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Christian Gold

**Effectiveness of individual music therapy with mentally ill
children and adolescents: A controlled study**

Thesis submitted for the degree of
Doctor of Philosophy

January 2003

Supervisor: Prof. Dr. Tony Wigram

Institute of Music and Music Therapy
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Abstract

This research addressed the efficacy and effectiveness of music therapy for children and adolescents with mental disorders. Findings from previous experimental research, as summarised in a meta-analysis, suggest that music therapy is an efficacious treatment with a medium to large effect size. However, little is known about its effectiveness in clinical settings and about factors that might influence its effectiveness.

A controlled quasi-experimental pre-test post-test design was used to assess the development in children and adolescents who received on average 23 weekly sessions of music therapy ($n = 75$) in comparison to others who were waiting or had been recommended for therapy ($n = 61$). Primary diagnoses included adjustment disorders and emotional disorders (27%), behavioural disorders (26%), and developmental disorders (46%). Outcomes were measured with standardised instruments for symptoms, competencies (Child Behaviour Checklist), and quality of life (Munich health-related quality of life questionnaire KINDL), and other questionnaires.

The results of an overall ANOVA showed no significant treatment effects, although effect sizes for quality of life were in the small to medium range. Further ANOVAs addressing clinical sub-groups suggested that the effectiveness of music therapy depends on the presence of comorbid medical conditions ($p < .01$) and on the frequent use of media and activities other than music and verbal reflection in music therapy ($p < .01$). Other influences included age, primary diagnosis, therapist's gender, experience and training, and number of music therapy sessions. The results suggest that music therapy is effective for clients without comorbid medical conditions, and more effective when other media and activities are not included on a regular basis.

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1 Introduction

1.1 Background of this research

This research addressed the effectiveness of individual music therapy for children and adolescents with a broad range of psychiatric disorders in a clinical setting. It contains the first meta-analytic review and the largest controlled study to date in this field. The focus of this research was not primarily whether music therapy would help, but rather to what extent it helps, for which problems, and under what circumstances. In the research literature, this is known as the issue of treatment effectiveness, as opposed to efficacy. The focus was on usual clinical practice rather than an experimental treatment.

1.1.1 Why this research became necessary

Children and adolescents are confronted with various developmental tasks. If they are unable to achieve the milestones of one stage, this may impair or disturb their capacity to move on to, and achieve the developmental milestones of subsequent stages. Because of their continuing development it is especially important to provide appropriate help for children and adolescents who have mental disorders. A good treatment should focus on specific problems as well as helping in the process of development. Inadequate treatment may result in an increased risk of even more severe mental health problems that often tend to persist in adult life.

There are a number of different forms of interventions for this group of patients, including a variety of psychotherapeutic, functional, and medical treatments as well as interventions on the educational and the social level. In comparison to medical treatment, psychotherapeutic approaches for children promise to achieve more substantive changes and to have less or no adverse side effects. Psychotherapeutic approaches promise to meet the developmental needs of children by taking into account psychological, social, and biological levels. However, traditional psychotherapy methods were developed for adults and may sometimes not be effective or usable with mentally ill children and adolescents - especially for the younger or more severely retarded ones. Other interventions such as play therapy and music therapy have emerged

as therapeutic models that are more easily adaptable for this population to meet their specific needs.

Music therapy is used as a regular treatment for children and adolescents with mental disorders in many countries. The music therapy models that are practised in Europe are frequently defined as a form of psychotherapy (e.g., Bissegger et al., 1998). Since music is sometimes understood and described as a non-verbal "language", music therapy has been recommended especially for patients who are not accessible through verbal language. However, the range of patients who receive music therapy is much broader, and music therapy is provided to patients with all different kinds of mental disorders.

The effects of psychosocial interventions are more difficult to measure and evaluate than the effects of pharmacological treatment. Especially when treatment approaches are specifically adapted for each individual patient, the issue of replicability may become an unsolvable problem. Other factors, such as the importance of the social context, add to the complexity of the problem. In music therapy, the small number of music therapists (estimated 12,000 world-wide; Wigram, 2002) and the diversity of clinical areas where music therapy is applied constitute further practical obstacles for the development of empirical research. When compared to the long clinical tradition of music therapy, there is only a relatively small amount of systematic outcome research.

Another reason for the relative sparseness of outcome research in music therapy with psychotherapeutic orientations is that some music therapists show quite a reluctance towards outcome research, although they may be aware of its necessity for the further development and establishment of the therapy method. This applies especially to those whose work is based on psychoanalytic or humanistic principles rather than behavioural theory. While effects of behavioural and structured approaches are well documented in the United States, there is a paucity of music therapy outcome research in Europe where psychodynamic and improvisational approaches prevail (Wigram, 2002). In existing research on the latter approaches, a much greater emphasis has been put on the analysis of processes within therapy.

1.1.2 Personal motivation

From my clinical experience of providing music therapy for mentally ill children and adolescents, both in a department of child and adolescent psychiatry and in private practice, I know how essential the question of treatment efficacy and effectiveness is.

All persons involved in the provision of music therapy depend on accurate information on the outcomes of a treatment - this includes the music therapists as well as other health care professionals, and the children as well as their parents. Music therapists need to know which children benefit most from their services, and what specific procedures are most helpful for their clients. Psychiatrists, psychologists and other health care professionals need to be able to compare the advantages and disadvantages of available treatments before referring children to therapy. The children want to know what they can expect from music therapy in relation to the reasons for which they were sent to therapy, and parents need this information to understand and be able to support the value of a suggested therapy for their child.

Unfortunately, there is not an easy answer to this complex question. Music therapy in mental health is a discipline which more often focuses on the therapist's and the client's subjectivity. It is often hard to make finite statements about the complex development of a patient in music therapy, or to decide which role music therapy played in a certain type of development. Even more difficulties arise when generalisations beyond an individual case are intended. However, it is necessary to have an idea of a patient's prognosis with and without music therapy, and this knowledge usually comes from observations of other, similar patients. Even admitting that no two cases are exactly the same, few people would argue that there are no similarities between cases at all. Without having an idea of typical development, it would not be possible to tell success from failure – but seeing whether one's work is successful is essential to ensure good quality treatment services.

From the author's perception, it seems that part of some music therapists' reluctance towards outcome research is grounded in a certain discomfort with, and distrust of, measurement and numbers. Some might argue that the effects of music therapy cannot be measured, because what happens in music therapy might be too complex to be expressed in numbers. However, numbers have been useful especially in describing complex processes and facilitating a better understanding of these things. In interpreting a measurement of a music therapy outcome, however, one needs to be aware that the numbers are just a tool to describe reality, rather than reality itself. But the same applies for verbal language that is often used to describe therapeutic processes and outcomes, without causing a similar discomfort in music therapists.

I remember when I first heard the description of a client's process in music therapy. This was in a seminar on improvisation in music and music therapy that I

attended before I began my music therapy training. The music therapist who conducted the seminar told the story of a client who was unable to cope with an experience of rape. Her lack of self-confidence and self-assertiveness showed in the musical patterns she played that consisted only of small three-note sequences, without any jumps. The therapist took up this pattern and gradually extended it with her. With the development of self-confidence within the musical improvisation, the client was then also able to improve her self-confidence in other situations, outside music therapy. When I asked the person who held the seminar whether this was a typical and systematic process or an exceptional case, I received a very easy and straightforward answer from the therapist: This is a systematic process, not an exceptional case. In the years since then, I had to learn that an accurate answer to this very basic question is not straightforward at all, and that in many clinical areas this question has not been systematically answered to date.

1.1.3 Theoretical framework

Unlike some other clinical treatments in mental health that are explicitly based on a single person's ideas, music therapy as a clinical treatment emerged simultaneously in many parts of the world. Clinical and artistic intuition was the basis for most emerging music therapy models, many of which were only linked to a theory afterwards. On the other hand, there was experimental research that had little to do with clinical music therapy practice. For example, there were music therapy researchers who attempted to find direct biological effects of music rather than addressing the much more complex effects of the systems of musical interactions music therapists were working with. Music therapists based their strategies much more on their clinical intuition than on the results of empirical research, knowing that the effect of music therapy, which was as complex as human relationships, had little to do with a direct and mono-causal effect of music or sounds. As music therapists are focused on subjective processes and emphasise the individuality of musical expression, the forms in which most of them prefer to report processes and outcomes of music therapy are case stories and case studies (cf. Bruscia, 1991; Wigram & De Backer, 1999), not experimental research. This is especially true for those who link their approach to psychoanalytic theory - they find a prominent precedent in Freud's famous classical case stories. However, music therapists have been challenged to prove the efficacy of their treatment through controlled trials, and several controlled trials on the effects of music therapy

have been performed (cf. Grawe, Donati, & Bernauer, 1994; American Music Therapy Association, 2000, Standley & Prickett, 1994).

