00 (0.00)	3.00 (0.00)	0.00 (0)	-	-	-
Familiarity	3.00 (0.00)	2.33 (1.03)	-0.67 (1.03)	-1.58	0.1747	0.5
Making sense	2.67 (0.82)	3.00 (0.00)	0.33 (0.82)	1.00	0.3632	1.0000
Dynamics	3.00 (0.00)	3.00 (0.00)	0 (0)	-	-	-
Tempi	2.83 (0.41)	3.00 (0.00)	0.17 (0.41)	1.00	0.3632	1.0000
Phrasing	3.00 (0.00)	2.83 (0.41)	-0.17 (0.41)	-1.00	0.3632	1.0000
Technical problems	2.17 (0.98)	2.33 (1.03)	0.16 (0.41)	1.00	0.3632	1.0000
Fluency	2.33 (1.03)	2.67 (0.82)	0.34 (0.82)	1.00	0.3632	1.0000
Sensitivity	3.00 (0.00)	3.00 (0.00)	0 (0)	-	-	-
"Cleanness"	2.67 (0.82)	3.00 (0.00)	0.33 (0.82)	1.00	0.3632	1.0000
Quality	3.00 (0.00)	2.50 (0.84)	-0.5 (0.84)	-1.46	0.2031	0.5

The control group experienced no statistically significant changes with regard to their piano performance, as measured by the relevant measuring instruments, between the pre-test and post-test.

6.5.3 Summary

The summary of the results of the pre assessment will be followed by a summary of the differences between the pre-treatment and post-treatment assessment.

6.5.3.1 Pre-test

The statistical analysis of the pre-treatment assessment shows the two groups to be equivalent with regard to their performance of a specific piano composition, as assessed by the external panel of adjudicators, as well as with regard to the assessment of their piano performance in general, as assessed by their piano lecturers. The two groups were, however, less equivalent with regard to the self-evaluation of their piano performances in general.

There were statistically significant differences between the groups' self-evaluation with regard to the subscales Accuracy, continuity and fluency, Technique, and Interpretation as measured by the PPRS; "Cleanness", and Quality as measured by the Mills Constructs; and General Impression. The control group showed a significantly higher score than the experimental group regarding these aspects.

6.5.3.2 Differences between the pre-test and post-test

The summary of the results of the differences between groups will be followed by a summary of the results of the differences within groups.

Differences between groups

The panel of external adjudicators perceived no statistically significant differences between the two groups regarding changes in their performance of a specific piano composition. There was, however, a statistically significant difference between the two groups regarding change in their piano performance in general, as assessed by the participants' piano lecturers as well as by the participants themselves. In both instances, change took place in opposite directions, resulting in significant differences between the groups.

The statistical analysis indicates that the participants' piano lecturers perceived a significant difference in change between the two groups' piano performance in general with regard to the subscale Technique, as measured by the PPRS. The experimental group changed positively while the control group showed a negative change in this regard.

The statistically significant difference in change between the two groups' piano performance, as assessed by the participants' themselves, occurred with regard to one of the Mills Constructs, namely Phrasing. The experimental group perceived a positive change regarding

the appropriateness of their use of phrasing, while the control group changed negatively in this regard.

Differences within groups

The panel of external adjudicators perceived no statistically significant changes within any of the groups regarding changes in their performance of a specific piano composition. There were also no statistically significant changes within any of the groups regarding the participants' self-evaluation of their piano performance in general. However, the participants' piano lecturers perceived a statistically significant positive change in the experimental group's piano performance in general with regard to Technique, as measured by the PPRS, but no statistically significant changes concerning the piano performance of the control group.

6.6 SYNOPSIS

Since this chapter contains many quantitative results, the purpose of this last section is to give a brief summary of these results.

6.6.1 Biographical Profile

The biographical profile of the majority of the whole group of thirteen participants was mostly reflected by the composition of the experimental group, and to a somewhat lesser degree, by that of the control group.

The majority of the participants (11) were female and most of the participants (9) were between the age of 20 and 21 at the time when the experiment took place. Most of the participants were either first or last born (10) and the majority of the participants' families (9) were still intact. Most of the participants (8) did not use any chronic medication, and seven of the thirteen participants have a history of middle ear infection or severe earache, from which only three of these seven suffer regularly.

Eight of the thirteen participants' music tuition started between the ages of seven and nine. Piano was the first instrument taught to twelve of the thirteen participants, and most of the participants (8) indicated their number of years of piano tuition to be between ten and thirteen years. Ten of the thirteen participants indicated playing another instrument in addition to piano, with eight of these ten participants playing more than one other instrument.

The majority of the participants (8) indicated that one or both parents had some formal music education. Nine of the thirteen participants indicated that one or both parents played a music instrument, and that most of these parents played piano.

6.6.2 Pre-Treatment Group Equivalence

The statistical analyses showed the two groups as being equivalent with regard to their self-reported psychological well-being, as well as the assessment of their piano performance by the panel of external adjudicators and the participants' piano lecturers. The two groups were, however, not totally equivalent regarding all aspects of music performance anxiety, or the self-evaluation of their piano performance before the experimental group's exposure to the Tomatis programme.

With regard to music performance anxiety as measured by the MPAI-A, the experimental group showed a significantly higher level than the control group, concerning Performance Evaluation as well as the MPAI-A Total. Pertaining to the self- evaluation of their piano performance, the control group's score was significantly higher than that of the experimental group in relation to Accuracy, continuity and fluency, Technique, and Interpretation as measured by the PPRS; "Cleanness", and Quality as measured by the Mills Constructs; and General Impression.

6.6.3 Pre-Post Differences between Groups

Although the experimental group's mood states, as measured by the POMS, fluctuated during the Tomatis programme, there were no statistically significant differences between the groups regarding changes in psychological well-being between pre-treatment and post-treatment, as measured by the relevant measuring instruments. There were, however, statistically significant differences between the two groups regarding changes in levels of music performance anxiety as well as the assessments of their piano performance. In these instances, the experimental group showed a positive change and the control group a negative change, resulting in significant differences between the groups with regard to pre-post changes.

The significant differences between the two groups, concerning music performance anxiety, occurred with regard to the subscale Performance Context of the MPAI-A, as well as the MPAI-A Total. The statistically significant differences between the groups regarding changes in the assessments of their piano performances occurred with regard to the assessments by the participants' piano lecturers, and the participants' self-evaluation. These assessments differ regarding the aspects of piano performance where statistically significant differences in change occurred between the two groups.

The results from the assessments by the participants' piano lecturers indicate a significant difference in change with regard to the subscale Technique, as measured by the PPRS. The results from the participants' self-evaluation of their piano performance indicate a statistically

significant difference in change between the two groups with regard to the appropriate use of Phrasing, as measured by the Mills Constructs.

6.6.4 Pre-Post Differences within Groups

Both groups showed statistically significant changes regarding aspects of mood states as measured by the POMS, but not regarding aspects of psychological well-being as measured by the SPWB and AFM 2. However, only the experimental group showed statistically significant differences in relation to music performance anxiety, and one of the assessments of their piano performance.

The two groups differ regarding the mood states, as measured by the POMS, where significant change took place during the post-test. The experimental group showed significant negative change regarding Depression-Dejection, Anger-Hostility, Vigor-Activity, and the POMS total, while the control group showed significant negative change regarding Fatigue-Inertia.

With regard to music performance anxiety, the experimental group's results indicate a statistically significant lower level of music performance anxiety with regard to the MPAI-A total, while the control group showed no significant change. None of the groups showed any statistically significant changes regarding the level of music performance anxiety as measured by the K-MPAI.

As far as the assessments of the piano performance of the participants are concerned, only the experimental group showed a statistically significant change. The participants' piano lecturers perceived that the participants in the experimental group showed a significant positive change in relation to Technique, as measured by the PPRS. There were no other statistically significant changes within either group in relation to their piano performance.

Because of the small sample of participants, the statistical results could have been affected by extreme cases. Therefore, it is sensible to not only rely on the statistical results for this study, but also make use of qualitative techniques. The qualitative results are presented in Chapter 7.

CHAPTER 7
QUALITATIVE RESULTS:
PSYCHOLOGICAL WELL-BEING

7.1 INTRODUCTION

Although this chapter is lengthy, it is regarded as an important part of the study as it provides an overview of the qualitative observations of the effect of the Tomatis Method on the experimental group participants' psychological well-being. Qualitative techniques, as described in Chapter 5, were used to analyse the data, which were obtained at three time points:

- pre-programme interviews with all participants as well as their piano lecturers;
- in-programme interviews and group discussions with experimental group participants, as well as projective drawings by them;
- post-programme interviews with experimental group participants as well as all participants' piano lecturers and other lecturers, as well as written reports by experimental group participants.

Some of the questions asked during semi-structured interviews related more directly to specific aspects of psychological well-being than others. A bilingual version of questions asked during these interviews is appended in Addendum C.

Even though data on psychological well-being will be presented in the framework of Ryff's (1989) dimensions of psychological well-being where applicable, there was no intentional sifting of the data according to these dimensions. After the process of open coding, the researcher realised there were themes which corresponded with these dimensions, and categorised them as such. Thus, the dimensions of psychological well-being, as defined by Ryff, provided a useful framework for the process of axial coding, which was especially helpful because of the researcher's lack of training in the field of psychology.

Since all participants and interviewees were Afrikaans speaking, all the data were in Afrikaans. Therefore, it was attempted to maintain the original character of interviews and written reports without representing them verbatim.

After introducing the participants, the results of pre-programme interviews will be presented, followed by results from data obtained during the programme, and results from post-programme interviews and written reports. A comparison of pre-programme, in-programme

and post-programme results obtained from experimental group participants and their piano lecturers will then be presented. This will be followed by a comparison of experimental group participants' changes as observed by them, their piano lecturers, and other lecturers. This comparison will focus on correspondence between the three data sources. A summary will conclude the chapter.

7.2 PARTICIPANTS

This section serves to introduce the thirteen participants. Participants are introduced with regard to their age, year of study, the age at which their piano tuition started, number of years they attended music lessons, and whether they played any other instruments in addition to piano. This information is presented in Table 7.1. Pseudonyms are used to protect the participants' identity.

Table 7.1 Introduction of participants

PARTICIPANTS						
Group	**Participant**	**Age**	**Level of study**	**Age when piano tuition started**	**Number of years of music lessons**	**Number of instruments played in addition to piano**
Experimental group (n = 7)	Mary	19	B.Mus. 2nd year	7	12	2
	Paul*	21	B.Mus. 2nd year	6	3	0
	Lucy	20	B.Mus. 3rd year	11	9	2
	Vicky*	20	B.Mus. 3rd year	9	10	2
	Kate	21	B.Mus. 4th year	8	13	0
	Anne*	21	B.Mus. 4th year	9	11	2
	Tracy	20	B.Mus. 4th year	7	13	3
Control group (n = 6)	Jim	19	B.Mus. 2nd year	8	11	2
	Celia	20	B.Mus. 3rd year	9	11	3
	Ina*	22	B.Mus. 3rd year	10	10	1
	Elsa**	21	B.Mus. 4th year	7	17	4
	Rita	21	Conservatory student 4th year	5	16	1
	Sara	27	M.Mus.	7	20	0

*Tuition was interrupted

** The participant's music lessons did not start with piano

7.3 PRE-PROGRAMME INTERVIEWS

Data collected before the experimental group's exposure to the Tomatis programme included semi-structured interviews with the participants' piano lecturers, as well as interviews with all the participants. In this section, data collected from these interviews will be presented. Data collected from the interviews with the participants' piano lecturers will be presented first, followed by data from the interviews with the participants. The names of the participants in the experimental group will be underlined where they appear in the text.

7.3.1 Interviews with Piano Lecturers

Semi-structured interviews with each of the participants' piano lecturers took place in November 2006, approximately three months before the experimental group's exposure to the Tomatis programme. During these interviews, the piano lecturers were requested to comment on their perceptions of the participants' general conduct and attitude, and any other perceptions they felt could be of value regarding the participants.

Lecturers' comments related to participants' conscientiousness, affect, attitude, and personality. Participants' attitude and personality do not relate to specific aspects of psychological well-being. However, it is possible that attitude and psychological well-being could have a mutual influence, and an individual's personality could have an influence on how he/she is perceived in relation to aspects of psychological well-being. Therefore, these two themes are included.

7.3.1.1 Conscientiousness

In addition to being conscientious, Paul[6] and Rita were perceived to be very meticulous. Mary, Lucy, Kate, Vicky, and Celia were also perceived as being conscientious, while Tracy, Anne, Ina and Jim were less so, since they tended to procrastinate.

7.3.1.2 Affect

Anne was a happy, positive, relaxed person, while Rita seemed tense.

7.3.1.3 Attitude

The lecturers noticed Ina, Rita, Elsa, Anne, Kate, and Lucy's positive attitude towards their studies, and mentioned that they were eager to learn.

7.3.1.4 Personality

Ina had a strong personality but was absentminded, and Kate seemed to be an introvert.

7.3.1.5 Summary of piano lecturers' pre-programme reports

Although lecturers also commented on some participants' affect (two), personalities (two) and positive attitude (six), their observations mainly consisted of remarks on conscientiousness, which included eleven of the thirteen participants. Lecturers' comments included twelve of the thirteen participants.

[6] Underlined names are those of the participants in the experimental group.

Although participants did not receive an equal number of comments, comments were almost equally divided between experimental group and control group participants. Kate, Anne, Ina and Rita each received remarks with regard to three of the themes, followed by Lucy (2), Mary, Tracy, Vicky, Paul, Celia, Elsa, and Jim (one), and Sara (none).

7.3.2 Interviews with Participants

Semi-structured interviews with all the participants took place in October 2006, approximately four months before the experimental group's exposure to the Tomatis programme. During interviews participants were requested to comment on their current experience of themselves and their lives, their relationships, studies in general, future expectations, and anything else they would like to impart.

Seven core themes, some with sub-themes, related to facets of psychological well-being. The core themes are autonomy, environmental mastery, conscientiousness, sense of direction and purpose, interpersonal relationships, conflict management, and affect. Although not directly related to psychological well-being, an eighth theme – experience of music studies – is also included since it could have an influence on the students' sense of psychological well-being.

7.3.2.1 Autonomy

The participants commented on the value they attached to the opinion and approval of others, handling of social pressure, and fear of judgement. These aspects correspond with autonomy as defined by Ryff and Keys (1995:727).

Importance of the opinion and approval of others

Anne and Vicky indicated that the opinion and approval of other people were very important to them, which could be the reason why Vicky felt "shy" in the company of strangers. Tracy was less bothered by other's opinion or approval.

Coping with social pressure

Although others' opinion and approval were important to Anne and Vicky, they did not always give in to social pressure. Sara could not say no to others, while Rita, Lucy and Paul declared themselves independent and not influenced by social pressure.

Fear of judgement and failure

Anne, Vicky and Mary implied that they were afraid of being judged. Mary also feared failure.

7.3.2.2 Environmental Mastery

Only two participants remarked on an aspect that relates to environmental mastery. Both Vicky and Ina perceived themselves to be adaptable to circumstances.

7.3.2.3 Conscientiousness

Seven participants remarked on their conscientiousness. Ina had a happy-go-lucky attitude with regard to her studies, and Tracy as well as Anne tended to procrastinate. In contrast, Lucy, Paul, Elsa and Celia themselves to be conscientious.

7.3.2.4 Sense of direction and purpose

In reaction to a question on how they saw their future as pianists, most participants indicated that when they started their tertiary studies, they had visions of becoming concert pianists. They further indicated their future occupation and remarked on further studies. In contrast to the rest of the participants, Mary, Celia, Sara, Ina, and Jim were still uncertain in this regard. It was important to Paul, and Vicky to have aims in life and to have a dream.

7.3.2.5 Interpersonal relationships

Participants commented on their experience of their relationships in general, support by family and friends, their need of the company of others, and their relationships with their piano lecturers.

Relationships in general

All participants reported satisfying relationships with others. Mary, Lucy, and Tracy emphasised the importance of relationships with their families, while Anne indicated that relationships were more important to her than being a pianist.

Jim, Lucy, and Vicky also wanted to help others. Although Jim added that he wanted to make people happy, he feared rejection and was afraid to invest too much in relationships. Paul and Vicky further revealed that they tended to get impatient with others, and Ina thought that she sometimes expected too much from relationships and did not fit in with the people around her.

Support of family and friends

The participants generally felt supported by family and friends. Although they felt supported in general, Elsa perceived that her music was not important to her family, and Mary perceived that her friends sometimes provided a negative type of motivation.

Company of others

Mary and Jim needed to be around other people. On the other hand, Anne and Ina needed to be alone sometimes, and Lucy and Elsa occasionally avoided people.

Kate felt anxious in the company of strangers. Kate and Elsa also avoided social gatherings, while Mary, Lucy, Vicky and Ina preferred small groups.

Relationship with piano lecturer

Even though their reasons differed, Elsa and Jim experienced their relationships with their piano lecturers to be stressful at times. The rest of the participants experienced positive relations with their piano lecturers.

7.3.2.6 Conflict management

Four participants commented on their conflict management. Lucy and Celia coped well, while Mary and Anne avoided conflict.

7.3.2.7 Affect

The participants reported on their emotional sensitivity, as well as on their positive and negative affect.

Emotional sensitivity

Mary, Elsa, Ina, and Jim imparted that they were very sensitive. Elsa and Jim added that they were emotional, and Jim further revealed that he was prone to mood swings.

Positive affect

Four of the participants described themselves as being "a happy person". These participants were Lucy, Anne, Paul, and Jim.

Negative affect

Mary and Kate tended to be tense and anxious. Kate and Paul revealed that past traumatic events in their personal lives sometimes still had a negative effect on them.

7.3.2.8 Experience of music studies

Tracy and Jim were disappointed with their music studies, and said that it differed from their expectations. Anne and Vicky also indicated that studying music differed from their expectations, but they accepted it. Paul felt positive about his music studies, especially when compared to his previous field of study.

7.3.2.9 Summary of participants' pre-programme reports

Since participants were asked about their perceptions of their relationships and their future as pianists, interpersonal relationships and sense of direction and purpose were the themes which rendered responses from all of them. Although participants were almost equally divided regarding their perceptions of their interpersonal relationships, they differed in relation to their sense of direction and purpose. Most experimental group participants expressed certainty with regard to their future careers, while most participants in the control group still felt uncertain. Generally, more participants in the experimental group than in the control group commented on the remaining themes.

Furthermore, participants varied regarding the number of themes commented on, as well as their perceived levels of well-being related to the respective dimensions of psychological well-being. Table 7.2 summarises this information by indicating whether participants reflected a higher or lower level of well-being related to the various dimensions, and whether they were in the experimental or control group. Information in relation to affect indicates feelings of happiness as higher, and tension and anxiety as lower levels of perceived psychological well-being. Since participants' experience of their music studies is not directly related to a specific aspect of psychological well-being, it is not included in the table.

Table 7.2 **Pre-programme interviews: Summary of participants' report on their perceived levels of well-being regarding aspects related to psychological well-being**

PARTICIPANTS' PERCEPTION OF THEIR LEVELS OF WELL-BEING REGARDING ASPECTS RELATED TO PSYCHOLOGICAL WELL-BEING DURING PRE-PROGRAMME INTERVIEWS				
	Higher level of perceived psychological well-being		**Lower level of perceived psychological well-being**	
	Experimental group	**Control group**	**Experimental group**	**Control group**
Autonomy	Lucy Tracy Paul	Rita	Anne Vicky Mary	Sara
Environmental Mastery	Vicky	Ina	-	-
Conscientiousness Higher level = conscientious Lower level = tendency to procrastinate	Lucy Paul	Elsa Celia	Anne Tracy	Ina
Sense of direction and purpose	Lucy Tracy Paul Vicky Anne Kate	Rita Elsa	Mary	Sara Ina Celia Jim
Interpersonal relationships	Lucy Tracy Anne	Rita Celia Sara	Mary Vicky Kate Paul	Ina Jim Elsa
Conflict management	Lucy	Celia	Mary Anne	-
Affect Higher level = happy Lower level = tension / anxiety	Lucy Paul Anne	Jim	Mary Kate	-

The information in Table 7.2 shows that the largest number of participants who commented on an aspect related to psychological well-being was 13, and the smallest number was two. Figure 7.1 illustrates the ranking of the themes related to psychological well-being as well as the number of participants who reflected higher and lower levels of well-being in relation to each of the themes.

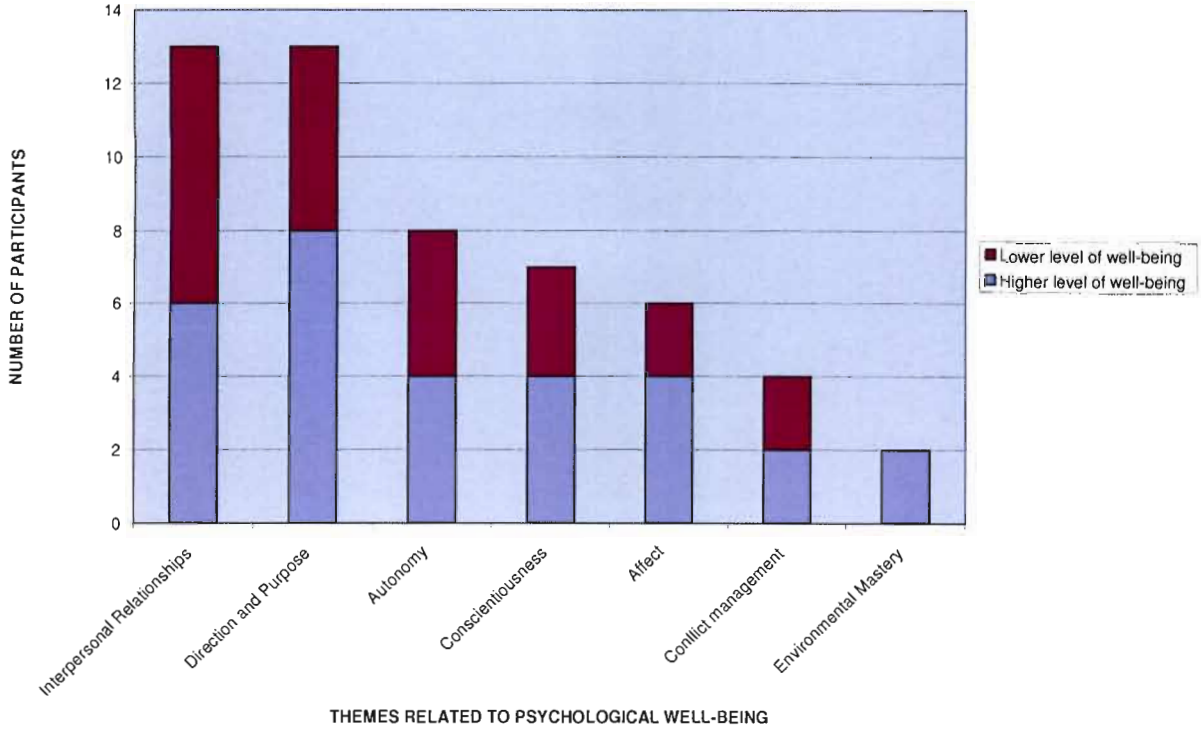


Figure 7.1 Participants' perceptions: Ranking of themes and perceived level of well-being as reflected during pre-programme interviews

The data in Table 7.2 further reveals that Rita and Lucy's comments reflected only higher levels of psychological well-being, while Mary's reflected only lower levels. The rest of them reflected higher as well as lower levels of well-being in relation to the different themes. Participants in the experimental group generally commented on more themes relating to their psychological well-being than participants in the control group did. Figure 7.2 illustrates individual participants' well-being as reflected during the pre-programme interviews.

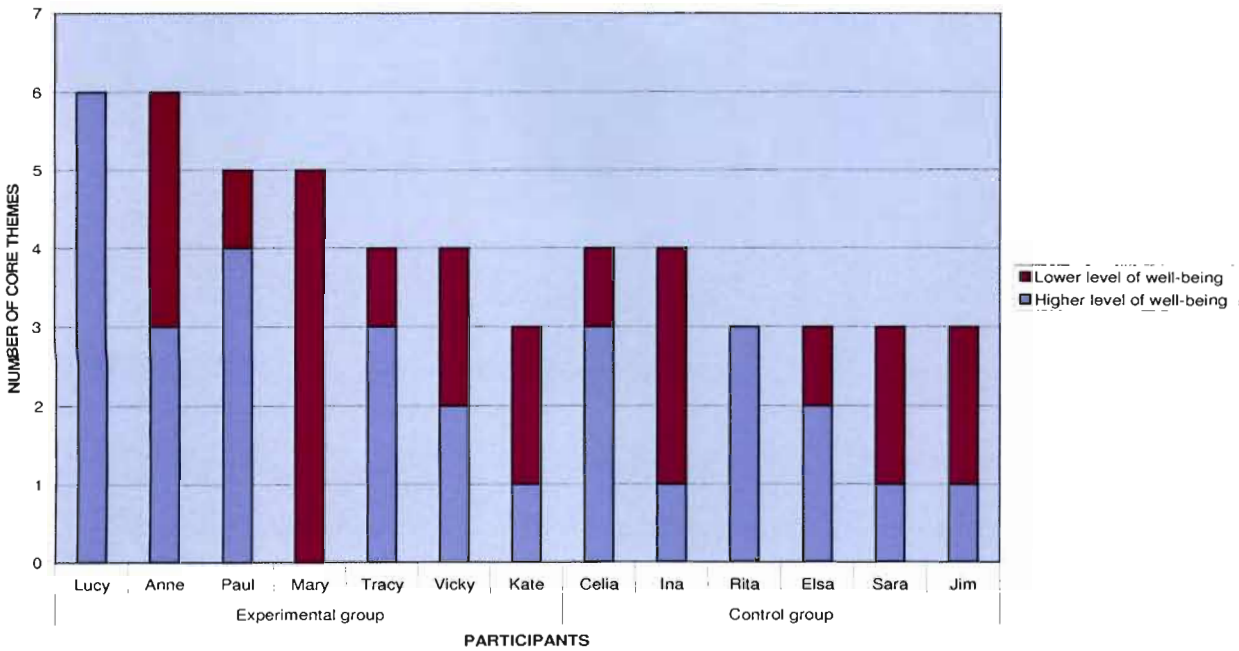


Figure 7.2 **Pre-programme interviews: Individual participants' perceived level of well-being regarding the number of core themes**

7.3.3 Summary of Pre-Programme Reports

Piano lecturers' responses on participants' general conduct and attitude included twelve of the thirteen participants. Although four themes emerged from the data analysis, lecturers' observations mainly consisted of remarks on participants' conscientiousness. Lecturers' remarks in relation to the four themes were almost equally divided between experimental group and control group participants, even though participants did not receive an equal number of comments.

Eight themes emerged from the data analysis of participants' reports. Only two themes rendered responses from all of them. These two themes were interpersonal relationships and sense of direction and purpose. More participants in the experimental group than in the control group made comments relating to each of the other identified themes.

According to the participants' self-reports, Lucy and Rita only reflected higher levels of well-being, while Mary only reflected lower levels. The rest of the participants reflected higher as well as lower levels.

Participants and their piano lecturers concurred with regard to certain aspects of their psychological well-being. The perceptions of the participants' piano lecturers and the

participants regarding corresponding aspects relating to participants' psychological well-being are compared in Table 7.3.

Table 7.3 Pre-programme interviews: Comparison of corresponding aspects from participants' and piano lecturers' interviews on participants' psychological well-being

PSYCHOLOGICAL WELL-BEING: COMPARISON OF CORRESPONDING ASPECTS OF PARTICIPANTS' AND PIANO LECTURERS' PRE-PROGRAMME INTERVIEWS					
Theme	**Group**	**Piano Lecturer**	**Total number of participants**	**Participant**	**Total number of participants**
Conscientious	Experimental group	Paul Lucy Vicky Kate Mary	5	Paul Lucy	2
	Control group	Celia Rita	2	Celia	1
Tendency to procrastinate	Experimental group	Tracy Anne	2	Tracy Anne	2
	Control group	Ina Jim	2	Ina	1
Positive Affect ("happy person")	Experimental group	Anne	1	Anne Lucy Paul	3
	Control group	-	0	Jim	1
Negative Affect (tension / anxiety)	Experimental group	-	0	Kate Mary	2
	Control group	Rita	1	-	0

The information in Table 7.3 shows that in addition to corresponding themes, there were instances where data sources corresponded regarding a specific participant. Their piano lecturers perceived Paul, Lucy, and Celia as conscientious, while Tracy, Anne, and Ina tended to procrastinate. These participants agreed with their piano lecturers. Anne and her piano lecturer also agreed that she was a "happy person".

7.4 In-Programme Data

In order to monitor the experimental group's experiences and progress, qualitative data obtained during the programme consisted of daily informal interviews with each of the participants, weekly group discussions, the researcher's own observations, and four projective drawings by each participant. Data from the interviews, group discussions and observations will be presented first, followed by data from the projective drawings.

7.4.1 Interviews, Group Discussions, and Observations

Since information from the interviews, group discussions and observations overlap, it will be presented as a unit. This data demonstrate the effect of the Tomatis Method on participants' psychological well-being during their exposure to the programme. An analysis of the data rendered five core themes, which indicate effects on the participants' assertiveness, communication in general, planning, affect, and physiological aspects.

7.4.1.1 Assertiveness

By the end of the second week of the passive phase, all participants indicated that they were more outspoken, frank, and assertive than usual. They felt positive about the greater ease with which they now voiced their opinions and feelings. This tendency remained throughout the programme.

7.4.1.2 Communication in general

In addition to improved communication being a recognised effect of the Tomatis programme (see chapter 4, section 4.6.1), communication could have an influence on other aspects of psychological well-being, and is, therefore, included as a separate theme. Kate and Mary were less quiet and communicated noticeably easier, without being prompted, during the second week's group session. Kate indicated that this also happened in class.

7.4.1.3 Planning

Paul started to devote himself more to determining priorities. Although Anne also started to plan better during the passive phase, Vicky did not plan every minute of her day as usual, but "went with the flow" and still got everything done. She found this a liberating experience.

7.4.1.4 Affect

Participants' experience of positive and negative affect during the various weeks of the passive and active phase is indicated in Table 7.4. The table also indicates when participants experienced stable emotions.

Table 7.4 In-programme experience of affect

Sub theme	EXPERIENCE OF AFFECT DURING THE TOMATIS PROGRAMME					
	Passive Phase			Active Phase		
	1st Week	2nd Week	3rd Week	1st Week	2nd Week	3rd Week
Positive Affect	Vicky Anne Paul Tracy	Anne Kate	Vicky Paul Lucy	Lucy	Lucy	Lucy Anne Kate Tracy Vicky
Negative Affect	Anne Paul Tracy	Anne Paul Tracy Vicky Mary Lucy	Anne Paul Tracy Vicky Mary Kate	Anne	Anne Mary Kate Paul	Mary Lucy
Stable Emotions	Kate Lucy Mary	Kate	Lucy	Kate Lucy Mary Tracy Vicky Paul	Lucy Tracy Vicky	Tracy Vicky Kate Anne

The information in Table 7.4 shows that, although there were periods where participants experienced stable emotions to be, their emotions tended to fluctuate between positive and negative affect.

Positive affect

By the end of the first week, Tracy, Anne, Paul, and Vicky related that they felt extraordinary happy, carefree and/or excited. At the start of the second week, Kate felt more positive than usual in spite of being sick, and Anne felt positive and excited. At the beginning of the third week, Paul again reported a feeling of extreme happiness, as if he was "on happy pills". By the end of the passive phase, Vicky felt peaceful and content, while Lucy felt caring and loving.

Lucy felt "super happy" on the third day of the active phase, and Kate experienced a "carefree" feeling during the last week. Although Vicky, Tracy and Anne shared a feeling of happiness during the last week of the active phase, it was more of a happy contented feeling than the extreme happiness of the first week of the passive phase. Lucy shared this happy, contented feeling.

Negative affect

Tracy and Anne reported that they felt weepy for no reason after the first day's listening sessions. With the exception of Kate who conveyed these emotions only during the third week, participants experienced themselves to be prickly, irritable, and weepy or down from the second week of the passive phase. Kate and Tracy also related feelings of anger, while Anne and Mary had episodes of anxiety. During this time, most participants reported that they vented their emotions through bouts of crying or by losing their temper.

Anne suddenly felt anxious on the fourth day of the active phase. During the second week of the active phase, Mary felt weepy and experienced mood swings, while Kate and Paul felt

emotionally confused. Paul also reported a feeling of anger. During the active phase, only Anne (second week) and Mary (third week) reported suddenly losing their temper, while only Lucy (third week) related excessive irritability on the second day.

Stable emotions

While Kate, Lucy and Mary's emotions were stable during the first week of the passive phase, only Kate's emotions were stable during the second week. Lucy again reported stable emotions throughout the third week.

Tracy and Vicky reported stable emotions throughout the active phase, while Lucy's emotions remained stable until the third week. With the exception of Anne whose emotions only stabilised during the third week, all the participants' emotions were stable during the first week of the active phase. Kate's emotions also stabilised again during the third week.

According to the information in Table 7.4, most participants' emotions were more stable during the active phase, they experienced less negative emotions, and their positive affect increased during the last week of the programme. Figure 7.3 illustrates the experimental group's fluctuation of emotions during the intervention.

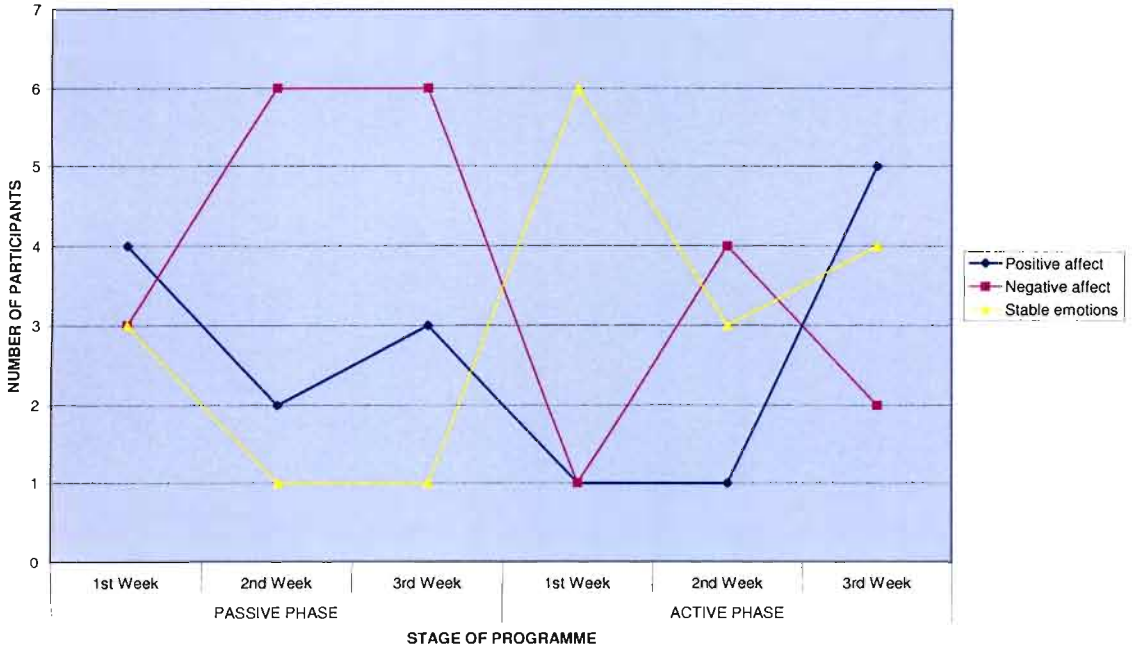


Figure 7.3 Fluctuation of emotions during the Tomatis programme

7.4.1.5 Physiological effects

Participants reported on physiological effects, which included energy levels, their need to sleep and sleeping patterns, appetite, depth perception, balance, and sensory stimulation. In addition

to energy levels being related to psychological well-being, physiological effects seem to be associated with the Tomatis programme and are therefore included in this research report.

Energy levels

Although Paul and Vicky reported an energising effect during the first week of the programme, all participants reported tiredness from the second week onwards.

Sleep

With the exception of Mary who only experienced change by the third week, all participants mentioned that they slept very well since the start of the programme. Tracy, Vicky, Anne and Paul slept very deeply and often struggled to wake up. During the passive phase, Paul, Mary, Lucy and Vicky constantly felt they needed sleep and found it frustrating.

Appetite

Most of the female participants went through a stage where they constantly wanted to snack. Tracy had this experience during the passive phase while the others experienced it during the active phase. However, Vicky and Kate lost their normal appetite for a while during the active phase.

Depth perception, balance, and sensory stimulation

During the passive phase, Anne, Lucy and Mary each experienced an episode where depth perception was problematic. Anne also had a problem with her balance during the first two weeks, and there were instances where Mary's sense of smell and Tracy's sense of touch were stimulated.

7.4.2 Projective Drawings

Participants made four drawings. Towards the end of the first and third weeks of each phase, participants were requested to create a drawing that reflected their current experience of themselves as thinking, feeling, communicating and music making individuals. They could use a metaphor, and were requested to write a brief explanation of the drawing on the back of the paper.

Eight interrelated core themes, namely self-acceptance, autonomy, communication, environmental mastery, personal growth, purpose in life, interpersonal relationships, and affect

emerged from the data analysis. With the exception of communication, these themes corresponded with dimensions of psychological well-being[7].

Certain drawings were selected to demonstrate the kind of data presented in this section. Since each of these drawings were used to illustrate aspects of a particular theme, it is important to note that no attempt was made to interpret all the material in these drawings. Projective drawings can also be interpreted in relation to the symbolism of lines, shading, colour use and placement, but for the purpose of this study participants' written explanations of the drawings were mainly used for understanding the drawings.

7.4.2.1 Self-acceptance

A positive attitude towards oneself and one's past, together with acknowledging and accepting good as well as bad qualities characterises self-acceptance, while the opposite constitutes low self-acceptance (Ryff & Keyes, 1995:727). Three of the four participants who portrayed aspects of self-acceptance did so in the third drawing. They made this drawing during the first week of the active phase, after the three-week integration period. The exception was Tracy who showed self-acceptance by the end of the passive phase.

In her second drawing, Tracy related that she felt comfortable and peaceful with herself. Mary's third drawing (Figure 7.8) depicts that she found herself, knew who she was, and accepted herself for who she was. Although Lucy[8] also showed glimpses of self-acceptance in her third and fourth drawings, it was more connected to her piano performance. Vicky's third drawing indicated that she accepted herself, and the fourth that she was comfortable with herself, and with being herself (Figure 7.4).

7.4.2.2 Autonomy

Autonomy comprises a sense of self-determination and independence, the regulation of behaviour from within, and the ability to resist social pressure, while the opposite characterises a person with low autonomy (Ryff & Keyes, 1995:727). Five participants reflected aspects of autonomy in their drawings. Two of them also revealed their dependence, while the others only reflected increased autonomy.

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[7] Although knowledge of the dimensions of psychological well-being as defined by Ryff may have influenced the researcher's identification of themes, there was no intentional sifting of the data according to these dimensions. Since many of the drawings appear in this section, the reader can determine whether the researcher's interpretation was biased.

[8] Since all Lucy's drawings depict her experience of her piano performance, her drawings are presented in Chapter 8.

Mary portrayed her extreme emotional vulnerability and dependence on others in her first drawing, while her third drawing reflects a stronger person who was more able to regulate behaviour from within (Figure 7.8). In her second and third drawings (Figure 7.6), Anne admitted to feeling scared of not being good enough, and that she was largely influenced by the opinions and approval of others. She also felt as if she would be compared to others, especially regarding her music, and felt inferior in this regard. In her last drawing, she mentioned a small incident where she was more assertive. Her detailed description of the incident, although not reflected in the drawing, suggested that she perceived this assertiveness as unusual.

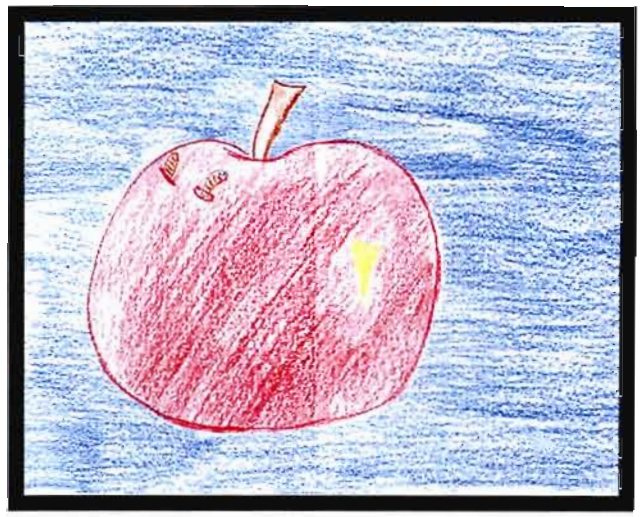
Tracy as well as Vicky suggested regulation of behaviour from within by indicating acceptance of their circumstances in their second drawings, while Lucy did so in the third. Figure 7.4 illustrates Vicky's increased sense of autonomy as reflected in her second to fourth drawings.

In Drawing 2, Vicky depicted herself as a small orange fish swimming at the top of the bowl. She was less rebellious and accepted her circumstances. Although she shared an environment with others, she was aware and accepting of differences. She further stuck to her decisions and responded more in terms of how she felt than how she thought she ought to respond.

In Drawing 3, she depicted herself as an individual apple, and realised that although she was still influenced by other people's positive or negative attitudes, she was her own person and wanted to be independent. Drawing 4 reflects her awareness that people differ and that she was now confident to be herself and to share her own viewpoints. Although the blue flower in the fourth drawing differs from the rest, it is close to others, and one of its petals touches the petals of other flowers.

Drawing 2

Drawing 3



Drawing 4

Figure 7.4 Vicky: Drawings 2 – 4

7.4.2.3 Communication

Five participants depicted communication in their drawings. Paul and Vicky only mentioned communication in their first drawing, and Mary just in her second drawing (Figure 7.8). Paul communicated easily, Vicky liked communicating with others, and Mary had trouble with communication at that stage.

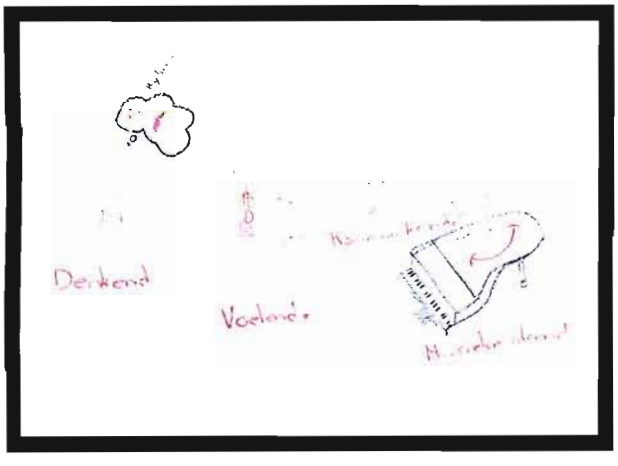
In her second and fourth drawing, Anne mentioned that she communicated easily. In her explanation of her third drawing (Figure 7.6), she related that, although she easily spoke about her positive feelings, she did not speak about things that bothered her.

Kate reflected communication in all her drawings and was the only participant whose drawings portrayed development regarding communication. According to Burns and Kaufman

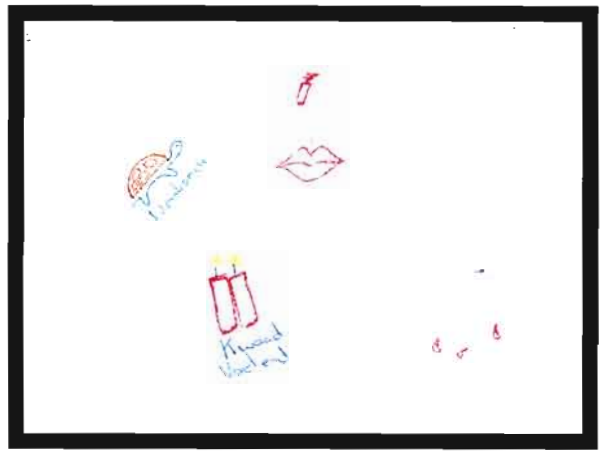
(1972:299), emphasis on the mouth may symbolise speech disturbance, feeding difficulties, or dependency. Since Kate's drawings are very concrete and experience of communication was specifically indicated in the drawing assignment, it can be assumed that in this case the mouth is simply a symbol of communication.

Figure 7.5 illustrates Kate's development in relation to communication. In drawing 1, Kate mentioned that she was a quiet person who did not talk much. Note the cross over the mouth, and the smallness of the mouth. Drawing 2 reflects her desire to communicate her anger. Notice that the mouth is also more prominent in this drawing. Drawing 3 depicts that, although she started to speak about things that bothered her, she was selective in her communication and did not want to talk about certain things. In Drawing 4, the mouth is placed less prominently, is paler and closed, but without a cross, portraying that she was tired at that stage and just not in the mood to speak.

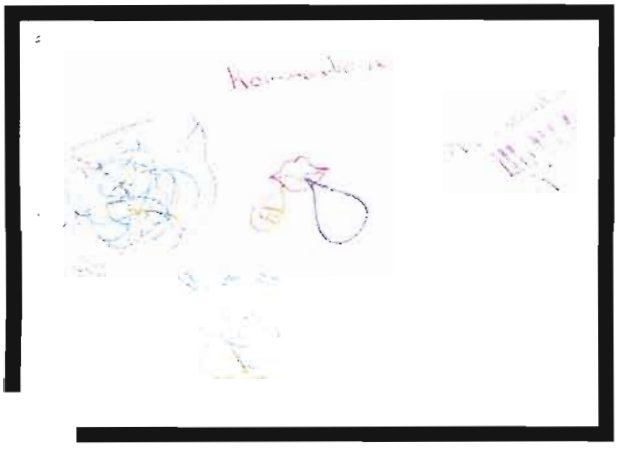
Drawing 1



Drawing 2



Drawing 3



Drawing 4

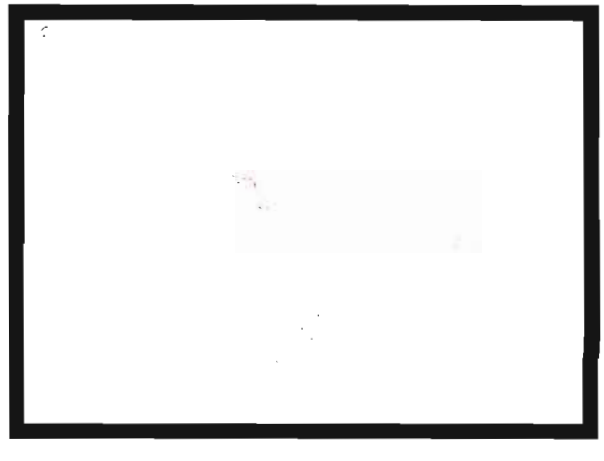


Figure 7.5 Kate: Drawings 1 – 4

7.4.2.4 Environmental mastery

Environmental mastery implies the ability to manage one's life and environment effectively, whereas difficulty in managing everyday affairs and lacking a sense of control depicts deficient environmental mastery (Ryff & Keyes, 1995:727). Four participants depicted aspects of environmental mastery.

Vicky as well as Anne lacked a sense of control over their external environment in their first drawings, whereas Mary (Figure 7.8) and Lucy felt less in control when they made their second drawings. While Vicky (Figure 7.4), Mary (Figure 7.8) and Lucy felt more in control of their environment in the next drawing, Anne sensed a lack of control in all her drawings – especially the first and third drawings.

Figure 7.6 illustrates Anne's lack of environmental mastery as reflected in her first and third drawings. In Drawing 1, Anne focused on her busy life and admitted that she was not organised. The prominent clock in Drawing 3 depicts her feeling that there was too little time in the day to do everything that had to be done.

Drawing 1 **Drawing 3**

Figure 7.6 Anne: Drawings 1 and 3

7.4.2.5 Personal growth

A sense of continuous development and growth, openness to new experiences, awareness of realising one's potential, and "changing in ways that reflect more self-knowledge and effectiveness", are indications of personal growth (Ryff & Keyes, 1995:727). Four participants reflected aspects of personal growth in their drawings.

Tracy, Mary and Vicky provided glimpses of personal growth, whereas Lucy's growth was more apparent. In her third and fourth drawings, Tracy (Figure 7.7) portrayed that she was ready for new experiences, while Mary reflected more self-knowledge, effectiveness, and awareness of her potential at the stage of her third drawing (Figure 7.8), and Vicky in her fourth (Figure 7.4).

Although Lucy's drawings are all connected to her piano performance, these drawings also depict her sense of growth, which culminates in her third and fourth drawings. The third and fourth drawings portray her awareness of realising her potential, while the fourth drawing further reflects that she had a sense of more self-knowledge and effectiveness.

7.4.2.6 Purpose in life

A person who experiences purpose in life has goals, a sense of direction, and perceives present as well as past life as meaningful (Ryff & Keyes, 1995:727). Six participants depicted aspects of this theme.

While Lucy and Paul reflected their goals in their first drawing, Vicky and Tracy were still uncertain at that stage and had many questions regarding their future. In her second drawing, Anne's goal was to become an extremely good music teacher, while Mary (Figure 7.8) knew where she was going but not how to get there. Vicky (Figure 7.4) portrayed a greater sense of direction in her second drawing. Although Tracy was still uncertain when she made her second drawing, her third drawing indicated a strong sense of direction.

Figure 7.7 illustrates Tracy's change from uncertainty to a sense of direction. Drawing 1 depicts her uncertainty regarding her future direction. In drawing 3, she indicated that she knew what she wanted and was ready to start a new chapter in her life.

Drawing 1 **Drawing 3**

Figure 7.7 Tracy: Drawings 1 and 3

7.4.2.7 Interpersonal relationships

This continuum stretches from having warm and trusting interpersonal relations to having few close relationships, feeling frustrated and isolated in relationships, finding it difficult to be concerned about others, and being unwilling to compromise in order "to sustain important ties with others" (Ryff & Keyes, 1995:727). Five participants reflected their relationships in their drawings.

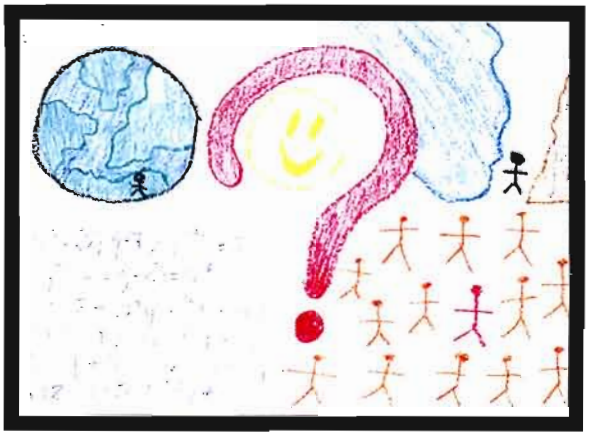
Tracy (Figure 7.7) depicted positive relations in her first drawing, and Anne (Figure 7.6) indicated a feeling of security in her romantic relationship, and mentioned that relationships were important to her. Vicky liked the company of other people and, in her fourth drawing (Figure 7.4), had more sympathy with others. Paul was very aware of the support of family and friends in his second drawing, and Mary's drawings reflected her need for close relationships and how she experienced her relationships.

Figure 7.8 illustrates how Mary experienced her relationships. In drawing 1, Mary depicted herself as a stick figure surrounded by family and friends and that she hated being alone. Note the red circle around the inner stick figure. Although she probably drew the circle to mark the figure representing her, it could also indicate isolation.

Drawing 2 portrays her feeling of loneliness and that nobody understood her. She also experienced herself being an outsider who did not fit in with the rest, and felt excluded from the group. Although she still experienced uncertainties regarding relationships in drawing 3, she was aware of all her positive relationships and of being surrounded by people who cared. Notice that the figures now form a circle without one figure being emphasised.

Drawing 1

Drawing 2



Drawing 3

Figure 7.8 Mary: Drawings 1 – 3

7.4.2.8 Affect

All the participants mentioned affect in their explanations of two or more drawings. Table 7.5 indicates participants' experience of positive and negative affect as reflected in their drawings.

Table 7.5 Reflection in projective drawings of participants' experience of affect

PARTICIPANTS' EXPERIENCE OF AFFECT AS REFLECTED IN PROJECTIVE DRAWINGS				
	Passive Phase		Active Phase	
	Drawing 1	Drawing 2	Drawing 3	Drawing 4
Positive affect	Vicky Mary	Vicky	Lucy	Lucy
Negative affect	Kate	Kate	Kate Paul	Kate
Positive as well as negative affect	Tracy Anne	Tracy Anne Lucy Mary Paul	Tracy Anne Mary	Tracy Mary

The information in Table 7.5 shows that all seven participants portrayed affect in their second drawing, six in the third drawing, five in the first, and four in the fourth drawing. In the second drawing most of them reflected positive as well as negative affect, while one participant each depicted only positive or negative affect.

Table 7.5 further shows that Kate reflected negative affect in all her projective drawings. Vicky, on the other hand revealed only positive affect, but just in the first two drawings. The rest of the participants reflected positive and negative affect, and sometimes both in the same drawing.

Tracy depicted positive as well as negative affect in all four drawings, and Anne in the first three drawings. Mary reflected positive affect in the first drawing, and positive as well as negative affect in the following three drawings. Lucy went from positive as well as negative affect in the second, to positive affect in the following two drawings. In contrast, Paul's second

drawing reflects positive as well as negative affect, while the third drawing only shows his intense negative emotions at that stage. Since Paul quit the programme during the active phase, he did not produce a fourth drawing.

Figure 7.9 illustrates Paul's intense negative emotions depicted in his third drawing. In this drawing, Paul spelled "moeg", the Afrikaans word for tired. Although he connected his tiredness to feelings of frustration and disappointment in people, the appearance of this drawing suggests that everything was falling apart, possibly an indication that his barriers started to disintegrate and that he was tired of keeping up appearances. The long grass might suggest neglect – perhaps past issues that had not been dealt with – or new growth.

Drawing 3

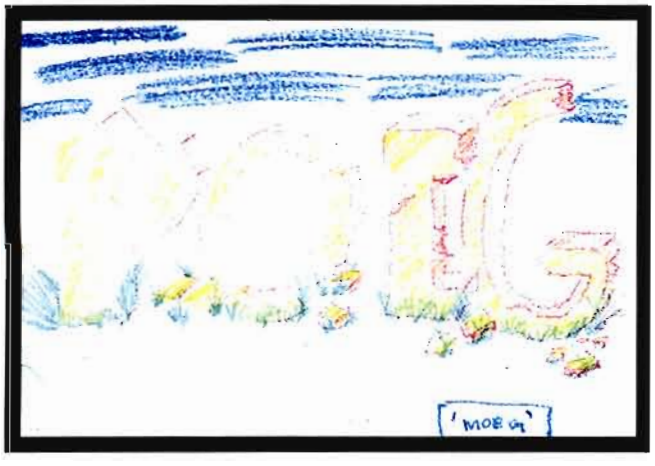


Figure 7.9 Paul: Drawing 3

7.4.3 Summary of In-Programme Results

Results from data obtained during the programme from interviews and projective drawings indicated that participants had perceived change in relation to aspects associated with psychological well-being. These aspects were self-acceptance, autonomy, environmental mastery, personal growth, purpose in life, interpersonal relationships, affect, energy levels, and communication. Although communication is not an aspect of psychological well-being, it can have an influence on other aspects of psychological well-being, and is, therefore, included.

Participants' perceived changes in relation to psychological well-being and whether they were perceived as positive or negative are summarised in Table 7.6. Since their emotions fluctuated during the programme, results in the table concerning affect only reflect positive feelings of happiness and general satisfaction with life, and negative feelings of tension, anxiety and depression.

Table 7.6 In-programme results: Participants' perceived changes in relation to psychological well-being

PSYCHOLOGICAL WELL-BEING: PARTICIPANTS' PERCEIVED CHANGES DURING THE PROGRAMME			
Core Theme	**Positive Change**	**Negative Change**	**Total Number of Participants (n = 7)**
Self-Acceptance (includes self-knowledge)	Vicky Mary Lucy Tracy	-	4
Autonomy (includes assertiveness)	Vicky Mary Lucy Tracy Anne Kate Paul	-	7
Environmental Mastery (includes planning)	Vicky Mary Lucy Paul Anne	-	5
Personal Growth	Vicky Mary Lucy Tracy	-	4
Purpose in Life	Vicky Tracy	-	2
Interpersonal Relationships	Vicky Mary Paul	-	3
Affect positive = happiness / life satisfaction negative = tension / anxiety / depression	Vicky Mary Lucy Tracy Anne	Mary Anne	5
Energy levels	-	Vicky Mary Lucy Tracy Anne Kate Paul	7
Communication	Mary Kate	Mary	2

The information in Table 7.6 indicates that most changes were perceived as positive, even though all participants reported tiredness during the programme. All participants perceived change in relation to autonomy and energy levels, followed by environmental mastery and affect (5), self-acceptance and personal growth (4), interpersonal relationships (3), and purpose in life and communication (2).

The qualitative data analysis further revealed that participants varied regarding the number of core themes where they experienced an effect. Vicky and Mary reflected change in relation to eight themes, followed by Lucy and Tracy (6), Anne and Paul (4), and Kate (3). With the exception of energy levels where all participants experienced negative change, Mary and Anne were the only participants who experienced positive as well as negative change.

7.5 Post-Programme Interviews and Written Reports

Data collected after completion of the Tomatis programme included interviews with participants' piano lecturers[9], interviews with other lecturers who knew the participants before and after the programme, and interviews with experimental group participants. Each participant also wrote a report on their experiences and observations during and after their exposure to the programme.

In this section, data collected from these interviews and written reports will be presented. Data collected from the participants' interviews and written reports will be presented first, followed by data from interviews with their piano lecturers, and lastly data from interviews with other lecturers.

7.5.1 Written Reports and Interviews of Experimental Group Members at One Week and Three Weeks Post-Programme Respectively

After completion of the programme, participants were requested to write a report on their experiences during and after the Tomatis programme, as well as on any changes that they became aware of. These written reports were collected a week after completion of the Tomatis programme.

Semi-structured interviews with the participants in the experimental group took place approximately three weeks after completing the programme. During the interviews they were requested to comment on their experience of themselves, the way they communicated, their relationships, emotions, and studies in general. Participants compared their experiences at that time to their experiences prior to the Tomatis programme. They were also invited to mention changes and/or new experiences that took place after completion of the programme, and anything else that they would have liked to impart.

Twelve core themes, some with sub-themes, emerged from the data analysis. Core themes are self-confidence, autonomy, communication, interpersonal relationships, conflict management, sense of direction and purpose, environmental mastery, coping, efficiency, affect, energy levels, and perceived benefits of the Tomatis programme. Since participants' reports of their experience of the programme in general often related to psychological well-being, the last theme is included.

[9] With the exception of the piano lecturer who attended the programme, lecturers mostly did not know whether participants were in the experimental or control group. The participant who did not complete the programme got behind with his academic work, and thus disclosed his attendance to the lecturers concerned.

Data from the interviews and written reports either overlap or complement each other. Therefore, they are presented as a unit. The presentation of the data according to the twelve core themes is followed by a summary.

7.5.1.1 Self-confidence

Paul, Kate, Mary and Vicky noted improved self-confidence. Mary also felt comfortable with herself and her own humanity, and Vicky felt more comfortable to speak to people out of her own. Previously, she would not have spoken to people that she did not know well because she did not think they would like to speak to her. Anne, on the other hand, disclosed that she felt somewhat self-conscious about her appearance, about how she acted and what she said.

7.5.1.2 Autonomy

Participants commented on the ways they voiced their opinions and feelings, the value they attached to the opinion and approval of others, their handling of social pressure, and the ease with which they made decisions. These aspects correspond with aspects of autonomy as described by Ryff and Keyes (1995:727).

Voicing opinion and feelings

With the exception of Kate, all participants indicated that they found it easier to voice their opinions and feelings. Anne perceived herself as speaking her mind more easily than before. Tracy made a similar remark and added that her voicing of opinion previously depended on how comfortable she felt with a person, but that that did not matter anymore. She found this to be a positive experience.

Vicky also indicated that she felt freer to voice her opinion during a conversation, as well as in class, and did not keep quiet anymore when her opinion differed from that of other people. She also communicated her feelings more often. Lucy and Paul indicated that they had less unexpressed emotions, and Paul now spoke up when something bothered him.

Although Mary conveyed that she tended to bottle-up her feelings less, she perceived herself to be less outspoken than during the programme. Kate, on the other hand, indicated that she still had a tendency to suppress emotions.

Importance of others' opinion and approval

Participants differed regarding their concern about the expectations and evaluations of others. Lucy, Paul and Vicky indicated that they were less influenced by others' opinion and approval than before.

Lucy now evaluated herself by her own personal standards. Although she previously had high standards, it was more to impress others or because it was expected of her. Lucy perceived that this changed outlook occurred after the programme. Vicky commented that with the exception of those whose opinion she really valued, she was less bothered by others' opinion of her, and did not try to conform to others' ideas anymore.

Paul related that he previously measured himself according to the values of others. How they wanted him to be or act was also important to him. Now, he measured himself according to his own values and did not conform anymore.

Anne was still sensitive to the approval of others, especially with regard to her music. Mary was now even more afraid of judgement than before. Tracy and Kate perceived themselves to have remained stable in this regard. In contrast, Tracy said that, with the exception of her parents and close friends, others' opinion and approval never influenced her.

Coping with social pressure

Four of the seven participants experienced some degree of change in the way they coped with social pressure. Lucy conceded even less to social pressure than before. While Paul previously gave in to social pressure, he now did not yield and still experienced respect from his friends.

Although Vicky still found it difficult to say no to others, she did not necessarily conform to please her peers. Anne found it easier to resist social pressure and say no to others, but was aware of adapting her personality to fit in with other people, and therefore felt as if she had different personalities. She felt as if she was not being herself, and that now bothered her more than before.

Tracy, Kate and Mary indicated that their handling of social pressure did not change in any way. According to Tracy and Kate they never experienced a problem in this regard.

Mary related that, except when something was going to interfere with her studies, she always had a problem saying no to others. She was inclined to compare herself to others and then had a tendency to put herself down. She also felt as if she did not fit in, and has always felt unaccepted, although she thought that it became worse since she started to use medication for anxiety[10].

[10] Mary started to use medication for anxiety towards the end of the intervention. According to her, she always had anxiety problems.

Decision-making

Six participants commented on decision-making. One found it more difficult to make decisions, while three found it easier. Two reported that they did not experience any change in this regard.

Mary noted that she found it more difficult to make decisions, while Lucy experienced herself as more clear thinking and found it easier to make decisions. Anne related that she thought a lot more about things than before, and therefore found it easier to make decisions.

Paul indicated that he, for the first time, made his own decisions. Since this was a novel experience for him, he was still finding his way. He thought about possible effects of decisions, and accepted that things might not turn out as he would like them to. Since his decisions were now his own choices, he took responsibility for them and did not feel he had to explain himself to others anymore.

Tracy still had a problem to make decisions. Kate also reported that she did not experience any change regarding decision-making.

Summary

The data in connection with autonomy indicates that six of the seven participants experienced change in the voicing of opinions and feelings. The importance of the opinion and approval of others, handling of social pressure and decision-making follows with only four participants reporting change. Others did not notice any change in relation to these four aspects of autonomy, and Vicky did not comment on decision-making. Although participants only reported positive change concerning the voicing of opinions and feelings and handling of social pressure, Mary indicated negative change regarding the importance of others' opinion and approval, as well as decision-making. Thus, most of the changes were experienced as positive.

The data analysis further shows that the amount of change individual participants experienced with regard to autonomy varied. Lucy and Paul experienced change in relation to all four sub-themes of autonomy, followed by Vicky, Anne and Mary (3), Tracy (1), and Kate (0).

7.5.1.3 Communication

Participants commented on how they experienced their communication in general, as well as their verbal participation in class.

Communication in general

Kate, Paul and Vicky noted that their communication improved. Kate mentioned it in passing, while Paul added that he found it easier to express himself. He could now thank somebody without feeling shy and could "rebel with style". Vicky previously spoke somewhat confusedly and did not come to the point, but found her communication was now more structured.

Verbal participation in classes

Paul, Kate, Lucy and Vicky indicated that they verbally partook more in classes than before, while Paul also found it easier to ask questions. Kate attributed her improved participation to enhanced self-confidence.

Lucy's view was that she perhaps partook more because she found the classes less boring. Vicky was of the opinion that since she now knew more about the subject, she had more to say and therefore found it easier to speak in class.

Tracy disclosed that her verbal participation depended on the class, and Anne felt that her participation in classes remained unchanged. Although she did not feel shy, Mary currently had no desire to speak in class.

Summary

Four of the participants noted a positive change in connection with their communication. Only Paul, Kate, and Vicky commented on their communication in general and reported a positive change in this regard. These three participants, as well as Lucy, related that their verbal participation in classes improved, while it seemed as if Anne, Tracy and Mary did not experience any change in this regard.

7.5.1.4 Interpersonal relationships

Participants commented on their experience of support by family and friends, whether they felt understood, their need of the company of others, and their relationships in general.

Support of family and friends

All participants indicated that they always felt supported by family and friends and did not perceive any changes in this regard. Only Mary related an incident at the time where she felt that her family was not sensitive to her need of support.

Understanding by others

Two participants sometimes felt misunderstood. Mary felt that her friends did not always understand what she was trying to communicate. She further related that she felt as if her piano lecturer did not understand her as well as she always thought. Tracy echoed this feeling with regard to her piano lecturer.

Company of others

Three participants remarked on their need to be in the company of others. Lucy had a greater need to be with friends, whereas previously she was more of a loner. Tracy remarked that relationships were very important to her and indicated that she needed to spend more time with family and friends.

Mary always liked the company of others, but her feelings had become more ambivalent. She further disclosed that she always had a sort of social phobia, and therefore avoided social gatherings where she did not know the people. In spite of this, she indicated that relationships were important to her and felt that she spent too much time on other things, and not enough time with family and friends.

Relationships in general

Four participants in the experimental group reported that they experienced no change in their relationships in general, and that their relationships are satisfying. Although Paul and Vicky also found their relationships satisfying, they experienced some change in this regard, while Mary found some relationships less satisfying.

Paul realised that relationships were important to him and therefore made the decision to focus more on them. Vicky became more sensitive to others' needs and became a better listener. Although she previously tended to finish people's sentences for them when they spoke too slowly, she now listened patiently to what others said before responding.

Even though Mary previously experienced relationships as satisfying, she now found some relationships less rewarding as she became aware of shortcomings. She also experienced more conflict with friends.

Summary

Five of the seven participants suggested that they experienced some change in connection to one or more aspects of their interpersonal relationships. Since all the participants reported

generally satisfying relationships during the pre-programme interview, the changes these five participants related seemed rather subtle.

The most change (three participants each) took place in connection with relationships in general and the company of others, while the least change (only Mary) took place regarding perception of support by family and friends. Mary and Tracy felt less understood, and were the only two participants who commented on this subject.

Only Mary perceived change regarding all four sub-themes. Even though she experienced most of these changes as negative, especially those concerning certain friendships, she was more aware of the quality and nature of her relationships than negative about them. Comments of Tracy (one positive and one negative) and Paul (one positive) also indicated more of an increased awareness than a definite change. Lucy's remark on her need for company, and Vicky's comment on relationships in general were more indicative of an experience of change.

7.5.1.5 Conflict management

Participants' comments differed with regard to their coping with conflict. Five experienced change in this regard. Tracy avoided conflict more than before, while Mary, Paul, Lucy and Vicky sensed that their conflict management improved. Kate indicated that she still avoided conflict and Anne said she coped with conflict as before.

Since Mary could now speak up when something bothered her, conflict situations were resolved more rapidly. Paul ignored unimportant things but spoke up when something bothered him. He now coped with conflict where he previously avoided it, or distanced himself. Lucy was calmer and less hostile in conflict situations. Vicky experienced herself to be calmer and more objective in conflict situations, but still tended to leave the situation as quickly as possible. Since she did not get angry and irritated as quickly as before, she had not experienced conflict for a long time.

7.5.1.6 Sense of direction and purpose

With the exception of Tracy, all participants reported a sense of direction and purpose. Vicky and Mary indicated that they had more clarity and knew what they wanted and where they were going. Lucy wanted to be a pianist and felt it was important to work towards her dream. She thought a lot about her future and realised she spent too much time on things that were less important. If she worked hard, she believed she would reach her goals.

Paul felt optimistic about his future and imparted that his passion was to play piano. As he knew that his future occupation would include music or musicians, he added that he realised during the programme that he would not allow anybody to stand in the way of his aspiration to find happiness.

Anne wanted to be a music teacher with goals she wanted to achieve. Kate mentioned that she was going to become a music teacher. Tracy, on the other hand, felt uncertain about her future and said that perhaps she just wanted to settle, marry and set up home.

Compared to the pre-programme interview, it seemed as if only Vicky, Mary and Tracy experienced change with regard to a sense of direction and purpose. It appeared though as if Paul and Lucy experienced a strengthening of their sense of direction and purpose. Kate and Anne, however, mostly maintained sentiments of their pre-programme interviews.

7.5.1.7 Environmental mastery

Planning and coping with work pressure surfaced as themes during the post-programme interviews. These aspects coincide with items regarding Environmental Mastery in the Scales of Psychological Well-Being (Ryff, 1989).

Planning

Three of the four participants who commented on their planning of work related activities noted some change in this regard, but differed regarding their observations. For the first time, Mary was aware of determining priorities when doing her planning. Although there was a stage during the passive phase when she just "went with the flow", Vicky needed a routine again. Previously she always planned her activities by drawing up a timetable, but found herself more flexible in this regard. She still made a list of things that should be done on a specific day, but did not specify the time anymore.

Tracy noted that she could never plan activities beforehand and therefore procrastinated. Anne also procrastinated and liked to socialise when she suddenly found herself with time on her hands. Although she now did some of her work in advance and planned her day, she thought it was a combination of factors and not just because of the programme. Anne started to plan her day as the result of advice from her boyfriend.

Coping with work pressure

Four participants remarked on their coping with of work pressure. Lucy, Paul and Vicky commented positively in this regard, but Kate's experience was more negative. Lucy observed

that although she was pressurised, she got everything done. She felt calm "midst the storm", saw her way through it all, and felt in control. Although the listening programme contributed, Lucy realised her sense of being in control could be the result of the listening programme and natural growth.

Paul reckoned that he coped well with work pressure since the previous week. If he could not get something done on time, he made peace with that without putting extra pressure on himself. Vicky now dealt with each day's obligations and problems as they came, and did not stress in advance. Since she was structured and planned everything, she knew what tomorrow's problems and obligations were, but did not worry about them in advance.

Kate related that her heart was not in her work at present, and that she did not coped well with work pressure. She added that her dealing with work pressure might even be worse than before.

Summary

With the exception of Tracy, all participants in the experimental group noted a change in connection with at least one aspect of environmental mastery. Four of them experienced change in how they dealt with work pressure. Vicky, Lucy and Paul noticed positive change, while Kate perceived negative change. Vicky, Mary and Anne observed positive change in relation to planning, while Tracy noticed no change. Thus, Vicky was the only participant who reported positive change concerning both these aspects of environmental mastery.

7.5.1.8 Coping

From their comments, it seemed as if Anne, Lucy and Vicky experienced their ability to cope more positively than Mary and Tracy. Anne remarked that, although she felt stressed about her piano performance, she coped. Lucy coped better with a current family crisis than she thought she would, and Vicky felt that she handled things better than before.

Mary and Tracy's observations were more negative. Mary remarked that she struggled to cope and felt helpless. Tracy noted that she was edgy and did not cope well.

7.5.1.9 Efficiency

Participants referred to their efficiency regarding their studies in general by remarking on their endurance. Lucy observed that she could now practise for longer periods. Kate, on the other hand, related that she worked more regularly for shorter spells, resulting in her actually working longer cumulatively. Vicky had more self-discipline and therefore pushed herself to

work longer. Since she now took her studies even more seriously than before, she did not allow herself to give up easily. Although Anne did not comment on her endurance, she indicated that she started to work harder during and after the programme, and found it a pleasurable accomplishment.

7.5.1.10 Affect

Participants reported on the intensity and stability of their emotions, as well as on their current positive and negative emotions.

Intensity of emotions

Six participants indicated that they experienced emotions very intensely. Kate did not expand on her comment, and Lucy and Tracy indicated that they had always experienced intense emotions. Mary, Vicky and Paul, on the other hand, observed that they experienced their emotions to be more intense than before the programme.

Vicky as well as Paul also experienced an emotion a bit longer than before, and Paul felt less distanced from himself. Although emotions did not dominate his thoughts, he felt more in contact with himself, which felt good, and even cried easier. Paul further indicated that he experienced his emotions for a longer period than before. Since he now had to make a decision regarding what to do with the emotion and direct it, he gained something positive from it.

Emotional stability

Participants' remarks varied concerning their current experience of the stability of their emotions. Some experienced fluctuating moods, while others perceived more stable emotions.

Although Mary experienced less mood swings than during the programme, she did not feel the same two days in a row. Kate experienced many mood swings at that time, and Tracy felt very emotional almost all the time.

Lucy, on the other hand, experienced her emotions to be more stable than before. She also got through the 'down phases' faster and put bad things behind her more quickly. She did not have bad days anymore, but rather had down moments during good days.

Although Vicky cried more easily than before, especially over other people's pain and circumstances, she was less irritable and people could push her further than before. Anne always liked to feel the extremes of her emotions and got it over with more rapidly. Presently,

she became aware that it also felt good to be more in control. However, she got angry more quickly and felt irritated more easily.

Negative and positive affect

Participants commented on their negative and positive emotions.

Negative affect

Tracy, Mary and Kate reported that they currently experienced intense negative emotions. All three noted that they experienced their stress and anxiety levels to be higher than before.

Tracy felt more anxious with regard to her studies than previously, and felt anxious about her future too. She also felt irritable and tired, cried easily, felt negative and unmotivated and struggled to change this state of mind. She felt "fed up with her studies" and should have made a change at the end of her first year when she realised she was in the wrong field.

Mary related that, although she always had a problem with anxiety, she became more aware of her anxiety since she had started with medication, and now experienced it as being out of control. She also felt highly irritable at that time, and overly sensitive to the words and actions of others. She also felt depressed, especially during the preceding two weeks. While it was controllable previously, she did not feel in control now.

Kate also felt mostly depressed and unhappy. When feeling like that, she felt passive, had guilt feelings, and disliked herself. She tried to hide it, though. She further related that these feelings came and went. She also thought too much, and had confusing thoughts. Paul also reported that his thoughts were in disarray, but did not expand on this comment.

Positive affect

Five participants indicated that in spite of negative situations, circumstances and feelings, they generally felt happy and contented, thus suggesting that positive feelings prevailed over negative feelings. Although Mary was currently aware of negative feelings, she generally felt satisfied with her life. Vicky said that although she felt tired and had to force herself to get up in the morning, she felt quite happy.

Paul conveyed that he felt he could be himself, since he now said what he thought and felt, and did what he thought was right. He also felt calm and happy. Anne and Lucy echoed this feeling and added that they enjoyed their studies. Lucy also felt less rebellious, accepted her

circumstances, felt full of life, looked forward to things, and felt enthusiastic, especially with regard to her piano performance.

Summary

The participants' comments varied regarding the sub-themes of affect and some of them perceived different nuances in relation to the same sub-themes. They also did not always qualify the nature of the change, or indicated whether they experienced any change at all. Therefore, their reports in connection with affect are more complex than just the categories of positive, negative, or no change.

The data relating to the participants' complex experiences on the sub-themes of affect are summarised in Table 7.7.

Table 7.7 Participants' post-programme experience of affect

POST-PROGRAMME EXPERIENCE OF AFFECT			
Report	**Intense emotional experience**	**Emotional stability**	**Positive & Negative Affect**
Positive change	-	Lucy Vicky	Paul Lucy
Negative change	-	Anne	Tracy Mary Kate
More intense experience	Vicky Paul Mary	-	-
Positive experience	Paul	Anne	Vicky Lucy Paul Mary Anne
Negative experience	-	Mary Kate Tracy	Paul
No indication of the nature of experience	Kate	-	-
No change	Lucy Tracy	-	-
No comment	Anne	Paul	-

The information in Table 7.7 further shows that Vicky and Lucy only had positive experiences and changes. Tracy and Kate, on the other hand, reported only negative experiences and changes, while Anne, Mary and Paul had positive as well as negative experiences and changes in connection with the sub-themes of affect.

7.5.1.11 Experience of energy levels

Only Lucy and Paul reported improved energy levels. Lucy noted that she had more energy than before the programme. Paul also had higher energy levels, woke up earlier and felt more alert than before. The other five participants reported that they felt tired, but differed with regard to their explanations.

Although Vicky did not have much energy and felt more tired than before, she reckoned that it might be because she worked more intensively, and pushed herself more than before. She added that it was different from the tiredness that she experienced during the second phase of

the programme. Mary also observed that her tiredness felt different from what she experienced during the programme. She said that although her energy levels were very low, it felt more like a psychological rather than a physical tiredness. Kate felt tired because of her circumstances.

Tracy related that she struggled to get up in the morning and just wanted to sleep. This feeling of fatigue was worse than the previous year. Although Anne felt very tired and struggled to get up in the morning, she thought it might be because of late nights.

7.5.1.12 Perceived benefits of the Tomatis programme

Although Mary, Vicky and Paul remarked that the programme was very time consuming, most of the participants indicated that they benefited from exposure to the Tomatis programme. Kate added that her exposure to the programme was enriching and gave her more self-confidence.

Tracy was aware that she had changed somewhat. She was now even more frank and said what she thought. She found this change positive. Although she still felt very negative regarding her studies, her emotions were back to normal.

Vicky thought that she was somewhat different from the person she was before the programme. She said that she did not really know how, but knew that she was different and found it positive.

Lucy disclosed that if she knew beforehand what the experience would be like and that she would not always find the process pleasant, she would still have done the programme. Everything normalised again afterwards, and only the positive remained. Although she found it difficult to pinpoint changes, she felt she gained from the experience in general. She felt better and overall things were easier. Because she benefited from it, Lucy would recommend the programme to others.

Paul related that in spite of being negative at times, especially during the second phase of the programme, he gained from the experience and felt glad that he did it. He discovered suppressed characteristics of himself, and his eyes opened with regard to his daily circumstances. He realised that the problems and obstacles he experienced during the programme were not because of it, but the result of underlying events and circumstances. His exposure to the programme was a journey he would never forget, and the promises and rewards outweighed the obstacles he experienced.

Mary and Anne were the only two participants who did not report having benefited from the programme. They only reported enjoying the communication and socialising with the experimental group. Anne added that participants in the experimental group became friends and had a shared experience.

Mary felt that the programme took too much time and energy and she had little time to practise piano, adding that she did not even want to practise during the project. Thus, her piano performance suffered. Since she also did not have time to exercise, she felt that her body and health also suffered. Vicky and Paul also remarked that the programme was very time consuming.

Although Vicky was excited about the programme from the beginning and looked forward to each day's listening sessions, she had to plan thoroughly to get through daily obligations. Paul recommended that such a project should rather take place during the holidays, since students had too much work.

7.5.1.13 Summary of experimental group participants' post-programme reports

The qualitative data analysis of the participants' interviews and written reports revealed twelve core themes. Since participants' responses varied with regard to these themes and they did not always comment on a topic, not all themes carried the same weight concerning change. Some participants noted positive change in connection with a topic, while others experienced negative or no change. Participants' experience with regard to positive, negative or no change regarding the relevant theme is portrayed in Table 7.8. Participants who did not comment on a specific topic are also indicated in the table.

Table 7.8 Post-programme results: Participants' perceived changes in relation to psychological well-being

PSYCHOLOGICAL WELL-BEING: PARTICIPANTS' PERCEIVED CHANGES AFTER THE PROGRAMME					
Core Theme	**Positive Change**	**Negative Change**	**Total number of participants**	**No Change**	**No Comment**
Self-Confidence	Vicky Mary Kate Paul	Anne	5	-	Tracy Lucy
Autonomy	Vicky Lucy Paul Mary Anne Tracy	Mary	6	Kate	-
Communication	Vicky Lucy Paul Kate	-	4	Anne	Tracy Mary
Interpersonal relationships	Vicky Lucy Paul Mary Tracy	Mary Tracy	5	Kate Anne	-
Conflict management	Vicky Lucy Paul Mary	Tracy	5	Kate Anne	-
Sense of direction and purpose	Vicky Mary	Tracy	3	Kate Anne Lucy Paul	-
Environmental mastery	Vicky Lucy Paul Mary Anne	Kate	6	Tracy	-
Coping	Vicky Lucy Anne	Mary Tracy	5	-	Kate Paul
Efficiency	Vicky Lucy Anne Kate	-	4	-	Tracy Mary Paul
Energy levels	Lucy Paul	Mary Tracy Kate Anne Vicky	7	-	-
Affect	Vicky Lucy Paul	Tracy Kate Mary Anne	7	-	-
Benefit from Tomatis programme	Vicky Lucy Paul Kate Tracy	-	5	-	Anne Mary

The information in Table 7.8 indicates that all participants noted change with regard to energy levels and affect, followed by aspects of autonomy and environmental mastery, where six participants observed change. The information in Table 7.8 further shows that participants mostly experienced positive change. Although some also related negative changes in connection with aspects of the core themes, these reports were in the minority. The only themes where a majority of the participants reported a negative experience was in relation to affect and to energy level.

There were also instances where some participants indicated positive as well as negative change with regard to the same theme. Figure 7.10 illustrates the ranking of core themes, as well as the distribution of positive and negative change. Since participants' general experience

of the programme did not influence their psychological well-being, general experience is excluded from the figure.

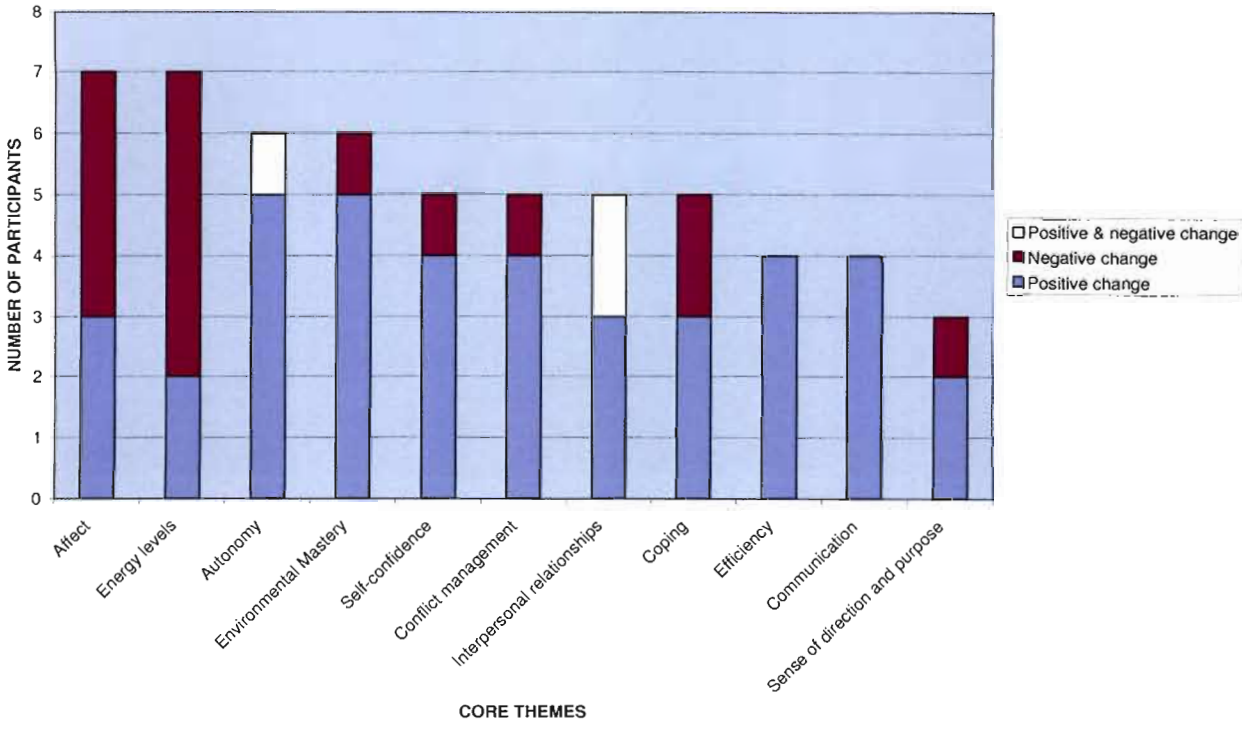


Figure 7.10 **Participants' post-programme reports on psychological well-being: Ranking of core themes, and distribution of positive and negative change according to the number of participants**

The qualitative data analysis further revealed that participants varied regarding the extent of change they experienced. In addition, their responses were divergent on whether they experienced changes as positive or negative. Vicky experienced change with regard to aspects of all the core themes, while Kate experienced the least change.