The main aim of an experimental outcome study is usually to show that a treatment is effective, and a frequent motivation for conducting outcome studies is the justification of a clinical method. As "the only person who does not have some vested interest in a subject is somebody who knows nothing about it" (The Cochrane Collaboration, 2002b), it is not possible to avoid bias completely. However, it is possible to reduce possible bias, for example by ensuring that the therapist and the researcher are two different persons, so that the therapists are not evaluating their own therapy.

On the other hand, music therapy researchers need to have a thorough understanding of the treatment as well as the research methodology - clinical and scientific thinking need to be connected appropriately. There may be a problem of communication between music therapists who try to evaluate their own therapy work scientifically, and the specialists in methodology and statistics they consult. They may not really understand each other's language. Therefore sometimes the statistical methods used may not meet the specific requirements of music therapy research, and the interpretation of research results may not be appropriate to the research method and results. This has been described as a "gap" between therapist and researcher (Smeijsters, 1999).

Inadequate handling of statistical issues, especially the indiscriminate and exclusive use of statistical significance tests without an analysis of effect size and test power, has sometimes led to an inappropriate interpretation of negative findings, and in some cases to the premature conclusion that quantitative methods might not be appropriate at all in music therapy research (Haines, 1989; Amir, 1993; see section 2.4.2).

What is maybe most urgently needed in contemporary music therapy outcome research is clinic-based effectiveness research that examines the typical clinical music therapy procedures, addressing relevant clinical questions with appropriate research methods, and keeping the connection of research findings and clinical meaning in the interpretation. For a researcher undertaking this type of research it is important to be knowledgeable in both clinical music therapy and research methodology, but not to be overly biased, such as in the evaluation of one's own therapy work.

In the larger field of psychotherapy, research questions and methods developed in a similar way. Psychotherapy researchers started with case stories and stuck to this form until they were challenged to prove the efficacy of their work in terms of controlled studies. The phase that followed was characterised by the search for scientific rigour. Efficacy studies were conducted to prove that a method was efficacious in general, without paying much attention to issues of external validity or applicability of the findings. In recent studies, summarised as effectiveness studies, more concern is found about clinical relevance and the generalisability of research findings (Russell & Orlinsky, 1996; Rudolf, 1998).

In health care in general, there has been a continuing increase in the demands for clinical practice to be evidence-based, and therefore studies on both efficacy and effectiveness of music therapy are needed. This research included a systematic review of efficacy studies and an effectiveness study of music therapy with mentally ill children and adolescents.

1.2 Literature basis

As noted above, there are various approaches to music therapy, both in terms of underlying theoretical constructs and in terms of actual therapeutic techniques. There have been attempts to find definitions of music therapy which are broad enough to include all relevant approaches, while still providing meaningful information and discriminating between what is and what is not music therapy (Bruscia, 1998; Bissegger et al., 1998). To some degree, the choice of a music therapy approach is apparently related to the patient population (Drieschner & Pioch, 2001).

The field of mental disorders in children and adolescents is outlined in different diagnostic manuals. Many mental disorders are defined as syndromes, based on observed behaviour rather than aetiology. There is a spectrum of continuity between mental health and mental illness, and similarly between different types of mental disorders. The distinctions between these categories are sometimes made at different points in different diagnostic systems. In Europe, classification of mental disorders in children and adolescents is usually based on the ICD-10 multi-axial classification (Remschmidt & Schmidt, 1994; World Health Organisation, 1996). However, professionals in Austrian health care institutions are sometimes reluctant to label and

"stigmatise" a child with a formal diagnosis, and less formal descriptors of problems are preferred because they are assumed not to have such an influence.

Previous empirical studies on the outcome of music therapy with mentally ill children and adolescents addressed a wide field of behavioural, emotional, and developmental problems, ranging from autism to juvenile delinquency. Music therapy was conducted as group or individual therapy. The models used were Creative Music Therapy, Orff Music Therapy, Guided Imagery and Music, and other approaches based on either psychodynamic, humanistic, or behavioural theory, or on eclectic mixtures of theories. Outcomes were measured on various scales addressing behaviour problems, developmental stage, self-concept, and social skills. The number of subjects in each study varied from 8 to 26.

The concept of meta-analysis brought several advances to the accumulation of empirical knowledge in the social sciences (Cooper & Hedges, 1994). Meta-analysis enables us to obtain more precise estimates of a parameter than were obtained in the primary studies, which is especially useful in a field of research where the primary studies are as small as in music therapy and therefore sampling errors are large. Furthermore, the advent of meta-analysis has caused a rethinking of concepts in the social sciences in that effect sizes have gained more attention. Effect sizes are actually more suitable to the questions of this research than an exclusive reliance on statistical significance alone.

Meta-analyses on music therapy for dementia (Koger, Chapin, & Brotons, 1999), psychotherapy for children and adolescents (e.g., Casey & Berman, 1985), and music in medicine (Standley, 1986) have provided useful summaries of related fields of research. Moreover, they have also enabled estimates of average effect sizes and an examination the role of moderator variables, which was not possible from the primary studies alone. A meta-analysis on music therapy for mentally ill children and adolescents, which was performed as part of this research, showed a medium to large effect size, which was statistically significant. The role of possible moderator variables remained unclear.

1.3 Development of a research design

1.3.1 Theory and issues in research design

The question of the effects of a treatment on a patient or a group of patients implicitly involves the empirically unanswerable question of how this patient or these patients might have developed had they not received this treatment. There are two common ways to approximate this situation. The first method uses a between-subjects design, which involves comparing the development of two groups of similar patients, one group under the treatment condition and the other under the control condition. The second method uses a within-subjects design, which involves comparing the development of the same subjects in different periods of time, under the treatment condition and under the control condition. To control for possible spontaneous remission, designs that rely on within-subjects comparisons usually include a second phase under the control condition after a first period of treatment. Therefore these designs are (only) suitable for those treatments that are assumed not to produce any carry-over effects (i.e. not to have enduring effects). Designs of the first type do not have this restriction and are also well suited for treatments that are assumed to have lasting effects.

A central question in parallel group designs is how to make sure that the patients in the two conditions are similar enough. The classical method, which works so well that it received the name "gold standard", is the randomised controlled trial (RCT), where a sample group of participants, meeting defined inclusion and exclusion criteria, are then randomly divided into treatment and control group. According to a stochastic law (the law of large numbers), the characteristics of any two randomly divided groups approaches equality as the number of randomised units goes towards infinity. When sample sizes are small, however, there may be large differences between the groups even if they were randomised - the law of large numbers is obviously not valid for small numbers, although many researchers in the social sciences seem to believe that there is a "law of small numbers" as well (Cohen, 1988). However, when sample size is sufficiently large, randomisation is the most powerful method to ensure that the groups of participants are similar. Furthermore, it is the only method to balance not only the known, but also the unknown characteristics of the participants that may influence the outcome.

While randomised controlled trials may have a high scientific rigour (internal validity) because they exclude most alternative explanations for any observed treatment effects, their applicability to "ordinary" clinical situations (external validity) is often limited. In research on psychotherapy (including music therapy), participants of RCTs may not be representative because they may not have a clinical disorder (analogue studies) or a less severe disorder, or because participants with comorbidity are excluded. Furthermore, the way in which the therapy is conducted often differs from how it is implemented in clinical practice (Weisz & Weiss, 1993).

An alternative to the RCT is the controlled clinical trial (CCT), a so-called "quasi-experiment" in which existing groups are compared in a similar way as in the RCT, but without random allocation to groups. Known characteristics of the participants may be statistically balanced (e.g., by matching, stratification, or covariate adjustment), but balancing unknown or unobservable variables is not possible. Quasi-experimental field studies usually have higher external, but lower internal validity than randomised experiments (Bortz & Döring, 1995). Their advantage is the applicability to clinical settings.

1.3.2 Choice of research design and procedures

Music therapists hope to facilitate permanent changes in their patients. Therefore, the effect of music therapy is not assumed to stop immediately after termination of treatment. A design with parallel groups was therefore deemed more appropriate for this research than a within-subjects design with interrupted phases of treatment.

As the main focus of this research was on the type of music therapy that is provided in everyday clinical practice, a quasi-experimental field study was preferred over a randomised experiment. Randomisation procedures might have distorted the field which was to be observed. Instead of randomising groups, attempts were made to find and observe an existing group of children who had similar conditions to the intervention group, except that the control group should not receive music therapy or other psychotherapy during the study.

Experimental studies sometimes rely on treatment manuals to reduce variability in treatment processes and to ensure a study's replicability. Therapists then receive a specific training in the procedures described in the manual, and their adherence to these procedures is controlled. This design feature was not appropriate for the present

research project because it would have distorted the usual therapeutic procedures that were to be observed. The object of investigation here was music therapy as it is actually conducted, with all the variability that may exist within or beyond the theoretical frameworks. In this research, the processes and activities within music therapy were to be observed and set into relation with other variables, rather than controlled through a rigid treatment manual.