Although five participants mostly experienced positive changes, Tracy mostly experienced negative changes, while Kate's perceptions were equally divided between positive and negative changes. Figure 7.11 illustrates the extent to which each participant experienced change, as well as the distribution of positive and negative change.

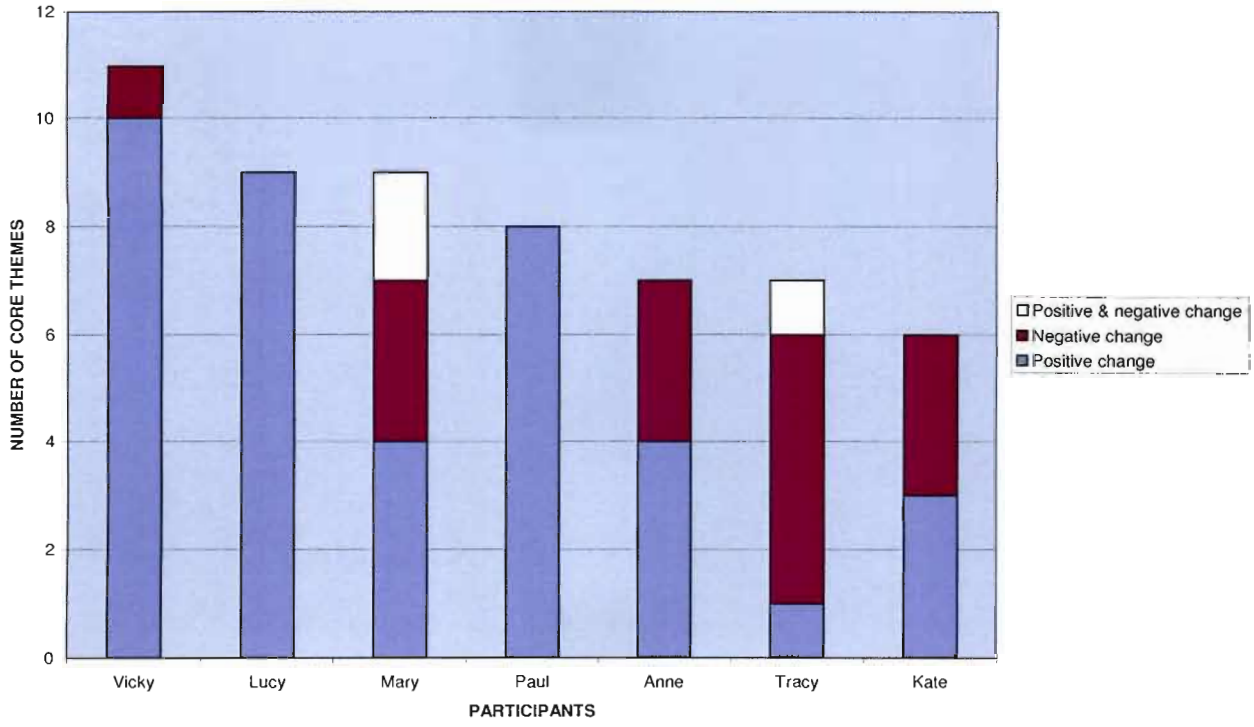


Figure 7.11 **Participants' post-programme reports on psychological well-being: Extent and nature of individual participants' experience of change according to the number of core themes**

7.5.2 Interviews with Piano Lecturers at Three Months Post-Programme

Semi-structured interviews with each participant's piano lecturer took place approximately three months after completion of the Tomatis programme. During these interviews, piano lecturers were requested to point out any changes that they observed with regard to the participants' general conduct and attitude, and any other changes observed.

Nine participants received comments concerning their general self-conduct. Change was observed regarding seven of these participants, of which four were in the experimental group. The lecturers' comments related to participants' "open" demeanour, autonomy and personal growth. Each of the participants received comments relating to only one of these aspects. The names of participants in the experimental group will be underlined.

Piano lecturers observed that five participants had a more "open" demeanour, of which three were in the experimental group. Kate was more open and spontaneous than before, and it seemed as if Kate, as well as Vicky, crawled out of their shells. Lucy, Elsa and Sara's piano lecturer conveyed that it seemed as if these three students' personalities have opened up more. Concerning the impression that Lucy opened up most, the lecturer found it difficult to be sure since the students' levels of development differed.

Paul was described as being more relaxed and free, which was not necessarily good for his music since he was now less meticulous. Although Ina did not change much, Rita showed development and growth with regard to personality, even more so than Anne did.

7.5.3 Interviews with Other Lecturers at Six Months Post-Programme

Participants named two lecturers each, in addition to the piano lecturer, who knew them before and after the experimental group's exposure to the Tomatis programme. Since their suggestions overlapped, six other lecturers were then interviewed. These semi-structured interviews took place approximately six months after the experimental group's completion of the Tomatis programme.

Although lecturers' views were specifically requested concerning the participants who named them as referents, they sometimes also volunteered observations regarding some of the other participants known to them. These observations were also taken into consideration when the data was analysed.

During the semi-structured interviews with these lecturers, they were requested to comment on their experience of the participants at that time, and how it compared to their previous experience. They could refer to the participants' general conduct and attitude, diligence and efficiency, way of class participation, development or changes, or anything else that came to mind.

Nine themes emerged from the data analysis. The themes were diligence and efficiency, autonomy, self-confidence, self-knowledge, "open" demeanour, interpersonal relationships, personal growth, sense of direction and purpose, and affect. The presentation of the data will be followed by a summary. The names of participants in the experimental group will once again be underlined.

7.5.3.1 Diligence and efficiency

With the exception of Jim, Elsa and Celia, all participants commented on were in the experimental group. Comments on these participants' diligence and efficiency varied from positive to negative. Kate was the only participant who received only positive comments in this regard.

Three of the lecturers remarked positively on the quality of Kate's work. One of them mentioned that the quality of her work had improved. Another lecturer concurred and observed that she took more pride in her work and seemed to experience more work satisfaction. She

also seemed more disciplined. A third mentioned that she kept up with assignments, and did better than expected in the subject concerned, even better than Elsa who was the stronger candidate.

Two lecturers commented on Anne's work. One of them imparted that she was conscientious and seemed to work with more dedication, especially during the second semester. The other lecturer was less positive about her work and said that she seemed more ineffective than before regarding the subject in question.

Tracy received comments from three lecturers. One lecturer related that, although she completed her project in the end, it seemed as if she had an unspecified blockage. Another imparted that she was usually late with assignments. A third noted that she seemed more ineffective regarding the subject concerned.

Although one of Mary's lecturers conveyed that Mary wanted to work and was a steady worker, another observed that it seemed as if her work had regressed somewhat. One of Paul's lecturers remarked that his work had regressed during the first semester, but improved again during the second.

Two of Jim's lecturers indicated that his work had deteriorated, and one conveyed that it seemed as if he had lost interest in his studies. One of Elsa's lecturers mentioned that she tended to be late with assignments. Although Celia seemed to be less enthusiastic about her work, three lecturers did not detect any changes, and added that she was always a good student.

7.5.3.2 Autonomy

Lecturers' comments related to three participants' autonomy. All these participants were in the experimental group.

Two lecturers commented positively on Mary. One of them noticed that she was more self-assertive and that her way of participation in class had changed. Where she previously blended in more, she now seemed less dependent on her peer group. It further seemed as if she was more accepting of her surroundings and circumstances. The other lecturer observed that it seemed as if her personality was now coming to the fore.

Kate spoke more easily in class. She also appeared to feel more at ease in class as well as with fellow students, and seemed to understand the class dynamics. Tracy was somewhat more outspoken.

7.5.3.3 Self-confidence

Lecturers only observed change with regard to experimental group participants' self-confidence. One of Vicky's lecturers remarked that although she was quiet, she showed more self-confidence. Two lecturers agreed that Kate and Mary had more self-confidence. Kate also acted less hesitantly and Mary had more 'guts'.

The report on Paul was less positive. A lecturer noted that he seemed more out of control, and it appeared as if everything was coming apart. This lecturer was of the opinion that his problems deepened, and that he had less self-confidence and felt more intimidated.

7.5.3.4 Self-knowledge

The comments of one of the lecturers related to two participants' self-knowledge. According to this lecturer, Mary seemed to know who she was, and Kate's increased self-confidence possibly stemmed from better self-knowledge.

7.5.3.5 "Open" demeanour

One of the lecturers remarked that Lucy reflected a new "openness". Another lecturer experienced Tracy as "closed", but did not indicate whether this was always the case.

7.5.3.6 Interpersonal relationships

One lecturer remarked that Kate started to interact well socially. It seemed as if Mary was more accepting of other people and saw people as partners. She further appeared to be "softer" and less distanced.

One of the other lecturers made a similar remark regarding Lucy, by saying that she seemed to be "softer" somehow. Vicky also seemed "softer" and more willing to assist.

7.5.3.7 Personal growth

One lecturer remarked that Kate showed an impressive improvement. She was more creative, her issues seemed sorted out, and she had matured. Apparently, she had taken a big step forward.

One of the lecturers made a similar remark regarding Lucy, by saying that she was a revelation, and almost appeared to be a new person who had matured a lot. Another lecturer concurred that she had matured, and a third lecturer observed that she seemed more 'together'. A fourth lecturer was more cautious and of the opinion that Lucy was in a continuing, natural process of growth since her first year of study.

Mary also seemed more mature. Ina, on the other hand, was in her normal process of growth and seemed to be very much the same as usual.

7.5.3.8 Sense of direction and purpose

In order to compare the results from the different data sources, sense of direction and purpose is included as a theme, even though only one of the participants received a comment in this regard. One of the lecturers observed that Mary seemed to know what she was doing here.

7.5.3.9 Affect

One of Celia's lecturers observed that she seemed to be tensed up in classes. Although one of the lecturers reported that Paul felt upset and depressed during the first semester and that his mood state improved during the second semester, there was no indication of whether there was an improvement since the intervention.

7.5.3.10 Summary of results from other lecturers' post-programme interviews

Nine core themes emerged from the qualitative data analysis of interviews with other lecturers. Table 7.9 indicates whether the lecturers observed positive or negative change in participants regarding the relevant theme, and which participants were involved.

Table 7.9 **Post-programme interviews: Changes in relation to participants' psychological well-being as perceived by their other lecturers**

OTHER LECTURERS' QUALITATIVE REPORTS OF CHANGES OBSERVED IN PARTICIPANTS' PSYCHOLOGICAL WELL-BEING				
Core theme	**Group**	**Positive Change**	**Negative Change**	**Total number of participants (n = 13)**
Diligence and efficiency	Experimental group (n = 7)	Kate Paul Anne	Mary Anne Tracy	5
	Control group (n = 6)	-	Jim Elsa	2
Self-confidence	Experimental group (n = 7)	Kate Mary Vicky	Paul	4
	Control group (n = 6)	-	-	0
Interpersonal relationships	Experimental group (n = 7)	Kate Mary Vicky Lucy	-	4
	Control group (n = 6)	-	-	0
Autonomy	Experimental group (n = 7)	Kate Mary Tracy	-	3
	Control group (n = 6)	-	-	0
Personal growth	Experimental group (n = 7)	Kate Mary Lucy	-	3
	Control group (n = 6)	-	-	0
Self-knowledge	Experimental group (n = 7)	Kate Mary	-	2
	Control group (n = 6)	-	-	0
Affect	Experimental group (n = 7)	-	-	0
	Control group (n = 6)	-	Celia	1
Sense of direction and purpose	Experimental group (n = 7)	Mary	-	1
	Control group (n = 6)	-	-	0
"Open" demeanour	Experimental group (n = 7)	Lucy	-	1
	Control group (n = 6)	-	-	0
Total number of participants (n = 13)	Experimental group (n = 7)	7	4	7
	Control group (n = 6)	0	3	3

The information in Table 7.9 shows that the themes vary regarding the number of participants commented on, and that most positive change was perceived in relation to participants' interpersonal relationships (four participants). Autonomy, personal growth, self-confidence, as well as diligence and efficiency followed with three participants each. However, negative change was also perceived with regard to some participants' diligence and efficiency, and self-

confidence. Figure 7.12 illustrates the ranking of core themes, as well as the distribution of positive and negative change.

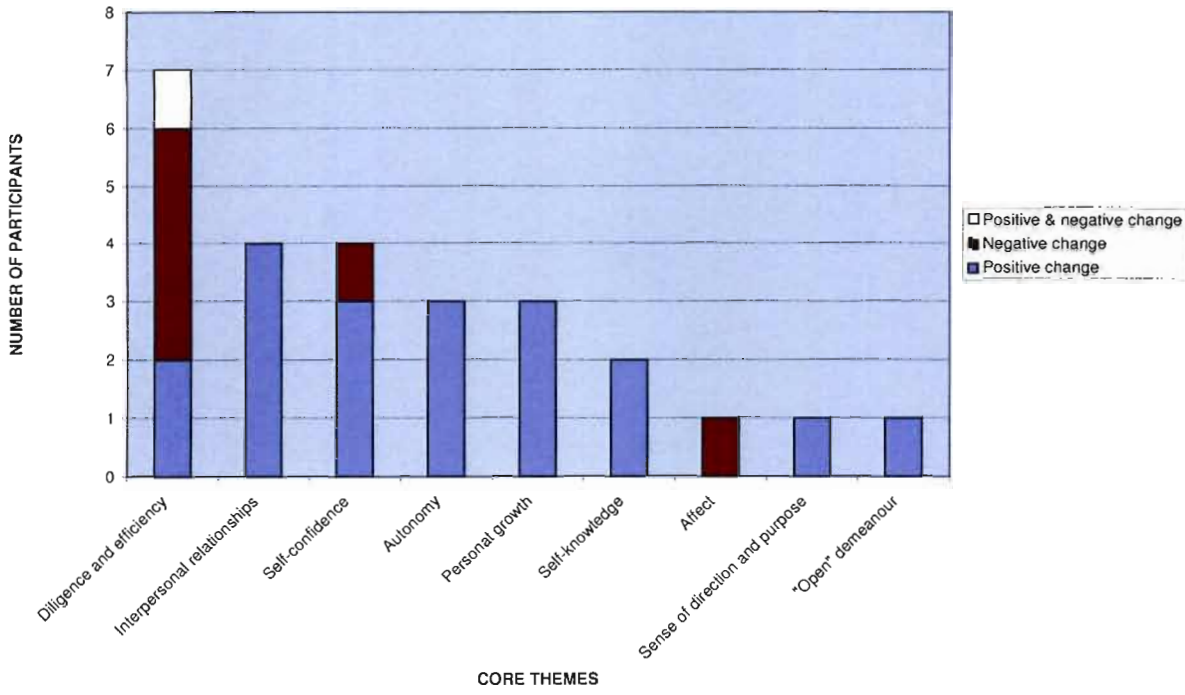


Figure 7.12 **Other lecturers' post-programme reports on psychological well-being: Ranking of core themes, and distribution of positive and negative change according to the number of participants**

The data in Table 7.9 further indicate that the lecturers mostly perceived change with regard to participants in the experimental group. Lecturers perceived mostly positive change regarding the experimental group, and only negative change regarding the control group.

Most participants received positive or negative comments in relation to a theme. Anne was the only participant who received positive as well as negative comments in connection with the same theme. In addition, participants differ regarding the number of themes commented on. Lecturers mostly perceived change with regard to Mary and Kate. Figure 7.13 illustrates the extent and nature of the participants' change as observed by their other lecturers.

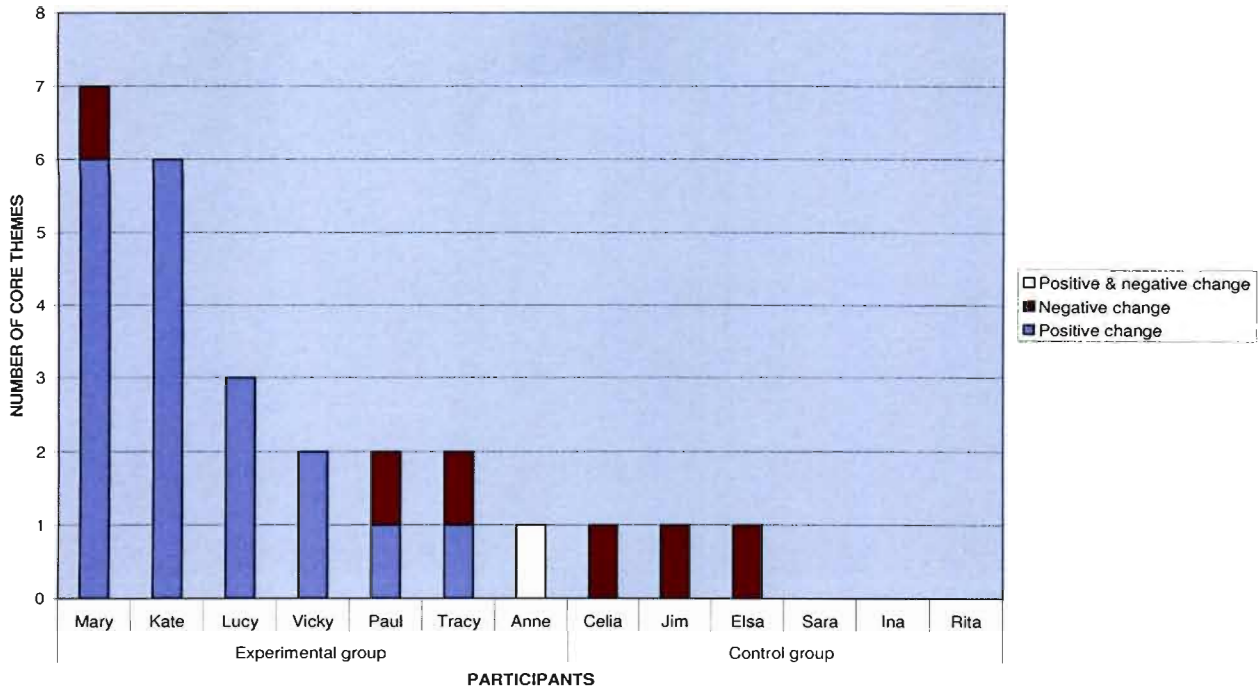


Figure 7.13 **Other lecturers' post-programme reports on psychological well-being: Impression of the extent and nature of individual participants' change according to the number of core themes**

7.5.4 Summary of Post-Programme Results

The analysis of experimental group participants' reports rendered twelve themes. Since one of these themes depicted participants' experience of the programme in general, only eleven themes related to changes were associated with their psychological well-being. All seven participants' reports related to at least six of the eleven themes. Although five of the seven participants mostly experienced positive changes, one participant mostly experienced negative changes, and one's perceptions were equally divided between positive and negative changes.

Nine themes relating to participants' psychological well-being emerged from the data analysis of the reports of participants' other lecturers. Most of these themes (7) only involved experimental group participants. Lecturers noticed change with regard to all seven participants in the experimental group, and only three of the six control group participants. Although they observed positive as well as negative changes, lecturers perceived mostly positive change regarding the experimental group, and only negative change regarding the control group.

However, the piano lecturers' observations were less conclusive. These lecturers observed change in relation to three aspects associated with participants' psychological well-being. Although they perceived change with regard to seven of the thirteen participants, each of the participants received comments relating to only one of these aspects. Like the other lecturers,

they also indicated most change regarding experimental group participants (4), but noticed change in an almost equal amount of control group participants (3). All these changes were perceived as positive.

Although there was correspondence between the data sources regarding some themes and participants, experimental group participants, their piano lecturers, and other lecturers differed with regard to the theme where the largest number of participants reflected change. They also differed on which participant reflected most change. Since participants' in-programme reports also indicated changes, correspondence between the three data sources with regard to experimental group participants' changes will be discussed in section 7.7.

7.6 Comparison of Pre-Programme, In-Programme, and Post-Programme Reports

Pre-programme, in-programme and post-programme data were presented in detail in the relevant sections. Therefore, this comparison will focus on corresponding themes in the data, and whether participants featuring in pre-programme data with regard to these themes, showed any change.

Since only the participants and their piano lecturers were involved in pre-programme interviews, this section only contains results from these two data sources. Results from the participants' piano lecturers and those of the participants will be presented separately. Names of participants in the experimental group will once again be underlined with regard to piano lecturers' reports.

Although all participants were involved in pre-programme interviews, only experimental group participants provided self-report data regarding change during and after the programme. Therefore, only data from these participants will be used for comparison of participants' pre-programme, in-programme and post-programme reports.

7.6.1 Comparison of Piano Lecturers' Pre-Programme and Post-Programme Reports

Piano lecturers' comments during pre-programme interviews concerned participants' conscientiousness, attitude, affect and personality. Comments during post-programme interviews related to five participants being more 'open', one participant being more 'free', and one participant's personal growth. Therefore, there were no corresponding themes between pre-programme and post-programme interviews associated with participants' psychological well-being.

7.6.2 Comparison of Participants' Pre-Programme, In-Programme and Post-Programme Reports

Themes that occurred in pre-programme, in-programme and post-programme reports relate to participants' autonomy, environmental mastery, interpersonal relationships, conflict management, purpose in life, and affect. The results from these reports are summarised in Table 7.10.

Regarding the pre-programme data, the table indicates whether participants reflected a higher or lower level of the various aspects relating to psychological well-being. The data acquired during and after the programme depicts whether participants perceived positive, negative or no change. Since experimental group participants' fluctuating emotions during the programme stabilised after the programme, data in the table concerning affect only reflect positive feelings of happiness and general satisfaction with life, and negative feelings of tension, anxiety and depression.

Table 7.10 Correspondence between experimental group participants' pre-programme, in-programme and post-programme reports regarding their psychological well-being

PARTICIPANTS' PSYCHOLOGICAL WELL-BEING: CORRESPONDENCE BETWEEN EXPERIMENTAL GROUP PARTICIPANTS' PRE-PROGRAMME, IN-PROGRAMME AND POST-PROGRAMME REPORTS								
	Pre-programme		In-programme			Post-programme		
	Perception of level of well-being		Perception of change			Perception of change		
Core theme	**Higher level**	**Lower level**	**Positive change**	**Negative change**	**No change**	**Positive change**	**Negative change**	**No change**
Autonomy	Lucy Tracy Paul	Mary Anne Vicky	Mary Anne Vicky Lucy Paul Kate	-	-	Mary Anne Vicky Lucy Paul Tracy	Mary	-
Environmental Mastery	Vicky	-	Lucy Vicky Paul Mary Anne	-	-	Lucy Vicky Paul Mary Anne	Kate	Tracy
Interpersonal Relationships	Lucy Tracy Anne	Mary Vicky Paul Kate	Mary Vicky Paul	-	-	Mary Vicky Paul Lucy Tracy	Mary Tracy	Kate Anne
Conflict Management	Lucy	Mary Anne	-	-	-	Mary Lucy Vicky Paul	Tracy	Anne Kate
Purpose in Life	Lucy Paul Kate Vicky Tracy Anne	Mary	Vicky Tracy	-	-	Mary Vicky	Tracy	Kate Anne Lucy Paul
Affect positive = happiness / life satisfaction negative = tension / anxiety / depression	Anne Lucy Paul	Kate Mary	Anne Mary Lucy Vicky Tracy	Anne Mary	-	Lucy Vicky Paul	Kate Mary Anne Tracy	-

Table 7.10 shows that participants, irrespective of whether they perceived higher or lower levels of well-being in relation to a certain aspect before the programme, sometimes reported positive changes during or after the programme, sometimes negative changes, or positive as well as negative changes, and sometimes no change. Participants who only reflected higher levels of well-being during pre-programme interviews in relation to the respective themes were Lucy (5) and Tracy (3). Lucy perceived positive change in relation to four themes and no change in relation to one. Tracy mostly perceived positive as well as negative change.

Vicky and Paul only perceived positive change. Paul perceived no change in relation to one theme while Anne and Kate mostly perceived no change. Mary, who only reflected lower levels of well-being (five themes) during pre-programme interviews, reflected positive change with regard to two of them and positive as well as negative change with regard to three.

As far as the themes are concerned, most participants who reported on autonomy, environmental mastery, interpersonal relationships, and conflict management before the programme, reported positive changes during or after the programme. Although all participants reported on their sense of direction and purpose before and after the programme, most of them (4) perceived no change in this regard. Participants whose comments related to affect before the programme, varied with regard to positive change (2 participants), negative change (one participant), and positive as well negative change (2 participants) during and/or after the programme.

7.7 Correspondence Between Data Sources Regarding Experimental Group Participants' Changes

This comparison will focus on correspondence between data sources in relation to themes and individual participants. Section 7.5.4 already established that, although reports from participants' piano lecturers were less conclusive, their other lecturers mostly perceived change with regard to experimental group participants. Furthermore, only experimental group participants provided self-report data regarding change during and after the programme. Therefore, comparisons in this section will only deal with changes in experimental group participants.

Qualitative results from the various data sources on changes relating to experimental group participants' psychological well-being are summarised in Table 7.11. Corresponding themes as well as data sources' perceived positive or negative change regarding individual participants are indicated in the table.

Table 7.11 Correspondence between data sources regarding changes in experimental group participants' psychological well-being

PSYCHOLOGICAL WELL-BEING: CORRESPONDENCE BETWEEN DATA SOURCES REGARDING EXPERIMENTAL GROUP PARTICIPANTS' CHANGES				
Core Theme	**Data Source**	**Positive Change**	**Negative Change**	**Total Number of Participants (n = 7)**
Self-Acceptance (include self-knowledge)	Piano lecturer	-	-	0
	Other lecturer	Mary Kate	-	2
	Participant	Mary Lucy Vicky Tracy	-	4
Autonomy (include assertiveness)	Piano lecturer	Paul	-	1
	Other lecturer	Mary Kate Tracy	-	3
	Participant	Mary Kate Tracy Lucy Anne Vicky Paul	Mary	7
Self-Confidence	Piano lecturer	-	-	0
	Other lecturer	Mary Kate Vicky	Paul	4
	Participant	Mary Kate Vicky Paul	Anne	5
'Open' Demeanour	Piano lecturer	Lucy Kate Vicky	-	3
	Other lecturer	Lucy	-	1
	Participant	-	-	0
Diligence & Efficiency	Piano lecturer	-	-	0
	Other lecturer	Kate Anne Paul	Anne Mary Tracy	5
	Participant	Kate Anne Lucy Vicky		4
Personal Growth	Piano lecturer	-	-	0
	Other lecturer	Mary Lucy Kate	-	3
	Participant	Mary Lucy Tracy Vicky	-	4
Purpose in Life	Piano lecturer	-	-	0
	Other lecturer	Mary	-	1
	Participant	Mary Vicky Tracy	Tracy	3
Interpersonal Relationships	Piano lecturer	-	-	0
	Other lecturer	Mary Vicky Lucy Kate	-	4
	Participant	Mary Vicky Lucy Tracy Paul	Mary Tracy	5
Total Number of Participants (n = 7)	Piano lecturer	4	0	4
	Other lecturer	7	4	7
	Participant	7	3	7

Table 7.11 shows that the extent of agreement among the data sources differed regarding change in relation to participants' psychological well-being. Although data sources agreed that participants showed change in relation to themes associated with psychological well-being, they often differed with regard to individual participants. Where they corresponded, data sources concurred that experimental group participants showed positive changes in connection with the relevant themes.

Correspondence between data sources regarding change in participants' psychological well-being occurred mostly between participants' and their other lecturers. There was no agreement between all three data sources regarding a particular participant.

Although the three data sources concurred that participants changed in relation to autonomy, only two agreed on specific participants. Autonomy was also the only theme agreed on by experimental group participants and their piano lecturers. Only Paul and his piano lecturer concurred that he changed positively in this regard.

With the exception of 'open' demeanour, participants and their other lecturers were in accord that change took place with regard to at least one specific participant per theme. Autonomy, self-confidence and interpersonal relationships rendered the most participants (3) agreed on by the two data sources. Diligence and efficiency, and personal growth followed with two participants each, followed by self-acceptance and purpose in life (1 participant). Six of the seven participants agreed with their other lecturers on at least one theme per participant. Mary and her lecturers concurred on six themes, followed by Kate (3), Lucy and Vicky (2), and Tracy and Anne (1).

Participants' piano lecturers and other lecturers only concurred with regard to "open" demeanour. Lucy's lecturers agreed that she seemed more 'open'.

Figure 7.14 illustrates the correspondence between data sources with regard to experimental group participants' change concerning specific themes related to psychological well-being.

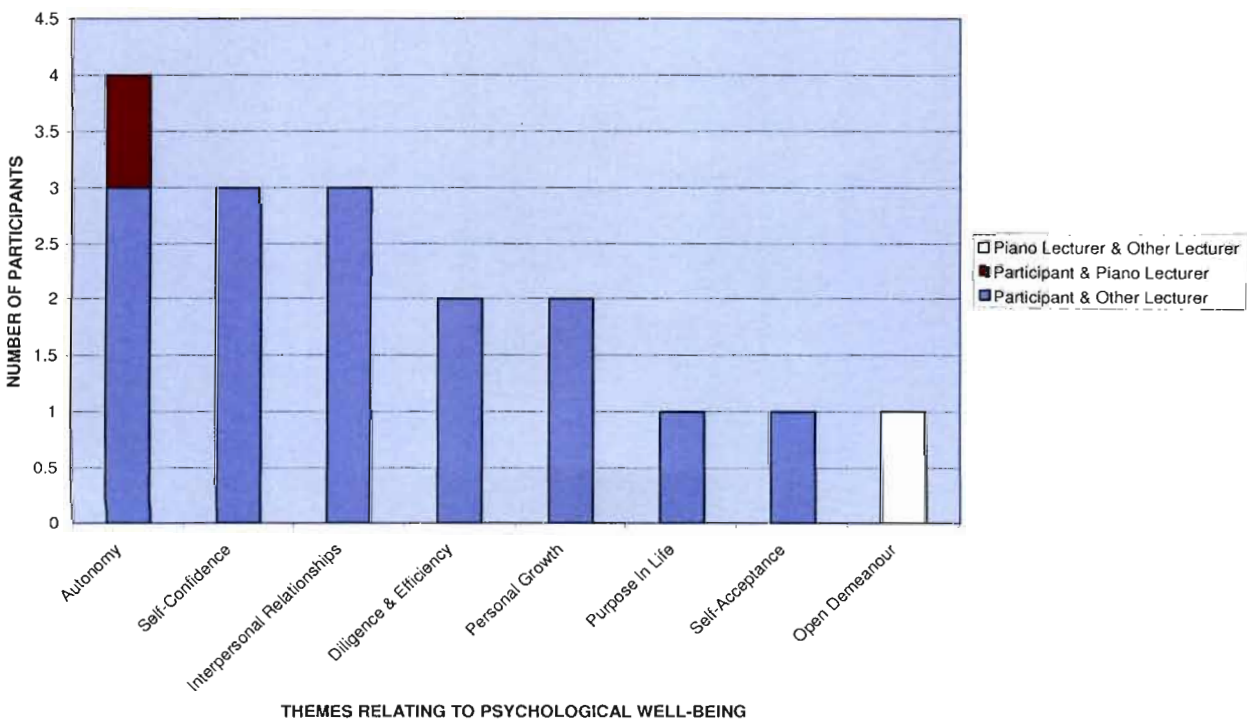


Figure 7.14 Correspondence between data sources: Themes reflecting changes in experimental group participants' psychological well-being

Only a combination of two data sources agreed on individual participants' change. Although the combination of data sources sometimes differed, Mary changed positively with regard to six themes, followed by Lucy and Kate (3), Vicky, (2), and Paul, Tracy and Anne with one theme each. Figure 7.15 illustrates the correspondence between data sources regarding individual participants' change related to psychological well-being.

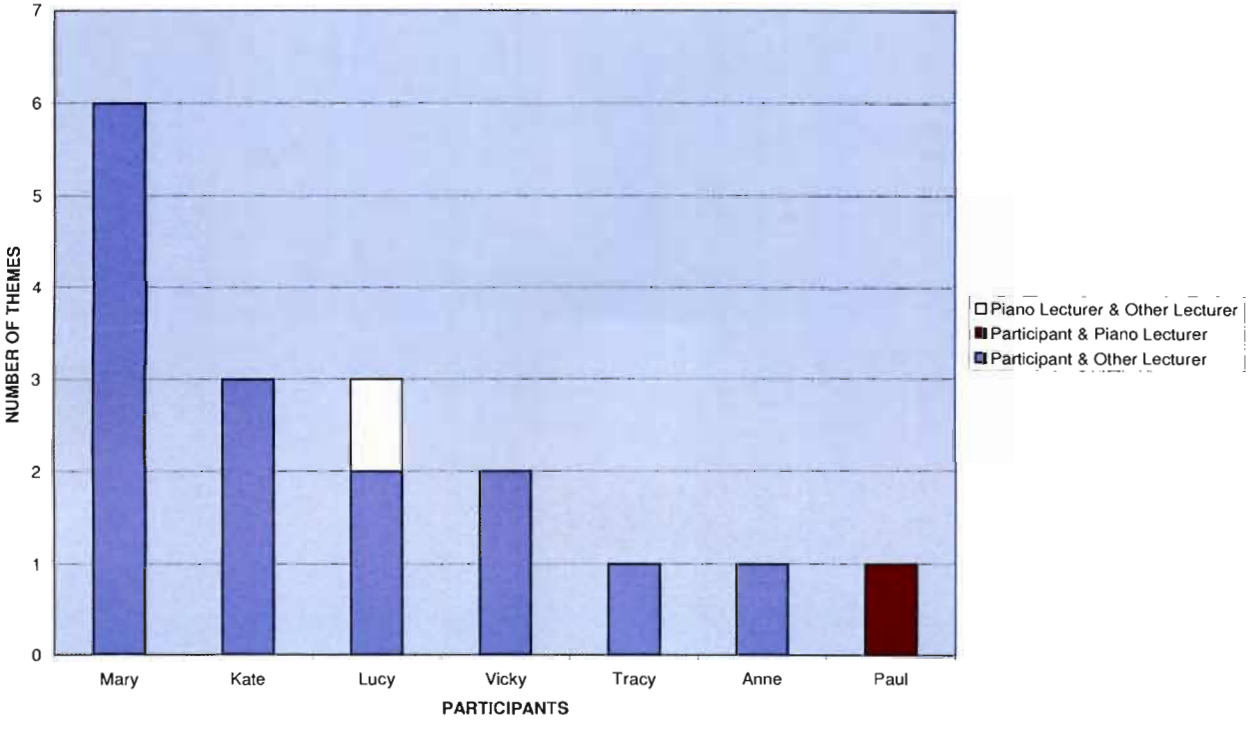


Figure 7.15 Correspondence between data sources: Changes in individual participants' psychological well-being

7.8 Summary of Qualitative Results on Psychological Well-Being

Pre-programme interviews involved all participants and their piano lecturers. During these interviews, experimental group participants generally commented on more themes relating to psychological well-being than control group participants did. With the exception of one control group participant, participants' piano lecturers commented on all participants during pre-programme interviews. These comments were almost equally divided between experimental group and control group participants.

During the programme, data were only obtained from experimental group participants. After the programme, data were obtained from experimental group participants, as well as all participants' piano lecturers and other lecturers. Most of the lecturers were unaware of whether participants were in the experimental or control group.

Although interviews were conducted with all participants' piano lecturers before and after the experimental group's exposure to the Tomatis programme, these lecturers made fewer observations regarding changes associated with participants' psychological well-being than their other lecturers did. Even though piano lecturers' reports were less conclusive, piano lecturers and other lecturers noted change with regard to more participants in the experimental group than in the control group. In addition, other lecturers observed change with regard to all experimental group participants, and piano lecturers noticed change regarding the majority of them.

Changes were predominantly perceived as positive by experimental group participants as well as their lecturers, even though negative changes were also observed. Although all experimental group participants perceived change, some experienced more change than others did. However, the majority perceived change in relation to most of the themes. The other lecturers also observed that some participants reflected more change than others did, while piano lecturers only noticed change in relation to one theme per participant.

During pre-programme interviews, piano lecturers mainly referred to participants' conscientiousness. This theme also appeared in participants' pre-programme interviews and six participants agreed with their piano lecturers in this regard. However, this theme did not reappear in later reports.

Three other prominent themes in participants' pre-programme interviews were their sense of direction and purpose, interpersonal relationships, and autonomy. All participants commented on aspects related to their sense of direction and purpose, as well as their interpersonal relationships, and the majority commented on aspects relating to their sense of autonomy. Interpersonal relationships and autonomy also featured prominently in post-programme interviews.

Although sense of direction and purpose did not feature notably in post-programme interviews, the only participant in the experimental group who reflected uncertainty regarding her plans for the future before the programme portrayed positive change after the programme. She was also the only participant on whom the other lecturers commented in this regard, and in relation to whom they observed positive change.

Before the programme, participants were equally distributed on whether they felt more positive or less positive regarding aspects associated with their interpersonal relationships, and whether they reflected higher or lower levels of autonomy. During and/or after the programme,

all experimental group participants reflected change in connection with autonomy, and most of them experienced change in relation to their interpersonal relationships. After the programme, participants' other lecturers only observed change regarding experimental group participants in connection with these themes. The majority of experimental group participants were included in the lecturers comments on interpersonal relationships. One of the experimental group participants' piano lecturers also observed change in association with this participant's autonomy.

Self-confidence as well as diligence and efficiency also featured in experimental group participants' and their other lecturers' reports as themes where changes were observed with regard to the majority of experimental group participants. Most experimental group participants' reports also reported positive change in relation to self-acceptance, personal growth and environmental mastery.

There was agreement between specific participants and their lecturers with regard to all the above-mentioned themes. Of these themes, autonomy was the one on which the majority of experimental group participants and their lecturers agreed.

Since experimental group participants experienced a fluctuation of positive and negative emotions during the programme, affect featured in all their reports. Their emotions stabilised after the programme and although some of them still experienced negative feelings, they generally felt happy and contented, which suggested that positive feelings prevailed.

The qualitative results seem to indicate that experimental group participants mostly benefited with regard to autonomy, interpersonal relationships, self-confidence, self-acceptance, personal growth and environmental mastery. The qualitative results of the effect of the Tomatis Method on participants' piano performance are presented in Chapter 8.

CHAPTER 8
QUALITATIVE RESULTS:
PIANO PERFORMANCE

8.1 INTRODUCTION

This chapter provides an overview of the qualitative observations of the effect of the Tomatis Method on experimental group participants' piano performance. Qualitative techniques, as described in Chapter 5, were used to analyse the data, which were obtained at three points:

- pre-programme interviews with all participants as well as their piano lecturers;
- in-programme interviews and group discussions with experimental group participants, as well as projective drawings by them;
- post-programme interviews with experimental group participants as well as all participants' piano lecturers and other lecturers, as well as written reports by experimental group participants.

Since all participants and interviewees were Afrikaans speaking, all the data were in Afrikaans. Therefore, it was attempted to maintain the original character of interviews and written reports without representing them verbatim. A bilingual version of questions asked during semi-structured interviews is appended in Addendum C.

Participants were already introduced in Chapter 7. Therefore, this chapter consists of results of pre-programme interviews, followed by results from data obtained during the programme, and results from post-programme interviews and written reports. A comparison of pre-programme, in-programme and post-programme results obtained from experimental group participants and their piano lecturers will then be presented. This will be followed by a comparison of experimental group participants' changes as observed by them, their piano lecturers, and other lecturers. This comparison will focus on correspondence between the three data sources. A summary will conclude the chapter.

8.2 PRE-PROGRAMME INTERVIEWS

Data collected before the experimental group's exposure to the Tomatis programme included semi-structured interviews with the participants' piano lecturers, as well as interviews with all the participants. In this section, data collected from these interviews will be presented. Data collected from the interviews with the participants' piano lecturers will be presented first,

followed by data from the interviews with the participants. The names of the participants in the experimental group will be underlined where they appear in the text.

8.2.1 Interviews with Piano Lecturers

Semi-structured interviews with each of the participants' piano lecturers took place in November 2006, shortly after the participants' piano examinations, and approximately three months before the experimental group's exposure to the Tomatis programme. During these interviews, the piano lecturers were requested to comment on their perceptions of the participants' piano performance.

The lecturers commented on thirteen aspects relating to their students' piano performance. These aspects are divided into piano performance in general and specific aspects of participants' piano performance that were good or needed improvement.

8.2.1.1 Piano performance in general

Piano lecturers' comments on participants' piano performance in general related to realisation of potential, rate of studying new compositions, self-confidence, and music performance anxiety.

Realisation of potential

Ina was attuned to the piano. Sara also had a natural talent and realised her potential as a pianist, while Jim, Tracy, and Anne did not realise their potential.

Rate of mastering new compositions

Although Anne needed to employ more effective practicing methods, she learned new compositions relatively quickly. Kate, on the other hand, mastered new compositions rather slowly.

Self-confidence

Vicky and Kate lacked self-confidence with regard to their piano performance. Especially Kate needed her lecturer's approval regarding her piano performance, while Vicky needed to be more spontaneous.

Music performance anxiety

Music performance anxiety had a debilitating effect on Paul, Anne, Elsa, and Rita's piano performance. Celia, Elsa and Paul also needed to relax more while performing.