In order to reflect the procedures of typical clinical practice, children and adolescents with any kind of mental disorders, including any type of comorbidity, for whom music therapy is provided in out-patient treatment, were included in this research. As the influence of the clinical conditions was addressed separately in the analysis, this inclusiveness does not mean that this research was not specific to clinical conditions. Further design features, such as the involvement of several therapists, were chosen with the same goal of maximising the clinical applicability (external validity) of the findings.

Clinical relevance was also the guiding line in choosing appropriate outcome measures. Changes may first show inside the therapy sessions, but are not clinically relevant until they are generalised to other situations and become visible in other situations in the patients' daily life. Therefore the outcome measures should address daily life behaviours. Outcome measures were chosen that matched the mental health problems of the broad population. Since music therapy hopes to address these general mental health problems effectively, it was not deemed necessary that the outcome measures were specifically designed for music therapy, although the outcome measures did need to be sensitive to the type of changes caused by music therapy.

The level of psychiatric symptoms was a necessary outcome to be included. This outcome may not be specific to the processes within music therapy, but it is one of the most obvious and important endpoints of any therapy for children and adolescents with mental disorders. Intra-personal resources or competencies, and quality of life were further important outcomes to be included. These outcomes were assumed to have a relatively direct relationship both to mental health conditions in general and to the specific processes in music therapy. Consumer perspectives and environmental contexts should also be addressed as the study was focused on service effectiveness (cf. Hoagwood, Jensen, Petti, & Burns, 1996).

To ensure the feasibility of the study, it was necessary to limit the number of observations. For the purposes of this research (and considering the diversity of clinical

conditions included), few observations on many subjects were preferred over many observations on few subjects. Drawing on my clinical experience, I decided that about half a year of therapy (corresponding to about 25 weekly therapy sessions) in out-patient treatment was a period where emerging changes through therapy begin to become visible in the patients' daily life. Therefore the participants were assessed at intake and after a period of 25 sessions of music therapy (with a corresponding time span in the control group), unless therapy (or waiting time for therapy) was finished earlier. Further assessments during the course of therapy, as well as follow-up assessments would have been desirable, but were deemed not to be feasible within this project. Questionnaires were chosen as a more effective way to collect information than direct behavioural observation, and had the further advantage of being much less intrusive and therefore less likely to distort the usual processes of music therapy. However, data from questionnaires may be influenced by subjective bias, which is one reason why multiple observer perspectives were to be included.

As mentioned above, the conditions of mental health and mental illness may be more accurately described as a spectrum of continuity than as two distinct categories. The same applies for the effectiveness or ineffectiveness of a therapy - the extent to which a therapy helps is important. The focus of this research was on the degree of change that would occur and on the degree to which music therapy would be effective for certain problems. The statistical models used in this study should reflect this, and therefore the use of effect sizes was emphasised and preferred over the alternative choice of using exclusively the concepts of statistical significance that give primarily dichotomous decisions.

1.4 Preliminary research questions and hypotheses

The research questions in this study centred around the effect over time of music therapy in child and adolescent psychiatry, and focused specifically on the size of the effect, and the elements that are likely to have contributed to any expected effect. When considering potential effects, questions were formulated to look closely at the whole population and determine differences in effect between discrete categories of the population. These questions are presented here with the corresponding null and alternative hypotheses. However, the reader is reminded that most of the alternatives

presented can be viewed as representing distinct points of continuous phenomena that were dichotomised for illustration and clarification. Following the literature review, the research questions and hypotheses are reformulated and extended (chapter 3).

1. Is there an average effect of individual music therapy as it is provided in out-patient treatment for mentally ill children and adolescents?

H0: There is no average effect that is significantly different from zero.

H1: There is an average effect that is significantly different from zero.

2. How large is this effect? Is it large enough to be clinically relevant?

H0: The effect is too small to be considered as clinically relevant.

H1: The effect is large enough to be considered clinically relevant.

3. In which domains of the outcome is the effect especially large or small, when expressed in effect sizes?

H0: There is no difference between the domains concerning their effect size.

H1: In some domains music therapy produces larger effects than in others.

4. Is the average effect representative for all different conditions?

H0: The average is representative for all conditions.

H1: The effect is related to one or more conditions of patient or therapy.

5. Are there any groups of mental disorders which respond especially well to individual music therapy, so that they are especially indicated?

H0: Patients with all kinds of problems respond equally well.

H1: Patients with certain kinds of problems respond better than others.

6. Are there any groups of mental disorders for which individual music therapy is contraindicated?

H0: There are no groups which develop worse with than without individual music therapy, and therefore no contraindications.

H1: There are groups for which individual music therapy is harmful and should not be prescribed.

7. Does the effect of individual music therapy depend on other patient characteristics, such as age or gender?

H0: All age groups and both genders benefit equally from individual music therapy.

H1: The effect of individual music therapy depends on age or gender.

8. Does the effect depend on type of individual music therapy or on frequency and duration, or on characteristics of the therapist?

H0: All types of individual music therapy used are equally helpful. There is no dose-effect relationship. The effect does not depend on age, gender, or experience of the music therapist.

H1: The effect depends on characteristics of therapy or therapist.

9. Is the effect of individual music therapy related to the involvement of primary carers and to their satisfaction with music therapy?

H0: The effect is unrelated to how the primary carers are involved in and satisfied with therapy.

H1: The effect is related to their involvement or satisfaction.

1.5 Overview of the thesis

The following chapter provides an overview of the theoretical and empirical knowledge that forms the basis for the present study. Mental disorders in childhood and adolescence are defined, their current classification and prevalence are outlined, and an overview of services and interventions for the clinical population of the study is given detailing what interventions are currently recommended, and with what empirical evidence. Models and approaches to music therapy and its application to the clinical population of the study are described, complemented by examples of clinical music therapy work with this population. After introducing central methodological issues of treatment evaluation pertinent to the present study, such as efficacy and effectiveness, internal and external validity, and the relevance of effect sizes, an overview of research findings on the efficacy and effectiveness of psychotherapy with the population of the

study is given. The literature review is completed with a meta-analysis of outcome studies on the efficacy of music therapy with mentally ill children and adolescents.

On the basis of these theoretical and empirical foundations, the research questions and hypotheses are reformulated and elaborated, falling into three sections that address the overall effectiveness of individual music therapy, the influences of specific clinical conditions, and the influences of types of music therapy treatment.

The method section explains the rationale for specific design features of the present study, such as its quasi-experimental design, the broadness and size of the study sample, the lack of treatment manuals, and the domains of outcome assessment that included a variety of clinically relevant variables (symptoms, competencies, quality of life) and ratings from multiple sources (parents, therapists, children). Characteristics of the participants, including primary and secondary diagnoses, and characteristics of the treatment conditions, including therapist variables, referral procedures, and goals and setting of music therapy, are described. The specific procedures for monitoring treatment characteristics and outcomes, as well as the procedures for statistical analysis, are explained.

The results section begins with a description of the treatment procedures, including the extent and the primary contents of the music therapy sessions, the frequency of other concurrent treatments, patient attrition, and a statistical analysis of how therapy characteristics are predicted by patient characteristics. Preparatory data screening procedures, addressing reliability of scales, handling of missing data, distribution forms of variables, and correlations between variables, are reported. The analysis of overall effects is presented, using analysis of variance and effect sizes with confidence intervals, and including a sensitivity analysis. Similar procedures are used for the presentation of the sub-group analyses that addressed the question of how the effectiveness of individual music therapy is influenced by patient characteristics, such as primary and secondary diagnosis, and by therapy characteristics, such as the use of specific techniques, the extent of therapy, and characteristics of the therapist. The results section is completed with further analyses that address treatment satisfaction and general change rating as further variables related to therapy outcome, and possible contraindications of individual music therapy.

In the discussion section the findings of the study are summarised and related back to previous research and theory. Issues that are addressed include efficacy versus effectiveness of music therapy, the influence of comorbidity, the effect of specific

music therapy techniques, and the role of therapist gender, training, and experience, among others. The limitations of the study are described, and their possible impact on the research results is discussed. On the basis of the findings of this research, recommendations for clinical practice are given, including indications of individual music therapy, effective models and techniques of music therapy, and useful tools for clinical evaluation. Suggestions for future research that are discussed include replication of the findings in experimental studies, outcome monitoring and quality assurance in clinic-based longitudinal studies, further types of research, and methodological recommendations.

Chapter two starts with a comprehensive literature review, which forms the foundations of this research by giving an overview of the clinical field and summarising previous research in this field and in related fields.

2 Literature review

2.1 Mental disorders in children and adolescents

2.1.1 Classification

Mental disorders in children and adolescents cover a broad range of conditions, including emotional, cognitive, and behavioural problems. The World Health Organisation (2001) defines mental disorders¹ as characterised by either sustained or recurrent alterations in thinking, mood, or behaviour that are outside of a range of normal variation, and associated with either personal distress or impaired functioning. A mental disorder is distinguished from a variation within the normal range by its severity and its duration. Depending on theoretical assumptions, models of the aetiology of mental disorders vary. There are ongoing controversies about the extent to which biological, psychological, or social factors contribute to the development of a mental disorder. Current diagnostic manuals for mental disorders have therefore tried to eliminate all potentially controversial aetiological elements, and definitions of disorders are primarily descriptive (Remschmidt & Schmidt, 1994).