8.2.1.2 Aspects of piano performance that were good or needed improvement

The piano lecturers commented on nine aspects of participants' piano performance that were good or needed improvement. These aspects were musical comprehension, technique,

listening skills, posture, musical communication, accuracy and fluency, memorisation, sight-reading, and concentration. Lecturers' comments are summarised in Table 8.1.

The table indicates whether the lecturers perceived participants as good or needing improvement regarding the relevant aspect, and which participants were involved. Participants who did not receive a comment on a specific aspect are also indicated in the table.

Table 8.1 Pre-programme interviews: Summary of piano lecturers' reports on aspects of participants' piano performance that were good or needed improvement

PIANO LECTURERS' PRE-PROGRAMME QUALITATIVE REPORT: ASPECTS OF PARTICIPANTS' PIANO PERFORMANCE THAT WERE GOOD OR NEEDED IMPROVEMENT				
Aspect of piano performance	**Group**	**Need improvement**	**Good**	**No comment**
Musical comprehension	Experimental group (n = 7)	Mary	Anne Tracy	Lucy Kate Paul Vicky
	Control group (n = 6)	-	Rita Celia Elsa Ina Sara	Jim
Technique	Experimental group (n = 7)	Mary Anne Tracy Paul	-	Lucy Kate Vicky
	Control group (n = 6)	Rita Ina Jim	Elsa	Celia Sara
Listening skills	Experimental group (n = 7)	Mary Anne Lucy Kate Vicky	-	Paul Tracy
	Control group (n = 6)	Rita Celia	-	Jim Sara Elsa Ina
Posture	Experimental group (n = 7)	Mary Tracy Paul	-	Lucy Kate Vicky Anne
	Control group (n = 6)	Elsa	-	Rita Celia Ina Sara Jim
Musical communication	Experimental group (n = 7)	Anne Tracy	-	Lucy Kate Paul Vicky Mary
	Control group (n = 6)	Sara	-	Rita Celia Elsa Ina Jim
Accuracy and fluency	Experimental group (n = 7)	Mary Lucy	-	Kate Paul Vicky Anne Tracy
	Control group (n = 6)	Rita	-	Jim Celia Sara Elsa Ina
Memorisation	Experimental group (n = 7)	Kate	-	Lucy Paul Vicky Anne Mary Tracy
	Control group (n = 6)	-	Celia Elsa	Jim Sara Ina Rita
Sight-reading	Experimental group (n = 7)	Paul	Mary	Lucy Kate Vicky Anne Tracy
	Control group (n = 6)	-	-	Jim Celia Sara Elsa Ina Rita
Concentration	Experimental group (n = 7)	Lucy	-	Kate Paul Vicky Anne Mary Tracy
	Control group (n = 6)	Celia	-	Jim Sara Elsa Ina Rita

The information in Table 8.1 shows that not all participants received comments with regard to a particular aspect of piano performance. In addition, the data in Table 8.1 reveal that

participants in the experimental group mostly needed to improve on more aspects of their piano performance than participants in the control group did. Figure 8.1 illustrates the ranking of the aspects in which participants needed improvement, as well as the distribution of these aspects between the experimental and control group.

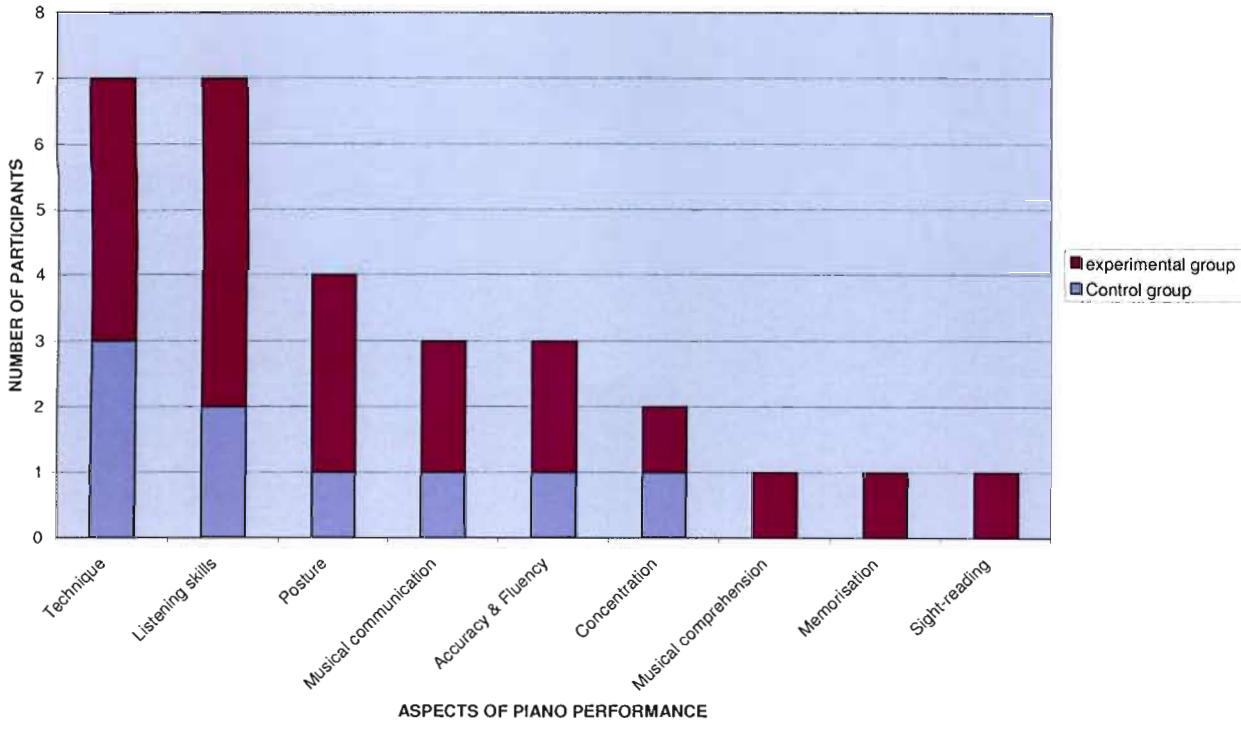


Figure 8.1 Piano lecturers' perceptions of aspects of participants' piano performance that needed improvement: Ranking of aspects and distribution between groups

Although all participants needed to improve one or more aspects of their piano performance, some participants needed to improve on more aspects than others did. Figure 8.2 illustrates the extent of improvement individual participants needed regarding their piano performance.

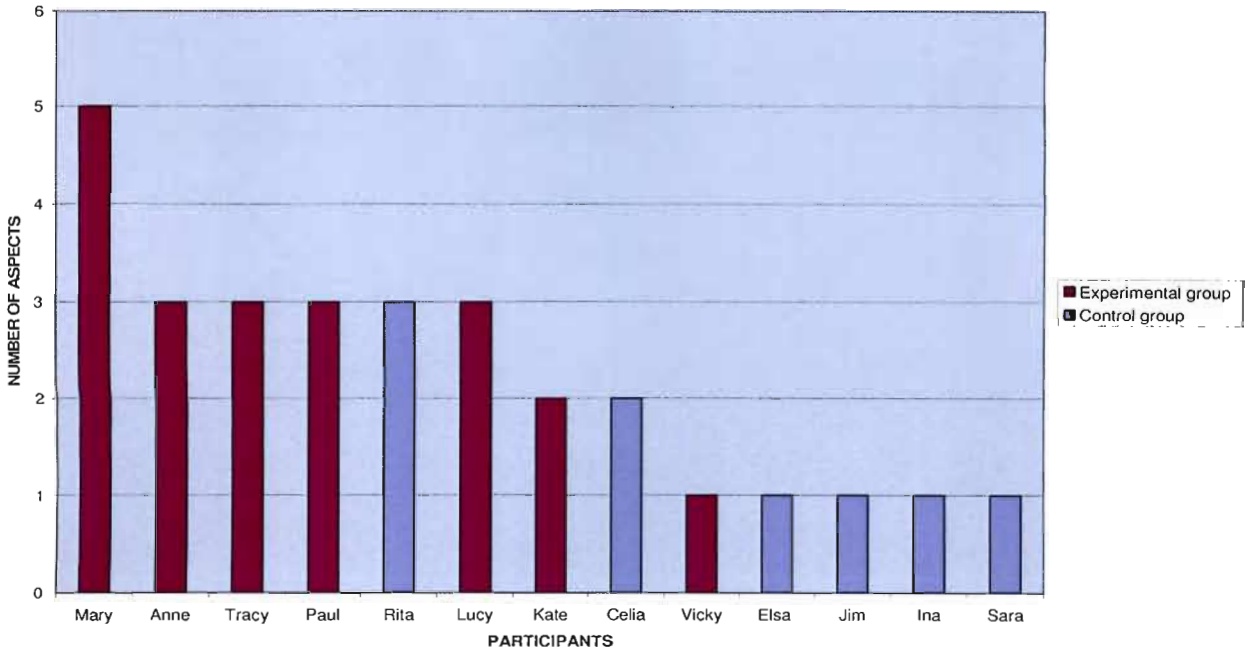


Figure 8.2 **Piano lecturers' perceptions: Extent of improvement individual participants needed regarding their piano performance**

8.2.2 Interviews with Participants

Semi-structured interviews with all the participants took place in October 2006, shortly before the participants' piano examinations, and approximately four months before the experimental group's exposure to the Tomatis programme. During interviews, participants were requested to comment on how they experienced themselves as student pianists and which aspects of their piano performance they would like to improve. There were also questions that related to music performance anxiety.

8.2.2.1 Piano performance in general

Participants commented on their general impression of their piano performance and their self-confidence.

General impression

All participants enjoyed playing piano. However, Tracy, Elsa, Ina and Jim did not like to practise piano. Sara, on the other hand, experienced frustration because she had too little time to practise. Lucy and Paul also experienced frustration. Their frustration, however, resulted from awareness of their shortcomings in piano performances. Tracy, Elsa, and Jim felt confined as pianists and experienced frustration in this regard.

Self-confidence

Although they enjoyed playing piano, Mary, Anne, Kate, and Sara experienced self-doubt regarding their piano performance. In order to stay positive with regard to their piano performance, Mary, Kate, and Elsa also needed positive motivation from their piano lecturers. Because Mary easily felt dispirited, she was afraid to undertake compositions that were more challenging.

8.2.2.2 Aspects of piano performance that participants would like to improve

Participants varied with regard to the number of, and the aspects of piano performance they would like to improve. Although Sara only wanted to perform as good before an audience as when she was alone, participants mentioned six aspects related to their piano performance that needed improvement. These aspects were technique, rate of studying new compositions, musical performance, accuracy, concentration, and listening skills.

Table 8.2 summarises participants' comments and indicates whether they were in the experimental or control group. Since Paul indicated that all aspects of his piano performance needed improvement, he was added to all aspects mentioned by other participants.

Table 8.2 Pre-programme interviews: Summary of participants' report on aspects of their piano performance that needed improvement

PARTICIPANTS' REPORT ON ASPECTS OF PIANO PERFORMANCE THAT NEEDED IMPROVEMENT		
Aspect of piano performance	**Experimental group**	**Control group**
Technique	Paul Mary Vicky Kate	Jim
Rate of mastering new compositions	Paul Kate Anne	Jim Celia
Musical performance	Paul Mary Anne Tracy	-
Accuracy	Paul Lucy	Rita
Concentration	Paul Lucy	Elsa
Listening skills	Paul Anne	Ina

The information in Table 8.2 shows that the largest number of participants who agreed on an aspect that needed improvement was five. Figure 8.3 illustrates the ranking of the aspects in which participants needed improvement, as well as the distribution of these aspects between the experimental and control group.

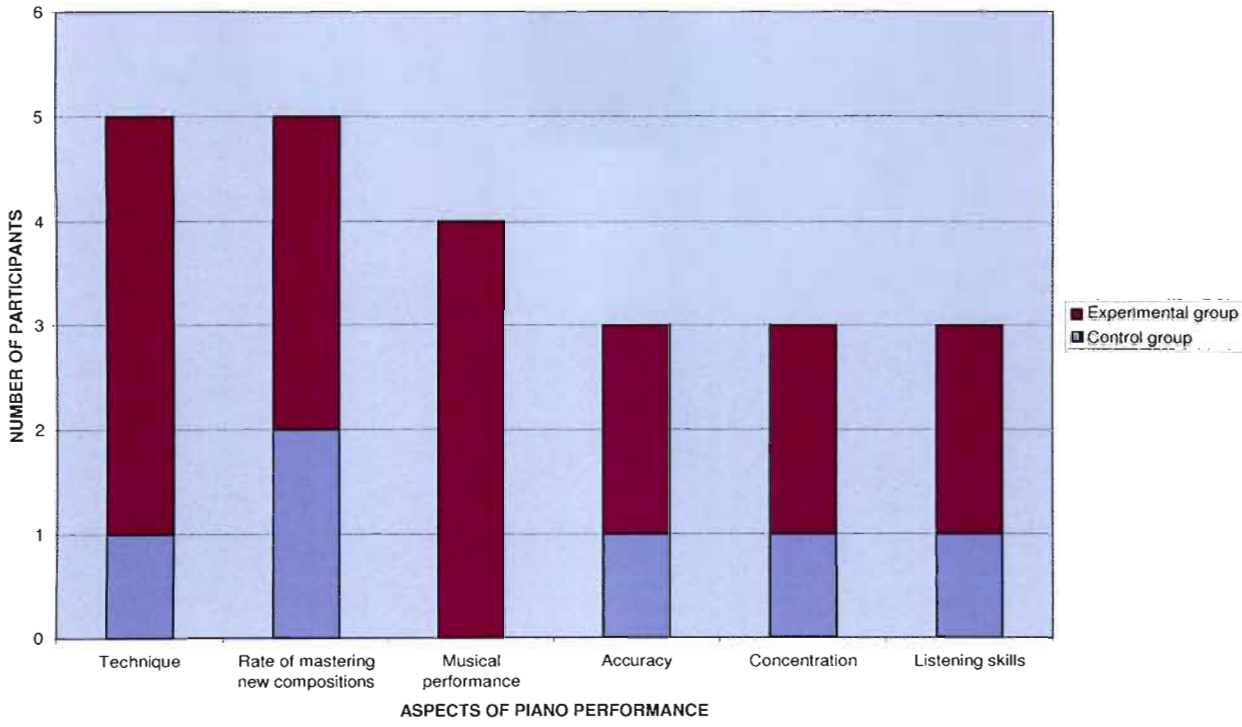


Figure 8.3 **Participants' perceptions of aspects of piano performance that needed improvement: Ranking of aspects and distribution between groups**

The data in Table 8.2 further reveals that, with the exception of Sara, all participants wanted to improve one or more aspects of their piano performance. Figure 8.4 illustrates the participants' perception of the extent to which their piano performance needed improvement.

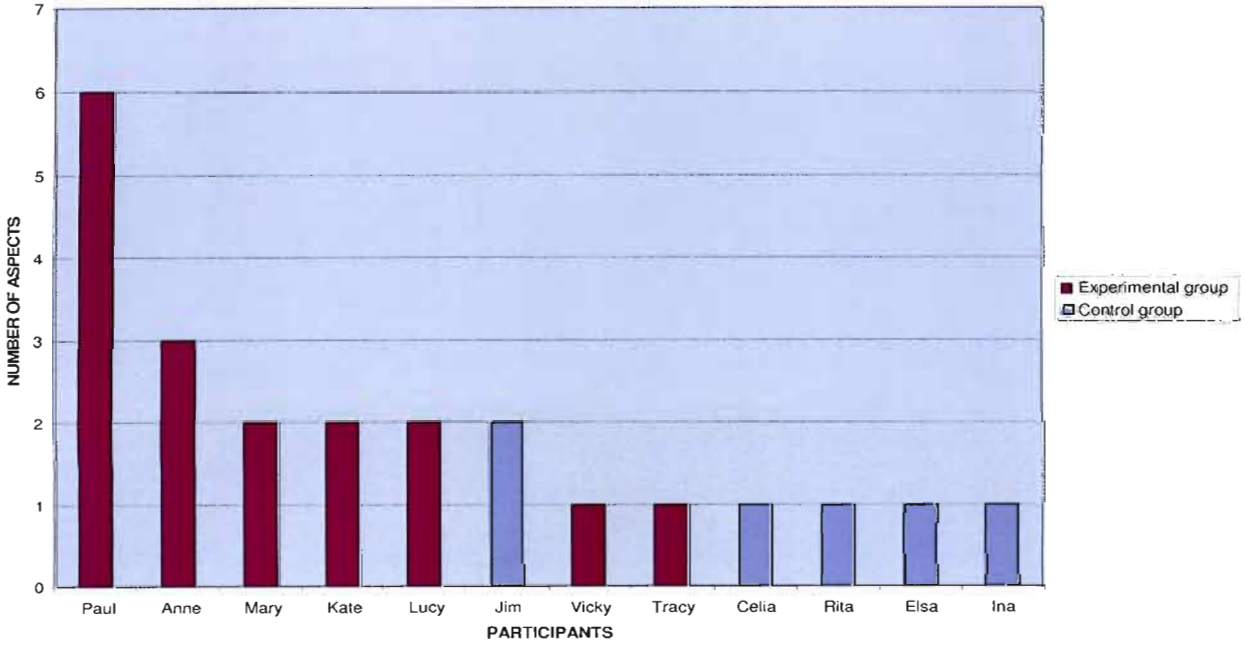


Figure 8.4 **Participants' perception of the extent to which their piano performance needed improvement**

8.2.2.3 Music performance anxiety

Participants revealed whether they experienced music performance anxiety. They further commented on their anxiety and sleep pattern before a piano performance, as well as their thoughts during their piano performance.

Experience of music performance anxiety

With the exception of Jim, all the participants experienced music performance anxiety. Jim only experienced music performance anxiety when his work was not sufficiently prepared.

Anxiety before piano performance

Ina, Mary, Tracy, Kate, and Anne were anxious before their piano performances. Anne ascribed her anxiety to her procrastination. Elsa felt stressed the day before the performance, but not on the day of her performance. Lucy's anxiety before her performance depended on her preparedness for the performance.

Although Celia and Paul were anxious before their piano performances, they purposefully tried to calm themselves. Because of his anxiousness, Paul struggled to focus.

Sleep pattern before piano performance

Lucy, Tracy, Vicky, Paul, Ina, and Celia slept restlessly the night before a performance. The other participants experienced their normal sleep pattern.

Thoughts during piano performance

Although Elsa, Celia and Rita focused on the music they were performing, it was not the case with other participants. Sara, Vicky, Tracy, and Mary had thoughts about the audience's evaluation of their piano performance, while Kate was aware of her shortcomings during her piano performance. Anne, Ina, and Jim's thoughts wandered, whereas Paul thought about nothing.

8.2.3 Summary of Pre-Programme Reports

Piano lecturers' responses on piano performance involved all thirteen participants. Only Anne received comments with regard to the majority of themes. Although thirteen themes emerged from the data analysis, lecturers' observations mainly consisted of remarks on participants' musical comprehension, technique and listening skills. The majority of the thirteen themes (seven) involved more participants in the experimental group than in the control group. Three of these seven themes – self-confidence, rate of studying, sight-reading – involved only experimental group participants. In addition, piano lecturers' comments indicated that experimental group participants needed to improve in relation to more aspects of their piano performance than those in the control group.

Nine themes emerged from the data analysis of participants' reports. Paul was the only participant whose responses related to the majority of themes. Since they were asked about it, only music performance anxiety rendered responses from all participants. More participants in the experimental group than in the control group made comments relating to seven of the other identified themes. Of these seven themes, only experimental group participants commented on musical performance. In addition, experimental group participants' reports indicated that their piano performances needed to improve to a greater degree than those of the control group.

Participants and their piano lecturers agreed with regard to certain aspects of the participants' piano performance. Both data sources commented on the participants' self-confidence with regard to their piano performance, the aspects of their piano performance that needed to be improved on, and their music performance anxiety. The perceptions of the two data sources regarding these aspects are compared in Table 8.3.

Table 8.3 Pre-programme interviews: Comparison of corresponding aspects from participants' and piano lecturers' interviews on participants' piano performance

COMPARISON OF CORRESPONDING ASPECTS OF PARTICIPANTS' AND PIANO LECTURERS' PRE-PROGRAMME INTERVIEWS					
Theme	**Group**	**Piano Lecturer**	**Total number of participants**	**Participant**	**Total number of participants**
General					
Lack self-confidence	Experimental group	Kate Vicky	2	Kate Mary Anne	3
	Control group	-	-	Sara	1
Need approval / positive motivation	Experimental group	Kate	1	Kate Mary	2
	Control group	-	-	Elsa	1
Aspects needing improvement					
Technique	Experimental group	Paul Mary Anne Tracy	4	Paul Mary Vicky Kate	4
	Control group	Jim Rita Ina	3	Jim	1
Musical performance (Includes musical comprehension & communication	Experimental group	Mary Anne Tracy	3	Mary Anne Tracy Paul	4
	Control group	Sara	1	-	0
Accuracy	Experimental group	Lucy Mary	2	Lucy Paul	2
	Control group	Rita	1	Rita	1
Concentration	Experimental group	Lucy	1	Lucy Paul	2
	Control group	Celia	1	Elsa	1

COMPARISON OF CORRESPONDING ASPECTS OF PARTICIPANTS' AND PIANO LECTURERS' PRE-PROGRAMME INTERVIEWS (CONTINUED)					
Theme	**Group**	**Piano Lecturer**	**Total number of participants**	**Participant**	**Total number of participants**
Aspects needing improvement (continued)					
Listening skills	Experimental group	Anne Mary Kate Lucy Vicky	5	Anne Paul	2
	Control group	Rita Celia	2	Ina	1
Music performance anxiety	Experimental group	Paul Anne	2	Paul Anne Lucy Vicky Kate Mary Tracy	7
	Control group	Rita Elsa	3	Celia Rita Elsa Ina Sara	5

The information in Table 8.3 shows that in addition to corresponding themes, the two data sources agreed on at least one participant per theme. Music performance anxiety was the theme which rendered the largest number of participants (four) who agreed with their lecturers, followed by technique and musical performance (three). Figure 8.5 illustrates the correspondence between data sources with regard to themes related to piano performance.

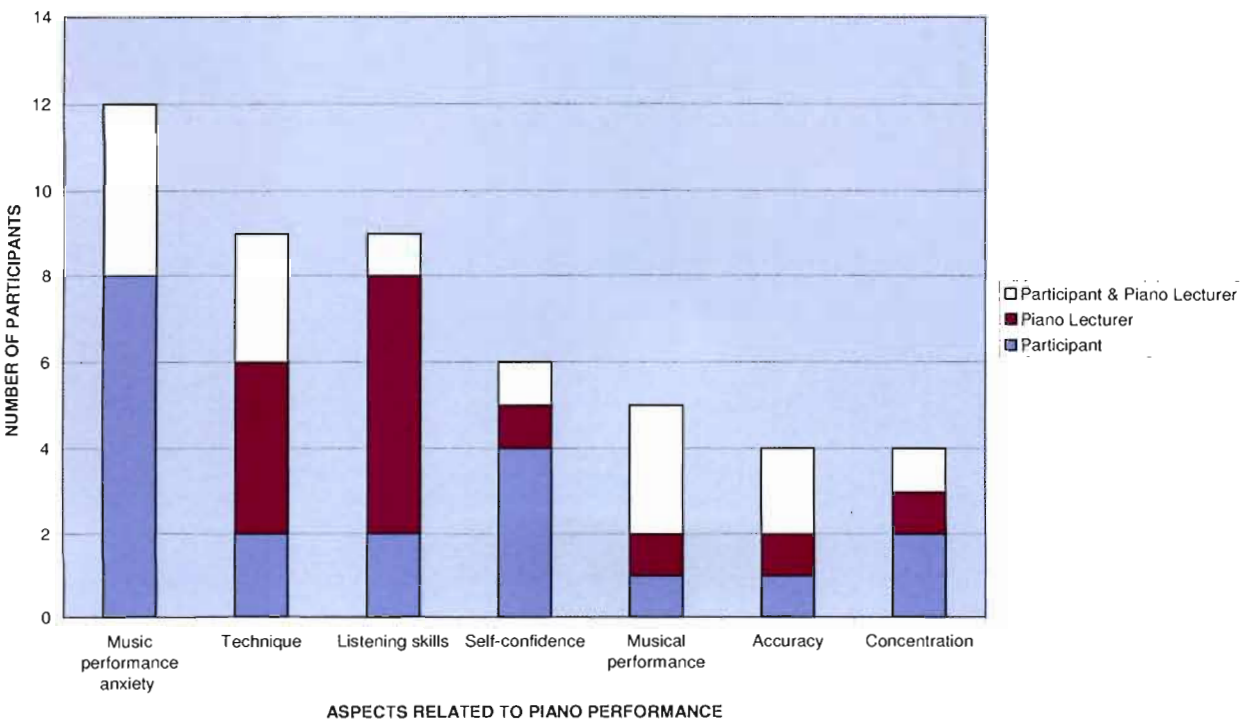


Figure 8.5 **Pre-programme interviews: Correspondence between piano lecturers and participants on themes regarding piano performance**

The information in table 8.3 further shows that the extent of agreement among the two data sources differed with regard to individual participants. Experimental group participants agreed more often with their piano lecturers than those in the control group did. Figure 8.6 illustrates the correspondence between data sources regarding individual participants' piano performance.

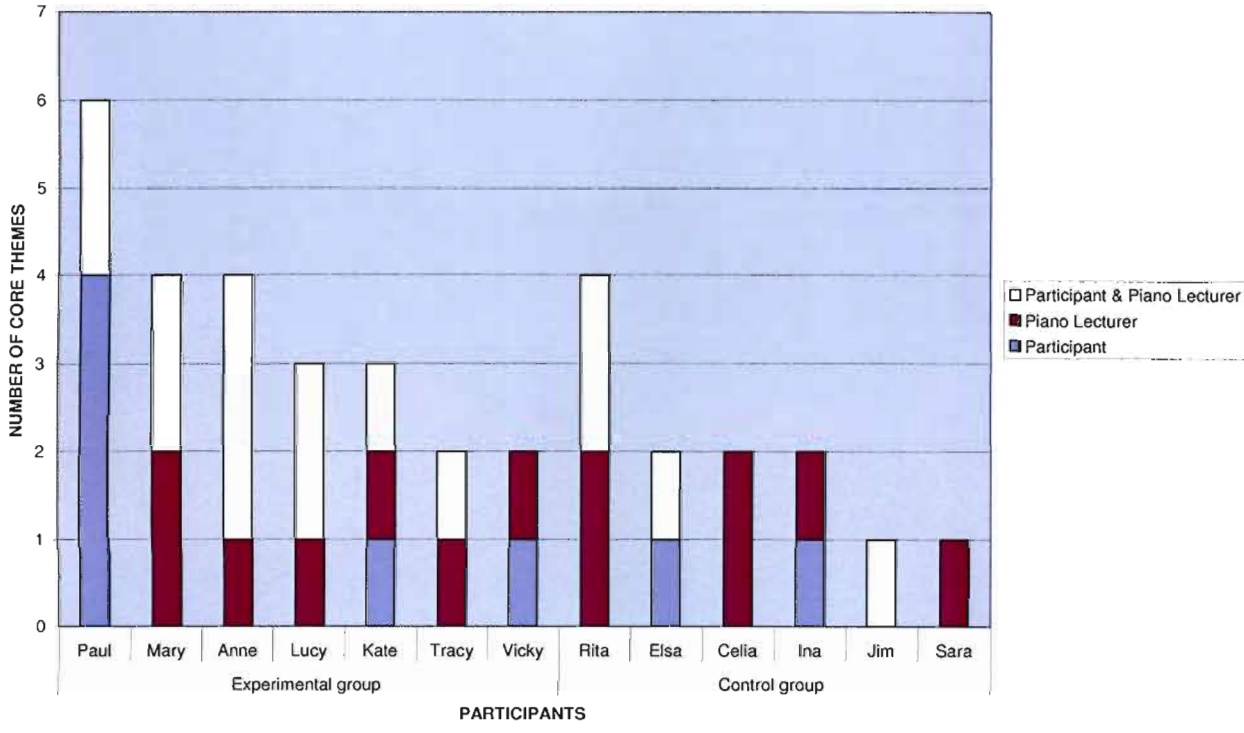


Figure 8.6 **Pre-Programme interviews: Correspondence between individual participants and their piano lecturers regarding their piano performance**

8.3 IN-PROGRAMME DATA

In order to monitor the experimental group's experiences and progress, qualitative data obtained during the programme consisted of daily informal interviews with each of the participants, weekly group discussions, the researcher's own observations, and four projective drawings by each participant. Data from the interviews, group discussions and observations will be presented first, followed by data from the projective drawings.

8.3.1 Interviews, Group Discussions, and Observations

Since information from the interviews, group discussions and observations overlap, it will be presented as a unit. This data demonstrate the effect of the Tomatis Method on participants' piano performance during their exposure to the programme. An analysis of the data rendered three core themes, which indicate effects on the participants' concentration, music performance anxiety, and listening skills.

8.3.1.1 Concentration

Tracy was the only participant who did not report any change in her ability to concentrate during the programme. Anne, Mary, Lucy and Paul found themselves to be absentminded, confused, or forgetful during the passive phase. Paul, Anne and Vicky also struggled to concentrate during the passive phase, while Kate concentrated well during the passive phase but had problems concentrating during the active phase.

During the active phase, Vicky reported that her concentration was better than before the start of the programme, and she did more work in a shorter period. She also concentrated and focussed exceptionally well while practising, but was extremely tired afterwards.

8.3.1.2 Music performance anxiety

Three participants reported on music performance anxiety. Vicky, Kate, and Lucy found they coped better with music performance anxiety during the active phase.

8.3.1.3 Listening skills

During the programme, all participants became aware of change in their listening skills, including awareness of surrounding sounds, sensitivity to loud sounds, awareness of intonation, and more acute or focussed listening. Table 8.4 indicates when participants became aware of changes in these aspects of listening.

Table 8.4 In-programme awareness of change regarding listening skills

AWARENESS OF CHANGE REGARDING ASPECTS OF LISTENING DURING THE PROGRAMME						
Sub-theme	**Passive Phase**			**Active Phase**		
	1st Week	**2nd Week**	**3rd Week**	**1st Week**	**2nd Week**	**3rd Week**
More aware of surrounding sounds		Paul Mary	Lucy			
Loud sounds hurt ears	Anne	Tracy			Lucy	
More aware of pitch and intonation		Vicky		Anne		Lucy
More acute listening	Paul	Kate			Lucy	Vicky
Listen to own piano performance		Kate				Kate Vicky

The information in Table 8.4 shows that all participants became aware of changes in their listening during the passive phase of the Tomatis programme.

Awareness of surrounding sounds

Paul and Mary experienced an episode where their ears were suddenly "open" to all surrounding sounds and that they could not focus their listening, which made them very anxious. Paul's ears adapted after a while, and Mary's the next day. Although Lucy also experienced her ears to be more "open" to all sounds, everything just sounded "clearer", and she found this ongoing experience pleasant.

Sensitivity to loud sounds

During the passive phase, Anne and Tracy experienced that loud sounds physically hurt their ears. Lucy only reported more sensitivity to loud sounds during the active phase.

Awareness of intonation

Vicky's intonation while playing violin improved during the passive phase. During the active phase, Lucy became more aware of her intonation when singing, and Anne became even more aware when someone did not sing or play in tune.

Acute listening

During the passive phase, Paul as well as Kate reported more acute listening, while Lucy and Vicky experienced more acute listening during the active phase. Vicky further indicated that she could focus on a specific aspect when listening to music, which was a novelty to her.

Listening to own piano performance

During the passive phase, Kate related that for the first time ever, she had an "inner sound image" before producing the sound on the piano. She also heard when the sound that she produced differed from her "sound image". During the active phase, she could hear how poor her piano performance really sounded, and found it very disturbing. She was also more aware of her sound production, and which techniques she should use to improve it. During the active phase, Vicky became aware that she listened more to her own piano performance.

Summary

All participants became aware of changes in their listening during the programme. Four of the seven participants' listening was more acute. Awareness of surrounding sounds, sensitivity to loud sounds, and awareness of pitch each received comments from three participants, and two participants became aware that they started to listen to their own piano performance.

Lucy perceived change regarding four sub-themes, followed by Vicky (3). Kate, Anne, and Paul commented on two sub-themes each. Mary only became more aware of surrounding sounds, and Tracy of more sensitivity to loud sounds.

8.3.2 Projective Drawings

Participants made four drawings. Towards the end of the first and third weeks of each phase, participants were requested to create a drawing that reflected their current experience of themselves as thinking, feeling, communicating and music making individuals. They could use a metaphor, and were requested to write a brief explanation of the drawing on the back of the paper.

Since all Lucy's drawings predominantly depict her experience of her piano performance at that time, her drawings are presented in this chapter. The other participants' drawings were presented in Chapter 7. Reference will be made to the relevant drawings.

All participants referred to their piano performance in their first drawings. With the exception of Tracy (Figure 7.7) who was unhappy and uncertain regarding her music studies in general, all of them enjoyed playing piano. Although Kate (Figure 7.5) enjoyed playing piano and found it therapeutic, she perceived that she was not good at it. Mary (Figure 7.8) and Paul did not mention piano performance again in any of their other drawings.

In her following drawings, Tracy was unmotivated to practise, while Anne enjoyed making music but learned slower and practised less because of a lack of time. In all her subsequent drawings, Kate (Figure 7.5) depicted her frustration with what she regarded as her poor performance. She did however experience progress in the fourth drawing although she perceived it as being extremely slow (see chameleon).

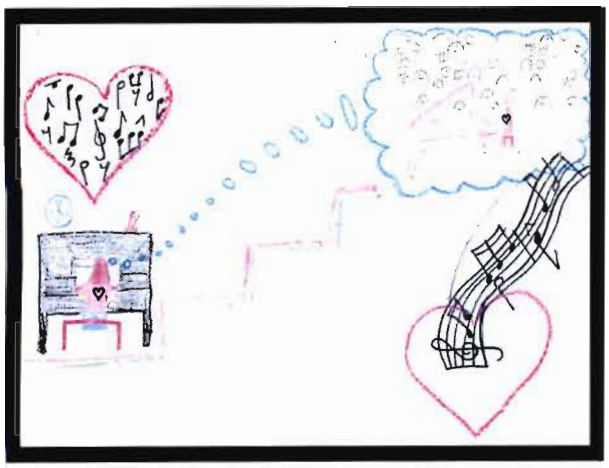
Vicky and Lucy also perceived progress in their piano performance. In her second drawing, Vicky (Figure 7.4) mentioned that she mastered her work faster and had a better grasp of the essence or character of a composition. She also noted that she listened differently to music, but could not pinpoint the difference. The fourth drawing portrayed her increased self-confidence regarding her piano performance. She also criticised herself less while she performed, and focussed less on the audience.

Figure 8.7 illustrates that Lucy's piano performance was central in all her drawings. In her first drawing, she depicted her dream and saw herself primarily as a music-making person in the process of getting to her destination. Note that she is at the bottom of the stairs. Drawing 2

reflects her frustration with the slowness of the process. She felt boxed in regarding her creativity and music making and that nobody understood her dream. Without feeling discouraged, she realised that her frustration was part of the process and she still had hope. Observe the sun (hope) and that she is now on a stair instead of at the bottom of the staircase.

In Drawing 3 she enjoyed making music again, made peace with other people's perception of her performance, and experienced herself as having unlimited potential. Notice that the keyboard goes beyond the flower border (unlimited potential), and its upward line could be compared to a staircase, portraying her progress since the first two drawings. In Drawing 4, she felt like a "colourful musical butterfly". To a certain extent, she now had her wings and felt free. The asymmetry of the butterfly denotes that she knew she still had a lot to learn.

Drawing 1



Drawing 2

Drawing 3

Drawing 4

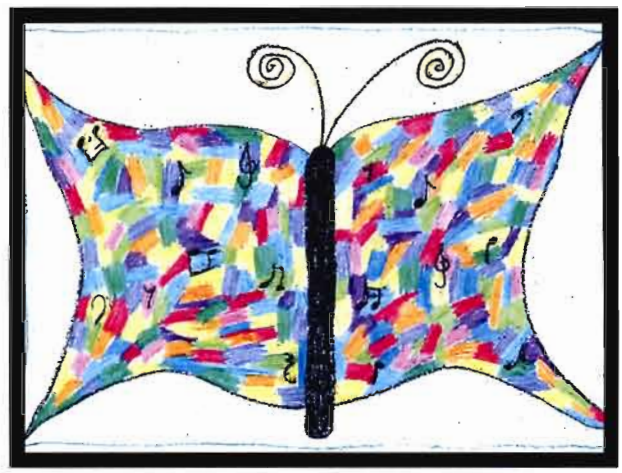


Figure 8.7 Lucy: Drawings 1 – 4

7.4.3 Summary of In-Programme Results

Results from data obtained during the programme from interviews and projective drawings indicate that participants perceived change in relation to musical comprehension, rate of mastering new compositions, self-confidence, general progress, concentration, listening skills and music performance anxiety. Perceived changes mainly occurred in relation to concentration and listening skills.

With the exception of Tracy, all participants experienced fluctuating levels of concentration during the programme. However, Vicky reported improved concentration during the active phase, and that it was better than before the programme. Although all participants became aware that their listening skills improved, only Vicky and Kate reported that they listened more attentively to their own piano performance.

Table 8.5 summarises participants' perceived changes in relation to piano performance, and indicates whether the perceived changes were positive or negative. Even though only one participant reflected change regarding musical comprehension as well as self-confidence in piano performance, it is included in this table because these themes occur in pre as well as post programme results.

Table 8.5 In-programme results: Participants' perceived changes in relation to piano performance

PIANO PERFORMANCE: PARTICIPANTS' PERCEIVED CHANGES DURING THE PROGRAMME			
Core Theme	**Positive Change**	**Negative Change**	**Total Number of Participants (n = 7)**
Listen to Own Piano Performance	Vicky Kate	-	2
Musical Comprehension	Vicky	-	1
Rate of Mastering New Compositions	Vicky	Anne	2
Self-Confidence	Vicky	-	1
General Impression	Vicky Kate Lucy	-	3
Concentration	Vicky	Anne Mary Paul Lucy Kate	6
Music Performance Anxiety	Vicky Kate Lucy	-	3

Information in Table 8.5 indicates that Vicky, Kate, and Lucy were the only participants who reflected positive change during the programme. Vicky perceived change in connection with all the themes, followed by Kate (3) and Lucy (2). All three these participants perceived positive changes in relation to general progress and music performance anxiety.

8.4 POST-PROGRAMME INTERVIEWS AND WRITTEN REPORTS

Data collected after completion of the Tomatis programme included interviews with participants' piano lecturers[11], interviews with other lecturers who knew the participants before and after the programme, and interviews with experimental participants. Each participant also wrote a report on their experiences and observations during and after their exposure to the programme.

In this section, data collected from these interviews and written reports will be presented. Data collected from participants' interviews and written reports will be presented first, followed by data from interviews with their piano lecturers, and lastly data from interviews with their other lecturers.

8.4.1 Written Reports and Interviews of Experimental Group Members at One Week and Three Weeks Post-Programme Respectively

After completion of the programme, participants were requested to write a report on their experiences during and after the Tomatis programme, as well as on any changes that they became aware of. These written reports were collected a week after completion of the Tomatis programme.

Semi-structured interviews with the participants in the experimental group took place approximately three weeks after completing the programme, and shortly before their piano performance examinations. During the interviews, they were requested to comment on their experience of their piano performance, music performance anxiety, and listening skills. Participants compared their experiences at that time to their experiences prior to the Tomatis programme. They were also invited to mention changes and/or new experiences that took place after completion of the programme, and anything else that came to mind.

Seven core themes, one with sub-themes, emerged from the data analysis. Participants commented on how they perceived their own piano performance, self-confidence, musical communication, concentration, rate at which they mastered a new composition, music performance anxiety, and listening skills.

[11] With the exception of the piano lecturer who attended the programme, lecturers mostly did not know whether participants were in the experimental group or the control group.

Data from the interviews and written reports either overlap or complement each other. Therefore, they are presented as a unit. The presentation of the results is followed by a summary.

8.4.1.1 General experience of own piano performance

Participants' responses varied with regard to how they experienced themselves as pianists. Four had negative perceptions regarding their own piano performances, while three noted a positive change.

Tracy said she experienced frustration regarding her piano performance. The previous day she also felt as if she never wanted to touch a piano again after the end of the year. She did not indicate whether her experience of her own piano performance had changed.

Kate's perception of her own piano performance had not changed. She tended to compare her own piano performance with that of other students and perceived her performance as poor and sloppy. She even experienced more problems with playing fluently. For the past three weeks, she felt anxious when having to touch the piano, almost as if it was her biggest enemy.

Mary experienced herself as a poor pianist. Although she enjoyed playing piano, she did not feel motivated to practise and felt frustrated and easily dispirited. Although she knew what she was capable of, she did not realise her potential and perceived "a wall or something blocking her way". She did not indicate whether she always felt this way about her piano performance.

Although Anne experienced her piano performance as poor, she started to enjoy practising and felt motivated, but found it frustrating when she put everything together and it felt as if it just did not work. Her fingers felt clumsy as if she experienced even more technical problems than before.

Paul related that he recently started to feel better about himself with regard to his piano performance. He conveyed that he did not even want to touch the piano during the previous two weeks, but now felt motivated to practise. Although still frustrated with his studies, he felt positive regarding his music, enjoyed playing again, and practised more systematically than before. He attended to fingering and accurate notes, and did not attempt to play only from hearing as he did before.

Vicky stressed less about her piano performance, and memorised more easily. Previously, she remembered the compositions mainly visually, but recently started to follow her ear. In contrast

to her earlier state of being driven by ambitions, her only desire now was to give a good quality performance. This was a new experience, since previously she was more concerned about playing correctly. Although she practised more intensively, she did not know whether her piano performance improved. She knew that she should be willing to be more vulnerable, but tended to hold back because she felt too shy to give everything and was afraid of appearing ludicrous.

Lucy started to enjoy playing again and found it rewarding. During her first and second year at university, she felt as if her 'flame' was somewhat extinguished. After the listening program, the 'flame' was lighted again and she regained the desire to play for an audience. She still felt as if her potential as a pianist was underestimated but that motivated her and she did not feel dispirited.