Most mental disorders in children and adolescents are syndromes rather than diseases (Angold, Costello, & Erkanli, 1999), i.e. their definitions are based on symptoms occurring together instead of aetiology. There is often a continuous spectrum between different disorders, as well as between the presence or absence of a disorder. Cut-off points between a variation of behaviour, or a duration of it, that is within versus beyond the normal range are necessarily artificial dichotomizations of variables that are in fact continuous. However, such cut-off points are used in classification systems in order to obtain distinct diagnostic categories. For example, a duration of at least 6 months is required for the diagnosis of conduct disorder (CD) according to ICD-10 (Remschmidt & Schmidt, 1994).

Comorbidity is a condition where two different pathologies have equal weight or demonstrate some degree of independent aetiology and symptomatology in a diagnostic

¹ More precisely, "mental and behavioural disorders". The term "mental disorders", however, is used in this thesis as a general term to summarise all mental and behavioural disorders.

formulation. It is important to establish the core symptoms (and secondary symptoms) of a specific pathology in order to determine primary and secondary diagnoses. For example, it is common for children² with autism to have language disorder or delay, where that language impairment forms a secondary diagnosis (even though social communication/language is a core impairment of autism). Epidemiological studies have shown that there are high rates of comorbidity between some mental disorders in children and adolescents. For example, it is very likely for a child with attention deficit hyperactivity disorder (ADHD) to meet the criteria for conduct disorder as well, or for a child with depression to meet criteria for an anxiety disorder. Comorbidity is also frequent between other combinations of disorders, such as between conduct disorder and depression (Angold, Costello, & Erkanli, 1999). In contrast to comorbidity between well-defined diseases with known aetiologies, comorbidity between syndromes may imply a problem with the diagnostic system used (*ibid.*). An alternative or supplementary approach to assess mental and behavioural problems on continuous multidimensional scales is represented by the Child Behaviour Checklist, and related instruments (Achenbach, 2002; Achenbach & Edelbrock, 1983), which have gained wide-spread use in assessment and evaluation.

The ICD-10 based multi-axial classification of psychiatric disorders in childhood and adolescence (Remschmidt & Schmidt, 1994; World Health Organisation, 1996) has more diagnostic categories than earlier versions, taking into account frequent cases of comorbidity, such as hyperkinetic conduct disorder (ADHD with CD), depressive conduct disorder, and others. It also supports a multidimensional view of child psychopathology, including clinical psychiatric syndromes (axis 1), specific disorders of psychological development (axis 2), mental retardation (axis 3), medical conditions (axis 4), associated abnormal psychosocial situations (axis 5), and assessment of psychosocial disability (axis 6).

With the number of available diagnoses increasing and the range of application of certain forms of therapy (such as music therapy) remaining broad, for evaluation purposes some sensible grouping of diagnoses is needed for practical reasons. One such system of categories is suggested by Hoffmann & Margraf (2000; see Table 1).

² The term "children" refers to children and adolescents in this thesis, except where a specific discrimination between different age groups is made.

Table 1. Groups of diagnoses for the evaluation of psychotherapy with children

Diagnostic Group	Diagnoses
1. Mood disorders and adjustment disorders	F30 to F39 Affective disorders F43.0 Acute stress reaction F43.1 Posttraumatic stress disorder F43.2 Adjustment disorders
2. Anxiety disorders and emotional disorders with onset specific to childhood and adolescence	F40 Phobic anxiety disorders F41 Other anxiety disorders F42 Obsessive-compulsive disorder F93 Emotional disorders with onset specific to childhood and adolescence
3. Dissociative and somatoform disorders and other neurotic disorders	F44 Dissociative disorders F45 Somatoform disorders F48 Neurasthenia and other neurotic disorders
4. Eating disorders and other behavioural syndromes associated with physical factors	F50 Eating disorders F51 Nonorganic sleep disorders F52 Sexual dysfunction not caused by organic disorder or disease F54 Psychological and behavioral factors associated with disorders or diseases classified elsewhere
5. Behavioural disorders with onset usually occurring in childhood and adolescence	F90 Hyperkinetic disorders F91 Conduct disorders F92 Mixed disorders of conduct and emotions F94 Disorders of social functioning with onset specific to childhood and adolescence F95 Tic disorders F98 Other behavioral and emotional disorders with onset usually occurring in childhood and adolescence
6. Autism and other pervasive developmental disorders	F84 Pervasive developmental disorders
7. Disorders of personality and behaviour, substance abuse and dependence, schizophrenia and delusional disorders	F10 to F19 Mental and behavioural disorders due to psychoactive substance use F20 to F29 Schizophrenia schizotypal and delusional disorders F55 Abuse of non-dependence-producing substances F60 to F69 Disorders of personality and behaviour
8. Mental retardation, organic mental disorders, and disorders of psychological development	F00 to F09 Organic including symptomatic mental disorders F70 to F79 Mental retardation F80 to F83 Specific developmental disorders F88 Other disorders of psychological development F89 Unspecified disorder of psychological development

Note. Based on a category system by Hoffmann and Margraf (2000)

Knölker, Mattejat, & Schulte-Markwort (2000) suggest that the definition of "emotional disorders" according to ICD-10 may be too narrow to reflect the clinical problem adequately and give a broader definition of emotional disorders that include anxiety disorders and phobias, depressive disorders, and obsessive-compulsive disorders.

An even broader classification, as suggested by Achenbach and Edelbrock (1983), is based on the "locus of control" and identifies patients into only two groups. The first group consists of all disorders that are primarily associated with under-controlled behaviours in children who tend to externalise problems. It would include most of the disorders from categories five and seven in the classification system above. The second group contains those disorders that are associated with over-controlled behaviours, as they are present in children who tend to internalise problems. This group would include categories one to four from the list above. Developmental problems and degrees of retardation and cognitive impairment were not included in Achenbach's system of externalising versus internalising problems. Therefore, one could define a third group, consisting of all disorders in category six and eight.

The Austrian mental health care system is set up to provide services for children in primary care (family doctors), secondary services (paediatricians and child psychiatrists at local general hospitals), and specialist services (child development services). Clinicians at secondary or tertiary levels in the Austrian health care system are sometimes very cautious or even resistant to giving formal diagnoses to children because a diagnosis might become a label or a stigma for a child, or turn out to be a "self-fulfilling prophecy". Informal verbal descriptions are frequently preferred for clinical use. However, where children meet formal diagnostic criteria as defined in ICD-10, it may not be helpful to fail to attach clear diagnoses to them as they may not qualify for the resources they need without an appropriate diagnosis. When using diagnoses, one needs to be aware that no diagnostic system, however sophisticated, can give a complete description of a person's mental health problems. For evaluation purposes, category systems are needed that reduce the complexity of existing diagnostic systems.

2.1.2 Prevalence

How frequent are mental disorders in children and adolescents? The answer to this question will depend on both the theoretical and the operational definition of mental disorders used. If any continuous variables, as discussed above, are involved, the choice of a cut-off point will be important.

The incidence of a disorder is defined by the number of people developing the disorder within a given time span, divided by the corresponding number of people in the general population, and can therefore be assessed through clinical records. Incidence does not involve the duration of a disorder and may therefore be less meaningful in chronic conditions; furthermore, incidence studies give distorted results if not all subjects with the disorder show up at a clinic. By contrast, the prevalence of a disorder is defined by the number of people having the disorder at a given point in time, divided by size of the corresponding population. Prevalence can therefore only be assessed in general population surveys. To determine the importance of a disorder in a society, prevalence is the more meaningful variable since it does not show the same limitations of incidence (cf. Verhulst & Koot, 1992).

A recent review of studies on the prevalence of mental disorders in children and adolescents found that while prevalence rates varied greatly between studies, only little variation was found when only studies using Diagnostic and Statistical Manual (DSM-III) criteria were considered (Verhulst & Koot, 1992). Therefore, most of the variation was explained by differences in the theoretical or operational definitions used. Studies in this review not using DSM criteria yielded prevalence rates ranging from 3% to 30%; where DSM criteria were used, prevalence rates only ranged from 17.6% to 26%, with a median of 18.1%. Therefore, one can say that about every fifth child suffers from a mental disorder at a given time.

Beside the influence of definition and assessment procedures, substantial factors that may influence the prevalence of mental disorders, such as age, sex, and socioeconomic status (SES), were analysed in the review. The reviewed studies showed inconsistent findings as to whether prevalence rates are related to age group, with some studies reporting a higher rate in adolescents than in children. There was a consistent finding that girls showed more internalising or emotional problems, while boys showed more externalising or disruptive behaviour problems. Low SES was related to a higher prevalence rate, especially for externalising problems.

Mental disorders in childhood and adolescence are not only a frequent, but also a persistent condition. Some of them have been found to predict mental disorders in later adulthood, although a problem may manifest in different forms at different ages. For example, it was found that depressed adolescents still tend to be depressed in adulthood, whereas girls with disruptive behaviour disorders tend to develop emotional disorders several years later (Angold et al., 1999). 61% of all children showing behaviour problems at three years of age still show deviant behaviour five years later (Verhulst & Koot, 1992, p. 115).

These findings might be explained by Erikson's theory of psychosocial development as being organised in stages, where each stage builds on what was achieved in previous stages, and therefore the specific challenges of each developmental stage need to be mastered to enable good development at later stages (Erikson, 1995). It is therefore important to provide treatment programmes that are comprehensive enough to help children with mental illnesses master the underlying problems that cause their disorder, rather than focusing primarily on their symptoms.

2.1.3 Pathologies relevant to the current study

The current study involved recruiting subjects from a wide range of local therapy and educational situations in and around Vienna. When the recruitment of the subjects for both the treatment and the control group were complete, pre-test questionnaires established whether or not the subjects could be identified within the previous diagnostic categories, as given in Table 1. In some cases, primary diagnoses were present when these children began therapy. In many other cases, no diagnostic label had been given to a child, and following pre-test assessment, these children were more clearly identified to belong to one or another diagnostic group based on current presentation. It is important to establish this at this stage in the literature review because some, but not all of the diagnostic groups listed above were present in this sample. Therefore, only those diagnostic groups that are relevant to the study will be further discussed in the literature review in order to avoid an unnecessary overview of the whole field of paediatric mental health. It is important to stress that the narrowing down of the sample population into only four of the eight categories was achieved randomly, and no children who were put forward for inclusion in the study were excluded. The diagnostic categories that most of the children included in the study fitted into were as follows:

- (a) Mood disorders and adjustment disorders (number 1 from Table 1)
- (b) Anxiety disorders and emotional disorders with onset specific to childhood and adolescence (number 2 from Table 1)
- (c) Behavioural disorders with onset usually occurring in childhood and adolescence (number 5 from Table 1)
- (d) Mental retardation, organic mental disorders, and disorders of psychological development (number 8 from Table 1)

It might be concluded that the children suffering from the disorders that make up this sample are the ones that are more typically referred to music therapy in the Austrian health system. Issues surrounding this will be addressed in the discussion of this research, but in order to effectively contextualise and clarify the range of the pathologies, it is useful to consider current interventions both from music therapy and from other interventions specifically for those children in the included diagnostic groups.

2.2 Services and interventions for children with mental health problems

Many different forms of services and interventions are available to help children and adolescents who have mental health problems, both treatments in a narrower sense that directly address their health problems, and other interventions provided to meet their special needs on the educational or social level. The main forms of treatment for mentally ill children are individual and group psychotherapy, family therapy, psychopharmacological therapy, and functional therapy. Different interventions are recommended depending on the child's specific diagnosis.

Psychotherapy is provided to influence and correct mental and behavioural problems. The primary goals are to alleviate symptoms, to foster normal development, and to strengthen the child's personality. In non-behavioural forms of psychotherapy, including psychoanalytic and client-centred approaches, the specific therapeutic relationship between therapist and client is considered as one of the main therapeutic agents. Contents of therapy involve reflection and working through of feelings and attitudes in order to enable insight, cathartic acting out, and coping. Play is often more important than verbal discourse, especially in younger children. Specific adaptations include group psychotherapy, body oriented psychotherapy (some of which include

relaxation techniques), and arts therapies with a psychotherapeutic level of intervention (including painting, music making, and other creative occupations). Non-behavioural forms of psychotherapy are currently mainly recommended for anxiety disorders, affective disorders, adjustment disorders, and mild forms of conduct disorder, but may also be recommended as supplementary treatment within a combined treatment plan for more severe forms of conduct disorder, mental retardation, and ADHD (Niebergall, 2000; Remschmidt & Quaschner, 2000; Steinhausen, 2000).

Behavioural forms of psychotherapy include behaviour therapy and cognitive therapy. In contrast to non-behavioural psychotherapy, behaviour therapy primarily addresses a child's overt behaviour rather than his/her internal mental processes. The primary goals are reduction of symptoms, especially problematic or maladaptive behaviour, and development of positive, adapted behaviour. There are various techniques for specific problems, such as systematic desensitisation (for phobic disorders, involves confrontation with the object or situation and simultaneous muscle relaxation), flooding (for extreme anxiety; rarely used with children), operant conditioning (to form a desired behaviour or to eradicate an undesired behaviour; involving techniques such as social reinforcement, token reinforcement, patient contracts, exclusion from a reinforcing situation), over-correction (practising steps of a desired behaviour over and over), and direct prevention of a reaction. Techniques to form a desired behaviour are recommended for specific developmental deficits; techniques to delete an undesired behaviour are recommended for hyperactivity, aggressive and self-aggressive behaviour in mental retardation, and obsessive-compulsive behaviour. Cognitive methods aim to alter attitudes and thoughts and use techniques such as modelling. They are recommended for depressive disorders and other problems. Social competence training is recommended for a variety of disorders, for socially withdrawn and depressive as well as for aggressive children, as well as in rehabilitation of mentally retarded children. Behaviour therapy techniques are often carried out by parents or teachers under a therapist's guidance (Niebergall & Quaschner, 2000; Steinhausen, 2000).

Family therapy addresses interaction patterns between family members. It is used in cases where the child's illness is seen in a close relationship with or as a symptom of a family system, for example when a child's separation anxiety and too close attachment to its mother is an expression of a disturbed relationship between the parents. Therapy sessions are conducted with the family as a whole or with a part of the

family. Often a family therapy is limited to a few sessions, where the first sessions are used to analyse the problem together with the family, and subsequent sessions aim at establishing new patterns of exchange and interaction within the family. Techniques of family therapy include re-framing (attributing a problem behaviour a positive meaning by putting it into a new context), family sculptures (making relationships in the family visible by letting the family members form a living "sculpture"), family contracts (where the results of a discussion about new roles or behaviours in the family are fixed with a written contract), and symptom prescription (a paradoxical intervention). Family therapy is often provided together with individual psychotherapy (Mattejat, 2000).

Likewise, psychopharmacological therapy for mentally ill children and adolescents is always given within a comprehensive treatment concept. Its use is restricted to a few specific indications. The five groups of substances given to children and adolescents are stimulants, antipsychotics, antidepressants, lithium, and tranquillisers. Stimulants are almost exclusively used to treat the core symptoms of ADHD, attention span and overactivity. Antipsychotics reduce psychotic symptoms and are sometimes used for severe aggressive and antisocial disorders, obsessive-compulsive disorders and tic disorders. Antidepressants are used to alleviate depressive symptoms, but are less effective in children and adolescents than in adults and therefore less often indicated. Lithium prevents or reduces manic and depressive phases and is in rare cases also given for severe aggressive and antisocial disorders. Tranquillisers help to resolve anxiety and tension, but since they only have a temporary effect and may cause dependency, their use in childhood and adolescence is limited. In general, psychopharmacology plays a minor role in this field when compared to adult psychiatry (Steinhausen, 2000; Toren, Laor, & Weizman, 1998).

The various forms of functional therapy address the core problems of disorders of psychological development and learning disorders and disabilities. Psychomotor training addresses deficits in motor development of mental origin by connecting the training of movements with their associated psychological mechanisms. Sensory integration therapy is used to treat learning problems and behaviour problems that are caused by an impaired ability to integrate perceptions from different senses. Visual perception training helps children with cerebral dysfunction to carry out daily tasks by practising visual recognition of objects. There are various other specialised training methods to improve specific skills, such as speech and language development or

reading, writing, or arithmetic skills, in children with specific disorders of psychological development (Steinhausen, 2000).