8.4.1.2 Self-confidence

Lucy said that although she did not see herself as a pianist yet, she had more self-confidence with regard to her own playing and was not afraid of playing in front of others anymore. Tracy said she experienced self-doubt regarding her piano performance, but did not indicate whether this experience was different from prior to the programme.

8.4.1.3 Musical communication

Lucy and Paul were more able to communicate through their piano performance. Lucy felt more able to play from her heart, and Paul could communicate emotions through his piano performance, which he found impossible before. According to him, this newfound ability might stem from the fact that he experienced emotions more intensely than before.

8.4.1.4 Concentration

All participants in the experimental group commented on their ability to concentrate. Vicky, Lucy, Paul, Mary and Anne reported increased concentration, while Kate experienced a lack of concentration, and Tracy noticed no change.

Vicky further noted that she did more and better work in less time. Paul echoed this sentiment and added that his improved concentration and work tempo might be the result of a gain in self-confidence. Although she always focussed well, Lucy perceived a slight improvement concerning piano performance. In contrast, Mary lost concentration when practising piano, but ascribed it to exhaustion. She did, however, perceive some improvement in work tempo regarding her academic work.

Anne became so focused on ordinary activities, i.e. making coffee, that it was almost as if nothing else existed – to such an extent that when somebody suddenly spoke, she startled easily. This intense focus was a novel experience, but according to her, did not extend to her studies. She related that she always concentrated with difficulty, and although she now found it easier to focus, it resulted from a conscious decision.

Although she studied more productively during the programme, it now took Kate longer because of poor concentration, due to fluctuating, negative emotions. Tracy always had problems with concentration, and her ability to focus depended on whether or not she was interested in what she was doing.

8.4.1.5 Rate of mastering new compositions

Lucy, Paul and Vicky found it easier to master new compositions and did so more rapidly. Paul thought that enhanced self-confidence had much to do with it. Vicky "saw" a composition in its entirety, thus making the learning process easier. Tracy and Anne experienced the opposite, and felt they mastered a new composition slower than before.

8.4.1.6 Music performance anxiety

Two participants' music performance anxiety seemed to be unchanged, one experienced a worsening, and four experienced less music performance anxiety. Paul, Vicky, Lucy, and to a lesser degree Kate, indicated a reduction in music performance anxiety.

Paul, Vicky, and Lucy reported that they experienced less anxiousness prior to a performance. Their thoughts also wandered less during their piano performance, and they focussed more on the music. Paul's thoughts previously started to wander while he performed, or he just played without thinking about anything. However, for the past few days, he consciously tried to focus on the music and found that it worked much better.

Vicky and Lucy indicated that they were less aware of the audience during a performance. Vicky was "sort of in her own world", where it was just she and the piano, while Lucy now listened to how her performance sounded. Vicky added that she consciously did not fret anymore, and trembled less while performing. Lucy almost never trembled during a performance anymore. Both of them now carried on performing in spite of mistakes.

Kate, however, indicated that when she made a mistake everything disintegrated and it sounded sloppy. Although she felt less anxious while performing, she still could not think, felt afraid of the notes, her thoughts wandered and she was even more aware of the audience

than before. Anne, Mary and Tracy also confessed to wandering thoughts while performing. Mary was concerned about how the audience would evaluate her performance, while Anne worried whether her lecturer would think it was good enough. Although she consciously tried to be calm during her performance, and listened to the sound before her thoughts wandered, everything usually disintegrated at some point.

Even though Anne was sometimes stressed before a performance, she felt calm during the past week because she realised it did not help to stress about the performance. Kate conveyed that she always tried consciously to calm herself before a performance, and felt that her anxiety might have lessened. Mary still experienced music performance anxiety, and Tracy experienced it as worse.

8.4.1.7 Listening skills

Participants in the experimental group became more aware of their listening skills and commented on changes perceived in this regard. Since the improvement of listening skills is central to the Tomatis Method, all reports on awareness of change in listening skills are presented. Participants' comments included listening to their piano performance, awareness and experience of their own voices, and awareness and experience of sound in general.

Listening to own piano performance

Tracy did not observe any change in her listening, while Paul, Anne, Mary, Lucy, and Vicky indicated that they attended better to their own piano performance. Paul and Anne were more aware of sound production. Though she did not always know how to correct it, Anne could hear when something sounded wrong. Mary thought she listened better since she heard when her accentuation was faulty.

Vicky noticed when she left things out, when her playing sounded sloppy or her technique was not efficient. When something did not sound right, she looked for the reason and tried to correct it. She could focus more on specific aspects of her piano performance, like bringing out a melody, which had been impossible before. This ability was more pronounced when she just listened to music.

Lucy noted that her listening skills had improved and that her ears were 'tuned'. She qualified her observation by saying that she was more aware when her playing did not sound good, and noted that she was more aware of what she was doing and hearing. Her post-programme listening test shows that right-ear dominance improved.

Awareness and experience of own speaking voice

Six experimental group participants noted that they became more aware of their own voices. Of these, only Anne experienced it as unpleasant.

Paul added that his voice sometimes irritated him because he became aware of its 'scratchiness'. He further observed that he articulated his words more clearly and was aware when he did not.

Mary experienced her voice as sounding clearer and deeper. Tracy also mentioned that she sometimes experienced her own voice as sounding deeper, but that it did not feel strange. She further noted becoming aware of listening to her own voice sometimes. Since she did not find the experience weird, she thought she was previously merely not **aware** of listening to herself.

Anne did not like being more aware of her own voice and found it "weird". She further related that it is as if she heard her voice from inside herself. Vicky made an observation that tied in with Anne's last comment. She observed that it was almost as if she previously heard herself from a distance and now she heard her voice as it was. She did not sound strange to herself anymore.

Lucy was more aware of her 'singing' voice but not of her 'speaking' voice. She sang more, and listened more to herself when singing. It was as if she had discovered the potential of her own voice and enjoyed it more. Even when just singing to herself, she tried to sing more beautifully.

Awareness and experience of sound in general[12]

Mary, Tracy and Anne reported that they experienced their ears as more sensitive to loud sounds than before. Particularly Mary's listening curve shows a strong ascending line with regard to higher frequencies. Tracy added that she always preferred bass sounds and had previously adjusted her listening equipment (hi-fi) accordingly when listening to music. Now she only turned the volume down.

Anne was immediately aware when someone did not sing on pitch and it irritated her more than before. She experienced her left ear as more sensitive to sound. Sudden loud sounds startled her, and since she now heard more sounds, even the sound of air conditioning disturbed her when she tried to focus on something.

[12] Reference to individual participants' Tomatis Listening Tests will be made where applicable.

Paul noted that although his ears were more 'open', he had the ability to "switch them on and off". This was something he could not do before. He was also more aware of how other people's voices sounded.

Like Paul, Vicky also could listen more selectively. When she listened to music, she could isolate something and just listened to that while the rest of the sounds were in the background. The first sign of changing listening skills occurred when she became aware that she started and ended in the same key when practising a scale on the violin. She was also aware of sounds she did not hear before and was more aware of what she was hearing. Previously she was more visually aware, but it felt as if she started to combine the visual and auditory, and listened more than before. She further detected that she was even more attuned to people's tone of voice, and tended to make conclusions from that regarding the context of their words. Vicky's Listening Tests show that her ears were 'closed' for frequencies above 4000 Hz prior to the programme, while they were 'open' with regard to these frequencies after completion of the programme.

Lucy also noted that her hearing was 'sharper' than before and she was more attuned to ambient sounds. She heard sounds more clearly and interpreted them more accurately. She further observed that the high tones on the marimba hurt her ears and that she was more aware of "pleasant and unpleasant" sounds.

8.4.1.8 Summary of experimental group participants' post-programme reports

All experimental group participants described their experiences of their piano performance at that time. Their comments were richer than just indicating positive, negative, or no change, and it seemed as if three of them perceived positive change. Although four perceived their piano performance negatively, only two suggested a negative **change** in their perception. The other two did not indicate whether they experienced change in this regard. The two participants who perceived negative change experienced it in relation to accuracy and technique, respectively.

Participants' reports with regard to other aspects relating to piano performance are summarised in Table 8.6. The table portrays participants' perceptions with regard to positive, negative or no change regarding the relevant theme. Instances where participants did not indicate whether their perceptions differed from those prior to the programme, are portrayed as no change. Those who did not comment on a specific topic are also indicated in the table.

Technique and accuracy also appeared in pre-programme reports as well as in post-programme reports of lecturers, and are therefore included in the table, even though these

aspects only rendered responses from one participant each. As far as listening skills are concerned, only perceived changes with regard to piano performance are included in the table.

Table 8.6 Post-programme results: Participants' perceived changes in relation to piano performance

PIANO PERFORMANCE: PARTICIPANTS' POST-PROGRAMME REPORTS OF PERCEIVED CHANGES					
Core Theme	**Positive Change**	**Negative Change**	**Total number of participants**	**No Change**	**No Comment**
Technique	-	Anne	1	-	Kate Mary Tracy Vicky Paul Lucy
Accuracy	-	Kate	1	-	Mary Tracy Vicky Paul Lucy Anne
Self-confidence	Lucy	-	1	Tracy	Kate Mary Vicky Paul Anne
Musical communication	Lucy Paul	-	2		Kate Mary Tracy Vicky Anne
Concentration	Lucy Paul Vicky Mary Anne	Kate	6	Tracy	-
Rate of mastering new compositions	Lucy Paul Vicky	Anne Tracy	5	-	Kate Mary
Music performance anxiety	Vicky Lucy Paul Kate	Tracy	5	Anne Mary	-
Listening skills	Vicky Lucy Paul Mary Anne	-	6	Tracy	Kate

The information in Table 8.6 indicates that participants mostly perceived positive change with regard to concentration and listening skills. Figure 8.8 illustrates the ranking of themes and distribution of positive and negative changes according to the number of participants.

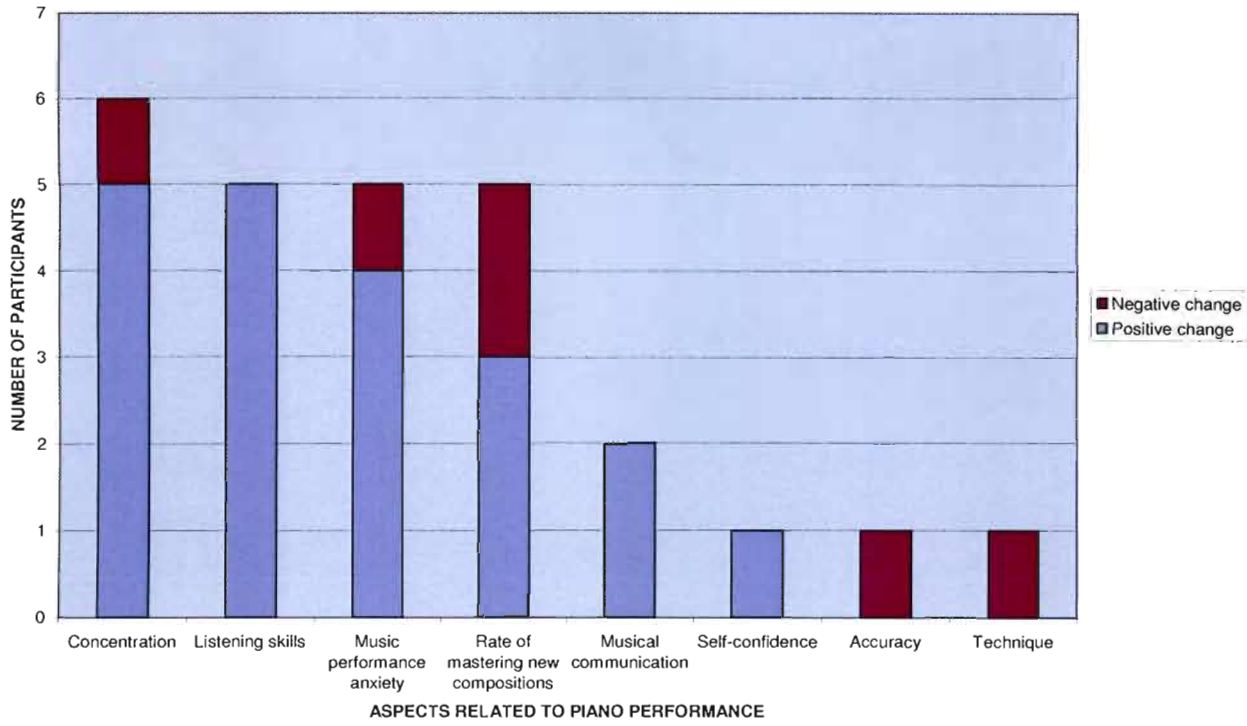


Figure 8.8 **Participants' post-programme reports on piano performance: Ranking of core themes, and distribution of positive and negative change according to the number of participants**

The qualitative data analysis further revealed that participants varied regarding the extent of change they experienced. In addition, their responses were divergent on whether they experienced changes as positive or negative. Lucy experienced most change, while Mary and Tracy experienced the least change.

Although the majority of participants mostly experienced positive changes, Tracy and Kate mostly experienced negative changes, while Anne's perceptions were equally divided between positive and negative experiences. Figure 8.9 illustrates the extent to which each participant experienced change, as well as the distribution of positive and negative change.

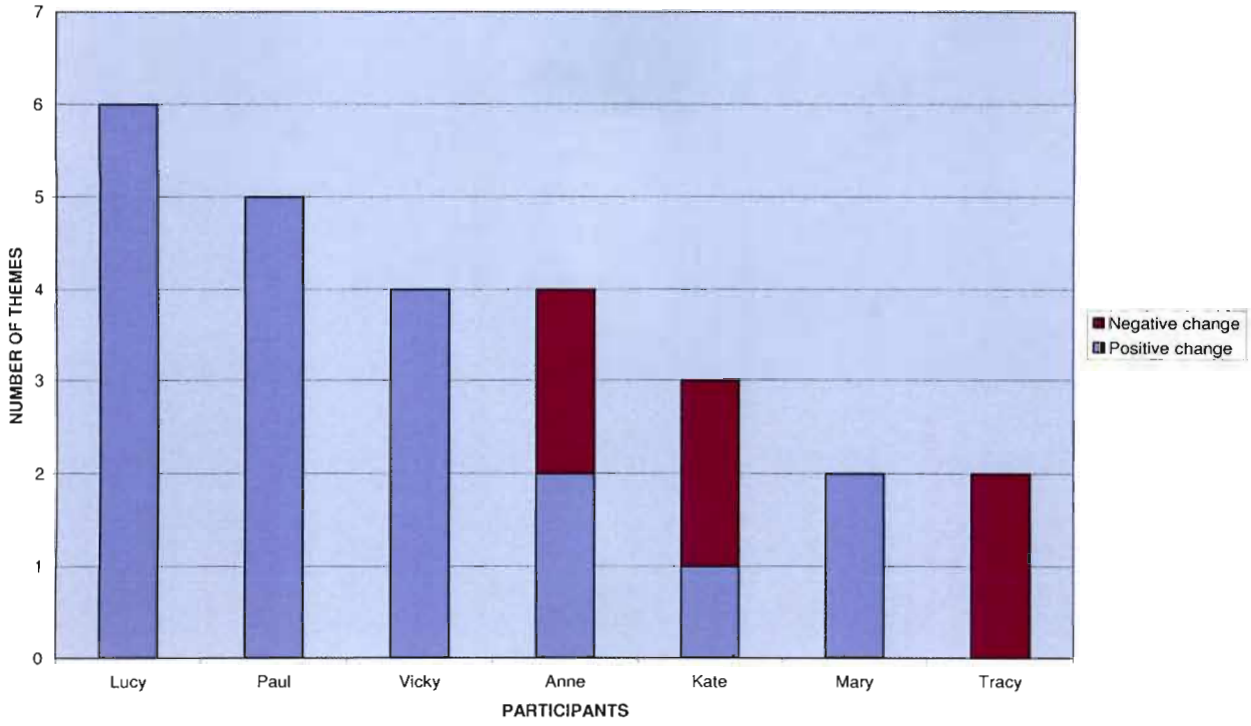


Figure 8.9 **Participants' post-programme reports on piano performance: Extent and nature of individual participants' experience of change according to the number of core themes**

8.4.2 Interviews with Piano Lecturers at Three Months Post-Programme

Semi-structured interviews with each participant's piano lecturer took place approximately three months after completion of the Tomatis programme, and shortly after participants' piano performance examinations. During these interviews, piano lecturers were requested to point out any changes that they observed with regard to the participants' piano performance.

Six themes came to the fore during the qualitative data analysis. Participants' piano lecturers remarked on the accuracy and fluency of participants' piano performances, their rate of mastering new compositions, self-confidence and artistic independence, listening skills, music performance anxiety, and gave a general impression. Additionally, two piano lecturers compared their own students regarding change in their piano performance in general.

A summary of the results and general comments by participants' piano lecturers follow the data on the core themes. The names of participants in the experimental group will be underlined.

8.4.2.1 Accuracy and fluency

Mary, Tracy and Lucy's piano lecturers commented on the accuracy and fluency of their piano performance. Mary and Lucy's performance had improved in this regard, while Tracy still experienced problems.

During the first semester Mary frequently interrupted her piano playing by stopping, whereas now she did not stop as much but carried on playing, thereby producing a more fluent piano performance. Tracy, on the other hand, still had a problem to play fluently. Her lecturer was of the opinion that Tracy's problem with fluency stemmed from lack of practice. Lucy's accuracy improved and she made fewer mistakes.

8.4.2.2 Rate of mastering new compositions

Tracy's lecturer observed that she learnt the notes of a new composition more rapidly and that she seemed more focused than previously. In contrast, it was observed that Anne needed more time to master a new composition than before.

8.4.2.3 Self-confidence and artistic independence

This theme relates to the confidence and artistic independence with which the participants performed their piano pieces. Kate's lecturer noted a reduction of over cautiousness in her performance, and that she seemed less anxious. Mary played with more confidence than in the first semester, and Lucy as well as Elsa had more self-confidence regarding their piano performance. Sara's lecturer thought that her self-confidence stemmed from a natural process of maturation.

Tracy always played with enough self-confidence, but her attitude towards her piano playing seemed to be more positive. Anne, on the other hand, seemed more tense and insecure regarding her piano performance.

Kate and Vicky seemed more capable of evaluating their own piano performance without needing to hear from the lecturer whether it was good or not. Celia, on the contrary, had always been more artistically independent.

8.4.2.4 Listening skills

Remarks were made with regard to three participants' listening skills. Two of these participants' listening skills seemed to have improved. Both were in the experimental group.

Anne's listening had improved and, according to her piano lecturer, she was therefore more aware of her shortcomings. The lecturer also reported that this new awareness of shortcomings might be causing Anne some stress. Paul's listening had also improved, and his lecturer further mentioned that although the sound quality of his piano playing had always been good, it now sounded more 'relaxed'. Rita, on the other hand, knew she had to listen better but it was as if her ears were not yet 'activated'.

8.4.2.5 Music performance anxiety

Four participants received comments regarding music performance anxiety. Paul and Kate seemed to experience less music performance anxiety. Paul seemed more relaxed while performing, and Kate, who had always been nervous when she performed, seemed less nervous now.

Vicky retained her anxiety when she had to perform in someone's presence. Celia, on the contrary, had never seemed affected by music performance anxiety.

8.4.2.6 General impression

Rita showed development and growth with regard to her piano performance, even more so than Anne did. Mary's piano lecturer reported that her piano playing had definitely improved. Lucy's piano performance also showed a lot of progress.

8.4.2.7 Summary of results from piano lecturers' post-programme interviews

Six core themes emerged from the qualitative data analysis of interviews with participants' piano lecturers. Table 8.7 indicates whether the lecturers perceived positive or negative change regarding participants in relation to the relevant theme, and which participants were involved.

Table 8.7 **Post-programme interviews: Changes in relation to participants' piano performance as perceived by their piano lecturers**

PIANO LECTURERS' QUALITATIVE REPORTS OF CHANGES OBSERVED IN RELATION TO PARTICIPANTS' PIANO PERFORMANCE				
Core theme	**Group**	**Positive Change**	**Negative Change**	**Total number of participants (n = 13)**
Accuracy & Fluency	Experimental group (n = 7)	Mary Lucy	-	2
	Control group (n = 6)	-	-	0
Rate of mastering new compositions	Experimental group (n = 7)	Tracy	Anne	2
	Control group (n = 6)	-	-	0
Self-confidence & Artistic independence	Experimental group (n = 7)	Mary Lucy Kate Vicky	Anne	5
	Control group (n = 6)	Elsa Sara	-	2
Listening skills	Experimental group (n = 7)	Anne Paul	-	2
	Control group (n = 6)	-	-	0
Music performance anxiety	Experimental group (n = 7)	Kate Paul	-	2
	Control group (n = 6)	-	-	0
General impression	Experimental group (n = 7)	Mary Lucy	-	2
	Control group (n = 6)	Rita	-	1
Total number of participants (n = 13)	Experimental group (n = 7)	7	1	7
	Control group (n = 6)	3	0	3

The information in Table 8.7 shows that the themes vary regarding the number of participants commented on, and that most positive change was perceived in relation to participants' self-confidence and artistic independence (six participants). Although most of the changes were perceived as positive, negative change was also perceived with regard to one participant. Figure 8.10 illustrates the ranking of core themes, as well as the distribution of positive and negative change.

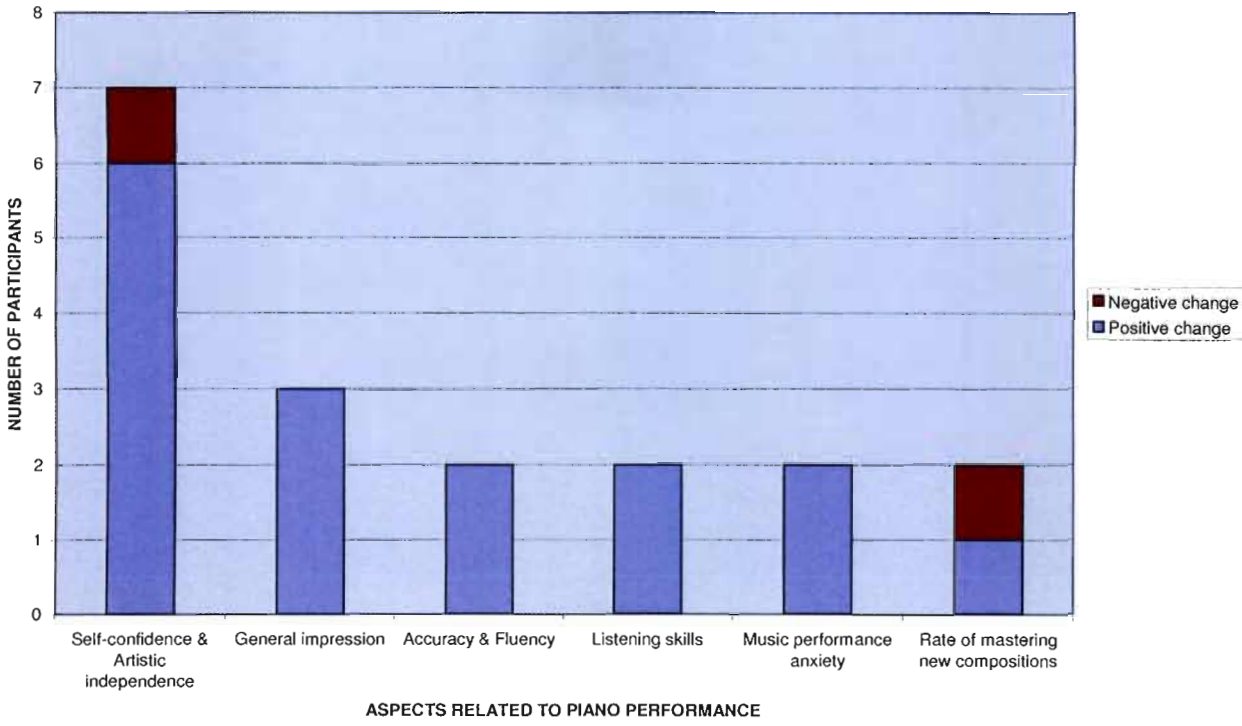


Figure 8.10 **Piano lecturers' post-programme reports on piano performance: Ranking of core themes, and distribution of positive and negative change according to the number of participants**

The data in Table 8.7 further indicate that the lecturers mostly perceived change with regard to participants in the experimental group. Anne was the only participant with regard to whom negative change was observed. Lecturers mostly perceived change with regard to Mary and Lucy. Figure 8.11 illustrates the extent and nature of the participants' change as observed by their piano lecturers.

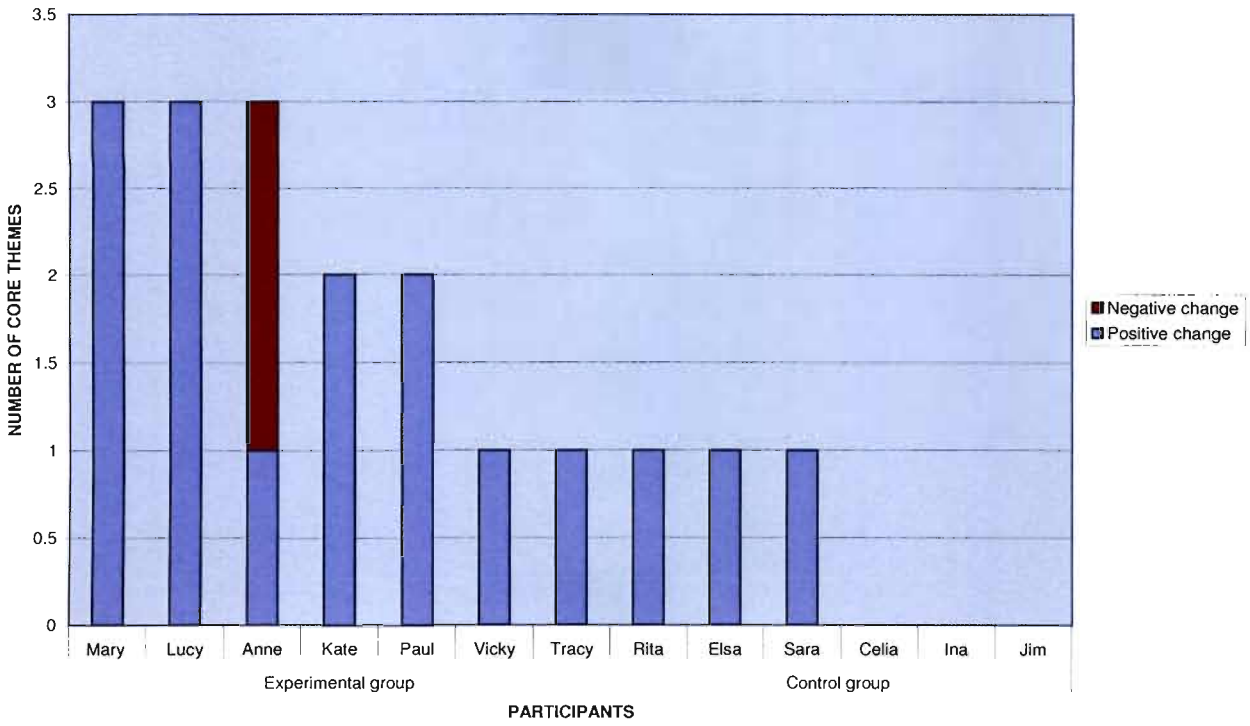


Figure 8.11 **Piano lecturers' post-programme reports on piano performance: Impression of the extent and nature of individual participants' change according to the number of core themes**

8.4.2.8 General comments

Jim, Lucy, Elsa and Sara's piano lecturer thought that all four students did the Tomatis programme. This lecturer rated the students by saying that it seemed as if Lucy benefited most from the programme, followed by Sara, then Elsa, and lastly Jim. The lecturer had nothing to report about Jim. The lecturer further remarked that although Lucy's development was more obvious than that of the other two females, it might be that someone like Sara's development was less obvious because she was a more senior student.

Kate, Vicky and Celia's piano lecturer similarly stated that since Celia was the stronger pianist and more spontaneous person from the beginning makes it more difficult to compare the students with regard to changes. This lecturer further suggested that any development regarding piano performance might rather be relative to the duration of studies, since the students had now taken lessons for a longer period. Therefore, as a lecturer, one would expect positive development.

In accordance with the above, Mary, Tracy and Paul's piano lecturer pointed out that many variables are involved. The lecturer further remarked that since Mary was made aware of

certain things and now attend to them, the improvement in her piano performance in general, had a lot to do with her tuition.

8.4.3 Interviews with Other Lecturers at Six Months Post-Programme

Participants named two lecturers each, in addition to the piano lecturer, who knew them before and after the experimental group's exposure to the Tomatis programme. Since their suggestions overlapped, six other lecturers were then interviewed. The semi-structured interviews took place approximately six months after the experimental group's completion of the Tomatis programme.

Although there was no intention to interview these lecturers in relation to participants piano performance, two of the lecturers[13] offered comments on some of the participants' piano performance. With the exception of Celia and Sara, all participants commented on were in the experimental group. The names of participants in the experimental group will once again be underlined.

Seven participants received comments concerning their piano performance. Positive change was observed regarding five of them, of which four were in the experimental group. The lecturers' comments included remarks on participants' sound production, musical communication, technique, the confidence with which they performed, a general impression of their piano performance, as well as their listening skills. Kate and Vicky's piano performance showed improvement in relation to three of these six aspects, followed by Lucy and Sara (two), and Tracy (one).

Three participants' sound production improved. Lucy showed more sensitivity with regard to tone colour, and Tracy produced a better sound. The quality of sound that Kate produced on the piano had also improved and seemed to be "richer".

Vicky's technique had improved and she communicated her musicality more when she performed. Kate also communicated more through her performance. She further performed with more self-confidence, and seemed more at ease and in control.

The lecturers gave a general impression of five participants' piano performance. Lucy's piano performance was improving, and Vicky showed progress, while Mary and Celia's piano

[13] One of these lecturers was the piano lecturer who attended the programme, and thus knew whether participants were in the experimental or control group. This lecturer provided most of the observations. The other lecturer only commented on a control group participant.

performances did not show any development. Mary's mark for piano performance was also lower during the June examinations, and Celia's performance was not as neat as usual.

One of the lecturers experienced a 'deepening' in Sara's piano performance and said it appeared as if she listened more carefully to the singers while accompanying them. This lecturer was of the opinion that it might stem from Sara's natural emotional growth and growth as an artist, as well as her better insight in genres.

Although it was not in relation to their piano performance, the aural training lecturer reported on Paul and Lucy's progress. Paul's mark in this subject has improved with 30% and Lucy's work showed an upward trend.

8.4.4 Summary of Post-Programme Results

Experimental group participants' reports related to nine aspects of piano performance. Since one of these themes depicted their experience of their piano performance in general, only eight themes related to changes associated with certain aspects of their piano performance. All seven participants' reports related to at least two of the eight themes. Although four of the seven mostly experienced positive changes, two experienced mostly negative changes, and one's perceptions were equally divided between positive and negative changes.

The data analysis of the reports of participants' piano lecturers rendered six themes relating to participants' piano performance. Two of these themes only involved experimental group participants. Lecturers noticed change with regard to all seven experimental group participants, and only three of the six control group participants. The majority of experimental group participants were perceived to have changed in relation to more than one theme each, while the three control group participants were observed to have changed in relation to only one theme each. Changes were predominantly perceived as positive. Negative change was only observed in connection with one experimental group participant's piano performance (two themes).

Two other lecturers commented on six aspects of participants' piano performance. Most of these themes (four) only involved experimental group participants. Lecturers noticed change with regard to four of the seven experimental group participants and three of the six control group participants. In addition, the majority of experimental group participants were perceived to have changed in relation to more themes per participant than the control group. Although they observed positive as well as negative changes, lecturers perceived mostly positive

changes. Perceptions of negative change involved one experimental group and one control group participant.

Although there was correspondence between the data sources regarding some themes and participants, experimental group participants, their piano lecturers, and other lecturers differed with regard to the theme where the largest number of participants reflected change. Lucy, who emerged as the participant who perceived the largest degree of positive change, was also one of the two participants who reflected most positive change according to the piano lecturers' perceptions. Since participants' in-programme reports also indicated changes, correspondence between the three data sources with regard to experimental group participants' changes will be discussed in section 8.6.

8.5 Comparison of Pre-Programme, In-Programme, and Post-Programme Reports

Since pre, during and post programme data were presented in detail in the relevant sections, this comparison will focus on corresponding themes in these data, and whether participants featuring in Pre-Programme data with regard to these themes showed any change.

Since only the participants and their piano lecturers were involved in Pre-Programme interviews, this section only contains results from these two data sources. Results from the participants' piano lecturers and those of the participants will be presented separately. Names of participants in the experimental group will once again be underlined with regard to piano lecturers' reports.

Although all participants were involved in Pre-Programme interviews, only experimental group participants provided self-report data regarding change during and after the programme. Therefore, only data from these participants will be used for comparison of their pre-programme, in-programme and post-programme reports.

Themes that occurred in piano lecturers' and individual participants' pre-programme as well as post programme interviews concerned participants' listening skills and music performance anxiety. Anne (listening skills) and Paul (music performance anxiety) were the only participants who agreed with their piano lecturers at both stages.

8.5.1 Comparison of Piano Lecturers' Pre-Programme and Post-Programme Reports

Themes that occurred in piano lecturers' pre-programme as well as post-programme interviews related to participants' listening skills, accuracy and fluency, self-confidence and artistic independence, rate of mastering new compositions, and music performance anxiety. Only four of these themes involved at least one corresponding participant. Data regarding the corresponding themes are summarised in Table 8.8.

Regarding pre-programme data, the table indicates which participants' piano performance needed improvement in relation to a specific aspect. The data acquired after the programme depicts whether positive, negative or no change was perceived.

Table 8.8 Correspondence between piano lecturers' pre-programme and post-programme reports regarding participants' piano performance

PARTICIPANTS' PIANO PERFORMANCE: CORRESPONDENCE BETWEEN PIANO LECTURERS' PRE-PROGRAMME AND POST-PROGRAMME REPORTS					
		Pre-Programme	Post Programme		
			Perception of change		
Core theme	**Group**	**Need improvement**	**Positive change**	**Negative change**	**No change**
Listening skills	Experimental group	Mary Anne Lucy Kate Vicky	Anne Paul	-	-
	Control group	Rita Celia	-	-	Rita
Accuracy & Fluency	Experimental group	Mary Lucy	Mary Lucy	-	Tracy
	Control group	Rita	-	-	-
Self-confidence & Artistic independence	Experimental group	Kate Vicky	Kate Vicky Mary Lucy	Anne	-
	Control group	-	Sara Elsa	-	Celia
Rate of mastering new compositions	Experimental group	Kate	Tracy	Anne	-
	Control group	-	-	-	-
Music performance anxiety	Experimental group	Paul Anne	Paul Kate	-	Vicky
	Control group	Elsa Rita	-	-	-

The information in Table 8.8 shows that according to their piano lecturers, some participants who needed to improve in relation to certain aspects of their piano performance did so after completion of the Tomatis programme. These participants were Anne (listening skills), Mary and Lucy (accuracy and fluency), Kate and Vicky (self-confidence and artistic independence), and Paul (music performance anxiety). All these participants were in the experimental group.

8.5.2 Comparison of Participants' Pre-Programme, In-Programme and Post-Programme Reports

Although eight aspects of piano performance occurred in participants' pre-programme as well as in-programme and/or post-programme reports, only five involved at least one corresponding participant. These aspects are listening skills, musical performance, rate of mastering new compositions, music performance anxiety, and concentration. The results from the corresponding themes are summarised in Table 8.9.

Regarding pre-programme data, the table shows which participants indicated their piano performance needed improvement in relation to a specific aspect. The data acquired during and after the programme depicts whether positive, negative or no change was perceived.

Table 8.9 Correspondence between experimental group participants' pre-programme, in-programme and post-programme reports regarding their piano performance

PARTICIPANTS' PIANO PERFORMANCE: CORRESPONDENCE BETWEEN EXPERIMENTAL GROUP PARTICIPANTS' PRE-PROGRAMME, IN-PROGRAMME AND POST PROGRAMME REPORTS							
	Pre-Programme	In-programme			Post Programme		
		Perception of change			Perception of change		
Core theme	Need improvement	Positive change	Negative change	No change	Positive change	Negative change	No change
Listening skills	Anne Paul	Kate Vicky	-	-	Anne Paul Vicky Lucy Mary	-	Tracy
Musical performance (Include musical comprehension & communication	Anne Paul Mary Tracy	Vicky	-	-	Paul Lucy	-	-
Rate of mastering new compositions	Anne Paul Kate	Vicky	Anne	-	Paul Vicky Lucy	Anne Tracy	-
Music performance anxiety	Paul Vicky Lucy Kate Tracy Anne Mary	Lucy Vicky Kate	-	-	Paul Vicky Lucy Kate	Tracy	Anne Mary
Self-confidence	Kate Mary Anne	Vicky	-	-	Lucy	-	Tracy
Accuracy & fluency	Paul Lucy	-	-	-	-	Kate	-
Technique	Paul Mary Vicky Kate	-	-	-	-	Anne	-
Concentration	Paul Lucy	Vicky	Anne Mary Paul Lucy Kate	Tracy	Paul Lucy Vicky Mary Anne	Kate	Tracy

The information in Table 8.9 shows that of participants who wanted to improve in relation to certain aspects of their piano performance, some did so after completion of the Tomatis programme, and some not. Only Paul (five), and Lucy and Anne (two) experienced change regarding more than one of the themes on which they commented prior to the programme, while Mary experienced no change. Most of the perceived changes were positive.

Participants who perceived improvement were Anne and Paul (listening skills), Paul, Lucy, Vicky and Kate (music performance anxiety), and Paul and Lucy (concentration). Paul also perceived improvement in relation to musical performance and his rate of mastering new compositions. Participants who perceived negative change were Anne (rate of mastering new compositions), and Tracy (music performance anxiety). Anne and Mary indicated that they perceived no change in relation to music performance anxiety.

8.6 Correspondence Between Data Sources Regarding Experimental Group Participants' Changes

This comparison will focus on correspondence between data sources in relation to themes and individual participants. Section 8.4.4 already established that participants' piano lecturers as well as their other lecturers mostly perceived change with regard to experimental group participants. Furthermore, only experimental group participants provided self-report data regarding change during and after the programme. Therefore, comparisons in this section will only deal with changes in experimental group participants.

Qualitative results from the various data sources on changes relating to experimental group participants' piano performance are summarised in Table 8.10. The table indicates corresponding themes as well as data sources' perceived positive or negative change regarding individual participants.

Table 8.10 **Correspondence between data sources regarding changes in experimental group participants' piano performance**

PIANO PERFORMANCE: CORRESPONDENCE BETWEEN DATA SOURCES REGARDING EXPERIMENTAL GROUP PARTICIPANTS' CHANGES				
Core Theme	**Data Source**	**Positive Change**	**Negative Change**	**Total Number of Participants (n = 7)**
Accuracy & Fluency	Piano lecturer	Mary Lucy	-	2
	Other lecturer	-	-	0
	Participant	-	Kate	1
Technique	Piano lecturer	-	-	0
	Other lecturer	Vicky	-	1
	Participant	-	Anne	1
Musical Performance (Include musical comprehension & communication	Piano lecturer	-	-	0
	Other lecturer	Vicky Kate	-	2
	Participant	Vicky Lucy Paul	-	3
Listening skills	Piano lecturer	Anne Paul	-	2
	Other lecturer	-	-	0
	Participant	Anne Paul Vicky Lucy Mary Kate	-	6
Rate of Mastering New Compositions	Piano lecturer	Tracy	Anne	2
	Other lecturer	-	-	0
	Participant	Vicky Lucy Paul	Anne Tracy	5
Self-Confidence & Artistic Independence	Piano lecturer	Kate Vicky Lucy Mary	Anne	5
	Other lecturer	Kate	-	1
	Participant	Vicky Lucy	-	2
General Impression	Piano lecturer	Mary Lucy	-	1
	Other lecturer	Vicky Lucy	Mary	3
	Participant	Vicky Lucy Kate		3
Music Performance Anxiety	Piano lecturer	Paul Kate	-	2
	Other lecturer	-	-	0
	Participant	Paul Kate Vicky Lucy	Tracy	5
Total Number of Participants (n = 7)	Piano lecturer	7	1	7
	Other lecturer	3	1	4
	Participant	6	3	7

The information in Table 8.10 shows that the extent of agreement among the data sources differed regarding change in relation to participants' piano performance. Although data sources agreed that participants showed change in relation to themes associated with their piano performance, they often differed with regard to individual participants. Where they corresponded, data sources concurred that experimental group participants mostly showed positive changes in connection with the relevant themes.

Correspondence between data sources regarding change in participants' piano performance occurred mostly between participants' and their piano lecturers. There was only one agreement between all three data sources regarding a particular participant.

Although the three data sources concurred that participants changed in relation to self-confidence and artistic independence, only combinations of two agreed on specific participants. However, Lucy, her piano lecturer, and other lecturer agreed that her piano performance showed general improvement.

Participants and their piano lecturers further agreed that change took place in relation to four of the other aspects of participants' piano performance. Although the two data sources agreed that change took place with regard to accuracy and fluency, they did not agree on particular participants in this regard. They did concur that change took place with regard to two participants each in relation to listening skills, rate of mastering new compositions, self-confidence and artistic independence, as well as music performance anxiety. However, Tracy and her piano lecturer differed regarding the nature of change in connection with her rate of mastering new compositions. Tracy perceived negative change while her piano lecturer perceived positive change.

Tracy and Mary's perceptions regarding changes in their piano performance differed from those of their piano lecturers. The rest of the participants and their piano lecturers agreed on at least one theme per participant. Lucy, Anne and Paul concurred with their lecturers on two themes each, followed by Vicky and Kate with one theme each. Although there were positive as well as negative changes, perceived changes were mostly positive. Only Anne and her lecturer concurred on a negative change by agreeing that her rate of mastering new compositions was slower.