All available treatments for mentally ill children and adolescents can be carried out as in-patient or out-patient treatment (or as a specific adaptation of one of these, such as a day-hospital or home-treatment). The choice of a treatment setting depends on the severity of the disturbance. The out-patient setting is the most frequent form and offers maximum flexibility of treatment duration and intensity while having the least possible negative impact on the child's and family's daily life. It is therefore recommended as the typical form of psychotherapy for all disorders of mild to moderate severity. However, there are a few instances that indicate the choice of an in-patient setting, such as in life-threatening states (e.g., intoxication, suicidal purposes), in cases where out-patient treatment has failed and a more intense, multi-disciplinary treatment is needed, or where a difficult family constellation plays a role in the development and persistence of symptoms. An in-patient setting may also be indicated for intensive diagnostic assessments, and for the correct adjustment of a medication (e.g., for epilepsy). However, the time span of in-patient treatment should always be limited and should pursue the goal of preparing the patient for continued therapy in an out-patient setting (Knölker, Mattejat, & Schulte-Markwort, 2000)

The professions involved in the treatment of mentally ill children and adolescents are medical doctors (with a specialisation as child and adolescent neuro-psychiatrists in Austria, or as child and adolescent psychiatrists in Germany) and psychologists (with a specialisation in clinical psychology), and many other, more specialised professions. Psychotherapy in Austria is a profession of its own which can be learned by people who have a previous "source profession" in a related discipline, for example music therapists (Stumm, Deimann, Jandl-Jager, & Weber, 1995). In Germany, by contrast, psychotherapy is seen as a treatment method which can only be practised by medical practitioners and clinical psychologists who have an additional psychotherapeutic training (Knölker, Mattejat, & Schulte-Markwort, 2000). Pharmacological treatment is provided only by medical practitioners. Functional therapy is carried out by various specialised professions, such as physiotherapists, occupational therapists, and speech and language therapists. In the area of overlap between health treatment and special education for mentally ill children, teachers for special education play a role in providing health-related educational services.

2.2.1 Interventions for children with mood disorders or adjustment disorders

About 3% of all children suffer from a chronic depressive episode, frequently in combination with an anxiety disorder. Typically recommended treatments for depression in children include individual psychotherapy, family therapy, support at school and in their social environment, and in some cases psychopharmacological therapy. Severe cases need in-patient treatment with an emphasis on supportive rather than psychotherapeutic interventions and will always include psychopharmacological therapy. In psychotherapy for depressed children, the typical approaches are depth psychological, client-centred, and behavioural therapy. Antidepressants, usually serotonin re-uptake inhibitors, are used in in-patient treatment, but they appear to be less effective in children than in adults. Special support to attend school, as well as social contact activation in sports and other groups, are used to improve coping and re-integration in social situations. The prognosis of depressive disorders in childhood depend highly on their severity, with a better prognosis for depressive reactions than for severe depressive episodes. There is an increased risk for depressive disorders in adulthood (Steinhausen, 2000).

Between 4% and 7% of all children suffer from an adjustment disorder, showing a variety of symptoms that are related to a traumatising event or continued hardship. Psychotherapeutic approaches are emphasised in the treatment of adjustment disorders, with the goals of removing or reducing the source of distress and/or developing better coping mechanisms, a more supportive social environment, or new living perspectives. Verbalisation of the relationship between the distressing events and their implications for the patient's illness has substantial relevance. In some cases, drugs, particularly with antidepressants or tranquillisers, are used to supplement the treatment. Interventions directly addressing the child's social environment, mainly their parents and sometimes schools, play a particularly important role in many adjustment disorders, depending on the specific cause of the disorder. Such interventions can range from information and support (e.g., in cases of academic problems) through to restrictions against parents to protect the child (e.g., in cases of physical and sexual abuse). The prognosis of adjustment disorders depends on their severity. Children with mild to moderate adjustment disorders have good chances of complete recovery, but a substantial number of children have a risk of developing more severe psychopathology over time (Schulte-Körne, 2000).

There are a number of systematic reviews addressing the efficacy of interventions for clients with mood or adjustment disorders. The results of such reviews, both on children and, where this was not available, on adults, are summarised in Table 2. The general conclusion from the overview presented in Table 2 is that psychosocial interventions are efficacious. The available pharmacological interventions are effective with adults, but do not appear to be helpful for children.

Table 2. Efficacy of interventions for mood and adjustment disorders

a) Children and adolescents

Interventions	Diagnosis	Included studies	Outcomes	Reference
group treatments	sexual abuse	15 outcome studies	large average effect size	Reeker, Ensing, & Elliott, 1997
psychosocial and pharmacological interventions	depression	38 studies	psychosocial interventions: moderate to large effects; pharmacological interventions: not effective	Michael & Crowley, 2002
cognitive-behavioural therapy	depression	6 RCTs	effective for mild to moderate cases; studies on severe depression are missing	Harrington, Whittaker, Shoebridge, & Campbell, 1998
cognitive-behavioural therapy	depression	6 controlled studies with 217 subjects	effective in short and long term	Reinecke, Ryan, & DuBois, 1998
tricyclic drugs	depression	11 studies with 336 participants	not effective	Hazell, O'Connell, Heathcote, Robertson, & Henry, 1995
tricyclic drugs vs. placebo	depression	13 RCTs with 506 participants	not effective in pre-pubertal children; small to moderate effects in adolescents	Hazell, O'Connell, Heathcote, & Henry, 2002

b) General (different age groups)

Interventions	Diagnosis	Included studies	Outcomes	Reference
drugs vs. placebo	dysthymia	15 RCTs	drugs are effective; adverse effects of tricyclic antidepressants; effects on quality of life and long-term outcomes unknown	Lima & Moncrieff, 2002
lithium vs. placebo	mood disorders	9 RCTs with 825 participants	effective for bipolar disorder; no significant effect for unipolar disorder	Burgess, Geddes, Hawton, Townsend, Jamison, & Goodwin, 2002
medication	posttraumatic stress disorder	15 RCTs	effective in reducing core symptoms; effects on quality of life, long-term outcome and combined effect with psychotherapy unknown	Stein, Zungu-Dirwayi, van der Linden, & Seedat, 2002

2.2.2 Interventions for children with anxiety or emotional disorders

The different forms of anxiety disorders, including emotional disorders with onset specific to childhood and adolescence as defined in ICD-10, are one of the more frequent groups of mental disorders in children and adolescents. Prevalence studies found that between 6% and 18% of all children suffer from an anxiety disorder. Most anxiety disorders in children are treated in an out-patient treatment. An in-patient setting is only recommended in cases where the family has an adverse influence on the development (e.g., in school phobia, where a close connection between the child and its mother may prevent an out-patient treatment to be effective), or in children with severe social anxiety who may benefit especially from the therapeutic milieu on an in-patient ward. Psychotherapy is central in the treatment of anxiety disorders in children, involving mainly play techniques in children and verbal reflection in adolescents. Behaviour therapy techniques recommended for anxiety disorders include systematic desensitisation for phobias and self-confidence training for social anxiety. Drugs, particularly antidepressants, are only indicated in cases of acute crisis; their effects are less reliable and less predictable in children than in adults. Counselling for parents is

recommended as a regular additional treatment component. Anxiety disorders have a higher rate of recovery than most other mental disorders. Anxiety disorders that do not resolve tend to persist as either anxiety or depressive disorders in adulthood (Steinhausen, 2000).

The databases Medline and the Cochrane Library (The Cochrane Collaboration, 2002a) were searched to identify any systematic reviews of the efficacy of interventions for children and adolescents with anxiety or emotional disorders. The searches did not identify any appropriate references, therefore it must be assumed that little evidence of treatment efficacy exists for this clinical group.

2.2.3 Interventions for children with behavioural disorders

The most frequent disorders in this group are conduct disorder (CD), with a prevalence rate of 4% to 5%, and attention deficit/hyperactivity disorder (ADHD) with a prevalence rate between 2% and 9.5%. Both disorders are present between three and nine times more often in boys than in girls, and there are high rates of comorbidity between these two disorders.

The treatment of children with conduct disorder is particularly complex and usually demands for a combination of treatment methods that address their environment's problem behaviour as well as their own. Family therapy, including parent training to improve parenting skills and to reduce possible inconsistencies in their education, plays an important role in the treatment of most children with CD, but especially in younger children. Behaviour therapy techniques recommended for children with CD include social skills training to acquire prosocial behaviour patterns, and problem solving skills training. Individual psychodynamic psychotherapy seems to be less effective in children with CD, but may be indicated in children that show comorbidity with depressive or anxiety disorders. Medication plays a minor role in the treatment of CD, but in exceptional cases antipsychotics may be used to reduce extreme forms of antisocial behaviour. There are home-based interventions to help children with CD from "multi-problem" families through educational and social work. Some children of such families are referred to foster care. Less than 50% of all children with CD continue showing antisocial behaviour as young adults. Boys have an increased risk of developing antisocial personality disorder or substance dependency, while girls tend to develop depressive or anxiety disorders (Herpertz-Dahlmann, 2000; Steinhausen, 2000).

Similarly as in conduct disorder, a multi-modal treatment approach is required for children with ADHD. Pharmacological treatment with stimulants is used to improve attention and reduce hyperactivity, but fails to influence their conduct problems. Behaviour therapy techniques for children include operant conditioning and contingency programmes to improve orientation of children and their parents, and self-instruction training and social skills training to improve the children's ability to control their behaviour and adapt to their environment in a more accepted way. Functional therapy is used to reduce developmental and learning deficits. Counselling for parents is provided to help them developing more consistent rules in the education of their child, and seeing their child in a more differentiated way. Psychotherapy (other than behaviour therapy) plays a minor role in the treatment of ADHD. At least 60% of all children with ADHD continue showing symptoms as adults. They have an increased risk developing substance dependency or antisocial personality disorder (Quaschner, 2000; Steinhausen, 2000).

A number of systematic reviews have been conducted to address the efficacy of interventions for clients with behavioural disorders (Table 3). These reviews show the diversity of interventions for this clinical group and highlight the efficacy of some psychosocial interventions, particularly where parents are included.

Table 3. Efficacy of interventions for behavioural disorders

a) Children and adolescents

Interventions	Diagnosis	Included studies	Outcomes	Reference
psychosocial treatments	conduct problems, such as oppositional defiant disorder and conduct disorder	82 controlled studies	videotype parent modelling and parent training: effective; other interventions: possibly effective	Brestan & Eyberg, 1998
family and parenting interventions	conduct disorder and delinquency	8 RCTs with 749 participants	effective in reducing time spent in institutions and criminal activity of juvenile delinquents	Woolfenden, Williams, & Peat, 2002a, 2002b
media-based behavioural treatments vs. no treatment or standard care	behavioural disorders	8 RCTs	moderate effect	Montgomery, 2002
psychosocial interventions	aggressive and disruptive behaviour in pre-school children	17 studies	narrative analysis (average effects not calculated)	Bryant, Vizzard, Willoughby, & Kupersmidt, 1999
parent training	conduct disorder, age 3-10	21 controlled studies	positive effects on behaviour	Barlow, 1997

b) General (different age groups)

Interventions	Diagnosis	Included studies	Outcomes	Reference
physical exercise	disruptive behaviour	42 studies	small to medium average effect size	Allison, Faith, & Franklin, 1995

2.2.4 Interventions for children with mental retardation or disorders of psychological development

Mental retardation or learning disabilities (LD) are present in 2% to 3% of all children. They are caused by a usually irreversible impairment; however, the resulting functional disability and the social handicap may be influenced to some extent. Children with learning disabilities need extended support and special care in everyday life situations, which is usually provided within the family, but may be conducted within

residential homes where families are not capable of giving the support their child needs. Out-patient treatment for children with LD often includes services of psychologists, social educators, and specialised therapists such as speech and language therapists, physiotherapists, and music therapists. Special education services begin with early intervention and special kindergartens, and continue through school age with special schools and special classes, into adult age with protected workplaces. Behaviour therapy techniques are used to facilitate the learning of practical activities of daily life, as well as to reduce behaviour problems, such as self-injurious behaviours. Non-behavioural psychotherapy is used in the treatment of secondary mental disorders in children with mild learning disabilities. Pharmacological treatment for children with LD includes antipsychotics to reduce motor over-activity, severe tantrums, high arousal, and autistic, stereotypic and self-injurious behaviour. Other psychopharmacological substances, except stimulants which are less effective in children with LD, are used for the same indications as in children without LD. Multiple handicaps, such as comorbid physical and perceptual handicaps or epilepsy, demand for an integrated approach in treatment and special care (Steinhausen, 2000).

Specific disorders of psychological development include disorders of speech and language, disorders of scholastic skills, disorders of motor functions, and mixed specific developmental disorders. Prevalence rates for any one of these disorders range from 2% to 8%. Children with disorders of psychological development have an overall IQ within the normal range, but show retarded development in one or several specific areas. The core symptoms of disorders of psychological development are addressed by specific functional training programmes, as provided by speech and language therapists, occupational therapists, and physiotherapists, and specific educational training, as provided by special teachers. Mental problems that are frequent in these children are addressed by psychotherapeutic interventions. Specific disorders of psychological development in children, particularly disorders of speech and language and disorders of scholastic skills, tend to continue into adulthood. There is an increased risk of developing emotional disorders (social anxiety, contact problems), conduct problems, and depressive symptoms (Remschmidt & Niebergall, 2000; Steinhausen, 2000; Warnke, 2000; see also Remschmidt & Schmidt, 1994).

A number of systematic reviews have been conducted to address the efficacy of interventions for clients with developmental disorders (Table 4). Behavioural

interventions appear to be more effective than medication. None of the identified reviews addressed treatment strategies for children and adolescents specifically.

Table 4. Efficacy of interventions for developmental disorders

a) Children and adolescents: No reviews identified

b) General (different age groups)

Interventions	Diagnosis	Included studies	Outcomes	Reference
antipsychotic medication	LD with challenging behaviour	8 RCTs	no evidence of effect	Brylewski & Duggan, 2002
sensory integration treatment	LD and other disorders	32 controlled studies with 1019 participants	vs. no treatment: small to medium effect; vs. alternative treatment: no effect	Vargas & Camilli, 1999
medication and behavioural training	LD and other developmental disorders	482 studies	behavioural training more effective than medication	Didden, Duker, & Korzilius, 1997

2.3 Music therapy for mentally ill children and adolescents

2.3.1 Models of music therapy

To give a comprehensive definition of what music therapy is today is a difficult task, since music therapy is more a summarising term for many different approaches than a name for one specific form of therapy. Unlike most other schools of psychotherapy, music therapy was not founded in one place or by one person. Rather, music has been used, in one form or another, in the alleviation of symptoms of what we today call mental disorders, probably throughout the history of mankind. However, it was not until the middle of the 20th century that music therapy started to emerge as a formalised clinical profession and scientific discipline. Societies for music therapy and institutional training courses began to be founded in North and South America from the 1940s, followed by Austria and England, as the first European countries, in 1958, and soon after that in many other countries in Europe and elsewhere (Maranto, 1993). Many of the first music therapists came initially from an arts background as musicians, who later linked their work to psychotherapeutic theories. The theoretical orientation would

sometimes depend on the predominant influences at the place they developed their clinical work.

Music therapy models as practised today are most often based on analytic (psychodynamic), humanistic, cognitive-behavioural, or developmental theory. Some models, such as Analytical Music Therapy or Behavioural Music Therapy, are expressly linked to a specific theory, while others, such as Creative Music Therapy, draw on more than one specific theory. Models involving a behavioural approach of positive and negative reinforcement have grown up more widely in the USA, but are rarely applied in Europe, where psychodynamic and humanistic models are more dominant. Music therapy in Austria started as a psychoanalytically informed treatment, but over the years, and especially from the 1990s, the influence of humanistic models, such as Gestalt therapy, increased and became an equally strong influence. This example shows that the competing theoretical models in music therapy and their applications do not necessarily form distinct categories, but rather prototypical positions in a wide and variant, but still coherent field. A very inclusive yet highly specified definition of music therapy is given by Bruscia (1998):

Music therapy is defined as "a systematic process of intervention wherein the therapist helps the client to promote health, using musical experiences and the relationships that develop through them as dynamic forces of change."

2.3.2 Techniques used in music therapy

How can the various "techniques" or modes of therapeutic intervention and interaction best be described and categorised? The most straightforward, oldest and still most widely used distinction is between "active" and "receptive" music therapy. The active mode of music therapy includes such diverse forms of musical interaction as free improvisation and reproduction of songs. Receptive music therapy techniques include listening to music which is played by the therapist and listening to recorded music which is selected by either therapist or client. Although some models of music therapy – such as Guided Imagery and Music (receptive mode; Bonny & Savary, 1973) or Creative Music Therapy (active mode; Nordoff & Robbins, 1977) – rely exclusively on one of these modes of musical interaction, most models use a mixture of both, depending on the client's needs and goals of therapy.

Another, equally important distinction addresses the level of structuring within music therapy. A specific degree of structure can be inherent in a form of musical interaction (e.g., a theme for an improvisation or a song structure), or it can be given within the musical process (e.g., a certain rhythmical or harmonic structure in an improvisation). Furthermore, a certain level of structuring can be given for a therapy session, as well as for a therapy as a whole. Different clients need different degrees of structure, and therefore the level of structuring should depend on the client's needs. However, the level of structuring also varies between music therapy models. For example, music therapy approaches that are used predominantly in the USA tend to be more structured than the more improvisational approaches that are frequently used in Europe (Wigram, 2002). – An issue related to structure in music therapy is the demand for replicability in experimental research. Structured music therapy techniques fit more easily into experimental research settings than process-oriented approaches.

A third relevant differentiation can be made based on whether the focus of attention is more on the processes that occur within the musical interaction itself or more on a verbal reflection of the client's problems. Again, these differences depend as well on the client's needs as on the model of music therapy used.

The relationship between techniques and models of music therapy appears less striking when the fact that most music therapy approaches were developed for a specific group of clients is taken into account. A recent study (Drieschner & Pioch, 2001) examined how the use of music therapy techniques is influenced by client group and goals of music therapy. The use of music therapy techniques was categorised and measured on the three dimensions explained above (active versus receptive, level of structuring, focus of attention). The results showed that a large amount of the variance (25% to 50%) of the use of music therapy techniques was explained by client group and goals of therapy. There was a proportion of unexplained variance, which may reflect differences between music therapy models or between the styles of individual therapists, but which probably also includes artefacts (such as imperfect validity and reliability of categories and measurements). Therefore, the findings of this study suggest that there may be more agreement between music therapy models than it seems. Most models were developed for specific client groups, and differences between the techniques suggested by different music therapy models may reflect differences between clients more than competing theoretical assumptions. However, this study did

not reflect any cross-cultural differences as it was only based on Dutch music therapy practice.