Two participants agreed with their other lecturers on their performance in general. Vicky and Lucy agreed with their lecturers that they perceived positive change. Only Vicky and one of her other lecturers concurred that she changed positively in relation to musical performance. Although there was agreement that change took place in connection with self-confidence and artistic independence as well as technique, the two data sources differed with regard to individual participants.

Kate's lecturers agreed that her piano performance reflected more self-confidence and artistic independence. Although Mary's piano lecturer and other lecturer agreed that change took place with regard to her performance in general, they differed regarding the direction of

change. Mary's piano lecturer observed positive change, while the other lecturer perceived negative change.

Figure 8.12 illustrates the correspondence between data sources with regard to experimental group participants' change concerning specific themes related to piano performance. To keep this figure as simple as possible and since the only negative change agreed on was with regard to Anne's piano performance, the nature of change was not considered in this illustration.

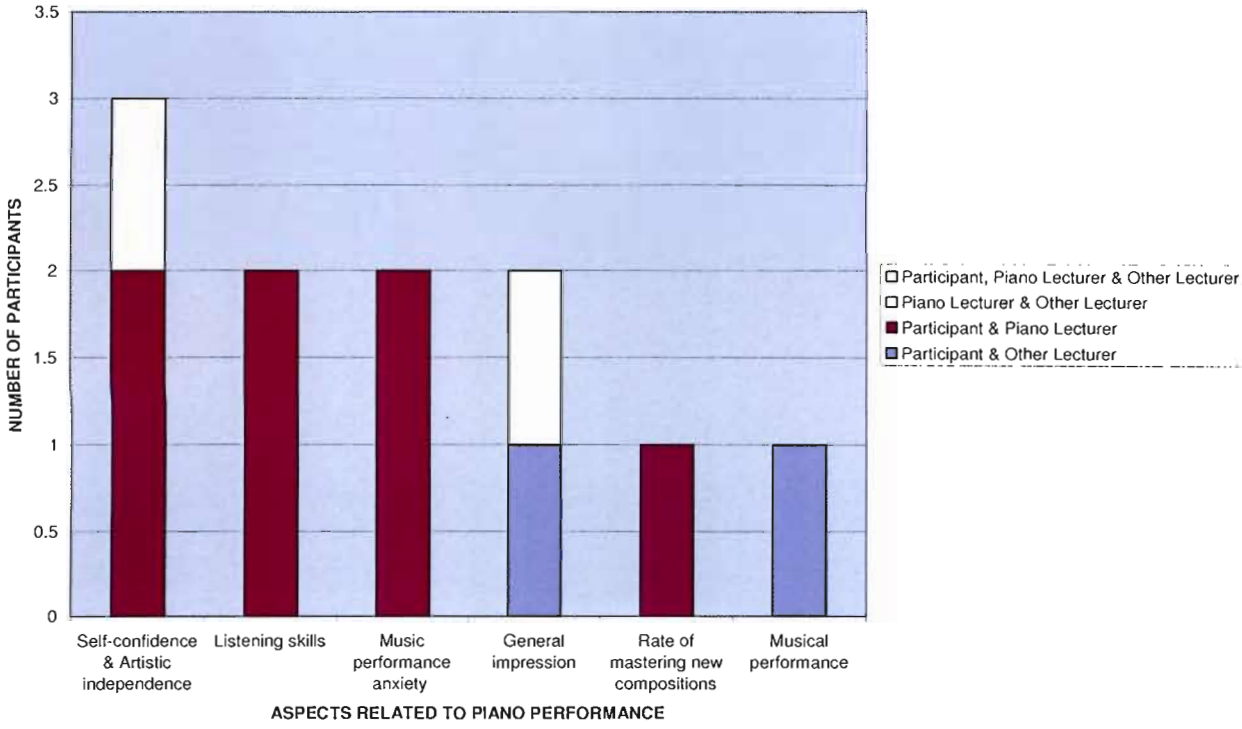


Figure 8.12 Correspondence between data sources: Themes reflecting changes in experimental group participants' piano performance

With the exception of Lucy, only a combination of two data sources agreed on individual participants' change. Although the combination of data sources mostly differed, Vicky's piano performance changed with regard to three themes, followed by Lucy, Paul, Anne and Kate with two themes each. Data sources differed with regard to changes in Mary and Tracy's piano performance. With the exception of Anne who changed negatively in relation to one theme, all the changes data sources agreed on were positive.

Figure 8.13 illustrates the correspondence between data sources regarding individual participants' change related to psychological well-being. The nature of change was once again not considered.

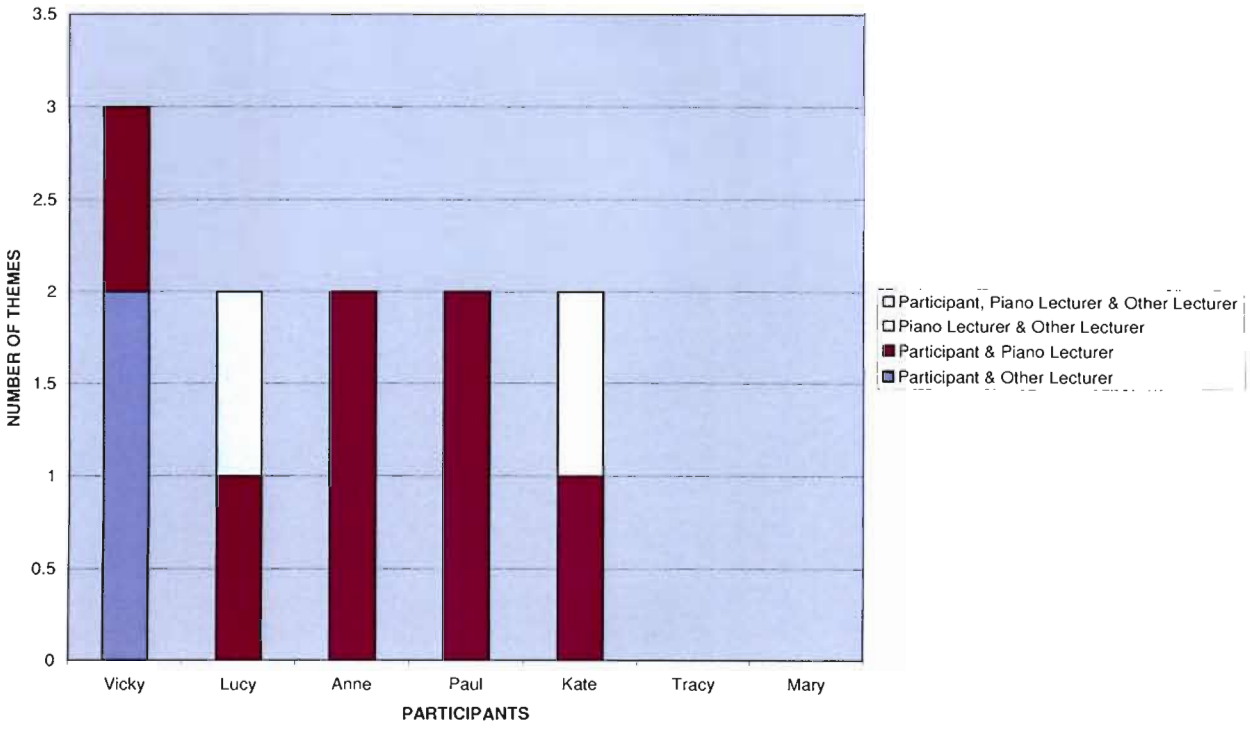


Figure 8.13 Correspondence between data sources: Changes in individual participants' piano performance

8.7 Summary of Qualitative Results on Piano Performance

Pre-programme interviews involved all participants and their piano lecturers. During these interviews, experimental group participants generally commented on more themes relating to piano performance than control group participants did. Piano lecturers commented on all participants during pre-programme interviews. These comments more often involved experimental group than control group participants.

During the programme, data were only obtained from experimental group participants. After the programme, data were obtained from experimental group participants, as well as all participants' piano lecturers and other lecturers. All of the lecturers, except the one who attended the intervention, were unaware of whether participants were in the experimental or control group. However, one participant disclosed to some lecturers his participation in the intervention.

Participants' piano lecturers made more observations regarding changes associated with participants' piano performance than their other lecturers did. Only two other lecturers remarked on participants' piano performance. Participants' piano lecturers and their other lecturers noted change with regard to more participants in the experimental group than in the

control group. In addition, piano lecturers observed change with regard to all experimental group participants, and other lecturers noticed change regarding the majority of them.

Changes were predominantly perceived as positive by experimental group participants as well as their lecturers, even though negative changes were also observed. Although all experimental group participants perceived change, some experienced more change than others did. The lecturers also observed that some participants reflected more change than others did.

Participants' musical comprehension, technique, and listening skills were the most prominent themes from piano lecturers' pre-programme interviews. Although their listening skills was one of the least prominent themes during participants' pre-programme interviews, during and after the programme, six of the seven experimental group participants became aware that they listened more attentively to their own piano performance. Among them were the two experimental group participants who indicated before the programme that they would like their listening skills to improve. Participants' piano lecturers only noted improvement with regard to these two participants, while another lecturer observed improvement with regard to a participant in the control group.

Music performance anxiety featured prominently in participants' pre-programme interviews, and most experimental group participants (5) reflected positive change in this regard in their post programme reports. Before the programme, all participants indicated that they suffered from music performance anxiety. Their piano lecturers, however, only perceived debilitating anxiety with regard to four participants of which two were in the experimental group. After the programme, participants' piano lecturers noted reduced anxiety with regard to two participants, both in the experimental group, of which one was commented on before the programme.

Change with regard to their rate of mastering new compositions was another theme which featured in the majority of experimental group participants' post-programme reports. Before the programme, two of them wanted to improve in this regard, but only one of them did. Although this theme was not prominent in participants' piano lecturers' interviews, they noted change with regard to two participants. Both these participants were in the experimental group. Although most of these participants improved in this regard, negative changes were also observed.

Participants' self-confidence and artistic independence with regard to their piano performance was the only prominent theme in piano lecturers' post-programme interviews. Lecturers mainly

observed change with regard to experimental group participants, and included the majority of these participants (five) in their comments. Before the programme, Kate and Vicky were the only participants whose piano lecturer indicated that they lacked self-confidence and artistic independence. After the programme, the piano lecturer observed positive change with regard to both participants. Kate was also the only participant on whom another lecturer commented in this regard, and in relation to whom positive change was observed. Only two experimental group participants, including Vicky, noticed change. Both participants perceived positive change.

There was agreement between specific participants and their lecturers with regard to changes in relation to all the above-mentioned themes. However, this was not the case with concentration, even though most experimental group participants experienced improvement in this regard. None of the lecturers commented on changes in relation to participants' concentration.

Nevertheless, during pre-programme interviews, one of the experimental group participants and her piano lecturer agreed that her concentration needed improvement. This participant was one of the five experimental group participants who reported improved concentration after completion of the programme.

The qualitative results seem to indicate that experimental group participants mostly benefited with regard to improved listening skills, concentration, self-confidence and artistic independence, and reduced music performance anxiety. A discussion of, and a comparison between the qualitative as well as the quantitative results will follow in Chapter 9.

CHAPTER 9
DISCUSSION

9.1 INTRODUCTION

The purpose of this exploratory study was to investigate the influence of the Tomatis Method on student pianists' psychological well-being and piano performance. In order to obtain a more comprehensive picture of this influence, a variety of measuring instruments was used, which included quantitative and qualitative measuring instruments. Using qualitative methods provides means to access data that might not be obvious from the results of the quantitative measurements. Furthermore, the small number of participants provided the opportunity for (and even necessitated) the use of qualitative methods of data collection. Quantitative and qualitative data were analysed through statistical and qualitative techniques respectively, as described in Chapter 5.

An overview of the time schedule, which included data collection, was presented in Table 5.1 (see Chapter 5, section 5.5). Quantitative data were obtained before and after the programme by means of rating scales and questionnaires. The Profile of Mood States (McNair *et al.*, 1992) was the only rating scale that was also used **during** the programme to monitor the mood states of experimental group participants.

Qualitative data were obtained before, during, and after the programme. Individual pre-programme interviews involved all participants and their piano lecturers, while data obtained during the programme involved only the experimental group participants. During the Tomatis programme, daily informal interviews, weekly group discussions and participants' projective drawings in the first and third week of each phase provided ongoing qualitative data on changes experienced by the participants. Post-programme data were obtained from all participants' piano lecturers and other lecturers as well as experimental group participants.

According to Tomatis (2005:128), integration continues during and after the training of the ear. Therefore, the collection of post-programme data at different points in time from all participants' piano lecturers, other lecturers and experimental group participants, provided the opportunity to determine whether changes perceived by experimental group participants during and shortly after the programme were also or still noticeable to their lecturers at a later stage. Experimental group participants' written reports were collected twelve days after completion of the programme and they were interviewed approximately three weeks after completing the programme, i.e. about nine days after their written reports were collected. Semi-structured

interviews with each participant's piano lecturer took place approximately three months after completion of the programme, while those with their other lecturers took place approximately six months after programme completion.

In this chapter, quantitative and qualitative results will be discussed simultaneously. A discussion of participants' biographical profiles will be followed by discussions of their psychological well-being and piano performance. The discussions of participants' psychological well-being and piano performance during the investigation, as reflected by quantitative as well as qualitative results, includes pre-programme group equivalence as well as in-programme and post-programme results.

Since communication, concentration, and general listening skills are effects associated with the Tomatis Method and can have an influence on psychological well-being and/or piano performance, a discussion of these three themes' qualitative results will then follow.

9.2 Biographical Profiles

The biographical profiles of the two groups were comparable to an acceptable extent prior to onset of the programme. The experimental group as well as the control group mostly reflected the biographical profile of the majority of the whole group of thirteen participants regarding their gender and age, family background, general health, and music education and background.

With regard to gender and age, the majority of participants were female and most were between the ages of 20 and 21 at the time when the study took place. Studies on lifespan changes in well-being revealed that young adults focus more on self-acceptance, self-knowledge and competence (Ryan & Deci, 2001:158). Furthermore, young adults (18-29 years old) scored lower on Autonomy and Environmental Mastery than older adults, and higher on Personal Growth and Purpose in Life. On the other hand, no age variations regarding Self-Acceptance and Positive Relations are reported (Ryff, 1989:1076; Ryff & Keyes, 1995:720).

Concerning family background, most of the participants were either first or last born, and the majority of their families were still intact. It must, however, be kept in mind that four participants' families were not intact, and that resulting circumstances had an emotional impact on the respective participants. According to Tomatis (1996:97), emotional or physical trauma, which may occur for any number of reasons, including stress, a major lifestyle disruption, an accident, or health problems, can contribute to impaired listening. Therefore, the death or divorce of these participants' parents could have had, amongst others, an influence on their

impaired listening skills. However, this study was not designed to determine these influences and the data do not provide clear indications on this matter.

With regard to general health, the majority of the participants did not use any chronic medication. Seven of the total of thirteen participants had a history of middle ear infection or severe earache, from which only three suffered regularly. According to Madaule (1994:44), ear infection during childhood may have a negative influence on the establishment of right-ear dominance. All seven these participants displayed right-ear dominance. However, right-ear dominance was not fully established concerning four of them. These four participants were equally divided between the experimental group and the control group.

Regarding the musical background of the participants' parents, the majority indicated that one or both parents had some formal music education, and most participants' parents played piano. Most of the participants' music tuition started between the ages of seven and nine, and piano was the first instrument taught to twelve of the thirteen participants. The majority of participants indicated their number of years of piano tuition to be between ten and thirteen years, and most of them played another instrument in addition to piano.

Since participants' piano tuition stretched over many years, their training environment probably had an influence on aspects such as their self-confidence, self-esteem, self-efficacy beliefs, self-evaluation, self-criticism, emotions, stress and anxiety levels, which, as described in Chapter 3, could impact on their piano performance. Given that a piano lecturer's positive attitude, encouragement and support can also contribute to improvements in piano performance and even psychological well-being, positive results from the present study should not be ascribed only to the Tomatis intervention.

9.3 Psychological Well-Being

Participants' levels of psychological well-being were quantitatively measured with the Scales of Psychological Well-Being (Ryff, 1989) and the Affectometer 2 (Kammann & Flett, 1983). The Profile of Mood States (McNair *et al.*, 1992) was also used, but with the exception of Vigor-Activity, which refers to an aspect of psychological well-being, this instrument is more indicative of an individual's mood states rather than to his/her psychological well-being (see Chapter 5, section 5.4.2.1). All these instruments are self-report rating scales. The subscales and properties of these instruments were described in Chapter 5, section 5.4.2.1.

Interviews, group discussions, projective drawings, written reports, and observations provided a qualitative view on participants' psychological well-being. Even though some of the questions

to participants during semi-structured interviews related to certain aspects of psychological well-being covered by quantitative measuring instruments, there was no intentional sifting of the qualitative data according to the dimensions of psychological well-being as measured by these instruments. However, after the process of open coding, the researcher realised there were themes which corresponded with these dimensions. Thus, the subscales of the Scales of Psychological Well-Being (SPWB) and the Affectometer 2 (AFM 2) provided a useful framework for the process of axial coding. Furthermore, this framework is convenient for a comparison of the quantitative and qualitative results. Therefore, the results of the effect of the intervention on participants' psychological well-being will be discussed according to this framework.

All six dimensions of the SPWB are used in the discussion. These dimensions are autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. The concept of affect was derived from the AFM 2 and the Profile of Mood States (POMS). The discussion of results also includes participants' self-confidence and coping ability. Since the quantitative measuring instruments did not cover these aspects of psychological well-being as concepts, the discussion of participants' self-confidence and coping ability rest upon qualitative results.

Although no questions to lecturers during the semi-structured interviews related to specific aspects of participants' psychological well-being, there were questions to participants, especially during post-programme interviews, which did (see Addendum C). Instances of interview questions relating to a specific aspect of psychological well-being will be indicated in the discussion of the results.

9.3.1 Pre-Programme Group Equivalence

Statistical analyses of participants' level of psychological well-being as measured before the programme showed no statistically significant differences between the two groups. Thus, the groups were comparable with regard to their self-reported psychological well-being. Since this was an exploratory study, no specific aspect relating to psychological well-being was identified as a focal point for the investigation. Therefore, the semi-structured interviews comprised general questions which were open-ended and thus the qualitative analyses provided mixed results.

Although all participants responded to questions regarding their psychological well-being, their responses related to different aspects. Since they were asked about their perceptions of their

relationships and their future as pianists[14], the only themes which rendered responses from all participants were interpersonal relationships and sense of direction and purpose. Their comments indicated that the two groups were equivalent regarding their perceptions of their interpersonal relationships. They differed, however, in relation to their sense of direction and purpose. Most experimental group participants expressed certainty with regard to their future careers, while most participants in the control group still felt uncertain. Therefore, if any improvement in relation to participants' sense of direction and purpose were observed, it would have been more likely with regard to most control group participants (since there were more scope for improvement) but only a minority of experimental group participants.

A larger percentage of participants in the experimental group than in the control group made comments relating to other identified themes. Furthermore, piano lecturers' responses on general conduct and attitude did not include all participants and mainly consisted of remarks on conscientiousness, which did not reappear in later reports. Therefore, it would be misleading to draw conclusions from the qualitative results on the two groups' equivalence.

9.3.2 In-Programme and Post-Programme Results

Qualitative data obtained from experimental group participants during the programme often indicated the beginning of change, which was mentioned again during post-programme interviews. For this reason, in-programme and post-programme changes will be discussed as a unit. Pre-post differences within groups will be followed by a comparison between groups.

9.3.2.1 Pre-post differences within groups

Results regarding the pre-post differences in psychological well-being of the experimental group will be discussed first, followed by a discussion of the results of the control group.

Experimental group (n = 7)

The experimental group did not show any statistically significant changes as measured by the SPWB. However, qualitative reports indicated that participants did perceive changes with regard to aspects of their psychological well-being. Lecturers' confirmation of some of these changes could be an indication that, although changes were too subtle to reflect statistical significance shortly after completion of the programme, they were notable to others at a later stage. Since statistics tend to be unstable with small samples, the small number of participants could also have caused the paucity of statistically significant results.

[14] See Addendum C questions 1.8 – 1.11

Piano lecturers made sparse comments in relation to participants' psychological well-being. Since the same tendency occurred during pre-programme interviews, the sparse comments could be because they were focussed on their students' piano performance. However, it is interesting to note that participants' other lecturers, with whom post-programme interviews were conducted three months later than with the piano lecturers, were more aware of changes related to participants' psychological well-being. Even though this phenomenon seems to support Tomatis' (2005:128) statement that integration continues after retraining of the ear, it should be taken with caution since there could be other explanations, as there was no statistical verification of this perceived effect. Changes were predominantly perceived as positive by experimental group participants as well as their lecturers, even though negative changes were also observed.

The discussion will show that as far as their psychological well-being was concerned, most experimental group participants reflected increased autonomy, improved interpersonal relationships, and increased self-confidence. Since this deduction rests on qualitative results, it should be taken with caution and cannot be generalised beyond this group of student pianists.

Autonomy

Three questions in participants' post-programme interviews related to their sense of autonomy.

- How do you determine the standards according to which you evaluate yourself as a person?
- How do you cope with social pressure?
- How do you experience your thoughts and decision-making processes? How does it compare with your thoughts and decision-making processes prior to the programme?

Answers to these questions were reflected in participants' comments on the value they attached to the opinion and approval of others and their handling of social pressure. In addition, participants commented on the ways in which they began to voice their opinions and feelings and the ease with which they made decisions. They indicated that they were more independent and less concerned about the opinion of others after the intervention. Some participants reflected more change than others did, but all of them conveyed that they were more assertive than before, which was a tendency also reported in previous research with music students (Burger, 1999:151).

Lecturers also noted positive change in relation to experimental group participants' autonomy. Only one participant's piano lecturer observed change, while the other lecturers noted change with regard to four of the participants. All these participants agreed with their lecturers. Thus, it

seems as if the intervention enhanced the experimental group participants' sense of autonomy, even though changes were too subtle to be statistically significant. Enhanced autonomy can lead to student pianists being less dependent on the teacher, and can thus contribute to their artistic independence.

Environmental mastery

Aspects of environmental mastery also featured in qualitative reports by experimental group participants and their other lecturers as a theme where changes were observed with regard to the majority of experimental group participants. Questions to participants on how they experienced themselves as students and how they handled daily demands rendered answers related to environmental mastery.

Although one participant indicated negative change, the majority (five) indicated positive change. However, reports by participants' lecturers did not include comments in relation to their environmental mastery. Therefore, the qualitative results of the present study suggest that even though individuals may perceive positive change with regard to aspects relating to their environmental mastery, it may not always be perceived as positive by others. This discrepancy raises the question on whether the Tomatis Method as such had any influence on the student pianists' environmental mastery. It is also possible, however, that a method aimed specifically at researching this aspect could have produced different results. Another explanation for this discrepancy could be that through almost constant questioning and discussions, experimental group participants became more aware of their psychological well-being, while their lecturers could also have been more aware if they too were prodded in this regard.

Interpersonal relationships

During post-programme interviews, participants were once again asked about their perceptions of their relationships. Despite statistically non-significant pre-post differences, the different formats of the qualitative reports agreed, reflecting an improvement in participants' interpersonal relationships. Qualitative results obtained through more than one instrument indicated that five of the participants experienced change, and that their other lecturers observed change with regard to four of the participants in relation to their interpersonal relationships. These participants experienced change with regard to different aspects of their relationships. Although all these participants experienced positive change, two of them reflected positive as well as negative change. The lecturers perceived participants to be 'softer', less distanced, and more at ease with fellow students. The lecturers only perceived positive change, and three participants agreed with their lecturers.

According to Tomatis (1991:189), normalised listening should harmonise relationships. Research with student musicians, which did not include pianists, as well as other research also indicated positive outcomes with regard to interpersonal relationships (Van Jaarsveld & Du Plessis, 1988:141; Burger, 1999:151; Nicoloff, 2004:35). It thus seems as if the positive results of the present study, although subtle, support the premise that exposure to the Tomatis Method can have a positive influence on individuals' interpersonal relationships.

Self-acceptance

According to the statistical results, the experimental group's levels of self-acceptance did not change. However, four participants testified that they experienced positive change associated with aspects of self-acceptance, and at six months post-programme participants' other lecturers noticed positive change with regard to two participants. One of these participants agreed with the lecturers. Since the lecturers only noticed change with regard to two of the seven participants, the results suggest that in the present study, the Tomatis Method did not have a general noticeable effect on this dimension of participants' psychological well-being.

Self-confidence

The Self-Acceptance scale of the SPWB includes two items: one positive and one negative statement, which relate to self-confidence but does not measure self-confidence as a concept. However, self-confidence did feature in experimental group participants' and their other lecturers' reports as a theme where change was observed with regard to the majority of experimental group participants. The lecturers noted change with regard to four participants, and five participants reported change. Two of these participants agreed with the lecturers that they changed positively. Although these changes were predominantly perceived as positive, negative change was also reported.

These results suggest that the Tomatis Method may have had an influence on these student pianists' self-confidence. It is possible that improvements regarding their sense of autonomy and their interpersonal relationships affected their self-confidence. Furthermore, a case study reported by Madaule (1976:25), involving a male student pianist, as well as other previous research on the effect of the Tomatis Method – although not with student pianists – also indicated an enhancement of self-confidence (Van Jaarsveld & Du Plessis, 1988:141; Nicoloff, 2004:35). The information on the demands of student pianists' training environment in Chapter 3 indicates that their training can result in impaired self-confidence. Therefore, even a small positive effect in this study can mean that the intervention buffered the impact, or even contributed to restoring lost confidence. Thus, the effect of the Tomatis Method on student pianists' self-confidence may be fruitfully investigated in future.

Personal growth

Positive change with regard to personal growth was reflected in the qualitative results. The majority of participants (four) provided glimpses of personal growth in their projective drawings. Participants' other lecturers observed that three experimental group participants had matured. Two of these participants agreed with their lecturers.

According to Tomatis (1991:164), the active phase of the programme brings about "an encounter with the self", which enables individuals to adapt to environmental conditions, to reality, and to their own objectives. In addition, experimental group participants repeated projective drawings four times during the programme. The request was always the same: "Make a drawing in which you express your experience of yourself as a thinking, feeling, communicating and music-making person. You are welcome to use any metaphor. Explain your drawing on the back". Repetition of the assignment probably encouraged self-search and a deeper self-awareness, which could have been enhanced by the effect of the sound stimulation. Furthermore, participants were on their own for the largest part of the two and a half hour listening sessions, had the opportunity to confide their personal experiences to the researcher every day during informal interviews, and were involved in group discussions once a week where their progress was discussed. Therefore, the whole process probably contributed to their personal growth, and not only the sound stimulation. It is important to note that in addition to sound stimulation, regular interviews also form an integral part of the Tomatis Method (Van Jaarsveld & Du Plessis, 1988:138; Thompson & Andrews, 2000:177).

Sense of direction and purpose

Madaule (1994:27) observes that during and after the active phase of the programme, clients often indicated that they knew which direction to take. During post-programme interviews, participants were once again asked about how they saw their future as pianists. Some participants (three) did indicate that they were more certain about their future careers, and others (two) experienced a strengthening in this regard. Lecturers observed positive change in relation to one of these participants. Since these participants already had a strong sense of direction and purpose prior to the programme, improvement in this regard can be seen as significant.

Affect

The AFM 2 and the POMS measured this aspect of psychological well-being quantitatively. Since their fluctuating emotions and low energy levels featured prominently in in-programme interviews and discussions, participants were asked about the state of their emotions and energy levels after the programme in post-programme interviews.

The POMS was also employed to monitor the experimental group's progress during the Tomatis programme. This was done twice during each of the two phases (passive and active phase) as well as at the start of the active phase, thus bringing it to a total of five assessments during the Tomatis programme. Although results from the POMS indicated that participants' mood states fluctuated between positive and negative changes during the programme, the only statistically significant change (negative) occurred between the pre-test and the fourth and fifth assessments with regard to Vigor-Activity. These results corresponded with participants' qualitative reports of fluctuating emotions and fatigue during the programme.

According to the statistical analysis of pre-post differences, reported through the POMS, the experimental group showed a significant increase with regard to Depression-Dejection and Anger-Hostility, and a significant decrease with regard to Vigor-Activity. These statistically significant differences between the experimental group's pre-test and post-test were also reflected in the POMS Total, indicating that their negative mood states became exacerbated.

These results, especially those with regard to Vigor-Activity, were surprising since previous research of the effect of the Tomatis Method – including Burger's research (1999:123) with student musicians – indicated significant positive changes, and one of the premises of the Tomatis Method is that it increases energy levels (Madaule, 1994:32). One possible explanation for the contradictory result of this study could be the fact that pre-tests were conducted at the beginning of the academic year when students' emotions were generally positive, and energy levels were still high after the summer holidays, while post-tests were conducted shortly before the semester examinations. Since experimental group participants completed the POMS on seven occasions during the study, another explanation could be that test fatigue amplified the results and that the test **itself** elicited negative emotions. Since two participants' qualitative reports did reflect increased energy levels after the programme, it seems that an energising effect probably occurs in some individuals, but cannot be claimed as a general effect of the intervention in this study, and that it could have been influenced by other circumstances.

In addition, participants' qualitative reports indicated that although they experienced fluctuating emotions during the programme, it stabilised after the programme. Even though some of them still experienced negative feelings, they generally felt happy and content, which suggested that positive feelings predominated over negative feelings. These reports were corroborated by the pre-post results from the AFM 2, which indicated no statistically significant changes regarding participants affect, and that positive affect still predominated. Thus, it seems that although

participants experienced the Tomatis Method to have had an effect on the stability of their emotions during the programme, it was not a lasting effect.

Coping

Literature on psychological well-being indicates that constructive coping with life's challenges and adversities is one of the advantages of high levels of psychological well-being (Antonovsky, 1987:148; Seligman & Csikszentmihalyi, 2000:8, Lyubomirsky, 2001:239). Three participants indicated that their coping ability improved, while two others experienced that they did not cope well. This result implies that some participants' psychological well-being improved, while the psychological well-being of others did not. However, participants' coping ability was not quantitatively measured. Furthermore, two participants did not comment on their coping ability, and there was no feedback from the lecturers in this regard. Therefore, it would be misleading to draw conclusions from this qualitative result, and it is suggested that the coping ability of student pianists can be investigated in future research.

Control group (n = 6)

The control group displayed no statistically significant pre-post differences regarding psychological well-being as measured by the SPWB and AFM 2. With regard to Fatigue-Inertia as measured by the POMS, the control group showed a significant increase, indicating that this negative mood state has worsened. The control group's statistically significant increase regarding Fatigue-Inertia strengthens the argument above that students' high energy levels at the beginning of the academic year, after the summer holidays, possibly affected the results obtained from the POMS.

Even though control group participants' piano lecturers and other lecturers commented on four of them in relation to psychological well-being, these comments were minimal. The lecturers observed change with regard to three participants, and each of them in relation to a different theme. Positive change was noticed with regard to one participant, and negative change with regard to the other two. Therefore, the statistical as well as qualitative results suggest that daily events and circumstances did not have a notable impact on the control group.

9.3.2.2 Pre-post differences between groups

Neither the experimental nor the control group showed any statistically significant changes regarding aspects of psychological well-being as measured by the SPWB and AFM 2. Thus, statistical results suggest that exposure to the Tomatis Method had no statistically notable effect on the psychological well-being of student pianists in the present study.

Both groups showed statistically significant negative changes regarding mood states measured by the POMS. The experimental group showed statistically significant change with regard to more mood states than the control group, which indicates that after the programme, their mood states were worse than that of the control group. This finding supports the observation that the Tomatis Method had an effect on the experimental group participants' emotions.

After the programme, qualitative observations by participants' lecturers[15] only indicated change in connection with experimental group participants' autonomy, interpersonal relationships, self-confidence, self-acceptance and sense of direction. According to the lecturers' comments, all experimental group participants reflected positive change with regard to aspects relating to their psychological well-being, while positive change was noticed with regard to only one control group participant in relation to one of the themes. Therefore, the qualitative results suggest that the psychological well-being of the experimental group participants benefited from the intervention.

It is interesting to note that the majority of experimental group participants' qualitative results reflected positive change in relation to their autonomy and interpersonal relationships and that these were two of the themes where the lecturers only noticed change with regard to experimental group participants. This finding supports the observation that in the current study, student pianists' autonomy and interpersonal relationships, which could affect their self-confidence, were probably influenced by the intervention.

9.4 Piano Performance

The quality of participants' piano performance was quantitatively measured by means of the self-designed Piano Performance Rating Scale (PPRS), as well as twelve constructs for the assessment of music performance, identified by Mills (2005:179-180). Additionally, a percentage indicating a general impression of participants' piano performance was awarded. The properties of these instruments were described in Chapter 5, Section 5.4.2.3. A panel of external adjudicators, the participants' piano lecturers, and the participants themselves assessed their piano performance by means of the above-mentioned instruments.

The level of participants' music performance anxiety, which could have a debilitating effect on their piano performance, was quantitatively measured with the Music Performance Anxiety

[15] With the exception of the piano lecturer who attended the programme, lecturers mostly did not know whether participants were in the experimental or control group. The participant who did not complete the programme got behind with his academic work, and thus revealed his participation in the invention to the lecturers concerned.

Inventory for Adolescents (Osborne & Kenny, 2005) and the Kenny Music Performance Anxiety Inventory (Kenny *et al.*, 2004), which are self-report rating scales. The properties of these instruments were described in Chapter 5, Section 5.4.2.2. Interviews, group discussions, projective drawings, written reports, and observations provided a qualitative view on participants' piano performance.

9.4.1 Pre-programme Group Equivalence

The statistical analyses showed the two groups to be equivalent with regard to the assessment of their piano performance by the panel of external adjudicators and their piano lecturers. The two groups were, however, not totally equivalent regarding the self-evaluation of their piano performance, or all aspects of music performance anxiety.

There were statistically significant differences between the groups' self-evaluation with regard to the three subscales Accuracy, continuity and fluency, Technique, and Interpretation as measured by the Piano Performance Ratings Scale (PPRS); "Cleanness", and Quality as measured by the Mills Constructs; and General Impression. The control group showed a significantly higher score than the experimental group regarding these aspects. These results suggest that the experimental group had a poorer opinion of the quality of their own piano performance than the control group.

Although it was difficult to draw conclusions from the qualitative results on the degree of equivalence between the two groups, participants as well as their piano lecturers indicated which aspects of the participants' piano performance needed improvement. Results from these responses indicated that more participants in the experimental group needed to improve on more aspects of their piano performance. Participants' qualitative reports were thus in line with their statistical results. There were no statistically significant differences between the two groups' piano performance as assessed by their piano lecturers.

Statistical results indicated that the two groups were equivalent with regard to two of the subscales of the Music Performance Anxiety Inventory for Adolescents (MPAI-A) as well as the total of the Kenny Music Performance Anxiety Inventory (K-MPAI). The experimental group's level of music performance anxiety, regarding Performance Evaluation as measured by the MPAI-A, as well as the MPAI-A total, was significantly higher than that of the control group during the pre-test. One possible explanation for the experimental group's higher level of music performance anxiety could be their more negative opinion of their own piano performance, which could result in a fear of judgement because of less self-confidence.

Qualitative results indicated that, with the exception of one participant in the control group, all participants in both groups perceived that they suffered from music performance anxiety and that it had a negative influence on their piano performance. Although piano lecturers' observations in this regard only involved four of the thirteen participants, they perceived debilitating music performance anxiety with regard to an equal number of participants in the experimental and control groups. These results suggest that although most participants experienced music performance anxiety, it was less debilitating to some of them.

9.4.2 In-programme and Post-Programme Results

Qualitative data obtained from experimental group participants during the programme often indicated the beginning of change, which was mentioned again during post-programme interviews. For this reason, in-programme and post-programme changes will be discussed together. Pre-post differences within groups will be followed by a comparison between groups.

9.4.2.1 Pre-post differences within groups

Results regarding the pre-post differences in relation to piano performance of the experimental group will be discussed first, followed by a discussion of the results of the control group.

Experimental group (n = 7)

The panel of external adjudicators perceived no statistically significant changes within the experimental group regarding changes in their performance of a specific piano composition at post-programme. In addition to the possibility that the quality of participants' piano performance remained unchanged because there was no effect from the programme, this result could be explained by the fact that the post-programme recordings were made shortly before the participants' practical examinations. Since the composition they had to perform was not part of their semester repertoire, and they were busy preparing for their examinations, their preparation for the recording of this self-study was probably insufficient. This variable should be taken into consideration when designing future studies of this kind.

Even though the experimental group's self-evaluation of their piano performance in general also did not show any statistically significant changes as measured by the quantitative instruments, congruence between various qualitative reports indicated that participants did perceive changes with regard to **aspects** of their piano performance. Lecturers' confirmation of some of these changes could be an indication that although changes were too subtle to reflect statistical significance shortly after completion of the programme, they were noticeable at a later stage.

However, piano lecturers' evaluation of participants' piano performance in general, as measured by the PPRS, did indicate statistical significant improvement in experimental group participants' technique. The discussion will show that aspects of technique as measured by the PPRS could be associated with improved listening skills. Qualitative results also indicated that the majority of participants' listening skills improved.

Other aspects of piano performance covered in the discussion are accuracy and fluency, musical performance, self-confidence and artistic independence, rate of studying new compositions, general impression, and music performance anxiety. In this study, statistically significant results confirmed by qualitative results suggest that the Tomatis programme benefited the group of student pianists with regard to music performance anxiety. However, the possibility that the Tomatis programme contributed to improvement concerning the other aspects mainly hinged on qualitative observations, and involved a small number of participants. Therefore, these results should be taken with caution, and further investigation is recommended.

Technique

The qualitative reports of participants and their other lecturers indicated change in relation to participants' technique only with regard to one participant each. The statistical results of the participants' self-evaluation as well as the assessments by the panel of external adjudicators and the participants' piano lecturers with regard to the Mills construct which refers to the performer's technical problems, showed no statistically significant changes. These results suggest that in spite of Madaule's (1994:53) statement that the Tomatis Method can help musicians to improve their dexterity in instrumental performance, this effect was not notable in this group of student pianists.

The panel of external adjudicators' assessment of the participants' technique by means of the Technique subscale of the PPRS, as well as the participants' self-evaluation once again indicated no statistically significant changes. However, at three months post-programme, participants' piano lecturers perceived a statistically significant positive change in the experimental group's piano performance in general with regard to Technique, as measured by the PPRS.

Surprisingly, this significant positive change regarding the experimental group's technique was not reflected in the piano lecturers' post-programme qualitative reports, since they did not comment on participants' technique at all. An explanation for this discrepancy may be that the Technique subscale of the PPRS did not only focus on motor skills, but that the items also

included observations on balance of sound, tone quality and pedalling, which not only depends on motor skills but also on listening skills (Bernstein, 1981:126; Gordon, 2000:322; Davidson, 2002a:97; Rosen, 2004:25, 27).

Listening skills

The primary aim of the Tomatis Method is to enhance an individual's general listening skills, and more specifically self-listening. As described in Chapter 3 (section 3.2.2), the characteristics of the piano contribute to the phenomenon that many pianists lack good self-listening skills and are unaware of the actual quality of their performance (Gieseking & Leimer, 1972:10; Rosen, 2004:33-34). Therefore, it was expected that the experimental group's self-listening skills would improve after their exposure to the Tomatis Method. Furthermore, any improvement in the listening skills of pianists is particularly significant, since in order to improve, pianists must strive against ingrained habits.

Six of the seven participants' qualitative reports indicated that their self-listening skills had improved. They were more aware of the actual quality of their performance, experienced more focussed listening, and became aware of their sound production.

According to Bernstein (1981:116), the development of "the technique of tuning in and out" will enable musicians to exercise deliberate control over their listening ability. Sound stimulation by means of the Tomatis Method stimulates the focusing potential of the ear (Van Jaarsveld & Du Plessis, 1988:138; Thompson, 2004c:56). The sound stimulation trains the muscles of the middle ear to attune to the high harmonics of a sound source. Consequently, the musician becomes more aware of the harmonics of the sound (Madaule, 1976:7; Thompson, 2004c:57). Rosen (2004:25) points out that the pianist's exploitation of overtones can contribute to the achievement of a beautiful tone quality. Thus, an improvement in student pianists' sound production could be an indication that they became more aware of the overtones of the sounds, even though they did not specifically report that they became aware of overtones. This is not surprising, since few musicians are consciously aware of overtones. Awareness of overtones usually is shown in a greater sensitivity to tone colour or sound production.

One of the other lecturers noticed that three participants' sound production improved. It was interesting to note that one of these three participants was the one who did not observe any difference in her listening with regard to her own piano performance. The participant concerned was also the one who indicated that she lost interest in her music studies and that she was in the wrong field of study. Therefore, one of the reasons for her own lack of

awareness of any change in her self-listening could possibly be her lack of interest in her own piano performance.

The participants' piano lecturers noticed improvement of listening skills with regard to two of the seven participants. These two participants indicated before the programme that their listening skills needed to improve, and they were among those who experienced improvement in this regard.

The piano lecturers' reports involved a surprisingly small number of participants, especially when the explanation for the discrepancy between the statistically significant improvement of participants' technique, as assessed by their piano lecturers, and the lack of qualitative reports on technique is kept in mind. This raises the question of whether piano lecturers associated improvement with regard to the above-mentioned items in the PPRS with improvement of participants' listening skills. Another explanation could be that they were not consciously aware of an improvement in their students' performance with regard to balance of sound, tone quality and pedalling, even though their quantitative assessment of the participants' technique, which included these aspects, indicated significant improvement. In that case, it could be an indication that participants' self-listening improved gradually from the start of the programme, resulting in a gradual improvement in those aspects of technique which was too subtle to be noticed by the lecturers. Therefore, it slipped the lecturers' notice because they saw their students regularly (once a week), or they ascribed the gradual improvement to tuition only.

Accuracy and fluency

Madaule (1976:11) implies that the improvement of motor function and spatial awareness through exposure to the Tomatis Method can enable musicians to play with greater accuracy. Furthermore, listening skills are also a prerequisite for noticing inexact execution of notation (Gieseking & Leimer, 1972:5). Therefore, the possibility exists that exposure to the Tomatis Method can contribute to increased accuracy in student pianists' piano performance. However, participants' self-evaluation, as well as assessments by the panel of external adjudicators and piano lecturers indicated no statistically significant changes with regard to Accuracy, continuity, and fluency, as measured by the PPRS.

Nevertheless, the qualitative reports of participants' piano lecturers indicated that the only two experimental group participants whose accuracy and fluency needed improvement before the programme did improve after the programme in this regard. These two participants also indicated that their listening skills had improved. Therefore, this result suggests the possibility that those student pianists who experience a problem with the accuracy and fluency of their

performance can benefit from the Tomatis programme. However, the combination of statistically insignificant changes, and small number of participants implicated in the piano lecturers' reports indicate that although the possibility exists that those student pianists who experience a problem with the accuracy and fluency of their performance could benefit from the Tomatis programme, this was not a general effect of the programme for this group.

Musical performance

There were qualitative indications that four participants improved their musical communication after their exposure to the Tomatis programme. One of these participants also indicated improved musical comprehension. The improvement in participants' musical communication, as observed by their other lecturers, could perhaps partly be attributed to the participants' gestures and facial expressions, which conveyed their performance intentions and thus a better understanding of the composition. This would be in line with Madaule's (1994:53) clinical observations, which indicate an improvement in individuals' body language after exposure to the Tomatis programme. In addition, previous research findings, although not with student musicians, indicated an improvement in comprehension and perceptual processing after exposure to a Tomatis programme (Van Jaarsveld & Du Plessis, 1988:138; Nicoloff, 2004:35). Thus, from these qualitative results, it could be deducted that the possibility exists that exposure to the Tomatis programme could play a part in the improvement of aspects of piano performance that contribute to a musical performance. However, statistical results from the Interpretation subscale of the PPRS, as well as four of Mills' constructs, which relate to musical performance and rely partly on musical comprehension, were statistically insignificant.

Self-confidence and artistic independence

Congruence in qualitative reports from participants' piano lecturers indicated that the majority of participants (four) played with more self-confidence and that two of these participants also displayed more artistic independence. Before the programme, the piano lecturer of these two participants remarked on their lack of self-confidence with regard to their piano performance. Although the reports of the participants and their other lecturers did not involve the majority of participants, participants included in these reports overlapped with those in the piano lecturers' reports, making these qualitative results meaningful.

Results from the piano lecturers' observations suggest that exposure to the Tomatis programme could have contributed to a subtle improvement in the confidence with which participants performed. The overlap of some participants in the piano lecturers' qualitative reports with all the participants included in the participants' own reports and those of the other lecturers seem to strengthen this possibility.

However, support for the possibility that the Tomatis programme can contribute to an improvement in the confidence with which student pianists perform mainly rests on the qualitative observations of the piano lecturers, and involved a small number of participants. In addition, the assessment of participants' piano performance by means of Mills' constructs includes an item where the evaluator indicates whether the performer is confident or nervous while performing. The post-programme assessment by the participants' piano lecturers, the panel of external adjudicators, as well as participants' self-evaluation indicated no statistically significant change in this regard. Therefore, the promising qualitative results should be taken with caution.

Nevertheless, the confident presentation of the music and the performer is important in a performance situation (Davidson, 2002a:98). For that reason and since student pianists in the present study displayed a subtle improvement, future in-depth research on the effect of the Tomatis Method on the confidence with which student musicians perform is necessary and can be fruitful. Most of the participants who displayed more confidence and artistic independence in their piano performance also reflected improved self-confidence, self-acceptance and autonomy with regard to their psychological well-being. Therefore, a more comprehensive investigation of a possible relationship between these aspects of psychological well-being and the confidence with which student musicians perform, is warranted.

Rate of mastering new compositions

The qualitative reports of the majority of participants (five) indicated that their rate of mastering new compositions had changed. Most of these participants (three) found it easier to master new compositions and therefore experienced that their rate of mastering new compositions improved. This is in accordance with Madaule's (1976:10) observation that music students experience that the "integration of a piece of music becomes faster and easier" after completion of a Tomatis programme.

However, two other participants experienced the opposite. Piano lecturers also observed change with regard to these two participants' rate of studying new compositions, but only one participants' lecturer agreed with her on negative change. The participant who agreed with her lecturer was one of the participants whose listening skills had improved. Her piano lecturer observed that she was therefore more aware of her shortcomings, and that this new awareness might be causing her some stress. This stress could have had a stalling effect and thus contributed to her decreased rate of studying new compositions. The participant who disagreed with her lecturer was the one who was disillusioned with her music studies. Thus, all

her feelings with regard to her piano performance were negative, and this can be an explanation for the discrepancy.

The qualitative results from the present study thus seem to suggest that exposure to the Tomatis programme can have an effect on student pianists' rate of studying new compositions. However, the results should be taken with caution because it rested on qualitative reports of a small number of participants, and these reports were contradictory.

Since students in tertiary music education often feel that the demands of their academic work leaves little time for practising (Burt & Mills, 2006:62), a positive effect on their rate of studying new compositions can be beneficial, leaving them with more time to refine their performance. Given that the results from the present study suggested that the possibility exist that the Tomatis programme can have had a positive effect on these student pianists' rate of studying new compositions, further investigation is warranted.

General impression

There were no statistically significant changes with regard to the general impression of the experimental group participants' piano performance as assessed by the panel of external adjudicators, the participants' piano lecturers, or the participants' self-evaluation. Explanations of this might be the following. Firstly, the percentage employed to represent a general impression of participants' overall piano performance was not graded to indicate which percentage reflects an excellent, good, average or poor performance. Thus, evaluators' perceptions might have differed in this regard and the lack of a graded overall impression could have contributed to the absence of a noticeable improvement. Secondly, the quality of participants' overall piano performance could have remained unchanged because there was no effect from the programme.

However, qualitative reports displayed inconsistent results. Other lecturers' observations indicated an equal number of participants with regard to positive and to negative change in the general impression of their piano performance. Even though the majority of participants' (four) general impression was that their piano performance changed, one of these participants experienced negative change.

The combination of these results indicates that although there were participants whose piano performance in general showed signs of improvement, the contrary was also true. The mixed qualitative results further suggest that the individual profiles of student pianists, including stronger and weaker aspects of their performance, could have influenced the general

impression of change in their piano performance. Thus, it seems as if exposure to the Tomatis programme did not have a common effect on the general impression of this group of participants' overall piano performance.

Music performance anxiety

Experimental group participants displayed a statistically significant decrease with regard to the MPAI-A Total. Furthermore, the qualitative reports of the majority of participants (four) reflected that they experienced a decrease in their music performance anxiety. Two of these participants' reports were supported by their piano lecturers' observations.

These results seemed to confirm Madaule's (1976:13) supposition that exposure to the Tomatis Method may lead to a reduction in music performance anxiety. According to Madaule (1976:11), dominant vagus activity leads to anguish phenomena, such as music performance anxiety. Since the tympanic membrane and the vagus nerve are connected, the enhancement of the tension of the tympanic membrane moderates the action of the vagus, resulting in a sensation of well-being, which leads to a reduction of the physiological effects of music performance anxiety (Madaule, 1976:13).

The physiological effects are only symptoms of music performance anxiety and are often the result of fear, leading to an excessive activation of the autonomic nervous system (Wilson, 1997:229; Steptoe, 2001:296; Valentine, 2002:168). These feelings of anxiety might stem from a fear of judgement, failure, or humiliation, as well as from worrying about the effects of anxiety (Steptoe, 2001:299; Valentine, 2002:169; Wilson & Roland, 2002:48; Kirchner *et al.*, 2008:63; Sternbach, 2008:47). Therefore, music performance anxiety is a multifaceted phenomenon (Lehrer, 1987:143; Steptoe, 2001:294; Kemp & Mills 2002:13) and a reduction of music performance anxiety involves more than just a reduction of physiological symptoms. Thus, a long-term positive effect can only be achieved by an intervention which also addresses individuals' underlying fears or other problems, such as low self-esteem and self-confidence.

Results from the present study suggest that the Tomatis Method can contribute to a reduction of student pianists' music performance anxiety as well as enhancement of certain aspects of psychological well-being, such as self-confidence which will act to decrease music performance anxiety. In addition to other aspects of psychological well-being, previous research on the effect of the Tomatis Method also reported enhanced self-esteem (Du Plessis *et al.*, 2004:65) and reduction of anxiety (Peché, 1975:163; Du Plessis, 1982:429; Madaule, 1994:31). Therefore, a more comprehensive investigation of the effect of the Tomatis Method on student musicians who experience debilitating music performance anxiety is warranted.

Control group (n = 6)

Statistical results showed that the control group displayed no statistically significant differences regarding the pre-post assessments by the panel of external adjudicators, piano lecturers, or their self-evaluation of their piano performance, as measured by the relevant measuring instruments. They also displayed no statistically significant changes with regard to their music performance anxiety.

Lecturers' qualitative reports related to one participant's listening skills, two participants' confidence, and three participants' piano performance in general. These reports mostly indicated improvement in these respects.

The lecturers observed change with regard to four of the six participants. With the exception of one of the participants, each of them was mentioned in relation to a different theme. Improvement was noticed with regard to three participants, and negative change with regard to the other one. Improved piano performance of the participant who featured in more than one theme, was seen by the lecturers as part of her normal development as a pianist. Thus, the statistical as well as the qualitative results imply that tuition and pending performance examinations had the expected influence on the control group's piano performance.

9.4.2.2 Pre-post differences between groups

The panel of external adjudicators perceived no statistically significant differences between or within the groups regarding changes in their performance of a specific piano composition. In addition, no statistically significant changes occurred within any of the groups regarding the participants' self-evaluation of their piano performance in general. There was, however, a statistically significant difference between the two groups regarding change in their piano performance in general, as assessed by the participants' piano lecturers as well as by the participants themselves. In both instances, the experimental group reflected positive change and the control group negative change.

The piano lecturers' assessment of participants' technique as measured by the PPRS indicated that the experimental group displayed positive change while the control group displayed negative change, resulting in a statistically significant difference between the groups. According to the piano lecturers' assessment, this positive change within the experimental group was also statistically significant. As discussed in section 9.4.2.1, three of the aspects measured in the Technique subscale of the PPRS depend on listening as well as motor skills, and qualitative results indicated enhancement of experimental group participants' listening skills. Thus, statistical results confirmed that exposure to the Tomatis Method had a statistically

notable positive effect on aspects of technique, as measured by the PPRS, even though the students were unaware of the difference. Since students generally find it hard to evaluate their own performance, their own lack of awareness was unsurprising.

Participants' self-evaluation of the appropriateness of their phrasing, as measured by the Mills constructs, indicated that the experimental group experienced improvement while the control group experienced negative change, resulting in a statistically significant difference between the groups. Thus, results suggested that enhanced listening skills and/or musical comprehension could have contributed to the experimental group's perception that the appropriateness of their phrasing had improved. Since the two groups' perceptions changed in opposite directions, it could imply that the experimental group gained self-confidence in this regard because of positive feedback from their lecturers, as well as exposure to the programme. However, the statistical insignificant differences between the groups as assessed by the panel and the piano lecturers in this regard, as well as the lack of qualitative backup, suggested that the Tomatis programme did not have a noticeable effect on this aspect of participants' piano performance.

There were also statistically significant differences between the groups regarding changes in levels of music performance anxiety between pre and post-treatment, as measured by the MPAI-A. These significant differences between the groups occurred with regard to the subscale Performance Context, as well as the MPAI-A total. The two groups' changes with regard to these aspects took place in opposite directions, with the experimental group showing a positive change, resulting in significant differences between the groups. Qualitative reports by experimental group participants and their piano lecturers likewise reflected a reduction in experimental group participants' music performance anxiety. Piano lecturers did not notice change in any of the control group participants in this regard. These statistical and qualitative results supported the observation that in the present study, exposure to the Tomatis Method contributed to a reduction of student pianists' music performance anxiety.

After the programme, qualitative observations by participants' lecturers only indicated change in connection with experimental group participants' technique, accuracy and fluency, musical performance, sound production and rate of studying new compositions. The possibility of changes in relation to these aspects of participants' piano performance being attributed to their exposure to the Tomatis programme was discussed in section 9.4.2.1.

According to the lecturers' comments, all experimental group participants displayed improvement with regard to one or more aspects of their piano performance, while positive

change was noticed with regard to only three of the six control group participants. Only one of the control group participants improved with regard to more than one theme. Therefore, the qualitative results suggest that experimental group participants benefited meaningfully from the programme in relation to some aspects of their piano performance.

9.5 Effects Associated with the Tomatis Method in this Study

Communication, concentration and general listening skills are associated with the effect of the Tomatis Method (see Chapter 4, sections 4.6 and 4.7).

9.5.1 Communication

The post-programme qualitative reports of three experimental group participants indicated that they found it easier to verbalise their thoughts. These reports are in line with previous research and clinical observations which suggested an improvement in the ability to express feelings and thoughts (Van Jaarsveld & Du Plessis, 1988:138; Nicoloff, 2004:35) as well as general communication skills (Gilmor, 1999:13; Nicoloff, 2004:35).

Improved communication skills can contribute to improved relationships, which in turn can lead to increased self-confidence and possibly other aspects which relate to psychological well-being. It is interesting to note that qualitative reports indicated that these three participants displayed improved interpersonal relationships, as well as increased autonomy, environmental mastery and self-confidence.

9.5.2 Concentration

Qualitative reports of six of the seven experimental group participants indicated that they experienced fluctuating levels of concentration during the programme. After the programme, five of them reported improved concentration. These reports are in accordance with clinical observations of improved concentration after exposure to the Tomatis programme (Madaule, 1976:25; 1994:31; Thompson, 2004c:57; Tomatis, 2005:129).

In addition to improved academic functioning, enhanced concentration can lead to more effective practising and an increased rate of studying new compositions. According to Bernstein (1981:9-10), productive practising encourages self-integration, which builds self-confidence. Some participants who experienced improved concentration also reported improvement in the rate with which they studied new compositions and some did indeed reflect more self-confidence. Two of these participants reported that they experienced increased concentration especially with regard to their piano performance.

Although it should be taken with caution, qualitative results from the present study suggested that the programme contributed to an improvement in student pianists' concentration, which possibly had a positive influence on their practice sessions as well as on their self-confidence. Furthermore, concentration is important for a successful performance (Caldwell, 1990:13-14; Davidson, 2002b:144-145). Therefore, further investigation into the effect of the Tomatis Method on student musicians' concentration and its relation to their music performance could be fruitful.

9.5.3 General Listening Skills

All experimental group participants became aware of change in their listening skills during and after the programme[16]. It included greater sensitivity to loud sounds, more awareness of ambient sounds and their own voices, as well as more focussed listening. This effect was also observed in previous studies (Burger, 1999:149, 150; Tunmer, 2001:22).

Since the filtered sounds stimulates the focusing potential of the ear, it enables the individual to perceive sound with less distortion and to analyse it more precisely over the whole frequency range (Madaule, 1976:6; Van Jaarsveld & Du Plessis, 1988:138; Thompson, 2004c:56). Therefore, the effects experienced by participants were expected, and confirmed that their general listening skills improved.

In the following final chapter a summary of the results of the study will be given, conclusions will be made, and recommendations for future research will be provided.

[16] The Tomatis Listening Test also indicated a significant improvement in the listening skills of three of these participants.

CHAPTER 10

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

10.1 INTRODUCTION

The purpose of this exploratory study was to investigate the effect of the Tomatis Method on the psychological well-being and piano performance of student pianists. The aim of this chapter is to conclude the research report. Therefore, a summary of the results of the study, an indication of methodological limitations, conclusions, and recommendations for future research is provided.

10.2 SUMMARY OF THE RESULTS OF THE STUDY

The hypothesis of the research was that the Tomatis Listening Programme can significantly enhance the psychological well-being and piano performance of student pianists. The next two sections summarises the results of the study in terms of the influences of the Tomatis Method on psychological well-being and on piano performance.

10.2.1 Psychological Well-Being

According to the statistical results, the Tomatis Listening Programme did not significantly enhance the psychological well-being of student pianists in the present study. However, confluence of qualitative reports indicate that participants and their lecturers agreed that most of the experimental group participants reflected increased autonomy, improved interpersonal relationships and increased self-confidence, which are qualitative indications of enhanced psychological well-being. Signs of enhancement in relation to other dimensions of psychological well-being were also noted in a minority of experimental group participants.

In addition, qualitative observations by participants' lecturers indicated that all experimental group participants reflected positive change with regard to aspects relating to their psychological well-being, while positive change was noticed with regard to only one control group participant. Therefore, the qualitative results suggest that the Tomatis Listening Programme contributed to the enhancement of aspects of the psychological well-being of student pianists in the present study, even though the effects were not statistically significant.

10.2.2 Piano Performance

According to the quantitative assessment of the piano lecturers, a statistically significant improvement occurred in experimental group participants' technique as measured by the Piano

Performance Rating Scale (PPRS). This improvement is also reflected by a statistically significant difference between the groups, which favours the experimental group. The Technique subscale of the PPRS does not only focus on motor skills, but also includes items on balance of sound, tone quality and pedalling, which depend on motor skills and listening skills.

Neither the panel of external adjudicators' assessment, nor the experimental group's self-evaluation of their piano performance showed any statistically significant changes as measured by the quantitative instruments. However, confluence of qualitative reports indicates that participants improved with regard to aspects relating to their piano performance. These aspects included their listening skills, as well as the confidence with which they performed.

Furthermore, qualitative self-reports as well as some reports by participants' piano lecturers reflected a reduction in experimental group participants' music performance anxiety. These reports are supported by statistical results which indicate that the experimental group displayed a statistically significant reduction in music performance anxiety. This reduction is also reflected by a statistically significant difference between the groups, which favours the experimental group. Reduced music performance anxiety can impact positively on an individuals' piano performance.

In addition, lecturers' qualitative reports indicated that all experimental group participants displayed improvement with regard to one or more aspects of their piano performance, while positive change was noticed with regard to only some control group participants. Therefore, statistical as well as qualitative results suggest that the experimental group participants benefited from the programme in relation to some aspects relating to their piano performance.

10.3 Methodological Limitations

Despite the positive outcomes of the current study, the results were limited by methodological problems:

- The study only involved student pianists from the Potchefstroom Campus of the North-West University. This necessitated a modest sample, because very few students studied piano performance at that time. Results can therefore not be generalised beyond this specific group of student pianists.
- Since this was an exploratory study, it was not designed to study the effect of the Tomatis Method on a specific aspect of psychological well-being or piano performance.

Therefore, the control of dependent variables was limited. This limit the scope for the interpretation of results and for theoretical explanations.

- Control group participants were not involved in data collection during the programme. Therefore, the data from the two groups could not be compared in all aspects.
- Participants' tight study schedules prevented more extended data collection for determining the integration effect and whether positive effects were retained.
- Experimental group participants' tight study schedule, which also necessitated sufficient practising, caused them to be under constant time pressure. The time consumed by the programme aggravated the pressure. Therefore, accompanying stress could have limited the benefits of the Tomatis intervention.
- In addition to the pre and post-programme testing, the experimental group completed the POMS five times during the programme. Thus, it is possible that familiarity with the questionnaire caused experimental group participants to mark extremes, which would not necessarily have been the case with control group participants. Furthermore, some participants developed an aversion to the test. Therefore, it is possible that over familiarity and frustration with this measuring instrument could have influenced post-programme results from the POMS.
- Participants' preparation for the recording of their self-study – *Le Sapin* by Jean Sibelius – was mostly insufficient. Therefore, their performances were inadequate. The reason for this was probably that the self-study was not part of their semester repertoire, and they were busy preparing for their performance examinations. Thus, their insufficient preparation limited the results with regard to the effect of the Tomatis Method on the quality of their piano performance as measured by the panel of external adjudicators.
- The percentage used to represent a general impression of participants' overall piano performance was not graded to indicate which percentage reflects an excellent, good, average or poor performance. Therefore, evaluators' perceptions might have differed in this regard. Thus, results with regard to the general impression of participants' overall piano performance were limited.

10.4 Conclusions

The paucity of statistically significant results was a disappointment. However, the statistical consultant confirmed that it might have been associated with the small sample, and added that with such small samples statistics tended to be unstable. Furthermore, this was an exploratory study, and was not designed to study the effect of the Tomatis Method on a specific aspect of psychological well-being or piano performance. Therefore, participants' profiles with regard to

psychological well-being and piano performance differed, thus limiting the control of dependent variables, and thereby the possibility of statistically significant results.

However, among the few statistically significant outcomes observed, the experimental group achieved significantly reduced music performance anxiety. Their piano technique, which comprises motor and listening skills, also showed significant improvement. Thus, it was concluded that undergoing the Tomatis intervention was indeed beneficial for experimental group participants regarding prerequisites for optimal piano performance. It is further concluded that listening skill enhancement via the Tomatis Method can be seen as the central underlying thrust resulting in improved piano performance with regard to technique.

The combination of sound stimulation, opportunity to confide personal experiences, group discussions, repeated projective drawings, and being on their own for the largest part of the listening sessions probably facilitated participants' self-search and deepened self-awareness. Thus, the opportunity and the time to be in touch with themselves contributed to their enhanced psychological well-being. Therefore, the positive outcomes of the experimental group, evident from the qualitative results, indicated that the student pianists in this study benefited from the Tomatis programme with regard to aspects of their psychological well-being.

Since participants' profiles with regard to psychological well-being and piano performance differ, qualitative results provide more insight into the effect of the Tomatis Method on student pianists' psychological well-being and piano performance than statistical results. Consequently, aspects of psychological well-being and piano performance with regard to which student pianists can benefit from exposure to the Tomatis Method were identified in the current study. For the very reason that participants' individual profiles differ, results are more significant.

Additionally, the use of three time points of evidence gathering, i.e. interviews with participants during and at three weeks post-programme; interviews with piano lecturers at three months post-programme; and interviews with other lecturers at six months post-programme, ensured another dimension in the data. This follow-up further strengthened the evidence in favour of a discernable impact of the Tomatis programme, at least with this group of experimental participants. However, as mentioned, the results cannot be generalised beyond this group of participants.

Whether the presence of the participating lecturer had any impact on the results will remain unknown. Admittedly, this lecturer's interaction during the weekly discussions fostered participant coherence. However, since this lecturer's data had not been used, it is assumed that it had no direct impact on participant outcomes.

Except for a single case study by Madaule, there seemed to be no other scientific evidence that the Tomatis Method has benefited student pianists. Therefore, results from the present study contribute to the body of research, and warrant further investigation.

10.5 RECOMMENDATIONS

The recommendations for future research include methodological recommendations as well as subjects that warrant further investigation.

10.5.1 Methodological Recommendations

- In order to compare results and exclude other explanations, it is recommended that control group participants are also involved in data collection at all time points in future studies involving student pianists.
- If possible, an alternative research design, which includes four groups of participants, could be fruitful. A group which is exposed to the Tomatis programme; a group that also receives daily personal attention but listens to unfiltered Mozart violin concertos and symphonies without the aid of the Electronic Ear; a group that only receives daily personal attention; and a non intervention control group.
- To determine the optimal integration effect of the Tomatis programme, it is suggested that research designs make provision for follow-up data collection three to six months post-programme.
- In order to prevent over familiarity with a quantitative measuring instrument, it is recommended that there should be at least two to three months between testing by means of such instruments.
- In addition to the sound stimulation, regular individual interviews and/or group discussions form an integral part of the Tomatis Method. Therefore, research on the effect of the Tomatis Method lends itself to the use of qualitative research methods. Given the richness of the qualitative results in the present study, it is proposed that future research of the effect of the Tomatis Method predominantly rely on qualitative methods and particularly focus groups.
- Attending a Tomatis programme is time consuming and student musicians have a tight study schedule, which causes them to be under constant time pressure. In order to prevent increased pressure and for them to experience the full benefit of the programme, it is advised that Tomatis programmes should be attended during holidays.

- In addition to the same self-study for all participants, recordings of each participant's music performance should include a piece which he/she knows well and feels comfortable to perform.
- It could be profitable to schedule recordings of participants' music performances as far as possible from their practical examinations.
- In order to obtain more comparable results, the percentage for the general impression of the overall music performance should be graded as excellent, good, average and poor.

10.5.2 Recommendations for Further Investigation

In the absence of scientific evidence regarding the effect of the Tomatis Method on student pianists, as well as an absence of theories concerning student pianists' psychological well-being and piano performance, this was an exploratory study. It thus forms the first phase in the study of the field. Therefore, observations could not be interpreted deeply and a next phase of research is needed to investigate more systematically the observations made in the present study. More research of the kind done in this study will greatly aid theory building and an understanding of the dynamic interaction between the three concepts included in this study (Tomatis Method; psychological well-being; piano performance), as illustrated in figure 10.1.

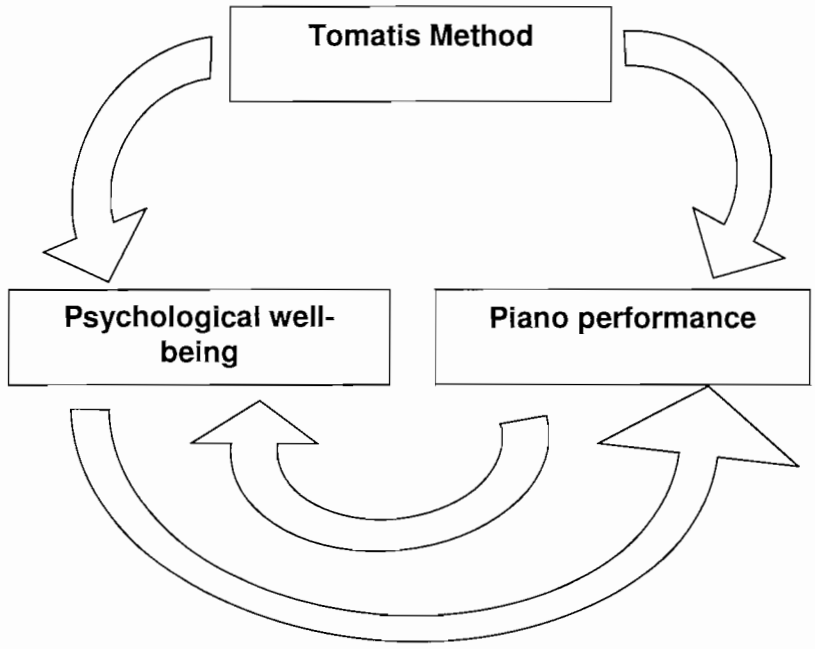


Figure 10.1 **Dynamic interaction between the Tomatis Method, psychological well-being, and piano performance**

Results of the present study also raise questions regarding certain aspects of student pianists' psychological well-being, as well as the relation between these aspects of their psychological well-being, their training environment and their piano performance. Consequently, from the observations of the present study, recommended avenues for further investigation include aspects of student pianists' psychological well-being and piano performance, as well as relationships between these two concepts. Since the Tomatis Method stood central in the present study, recommendations also include this intervention. However, future investigations do not necessarily have to include a Tomatis intervention, neither do they have to involve student pianists only. Most of the recommendations in the following sections can also be useful for investigations with other student musicians, and using other interventions.

10.5.2.1 Psychological well-being of student pianists

Although there were no statistically significant indications of improvement in experimental group participants' psychological well-being, qualitative results suggest that further research regarding student pianists' autonomy, interpersonal relationships, self-acceptance, self-confidence, coping ability, and sense of direction is warranted. The improvement displayed by participants in the present study, suggest that student pianists may experience problems concerning these aspects of psychological well-being. In addition, there are indications in the literature that student pianists' training environment may contribute, amongst others, to a lack of self-confidence and self-esteem (see Chapter 3, section 3.3).

Qualitative results further indicated that the Tomatis intervention can benefit student pianists with regard to the above-mentioned aspects. Therefore, a systematic investigation into the effect of the Tomatis Method on each of these aspects with regard to student pianists who need improvement in this respect could be fruitful.

In addition, observations in the present study point to the possible existence of a relationship between student pianists' sense of autonomy, interpersonal relationships, and self-confidence (see Chapter 9, section 9.3.2.1). Thus, a more comprehensive investigation regarding the existence of such a relationship will be valuable. Since the participants who indicated an improvement in their communication (a recognised effect of the Tomatis Method) also displayed improved interpersonal relationships, as well as increased autonomy, environmental mastery and self-confidence, this is another relationship which deserves further investigation.

10.5.2.2 Piano performance of student pianists

Experimental group participants displayed statistically significant improvement regarding their technique (as measured by the PPRS and evaluated by their piano lecturers). As discussed in

Chapter 9 (section 9.4.2.1), the Technique subscale of the PPRS also included items related to listening skills. Since the literature (see Chapter 3, section 3.2.2) emphasises the importance of listening skills, and qualitative reports indicated that participants' listening skills had improved, an investigation into the influence of student pianists' listening skills on the aspects of technique that require listening skills as well as motor skills can be insightful. These aspects include balance of sound, tone quality and pedalling (also measured by the PPRS).

Although not measured quantitatively, qualitative results suggest student pianists' concentration, and their rate of mastering new compositions merit more in depth investigation. This observation is supported by the literature, which point to the importance of concentration and productive practice for a successful performance (Chapter 3, section 3.2 – 3.4). Since concentration is a necessary ingredient of efficient practice, which includes the rate of mastering new compositions, the relationship between levels of concentration and the rate of mastering new compositions can be investigated.

Since the results from the present study suggest that the Tomatis intervention can benefit student pianists with regard to the above-mentioned aspects, in-depth investigations into the effect of the Tomatis Method on each of these aspects can be valuable. Results further indicate the likelihood that the Tomatis intervention can have a positive effect on the confidence with which student pianists perform and that the intervention can contribute to the reduction of music performance anxiety. Therefore, a more comprehensive investigation of the effect of the Tomatis Method on these aspects of student pianists' piano performance is also warranted. Since these two aspects also include elements of psychological well-being, avenues of research in this regard will be suggested in the next section.

10.5.2.3 Relationships between psychological well-being and piano performance

Even though not statistically significant, qualitative results suggest that the confidence with which student pianists perform warrants further investigation. Most of the participants who performed more confidently also reflected improved self-confidence, self-acceptance and autonomy. Since the confident presentation of the music and the performer is important in a performance situation, an investigation of the relationship between these aspects of psychological well-being and the confidence with which student pianists perform, can be fruitful.

Statistically significant results from the present study (measured by the MPAI-A) supported by qualitative results suggest that the Tomatis Method can contribute to a reduction of student pianists' music performance anxiety. Since one of the causes for music performance anxiety

may be low self-confidence, and qualitative results also indicated an enhancement of self-confidence, an investigation into the effect of the Tomatis Method on student pianists' self-confidence and its relation to a reduction of music performance anxiety is merited. However, music performance anxiety is a multifaceted phenomenon and can sometimes have such a debilitating effect on the performer that it impairs the quality of the performance (see Chapter 3, section 3.4). Some of the causes of music performance anxiety also seem to relate to aspects of psychological well-being such as autonomy, self-acceptance, and environmental mastery. Therefore, research into the relationship between music performance anxiety and these or other aspects of psychological well-being can be valuable and may clarify the dynamic interaction between these two concepts and piano performance.

ADDENDUM A
PIANO PERFORMANCE EVALUATION: QUANTITATIVE INSTRUMENTS

1. Self-Designed Piano Performance Rating Scale (PPRS)
2. Constructs for Assessing Music Performance (Mills, 1987)

These forms were slightly altered to suit the evaluation of the student's general piano performance by their piano lecturers and the student's self-evaluation. They were asked to evaluate the piano performance in general, instead of a specific piano performance. Thus, it was only the basic instruction as well as the sentence construction of the second form that was slightly altered. Therefore, the altered forms are not included in this document. Sources used in the development of the PPRS are included.

EVALUATION OF STUDENT'S PIANO PERFORMANCE

CD

(All information is strictly confidential)

DATE: .....

STUDENT: Nr.....

EVALUATOR: .....

I. Please rate the student's overall piano performance by using a percentage. Maximum is 100%. Go with your first impression.

.....%

II. The following items are all aspects of piano performance. Please circle the number that best describes your perception of this student's performance. Go with your first impression.

	Exceedingly poor	Poor	Average	Satisfactory	Good	Very good	Excellent
A. Accuracy, continuity and fluency							
1. Accurate pitch	1	2	3	4	5	6	7
2. Rhythmic accuracy	1	2	3	4	5	6	7
3. Tempo (Convincing and controlled)	1	2	3	4	5	6	7
4. Performance indications (Accurate realization of indications such as dynamics, phrasing, articulation, etc.)	1	2	3	4	5	6	7
5. Fluency / Continuity	1	2	3	4	5	6	7
B. Technique (physical control of the instrument)							
1. Articulation and ornamentation (Skilful realization of performance indications)	1	2	3	4	5	6	7
2. Coordination	1	2	3	4	5	6	7
3. Balance of sound (Relationship between melody and accompaniment or between voices)	1	2	3	4	5	6	7
4. Pedaling	1	2	3	4	5	6	7
5. Tone quality (Evenness of tone, singing tone)	1	2	3	4	5	6	7

	Exceedingly poor	Poor	Average	Satisfactory	Good	Very good	Excellent
C. Interpretation							
1. Dynamic range (Including contrast, shading, control and appropriateness)	1	2	3	4	5	6	7
2. Phrasing (Shaped with artistic understanding of lines, climaxes, and conclusions / cadences)	1	2	3	4	5	6	7
3. Climax (Including realization of the climax in a section and the central climax to the whole piece)	1	2	3	4	5	6	7
4. Rubato (Appropriateness of rubato)	1	2	3	4	5	6	7
5. Musical character and style (Including the ability to convey musical intent and the mood of the piece to the listener, within the contexts of the style period)	1	2	3	4	5	6	7

The following sources were consulted during the designing of the PPRS:

AHRENS, C.B. & ATKINSON, G.D. 1963. For all piano teachers. London: Frederick Harris Music. 131 p.

ASMUS, E.P. 1999. Music assessment concepts. *Music educators journal*, 86(2):19-24, September.

BARRA, D. 1983. The dynamic performance: a performer's guide to musical expression and interpretation. New Jersey: Prentice-Hall.
181 p.

BERGEE, M.J. 2000. Faculty interjudge reliability of music performance evaluation. *Journal of research in music education*, 51(2):137-150, Summer.

BERGEE, M.J. (bergeem@missouri.edu) 27 Sept. 2006. Piano performance rating scale. E-mail to: Vercueil, A.C. (ansieve@lantic.net).

BURRACK, F. 2002. Enhanced assessment in instrumental programs. *Music educators journal*, 88(6):27-32, May.

D'ABREU, G. 1964. Playing the piano with confidence. London: Faber and Faber. 126 p.

FISKE, H.E. 1975. Judge-group differences in the rating of secondary school trumpet performances. *Journal of research in music education*, 23(3):186-196, Autumn.

FISKE, H.E. 1977a. Relationship of selected factors in trumpet performance adjudication reliability. *Journal of research in music education*, 25(4):256-263, Winter.

FISKE, H.E. 1977b. Who's to judge?: new insights into performance evaluation. *Music educators journal*, 64(4):22-25, December.

LAST, J. 1980. Freedom in piano technique. London: Oxford University Press. 80 p.

LIEN, J.L. & HUMPHREYS, J.T. 2001. Relationships among selected variables in the South Dakota all-state band auditions. *Journal of research in music education*, 49(2):1346-155, Summer.

MACKINNON, L. 1939. Musical secrets. London: Oxford University Press. 95 p.

MILLS, J. 1987. Assessment of solo music performance. *Council for research in music education. Bulletin*, 91:119-125, Spring.

MILLS, J. 2005. Music in the school. New York: Oxford University Press. 244 p.

PRICE, H.E. & CHANG, E.C. 2005. Conductor and ensemble performance expressivity and state festival ratings. *Journal of research in music education*, 53(1):66-77, Spring.

SANDOR, G. 1981. On piano playing: motion, sound and expression. New York: Schirmer. 240 p.

SAUNDERS, T.C. & HOLOHAN, J.M. 1997. Criteria-specific rating scales in the evaluation of high school instrumental performance. *Journal of research in music education*, 45(2):259-272, Summer.

TAYLOR, C. 2005. These music exams. http://www.abrsm.org Date of access: 27 Sept. 2006.

TRINITY-GUILDHALL. 2006. Assessment criteria. http://www.trinityguildhall.co.uk Date of access: 8 Nov. 2006.http://www.abrsm.org/

VAN DEN BERG, S.F. 1995. Die ontwikkeling van 'n raamwerk vir die evaluering van buitekurrikulêre klavieronderrig. Potchefstroom: PU vir CHO. (Proefskrif - D.Phil.) 361 p.

WAPNICK, J., MAZZA, J.K. & DARROW, A.A. 2000. Effects of performer attractiveness, stage behavior, and dress on evaluation of children's piano performances. *Journal of research in music education*, 48(4):323-336, Winter.

ZDINSKY, S.F. & BARNES, G.V. 2002. Development and validation of a string performance rating scale. *Journal of research in music education*, 50(3):245-255, Autumn.

EVALUATION OF STUDENT'S PIANO PERFORMANCE

DVD

(All information is strictly confidential)

DATE: .....

STUDENT: Nr.....

EVALUATOR: .....

I. Please rate the student's overall piano performance by using a percentage. Maximum is 100%. Go with your first impression.

.....%

II. Below are some statements on piano performance. Please underline the part in each statement written in capital letters, which best describes your perception of this student's piano performance.

1. The performer was CONFIDENT / NERVOUS

2. The performer DID ENJOY / DID NOT ENJOY playing

3. The performer WAS FAMILIAR WITH / HARDLY KNEW the piece

4. The performer MADE SENSE / DID NOT MAKE SENSE of the piece as a whole

5. The performer's use of dynamics was APPROPRIATE / INAPPROPRIATE

6. The performer's use of tempi was APPROPRIATE / INAPPROPRIATE

7. The performer's use of phrasing was APPROPRIATE / INAPPROPRIATE

8. The performer's technical problems were HARDLY NOTICEABLE / DISTRACTING

9. The performance was FLUENT / HESITANT

10. The performance was SENSITIVE / INSENSITIVE

11. The performance was CLEAN / MUDDY

12. I found this performance INTERESTING / DULL

These statements are constructs for the assessment of music performance, developed in a study by Janet Mills. 2005. Music in the school. New York: University Press. 244 p (See p. 179-180)

III. Remarks (optional)

.....

.....

ADDENDUM B

BIOGRAPHICAL QUESTIONNAIRE

CONFIDENTIAL

Underline the applicable answer or fill in your answer in the given space.

A. PERSONAL DETAILS

1. Surname, full names: _____

2. Birth date: _____

3. Age: _____

B. MUSIC EDUCATION AND –BACKGROUND

1. Did you have any informal music education (in a group) before getting individual coaching? **Yes / No**

2. Was piano the first instrument you were taught? **Yes /No**

3. If the answer to the previous question was **no**:
   3.1 Name the first instrument you were taught _____

   3.2 At what age did you start with tuition in the above mentioned instrument? _____

4. At what age did your piano tuition started? _____

5. How many years have you been attending music lessons? _____

6. If you play any other instruments besides piano, please answer the following questions:

   6.1 How many other instruments are you playing? _____

   6.2 Name the instrument/s _____

   6.3 Indicate how long you have been playing the above mentioned instruments and how many years you had formal tuition in these instruments.

Instrument	Time played	Years tuition
_____	_____	_____
_____	_____	_____
_____	_____	_____

7. Did any of your parents have any music tuition? **Yes / No**

8. If the answer to the previous question was yes ....
   8.1 Which of your parents have had music tuition? **Father / Mother / Both**

   8.2 What is your parent's highest music qualification? (if known to you)

   Father: _____

   Mother: _____

   8.3 Which instrument does your parent play?

   Father: _____

   Mother: _____

   8.4 Are or were any of your parents music teachers? **Yes/ No**

C. HEALTH

1. Do you have a chronic disease? **Yes / No**

   If yes, specify: _____

   _____

2. Do you often experience middle ear infection / earache? **Yes / No**

3. Did you have middle ear infection / serious earache at any time during your life? **Yes / No**

4. Do you use any chronic medication? **Yes / No**

   If yes, specify what it is used for. _____

   _____

D. FAMILY BACKGROUND

1. How many brothers and / or sisters do you have? **Brothers** _____ **Sisters** _____

2. How many older siblings do you have? _____

3. Are your parents still alive? **Yes** / **No** / **Father only** / **Mother only**

4. If one or both your parents have passed away, how many years ago did it happen?
_____

5. Do/did you live with your biological parents **Yes** / **No**

6. If your parents are divorced, please answer the following questions:
   6.1 How many years ago did your parents get divorced? _____

   6.2 With which parent do/did you live? **Father** / **Mother**

   6.3 Do your brother/s and/or sister/s also live with the above mentioned parent?
   Yes / **No**

Thank you for your cooperation

Ansie Vercueil

ADDENDUM C

SEMI-STRUCTURED INTERVIEWS: QUESTIONS

1. SEMI-STRUCTURED INTERVIEWS WITH PARTICIPANTS

1.1 Pre-Programme Interview

1.2 Post-Programme Interview

2. SEMI-STRUCTURED INTERVIEWS WITH PIANO LECTURERS

1.1 Pre-Programme Interview

1.2 Post-Programme Interview

3. SEMI-STRUCTURED INTERVIEW WITH OTHER LECTURERS

SEMI-STRUCTURED INTERVIEWS WITH PARTICIPANTS

1. PRE-PROGRAMME INTERVIEW

1.1 Vertel my iets van jouself sodat ek 'n beeld kan vorm van wie jy is en hoe jy die lewe ervaar.
Tell me something about yourself so that I can form an idea of who you are and how you experience life.

1.2 Watter besondere ervaringe het jou as persoon gevorm?
Which particular experiences have shaped you as a person?

1.3 Hoe ervaar jy jouself as student-pianis?
How do you experience yourself as student pianist?

1.4 Waaraan dink jy wanneer jy voordra?
What do you think about when you perform?

1.5 Hoe voel jy wanneer jy voorberei vir 'n eksamen / optrede?
How do you feel when you prepare for an examination or performance?

1.6 Hoe is jou slaappatroon voor 'n klaviereksamen of optrede?
Tell me about your sleep pattern before an examination or performance.

1.7 Hoe dink jy sou jy graag jou klavierspel wou verbeter? (in watter opsigte)
Which aspects of your piano performance would you like to improve?

1.8 Hoe ervaar jy jou menseverhoudinge in die algemeen?
How do you experience your interpersonal relationships in general?

1.9 Hoe ervaar jy jou verhouding met jou klavierdosent?
How do you experience your relationship with your piano lecturer?

1.10 Hoe ervaar jy jou ondersteuningsgroep?
How do you experience your support group?

1.11 Hoe sien jy jou toekoms as pianis?
How do you see your future as pianist?

1.12 Is daar nog enigiets wat jy wil bysê/noem/oor wil praat/deel?
Is there anything else you would like to add?

2. POST-PROGRAMME INTERVIEW

2.1 Vertel my hoe jy jouself en die lewe tans ervaar.
How do you currently experience yourself and your life?

2.2 Hoe bepaal jy die standaarde waarvolgens jy jouself as mens evalueer?
How do you determine the standards according to which you evaluate yourself as a person?

2.3 Hoe hanteer jy die daaglikse druk en aktiwiteite?
How do you cope with daily pressure and activities?

2.4 Hoe hanteer jy sosiale druk?
How do you cope with social pressure?

2.5 Hoe ervaar jy jou denke en besluitnemingsprosesse in die algemeen. Hoe vergelyk dit met voorheen?
How do you experience your thoughts and decision-making processes? How does it compare with your thoughts and decision-making processes prior to the programme?

2.6 Hoe ervaar jy tans jou emosies?
How do you experience your emotions at present?

2.7 Hoe ervaar jy jou kommunikasie en vermoë om jouself in woorde uit te druk– sosiaal en in klasse – en hoe vergelyk dit met voorheen?
How do you experience your communication and ability to express yourself – socially as well as in classes – and how does it compare with prior to the programme?

2.8 Hoe ervaar jy jouself tans as student?
How do you presently experience yourself as student?

2.9 Hoe ervaar jy jou optrede in klasse en hoe vergelyk dit met voorheen?
How do you experience your conduct in classes and how does it compare to your conduct prior to the programme?

2.10 Hoe ervaar jy jouself as pianis?
How do you experience yourself as pianist?

2.11 Waaraan dink jy wanneer jy voordra?
What do you think about when you perform?

2.12 Hoe voel jy wanneer jy voorberei vir 'n eksamen / optrede?
How do you feel when you prepare for an examination or performance?

2.13 Hoe is jou slaappatroon voor 'n klaviereksamen of optrede?
Tell me about your sleep pattern before an examination or performance.

2.14 Hoe ervaar jy tans jou klavierspel – positief en negatief?
How do you experience your piano performance at present?

2.15 Hoe ervaar jy tans jou luistervaardighede – in die algemeen en as pianis?
How do you currently experience your listening skills – in general and as pianist?

2.16 Hoe ervaar jy klank in die algemeen en hoe vergelyk dit met voorheen?
How do you experience sound in general and how does it compare with how it used to be prior to the programme?

2.17 Hoe ervaar jy deesdae jou eie stem en hoe vergelyk dit met voorheen?
How do you experience your own voice and how does it compare with how it used to be prior to the programme?

2.18 Hoe ervaar jy tans jou musiekstudies en die waarde daarvan vir die toekoms?
How do you currently experience your music studies and its value for the future?

2.19 Hoe ervaar jy op die oomblik jou menseverhoudinge in die algemeen?
How do you experience your interpersonal relationships in general at present?

2.20 Hoe ervaar jy konflik en jou hantering daarvan en hoe vergelyk dit met die verlede.
How do you experience your coping with conflict and how does it compare with your coping with conflict prior to the programme?

2.21 Hoe ervaar jy tans jou verhouding met jou klavierdosent?
How do you currently experience your relationship with your piano lecturer?

2.22 Hoe ervaar jy jou ondersteuningsgroep?
How do you experience your support group?

2.23 Hoe sien jy jou toekoms oor die algemeen en as pianis?
How do you see your future as pianist?

2.24 Beskryf vir my jou gemoedstoestand oor die algemeen
Please describe your general state of mind.

2.25 Vertel my van jou energievlakke en uithouvermoë in die algemeen en hoe dit vergelyk met voorheen.
Tell me about your energy levels and how it compares with past levels.

2.26 Vertel my van enige veranderinge of nuwe ervarings sedert die program gestop het.
Tell me about any changes or new experiences since completion of the programme.

2.27 Is daar nog enigiets wat jy wil bysê/noem/oor wil praat/deel?
Is there anything else you would like to add?

SEMI-STRUCTURED INTERVIEWS WITH PIANO LECTURERS

1. PRE-PROGRAMME INTERVIEW

Vertel my hoe u elkeen van die volgende studente (noem name) ervaar ten opsigte van hulle klavierspel sowel as hulle algemene optrede, en enige ander waarnemings wat u dink van waarde kan wees.

Tell me about your perceptions of the following students (name them) with regard to their piano performance as well as their general conduct and attitude, and anything else you feel could be of value.

2. POST-PROGRAMME INTERVIEW

Vertel my hoe u elkeen van die volgende studente (noem name) tans ervaar ten opsigte van hulle klavierspel sowel as hulle algemene optrede. Vertel my ook of u enige veranderinge ten opsigte van hierdie studente waarneem, en enige ander waarnemings wat u dink van waarde kan wees.

Tell me about your current perceptions of the following students (name them) with regard to their piano performance as well as their general conduct and attitude. Point out any changes that you have observed, and anything else that comes to mind.

SEMI-STRUCTURED INTERVIEW WITH OTHER LECTURERS

Vertel my hoe u elkeen van die volgende studente (noem name) tans ervaar en hoe dit vergelyk met hoe u hulle voorheen ervaar het. U kan verwys na die studente se algemene optrede, gesindheid, werksverrigting, doeltreffendheid, asook deelname in klasse. Vertel my ook of u enige ontwikkeling of verandering ten opsigte van hierdie studente waarneem, en enige ander waarnemings wat u dink van waarde kan wees.

Please comment on your current experience of the following students (name them) and how it compares to your previous experience of them. You may refer to the students' general conduct and attitude, diligence and efficiency, class participation, development or changes, or anything else that comes to mind.

ADDENDUM D

INFORMED CONSENT

Consent

Title of the project:

The effect of the Tomatis Method on the psychological well-being and piano performance of student pianists

I, the undersigned ..... (full names) read/listened to the information on the project in PART 1 and PART 2 of this document and I declare that I understand the information. I had the opportunity to discuss aspects of the project with the project leader and I declare that I participate in the project as a volunteer. I hereby give my consent to be a subject in this project

.

I indemnify the University, also any employee or student of the University, of any liability against myself, which may arise during the course of the project.

I will not submit any claims against the University regarding personal detrimental effects due to the project, due to negligence by the University, its employees or students, or any other subjects.

(Signature of the subject)

Signed at ..... on .....

Witnesses

1. .....

2. .....

Signed at ..... on .....

REFERENCES

AHRENS, C.B. & ATKINSON, G.D. 1963. For all piano teachers. London: Frederick Harris Music. 131 p.

AKAKIOS, A. 2001. The effect of the Tomatis Method on first-time pregnant women. Potchefstroom: PU for CHE. (Mini-dissertation - MA). 56 p.

ANDREWS, S.R. 2004. Remarks about research. *Ricochet: international journal of Tomatis Method research* 1(1):16-22, May.

ANON. 2004. Historical development of the Tomatis Method. *Ricochet: international journal of Tomatis Method research*, 1(1):49-50, May.

ANTONOVSKY, A. 1987. Unraveling the mystery of health: how people manage stress and stay well. San Francisco: Jossey-Bass Publishers. 209 p.

ASMUS, E.P. 1999. Music assessment concepts. *Music educators journal,* 86(2):19-24, September.

ASPINWALL, L.G. & STAUDINGER, U.M. 2003a. A psychology of human strengths: fundamental questions and future directions for a positive psychology. Washington, DC: American Psychological Association. 369 p.

ASPINWALL, L.G. & STAUDINGER, U.M. 2003b. A psychology of human strengths: some central issues of an emerging field. (*In* Aspinwall, L.G. & Staudinger, U.M., *eds.* A psychology of human strengths: fundamental questions and future directions for a positive psychology. Washington, DC: American Psychological Association. p. 9-22.)

AUSTIN, J., RENWICK, J. & MCPHERSON, G.E. 2006. Developing motivation. (*In* McPherson, *ed.* The child as musician: a handbook of musical development. Oxford: Oxford University Press. p. 213-238.)

BARRA, D. 1983. The dynamic performance: a performer's guide to musical expression and interpretation. New Jersey: Prentice-Hall. 181 p.

BARTON, R. & FEINBERG, J.R. 2008. Effectiveness of an educational program in health promotion and injury prevention for freshman music majors. *Medical problems of performing artists*, 23(2):47-53, June.

BARTON, R., KILLIAN, C., BUSHEE, M., CALLEN, J., CUPP, T., OCHS, B., SHARP, M. & TETRAULT, K. 2008. Occupational performance issues and predictors of dysfunction in college instrumentalists. *Medical problems of performing artists*, 23(2):72-78, June.

BERENSON, G. 2008. Competitions, recitals and auditions – oh my! *American music teacher*, 57(4):4-5, February/March.

BERGEE, M.J. 2000. Faculty interjudge reliability of music performance evaluation. *Journal of research in music education,* 51(2):137-150, Summer.

BERGEE, M.J. (bergeem@missouri.edu) 27 Sept. 2006. Piano performance rating scale. E-mail to: Vercueil, A.C. (ansieve@lantic.net).

BERNSTEIN, S. 1981. With your own two hands: self-discovery through music. New York: Schirmer. 296 p.

BERNSTEIN, S. 2001. To what degree should we go? *Piano & keyboard*, 208:45-49, January/February.

BISWAS-DIENER, R., DIENER, E. & TAMIR, M. 2004. The psychology of subjective well-being. *Daedalus*: 18-25, Spring.

BOTHA, E.M. 2006. Psychological well-being and biological correlates in African women. Potchefstroom: NWU. (Thesis – DPhil.) 147 p.

BRANDFONBRENER, A. 2009. History of playing-related pain in 330 university freshman music students. *Medical problems of performing artists*, 24(1):30-36, March.

BRANDFONBRENER, A.G. & KJELLAND, J.M. 2002. Music medicine. (*In* Parncutt, R. & McPherson, G.E., *eds.* The science & psychology of music performance: creative strategies for teaching and learning. New York: Oxford University Press. p. 83-96.)

BRODSKY, W. & SLOBODA, J.A. 1997. Clinical trial of a music generated vibrotactile therapeutic environment for musicians: main effects and outcome differences between therapy subgroups. *Journal of music therapy,* 34(1):2-32.

BRUNO, S., LORUSSO, A. & L'ABBATE, N. 2008. Playing-related disabling musculoskeletal disorders in young and adult classical piano students. *International archives of occupational environmental health*, 81(7):855-860, May.

BURGER, S. 1999. Die effek van 'n gestruktureerde oudiopsigofonologiese program met musikale jong volwassenes. Potchefstroom: PU vir CHO. (Dissertation – MA.) 211 p.

BURNS, R.C. & KAUFMAN, S.H. 1972. Actions, styles and symbols in kinetic family drawings (K-F-D): an interpretive manual. New York: Brunner/Mazel. 304 p.

BURRACK, F. 2002. Enhanced assessment in instrumental programs. *Music educators journal,* 88(6):27-32, May.

BURT, R & MILLS, J. 2006. Taking the plunge: the hopes and fears of students as they begin music college. *British journal of music education,* 23(1):51-73.

CALDWELL, R. 1990. The performer prepares. Dallas, TX: Pst...Inc. 158 p.

CHAFFIN, R. & IMREH, G. 2001. A comparison of practice and self-report as sources of information about the goals of expert practice. *Psychology of music*, 29(1):33-69, April.

CHRISTOPHER, J.C. 1999. Situating psychological well-being: exploring the cultural roots of its theory and research. *Journal of counseling & development*, 77:141-152, Spring.

CLARKE, E. 2002. Understanding the psychology of performance. (*In* Rink, J., *ed.* Musical performance: a guide to understanding. Cambridge: Cambridge University Press. p. 59-72.)

COETZEE, J.O. 2001. The effect of the Tomatis Method on depressed young adults. Potchefstroom: PU for CHE. (Mini-dissertation - MA). 42 p.

D'ABREU, G. 1964. Playing the piano with confidence. London: Faber and Faber. 126 p.

DAVIDSON, J. 2002a. Developing the ability to perform. (*In* Rink, J., *ed.* Musical performance: a guide to understanding. Cambridge: Cambridge University Press. p. 89-101.)

DAVIDSON, J. 2002b. Communicating with the body in performance. (*In* Rink, J., *ed.* Musical performance: a guide to understanding. Cambridge: Cambridge University Press. p. 144-152.)

DAVIDSON, J. 2002 c. The solo performer's identity. (*In* MacDonald, R.A.R., Hargreaves, D.J. & Miell, D. *eds.* Musical identities. New York: Oxford University Press. p. 97-113.)

DAVIDSON, J.W., HOWE, M.J.A. & SLOBODA, J.A. 1997. Environmental factors in the development of musical performance skill over the life span. (*In* Hargreaves, D.J. & North, A.C. *eds.* The social psychology of music. New York: Oxford University Press. p. 188-206.)

DELIÈGE, I. & SLOBODA, J. 1996. Musical beginnings: origins and development of musical competence. New York: Oxford University Press. 222 p.

DEWS, C.L.B. & WILLIAMS, M.S. 1989. Student musicians' personality styles, stresses, and coping patterns. *Psychology of music,* 17(1):37-47.

DIENER, E. 2000. Subjective well-being: the science of happiness and a proposal for a national index. *American psychologist*, 55(1):34-43, January.

DIENER, E., SAPYTA, J.J. & SUH, E. 1998. Subjective well-being is essential to well-being. *Psychological inquiry*, 9:33-37.

DIENER, E., LUCAS, R.E. & OISHI, S. 2002. Subjective well-being: the science of happiness and life satisfaction. (*In* Snyder, C.R. & Lopez, S.J., *eds.* Handbook of positive psychology. New York: Oxford University Press. p. 63-73.)

DIENER, E., LUCAS, R.E. & SCOLLON, C.N. 2006. Beyond the hedonic treadmill: revising the adaptation theory of well-being. *American psychologist*, 61(4):305-314, May-June.

DUKE, R.A., SIMMONS, A.L. & CASH, C.D. 2009. It's not how much; it's how: characteristics of practice behavior and retention of performance skills. *Journal of research in music education*, 56(4):310-321, January.

DUNSBY, J. 2002. Performers on performance. (*In* Rink, J., *ed.* Musical performance: a guide to understanding. Cambridge: Cambridge University Press. p. 225-236.)

DU PLESSIS, W.F. 1982. Beangste en nie-beangste eerstejaardamestudente: 'n kliniese-psigologiese verkenning. Potchefstroom: PU vir CHO. (Proefskrif – DPhil.) 439 p.

DU PLESSIS, W., BURGER, S., MUNRO, M., WISSING, D., & NEL, W. 2001. Multimodal enhancement of culturally diverse, young adult musicians: a pilot study involving the Tomatis method. *South-African journal of psychology,* 31(3):35-42.

DU PLESSIS, W.F., VERMEULEN, C.M., KIRSTEN, D.K. 2004. The impact of a combined psycho-educational program on weight preoccupied, female South African Students. *Ricochet: international journal of Tomatis Method research*, 1(1):63-74, May.

EISENBERG, N. & WANG, V.O. 2003. Toward a positive psychology: social developmental and cultural contributions. (*In* Aspinwall, L.G. & Staudinger, U.M., *eds.* A psychology of human strengths: fundamental questions and future directions for a positive psychology. Washington, DC: American Psychological Association. p. 117-129.)

FAVA, G.A. & MANGELLI, L. 2001. Assessment of subclinical symptoms and psychological well-being in depression. *European archives of psychiatry and clinical neuroscience*, 251(2):47-52.

FERNÁNDEZ-BALLESTEROS, R. 2003. Light and dark in the psychology of human strengths: the example of psychogerontology. (*In* Aspinwall, L.G. & Staudinger, U.M., *eds.* A psychology of human strengths: fundamental questions and future directions for a positive psychology. Washington, DC: American Psychological Association. p. 131-147.)

FISKE, H.E. 1975. Judge-group differences in the rating of secondary school trumpet performances. *Journal of research in music education*, 23(3):186-196, Autumn.

FISKE, H.E. 1977a. Relationship of selected factors in trumpet performance adjudication reliability. *Journal of research in music education,* 25(4):256-263, Winter.

FISKE, H.E. 1977b. Who's to judge? new insights into performance evaluation. *Music educators journal,* 64(4):22-25, December.

FREDRICKSON, B.L. 2002. Positive emotions. (*In* Snyder, C.R. & Lopez, S.J., *eds.* Handbook of positive psychology. New York: Oxford University Press. p. 120-133.)

FREDRICKSON, B.L. 2003. The value of positive emotions: the emerging science of positive psychology is coming to understand why it's good to feel good. *American scientist*, 91:330-335, July-August.

FREDRICKSON, B.L. & BRANIGAN, C. 2005. Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition and emotion*, 19(3):313-332.

FRIEDBERG, R.C. 1993. The complete pianist: body, mind, synthesis. Metuchen, NJ: Scarecrow Press. 132 p.

GABRIELSSON, A. 2003. Music performance research at the millennium. *Psychology of music,* 31(3):221-272, July.

GIESEKING, W. & LEIMER, K. 1972. Piano technique. New York: Dover. 140 p.

GILMOR, T. 1999. The efficacy of the Tomatis Method for children with learning and communication disorders: a meta-analysis. *International journal of listening*, 13:12-23.

GORDON, S. 2000. Other twentieth-century pedagogy. (*In* Uszler, M., Gordon, S. & Smith, S.M., *eds.* The well-tempered keyboard teacher. 2nd ed. Australia: Schirmer. p. 317-337.)

GUPTILL, C., ZAZA, C. & PAUL, S. 2005. Treatment preferences of injured college student musicians. *OTJR: occupation, participation and health*, 25(1):4-8, Winter.

GUPTILL, C. & GOLEM, M.B. 2008. Case study: musicians' playing-related injuries. *Journal of prevention, assessment and rehabilitation*, 30(3):307-310.

HALLAM, S. 2002. Musical motivation: towards a model synthesising the research. *Music education research*, 4(2):225-244, September.

HAMMEL, B. 2003. Motivational strategies: the outcome starts here. *American music teacher*, 53(2):29-40, October/November.

HARGREAVES, D.J. & NORTH, A.C. 1997. The social psychology of music. New York: Oxford University Press. 319 p.

HARRIS, A.H.S., THORESON, C.E. & LOPEZ, S.J. 2007. Integrating positive psychology into counseling: why and (when appropriate) how. *Journal of counseling & development*, 85:3-13, Winter.

HEWITT, M.P. 2001. The effects of modelling, self-evaluation, and self-listening on junior high instrumentalists' music performance and practice attitude. *Journal of research in music education,* 49(4):307-322, Winter.

JOHNSTON, P. 2002. The practice revolution: getting great results from the six days between music lessons. Pearce: PracticeSpot Press. 323 p.

JØRGENSEN, H. 2002. Instrumental performance expertise and amount of practice among instrumental students in a conservatoire. *Music Education Research*, 4(1):105-119, March.

JOSEPH, S. & LINLEY, A. 2005. Positive psychological approaches to therapy. *Counselling & psychotherapy research*, 5(1):5-10, March

KAMMANN, R., & FLETT, R. 1983. Affectometer 2: a scale to measure current level of general happiness. *Australian journal of psychology,* 35(2):259-265.

KEMP, A. 1982. The personality structure of the musician: IV. Incorporating group profiles into a comprehensive model. *Psychology of music,* 10(2):3-6.

KEMP, A.E. & MILLS, J. 2002. Musical potential. (*In* Parncutt, R. & McPherson, G.E., *eds.* The science & psychology of music performance: creative strategies for teaching and learning. New York: Oxford University Press. p. 3-16.)

KENNY, D.T. 2005. A systematic review of treatments for music performance anxiety. *Anxiety, stress, and coping,* 18(3):183-208, September.

KENNY, D.T. 2006. Music performance anxiety: origins, phenomenology, assessment and treatment. *Context*, 31:51-64.

KENNY, D.T., DAVIS, P. & OATES, J. 2004. Music performance anxiety and occupational stress amongst opera chorus artists and their relationship with state and trait anxiety and perfectionism. *Anxiety disorders,* 18:757-777.

KENNY, D.T. & OSBORNE, S. 2006. Music performance anxiety: new insights from young musicians. *Advances in cognitive psychology,* 2(2):103-112.

KEYES, C.L.M. 2005. Chronic physical conditions and aging: is mental health a potential protective factor? *Ageing international*, 30(1):88-104, Winter.

KEYES, C.L.M. 2006. Subjective well-being in mental health and human development research worldwide: an introduction. *Social indicators research*, 77:1-10.

KEYES, C.L.M & LOPEZ, S.J. 2002. Toward a science of mental health: positive directions in diagnosis and interventions. (*In* Snyder, C.R. & Lopez, S.J., *eds.* Handbook of positive psychology. New York: Oxford University Press. p. 45-59.)

KEYES, C.L.M. & HAIDT, J. 2003. Flourishing: positive psychology and the life well lived. Washington, DC: American Psychological Association. 335 p.

KIRCHNER, J.M., BLOOM, A.J. & SKUTNICK-HENLEY, P. 2008. The relationship between performance anxiety and flow. *Medical problems of performing artists*, 23(2):59-65, June.

KOOPMAN, C., SMIT, N., DE VUGT, A., DENEER, P. & DEN OUDEN, J. 2007. Focus on practice-relationships between lessons on the primary instrument and individual practice in conservatoire education. *Music education research*, 9(3):373-397, November.

KOSTKA, M.J. 2002. Practice expectations and attitudes: a survey of college-level music teachers and students. *Journal of research in music education,* 50(2):145-154, Summer.

KREUTZ, G., GINSBORG, J. & WILLIAMON, A. 2008. Music students' health problems and health-promoting behaviours. *Medical problems of performing artists*, 23(1):3-11, March.

KREUTZ, G., GINSBORG, J. & WILLIAMON, A. 2009. Health-promoting behaviours in conservatoire students. *Psychology of music*, 37(1):47-60, January.

LANG, B.F. 1998. A piano teacher's words of wisdom: common-sense commentary on the study of music. Raleigh, NC: Pentland Press. 123 p.

LAST, J. 1980. Freedom in piano technique. London: Oxford University Press. 80 p.

LEEDY, P.D., ORMROD, J.E. 2005. Practical research: planning and design. 8th ed. Upper Saddle River, N.J. Pearson Education. 319 p.

LEHRER, P.M. 1987. A review of the approaches to the management of tension and stage fright in music performance. *Journal of research in music education,* 35(3):143-153, Autumn.

LEON-GUERRERO, A. 2008. Self-regulation strategies used by student musicians during music practice. *Music education research*, 10(1):91-106, March.

LIEN, J.L. & HUMPHREYS, J.T. 2001. Relationships among selected variables in the South Dakota all-state band auditions. *Journal of research in music education,* 49(2):146-155, Summer.

LINLEY, P.A. & JOSEPH, S. 2003. Putting it into practice. *The psychologist*, 16(3):143, March.

LINLEY, P.A., JOSEPH, S. & BONIWELL, I. 2003. Positive psychology. *The psychologist*, 16(3):126, March.

LUCAS, R.E., CLARK, A.E., GEORGELLIS, Y. & DIENER, E. 2004. Unemployment alters the set point for life satisfaction. *Psychological science*, 15(1):8-13.

LYUBOMIRSKY, S. 2001. Why are some people happier than others?: the role of cognitive and motivational processes in well-being. *American psychologist*, 56(3):239-249, March.

MACKINNON, L. 1939. Musical secrets. London: Oxford University Press. 95 p.

MACDONALD, R.A.R., HARGREAVES, D.J. & MIELL, D. 2002. Musical identities. New York: Oxford University Press. 213 p.

MADAULE, P. 1976. Audio psycho phonology for singers and musicians. Potchefstroom: PU for CHE. 29 p.

MADAULE, P. 1994. When listening comes alive: a guide to effective listening and communication. 2nd ed. Canada: Moulin Publishing. 204 p.

MCCORMICK, J. & MCPHERSON, G. 2003. The role of self-efficacy in a musical performance examination: an exploratory structural equation analysis. *Psychology of music*, 31(1):37-51, January.

MCMAHON, D.M. 2004. From the happiness of virtue to the virtue of happiness: 400 B.C. – A.D. 1780. *Daedalus*: 5-17, Spring.

MCNAIR, D. M., LORR, M., & DROPPLEMAN, L. F. 1992. POMS manual: profile of mood states. San Diego, Calif.: Edits. 37 p.

MCPHERSON, G.E. 2006. The child as musician: a handbook of musical development. Oxford: Oxford University Press. 501 p.

MCPHERSON, G.E. & MCCORMICK, J. 2006. Self-efficacy and music performance. *Psychology of music*, 34(3):322-336, July.

MCREADY, S. & REID, D. 2007. The experience of occupational disruption among student musicians. *Medical problems of performing artists*, 22(4):140-146, December.

MIKSZA, P. 2006. Relationships among impulsiveness, locus of control, sex, and music practice. *Journal of Research in Music Education*, 54(4):308-323, Winter.

MILLS, J. 1987. Assessment of solo music performance. *Council for research in music education. Bulletin,* 91:119-125, Spring.

MILLS, J. 1991. Assessing musical performance musically. *Educational studies,* 17(2): 173-181.

MILLS, J. 2003. Musical performance: crux or curse of music education. *Psychology of music,* 31(3):324-339, July.

MILLS, J. 2005. Music in the school. New York: Oxford University Press. 244 p.

MOORE, D.G., BURLAND, K. & DAVIDSON, J.W. 2003. The social context of musical success: a developmental account. *British journal of psychology*, 94(4):529-249, November.

NAGEL, J.J. 1988. In pursuit of perfection: career choice and performance anxiety in musicians. *Medical problems of performing artists,* 3(4):140-145, December.

NAGEL, J.J. 2009. How to destroy creativity in music students: the need for emotional and psychological support services in music schools. *Medical problems of performing artists,* 24(1):15-17, March.

NAKAMURA, J. & CSIKSZENTMIHALYI, M. 2002. The concept of flow. (*In* Snyder, C.R. & Lopez, S.J., *eds.* Handbook of positive psychology. New York: Oxford University Press. p. 89-105.)

NEL, L. 2005. Asperger disorder and the Tomatis Method: a case study. Potchefstroom: NWU. (Mini-dissertation - MA). 47 p.

NEUHAUS, H. 1993. The art of piano playing. 2nd ed. London: Kahn & Averill. 240 p.

NEUMAN, W.L. 2006. Social research methods: qualitative and quantitative approaches. 6th ed. Boston: Pearson Education. 592 p.

NEYSMITH-ROY, J.M. 2001. The Tomatis Method with severely autistic boys: individual case studies of behavioral changes. *South-African journal of psychology,* 31(1):19-28.

NICOLOFF, F. 2004. Case studies of children with Dyspraxia following intervention with a Tomatis Method program. *Ricochet*: *international journal of Tomatis Method research*, 1(1):30-35, May.

NIELSEN, S. 2004. Strategies and self-efficacy beliefs in instrumental and vocal individual practice: a study of students in higher music education. *Psychology of music*, 32(4):418-431, October.

O'NEILL, S.A. 2002. The self-identity of young musicians. (*In* MacDonald, R.A.R., Hargreaves, D.J. & Miell, D. *eds.* Musical identities. New York: Oxford University Press. p. 79-96.)

O'NEILL, S.A. & MCPHERSON, G.E. 2002. Motivation. (*In* Parncutt, R. & McPherson, G.E., *eds.* The science & psychology of music performance: creative strategies for teaching and learning. New York: Oxford University Press. p. 31-56.)

ONWUEGBUZIE, A.J., JOHNSON, R.B. & COLLINS, K.M.T. 2009. Call for mixed analysis: a philosophical framework for combining qualitative and quantitative approaches. *International journal of multiple research approaches*, 3(2):114-139, August.

OSBORNE, M.S., & KENNY, D.T. 2005. Development and validation of a music performance anxiety inventory for gifted adolescent musicians. *Anxiety disorders,* 19:725-751.

PARNCUTT, R. & MCPHERSON, G.E. 2002. The science & psychology of music performance: creative strategies for teaching and learning. New York: Oxford University Press. 388 p.

PARK, A., GUPTILL, C. & SUMISON, T. 2007. Why music majors pursue music despite the risk of playing-related injuries. *Medical problems of performing artists*, 22(3):89-96, September.

PECHÉ, A. 1975. Die effek van oudio-psigofonologiese opleiding op angs. Potchefstroom: PU vir CHO. (Verhandeling – MA). 180 p.

PERSSON, R.S. 2000. Survival of the fittest or the most talented? *Journal of secondary gifted education,* 12(1):25-38, Fall.

POINTON, C. 2006. Positive psychology. *Therapy today*, 17(5):4-7, June.

PRICE, H.E. & CHANG, E.C. 2005. Conductor and ensemble performance expressivity and state festival ratings. *Journal of research in music education,* 53(1):66-77, Spring.

RANELLI, S., STRAKER, L. & SMITH, A. 2008. Prevalence of playing-related musculoskeletal symptoms and disorders in children learning instrumental music. *Medical problems of performing artists*, 23(4):178-185, December.

REID, S. 2002. Preparing for performance. (*In* Rink, J., *ed.* Musical performance: a guide to understanding. Cambridge: Cambridge University Press. p. 102-112.)

RINK, J. 2002. Musical performance: a guide to understanding. Cambridge: Cambridge University Press. 245 p.

ROLF, A.S. 1998. Die evaluering van 'n oudiopsigofonologiese verrykingsprogram vir psigologiestudente. Potchefstroom: PU vir CHO. (Dissertation – MA.) 200 p.

ROSEN, C. 2004. Piano notes: the hidden world of the pianist. London: Penguin. 246 p.

RYAN, R.M. & DECI, E.L. 2001. On happiness and human potential: a review of research on hedonic and eudaimonic well-being. *Annual review of psychology*, 52:141-166.

RYFF, C.D. 1989. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of personality and social psychology*, 57(6):1069-1081.

RYFF, C.D. & KEYES, C.L.M. 1995. The structure of psychological well-being revisited. *Journal of personality and social psychology*, 69(4):719-727.

RYFF, C.D. & SINGER, B. 1998. The contours of positive human health. *Psychological inquiry*, 9(1):1-28.

RYFF, C.D. & SINGER, B. 2003a. Ironies of the human condition: well-being and health on the way to mortality. (*In* Aspinwall, L.G. & Staudinger, U.M., *eds*. A psychology of human strengths: fundamental questions and future directions for a positive psychology. Washington, DC: American Psychological Association. p. 271-287.)

RYFF, C.D. & SINGER, B. 2003b. Flourishing under fire: resilience as a prototype of challenged thriving. (*In* Keyes, C.L.M. & Haidt, J., eds. Flourishing: positive psychology and the life well lived. Washington, DC: American Psychological Association. p. 15-35.)

RYFF, C.D. & SINGER, B.H. 2006. Best news yet on the six-factor model of well-being. *Social science research*, 35(4):1103-1119.

RYFF, C.D., SINGER, B.H. & LOVE G.D. 2004. Positive health: connecting well-being with biology. *The royal society*: 1383-1394, 11 August.

SAKAI, N. 2008. Keyboard span in old musical instruments: concerning hand span and overuse problems in pianists. *Medical problems of performing artists*, 23(4):169-171, December.

SALOVEY, P., MAYER, J.D. & CARUSO, D. 2002. The positive psychology of emotional intelligence. (*In* Snyder, C.R. & Lopez, S.J., *eds.* Handbook of positive psychology. New York: Oxford University Press. p. 159-171.)

SANDOR, G. 1981. On piano playing: motion, sound and expression. New York: Schirmer. 240 p.

SAS INSTITUTE, INC. 2006. SAS for Windows: SAS 9.1 TS Level 1MO: XP-PRO Platform.

SAUNDERS, T.C. & HOLAHAN, J.M. 1997. Criteria-specific rating scales in the evaluation of high school instrumental performance. *Journal of research in music education,* 45(2):259-272, Summer.

SCHMIDT, C.P. 2005. Relations among motivation, performance achievement, and music experience variables in secondary instrumental music students. *Journal of research in music education,* 53(2):134-147, Summer.

SELIGMAN, M.E.P. 2002a. Authentic Happiness: using the new positive psychology to realize your potential for lasting fulfillment. New York: Free Press. 321 p.

SELIGMAN, M.E.P. 2002b. Positive psychology, positive prevention, and positive therapy. (*In* Snyder, C.R. & Lopez, S.J., *eds.* Handbook of positive psychology. New York: Oxford University Press. p. 3-9.)

SELIGMAN, M.E.P. 2003a. Positive psychology: fundamental assumptions. *The psychologist*, 16(3):126-127, March.

SELIGMAN, M.E.P. 2003b. Foreword: the past and future of positive psychology. (*In* Keyes, C.L.M. & Haidt, J., *eds*. Flourishing: positive psychology and the life well lived. Washington, DC: American Psychological Association. p. xi-xx.)

SELIGMAN, M.E.P. 2004. Can happiness be taught? *Daedalus*: 80-87, Spring.

SELIGMAN, M.E.P. & CSIKSZENTMIHALYI. 2000. Positive psychology: an introduction. *American psychologist*, 55(1):5-14, January.

SELIGMAN, M.E.P., STEEN, T.A., PARK, N. & PETERSON, C. 2005. Positive psychology progress: empirical validation of interventions. *American psychologist*, 60(5):410-421, July-August.

SHELDON, K.M. & KING, L. 2001. Why positive psychology is necessary. *American psychologist*, 56(3):216-217, March.

SHELDON, K.M., KASSER, T., SMITH, K. & SHARE, T. 2002. Personal goals and psychological growth: testing an intervention to enhance goal attainment and personality integration. *Journal of personality*, 70(1):5-31, February.

SHELDON, K.M. & LYUBOMIRSKY, S. 2006. Achieving sustainable gains in happiness: change your actions, not your circumstances. *Journal of happiness studies*, 7:55-86.

SLOBODA, J. & DAVIDSON, J. 1996. The young performing musician. (*In* Deliège, I. & Sloboda, J., *eds*. Musical beginnings: origins and development of musical competence. New York: Oxford University Press. p. 171–190.)

SMITH, B.P. 2005. Goal orientation, implicit theory of ability, and collegiate instrumental music practice. *Psychology of music*, 33(1):36-57, January.

SMITH, S.M. 2000. Teaching the advanced student. (*In* Uszler, M., Gordon, S. & Smith, S.M., *eds*. The well-tempered keyboard teacher. 2nd ed. Australia: Schirmer. p. 145-150.)

SNYDER, C.R. & LOPEZ, S.J. 2002. Handbook of positive psychology. New York: Oxford University Press. 829 p.

SNYDER, C.R., RAND, K.L. & SIGMON, D.R. 2002. Hope theory: a member of the positive psychology family. (*In* Snyder, C.R. & Lopez, S.J., *eds.* Handbook of positive psychology. New York: Oxford University Press. p. 257-275.)

SPAHN, C., BURGER, T., HILDEBRANDT, H. & SEIDENGLANZ, K. 2005. Health locus of control and preventive behaviour among students of music. *Psychology of music*, 33(3):256-268, July.

STEPTOE, A. 2001. Negative emotions in music making: the problem of performance anxiety. (*In* Juslin, P.N. & Sloboda, J.A., *eds*. Music and emotion: theory and research. Oxford: Oxford University Press. p. 291-307.)

STERNBACH, D. 2008. Stress in the lives of music students. *Music educators journal*, 94(3): 42-48, January.

STRÜMPFER, D.J.W. 1990. Salutogenesis: a new paradigm. *South-African journal of psychology*, 20(4):265-276.

STRÜMPFER, D.J.W. 1995. The origins of health and strength: from 'salutogenesis' to 'fortigenesis'. *South-African journal of psychology*, 25(2):81-89.

STRÜMPFER, D.J.W. 2005. Standing on the shoulders of giants: notes on early positive psychology (Psychofortology). *South-African journal of psychology*, 35(1):21-45.

TATUM, J.M. 2004. Tomatis-assisted speech therapy. *Ricochet: international journal of Tomatis Method research*, 1(1):37-41, May.

TAYLOR, C. 2005. These music exams. http://www.abrsm.org Date of access: 27 Sept. 2006.

TEMANE, Q.M. 2006. Dynamics of context and psychological well-being: the role of subjective health perceptions, personality factors and spirituality. Potchefstroom: NWU. (Thesis – PhD.) 162 p.

TEMMINGH, K. 1992. Personality aspects of the performing musician: a review of the literature. Dallas, Texas: Southern Methodist University (Project - Music Psychology) 14 p.

THOMPSON, B.M. 2004a. Editor's letter. *Ricochet: international journal of Tomatis Method research*, 1(1):3-13, May.

THOMPSON, B.M. 2004b. Tribute from members of IARCTC to dr. Alfred A. Tomatis (1920 – 2001). *Ricochet: international journal of Tomatis Method research*, 1(1):43-48, May.

THOMPSON, B.M. 2004c. The Tomatis method, listening test, and electronic ear. *Ricochet: international journal of Tomatis Method research*, 1(1):55-58, May.

THOMPSON, B.M. & ANDREWS, S.R. 1999. The emerging field of sound training. *IEEE engineering in medicine and biology,* 18(2):89-96, March/April.

THOMPSON, B.M. & ANDREWS, S.R. 2000. An historical commentary on the physiological effects of music: Tomatis, Mozart and neuropsychology. *Integrative physiological and behavioral science*, 35(3):174-188, July-September.

TOMATIS, A. A. 1991. The conscious ear. New York: Station Hill Press. 277 p.

TOMATIS, A. A. 1996. The ear and language. Canada: Moulin Publishing. 207 p

TOMATIS, A.A. 2005. The ear and the voice. English translation by Roberta Prada. Maryland: Scarecrow Press. 142 p.

TRINITY-GUILDHALL. 2006. Assessment criteria. http://www.trinityguildhall.co.uk Date of access: 8 Nov. 2006.http://www.abrsm.org/

TRUMPS, M. 2004. Tomatis Method: integrator of rehabilitation in a traumatic brain injury (TBI) case study. *Ricochet: international journal of Tomatis Method research*, 1(1):23-29, May.

TUNMER, S.D. 2002. The effect of the Tomatis Method on adults who experienced perinatal complications: a qualitative analysis. Potchefstroom: PU for CHE. (Mini-dissertation - MA). 54 p.

URRY, H.L., NITSCKE, J.B., DOLSKI, I., JACKSON, D.C., DALTON, K.M., MUELLER, C.J., ROSENKRANZ, M.A., RYFF, C.D., SINGER, B.H. & DAVIDSON, R.J. 2004. Making a life worth living: neural correlates of well-being. *Psychological science*, 15(6):367-372, June.

USZLER, M., GORDON, S. & SMITH, S.M. 2000. The well-tempered keyboard teacher. 2nd ed. Australia: Schirmer. 391 p.

USZLER, M. 2000. Putting theory into practice. (*In* Uszler, M., Gordon, S. & Smith, S.M., *eds*. The well-tempered keyboard teacher. 2nd ed. Australia: Schirmer. p. 239-263.)

VALENTINE, E. 2002. The fear of performance. (*In* Rink, J., *ed.* Musical performance: a guide to understanding. Cambridge: Cambridge University Press. p. 168-182.)

VAN DEN BERG, S.F. 1995. Die ontwikkeling van 'n raamwerk vir die evaluering van buitekurrikulêre klavieronderrig. Potchefstroom: PU vir CHO. (Thesis – D.Phil.) 361 p.

VAN JAARSVELD, P.E. 1974. Hakkel en 'n waardering van die tegniek van Tomatis by die remediëring daarvan. Potchefstroom: PU vir CHO. (Proefskrif – DPhil.) 397 p.

VAN JAARSVELD, P.E. & DU PLESSIS, W.F. 1988. Audio-psycho-phonology at Potchefstroom: A review. *South African journal of psychology,* 18(4):136-143, June.

WAPNICK, J., MAZZA, J.K. & DARROW, A.A. 2000. Effects of performer attractiveness, stage behaviour, and dress on evaluation of children's piano performances. *Journal of research in music education,* 48(4):323-336, Winter.

WAPNICK, J., FLOWERS, P., ALEGANT, M. & JASINSKAS, L. 1993. Consistency in piano performance evaluation. *Journal of research in music education,* 41(4):282-292, Winter.

WATERMAN, A.S. 1993. Two conceptions of happiness: contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of personality and social psychology*, 64(4):678-691.

WATERMAN, A.S. 2005. When effort is enjoyed: Two studies of intrinsic motivation for personally salient activities. *Motivation and emotion*, 29(3):165-188, September.

WHITCOMB, B. 2008. Overcoming performance anxiety. *American string teacher*, 58(4):36-39, November.

WILLIAMON, A. & THOMPSON, S. 2006. Awareness and incidence of health problems among conservatoire students. *Psychology of music*, 34(4):411-430, October.

WILSON, G.D. 1997. Performance anxiety. (*In* Hargreaves, D.J. & North, A.C., *eds.* The social psychology of music. New York: Oxford University Press. p. 229-245.)

WILSON, G.D. & ROLAND, D. 2002. Performance anxiety. (*In* Parncutt, R. & McPherson, G.E., *eds.* The science & psychology of music performance: creative strategies for teaching and learning. New York: Oxford University Press. p. 47-61.)

WISSING, M.P. & VAN EEDEN, C. 2002. Empirical classification of the nature of psychological well-being. *South African journal of psychology,* 32(1):32-44.

YOSHIE, M., KUDO, K. & OHTSUKI, T. 2008. Effects of psychological stress on state anxiety, electromyographic activity, and arpeggio performance in pianists. *Medical problems of performing artists*, 23(3):120-132, September.

ZDZINSKY, S.F. & BARNES, G.V. 2002. Development and validation of a string performance rating scale. *Journal of research in music education,* 50(3):245-255, Fall.