Music therapy with children frequently includes activities that are neither musical in a narrow sense, nor verbal. However, some argue that even non-musical play, and virtually any form of expression or interaction, can be perceived and interpreted as a form of musical expression or interaction and used as such in music therapy (Fak & Schmidtmayr, 1997). Approaches and techniques used in music therapy for children in Austria will be addressed in greater detail in the methods section (see subsections of 4.3).

2.3.3 Examples of clinical work in music therapy for mentally ill children

Paediatric clients have been a special focus of music therapy clinical practice in many countries. Among other groups, music therapy is provided for children with early emotional damage, children with ADHD, and children who suffer from mental retardation, brain damage, global developmental delay, or specific learning disorders. Also included are children who have behaviour, communication, social, or attentional problems not previously diagnosed (Wigram, Nygaard Pedersen, & Bonde, 2002, p. 175-176).

Some of the goals of music therapy with children are directly related to expression and communication, such as the development of understanding and contact with their emotions, the ability of personal expression and expression within a dialogue, and the potential for initiating and responding to contact and communication. Other, more general goals, go beyond this area. They include the development of social skills, the ability to concentrate, a feeling of identity, and improvement of their quality of life (ibid., p. 177).

The function of music in music therapy can vary greatly as this is a very diverse population. Freely improvised music is used as a bridge between the inner and outer world of a child, and as a language that both the therapist and the client use. In severely handicapped children improvisations may be at a very simple level. Within an improvisation, the therapist can make supportive, stimulating, or challenging interventions. An improvisation can be given a degree of predefined structure, for example by a playing rule. Other forms of music with a given structure include songs. Well-known songs are used to establish stable and secure frameworks within which clients can express their feelings, moods and themes safely. Play songs

(Situationslieder) are used to mirror or interpret to the child what he/she is doing, and to help them to focus and extend their play. Musical activities that are even more structured can be used to improve coordination or concentration. Recording and playing back musical improvisations is used with children who are able to reflect about themselves. Listening to their musical expression can help them to gain insight and bring up issues, problems, or fantasies that can then be included in a new improvisation (ibid., p. 178-179).

Outcomes of music therapy with paediatric clients, as identified in the clinical literature, are related to general development (concentration, learning, use of language), emotional balance (self-confidence, contact with themselves), and social skills and expressiveness (maturing of social play, range of expression, independence, social understanding, contact with others). An important aspect in communicating outcomes of music therapy with children is the relationship with parents and, where applicable, the place of music therapy in a multidisciplinary team (ibid., p. 180-181; Müller & Kehl, 1997).

2.3.3.1 Clinical music therapy for children with mood disorders or adjustment disorders

This group of clients includes children and adolescents with affective disorders, such as depression or bipolar disorder, as well as children and adolescents with acute stress reaction, posttraumatic stress disorder or adjustment disorder. Examples of clinical music therapy in this field include children who have suffered traumatising experiences, such as child abuse, where the traumatic experience itself, rather than the diagnosis, may be described as the basis for a music therapy treatment.

Etkin (1999) describes individual music therapy with a nine-year-old girl who had experienced physical deprivation and showed symptoms of depression, withdrawal and low cognitive functioning, on the background of a primary handicap of visual impairment and brain disorder. The therapy with this girl went through several phases: The first phase was characterised by the client's avoidance of musical contact within improvisations by playing very loud and shifting rhythms so that the therapist could not follow her. With an increasing sense of security, the girl allowed rhythmical connections and shared two-way musical interaction and began to explore a wider range of musical expression. After several months of therapy, the client became "more outgoing and assertive", both within music therapy and in other situations. She

disclosed that she was being sexually abused, which eventually led to a change in her legal custody. She had developed enough “ego strength that she could emphasise her belief in herself”. The inner strength this client had developed within this two-year period of music therapy remained evident in letters she sent to her music therapist during the ensuing two years after termination of music therapy (Etkin, 1999).

Lorz-Zitzmann (1999) reports of two adolescent girls with experiences of sexual abuse who received individual music therapy as part of a multidisciplinary in-patient treatment programme. Both of these girls had been admitted to hospital for symptoms such as self-injurious behaviour or mutism, with the sexual abuse being disclosed later, during treatment. They used musical improvisation to express feelings related to their abuse they couldn't express verbally. As a consequence of the treatment programme they were able to actively engage in the planning of a new living situation. The author argues that music offers specific therapeutic opportunities to get in emotional contact with oneself and overcome muteness and stagnancy, to build self-esteem by a process of creating, to express emotions, and to get in touch with others and overcome patterns of avoiding relationships.

Jochims (1999) describes an in-patient music therapy treatment of a 14-year-old boy who had grown up with foster parents after having experienced early deprivation and was admitted to hospital with a diagnosis of depressive reaction. Musical improvisations and recordings of these helped him to find access to his emotions that he had split off previously. Through symbolic play with and without music, the client could re-experience early phases of his development and integrate them. Verbal interpretation of his symbolic play, as well as a meeting with his natural parents, helped him to accept the reality. At the end of treatment, the boy was reported to have greater emotional acceptance of his foster parents and was able to cope better with separation, as shown in his active engagement in planning his farewell party from hospital.

With the case of a nine-year-old boy with severe emotional problems, showing depression, impulsivity and hyperactivity, Herman (1991) gives an example of the broadness and variety of mental problems addressed in music therapy. In a long-term treatment programme of 120 sessions of music and art therapy within a multidisciplinary team, this boy was able to improve attention span, decrease difficult behaviours, improve verbal communication and social skills, reduce the number of tantrums and severity of depressive symptoms, remove eating problems, and improve self-esteem.

Burke (1991) gives an example of an early intervention for posttraumatic symptoms in a four-year-old boy who showed aggressive behaviour after having suddenly lost his father. An individual music therapy treatment with a mainly improvisational approach, conducted over a period of six months, enabled this boy to express his rage and confusion at his father's death. Music therapy was terminated when his mother reported that his aggressive symptoms, his clinging to her, and his refusal to attend school had stopped. However, the author admits that this boy was an exceptional case in meeting the therapeutic goals so rapidly.

A case example of a 13-year-old girl with posttraumatic stress disorder, caused by sexual abuse and accompanied by transcultural problems, is reported by Henderson (1991). An improvisational music therapy approach with elements of play therapy was offered as part of an in-patient treatment programme. Music therapy enabled this girl to express her dilemma in songs. As a result of the treatment programme, she became able to "deal with some of her anxieties, particularly those concerning her dreams and experiences with her father" (ibid.).

2.3.3.2 *Clinical music therapy for children with anxiety or emotional disorders*

The second group of diagnoses includes different kinds of anxiety disorders (phobic and other anxiety disorders, emotional disorders with onset specific to childhood and adolescence) and obsessive-compulsive disorders.

Meyberg and Bode (1999) describe the long-term developmental course of a boy suffering from emotional disorder with difficulties in relationships, who had also been formerly diagnosed with elective mutism, and who received music therapy in varying settings between the ages of three and a half and fourteen years. Although the first episode of music therapy was stopped after only four sessions and no apparent outcomes had been achieved, the boy had built a relationship there that he remembered when he came back to the unit six years later. In this second episode of out-patient individual music therapy, the boy used music to express aggressive sounds and to experiment with his voice. His musical contact in improvisational dialogues improved. He also used musical instruments in an unspecific way (disassembling xylophones) and made experiences of playing he had missed in earlier developmental phases. After one year of music therapy, the boy had become generally more open, more able to express himself verbally, and less anxious, according to the therapist's impression from the sessions and to reports of parents and teachers. Music therapy was terminated. Three

years later, the boy received group music therapy as part of an in-patient treatment programme where he was referred because he showed aggressive behaviour problems at school and at home. In group music therapy the boy worked on his social skills and on his personal identity, using project work and dream journeys. His symbolic expression appeared to show progress in his personality development. However, the success of the in-patient treatment was limited by an unresolved conflict between other family members that could not be accessed.

Roeske (1999) reports on a 14-year-old boy with a diagnosis of obsessive-compulsive disorder who received individual music therapy as part of an in-patient treatment programme. His washing compulsion was seen as related to unspoken and, for him, unspeakable problems, particularly the death of his mother and being constantly teased by classmates. Musical improvisations enabled him to express feelings related to problems he could not express with words. At a later stage, the therapeutic relationship that had been built through music helped the patient to discuss problems verbally with his music therapist and find support and relief. The boy's obsessive-compulsive symptoms disappeared, and he became able to build new and more satisfying relationships with peers, as observed by the staff of the ward.

2.3.3.3 Clinical music therapy for children with behavioural disorders

This group of clients includes children with different forms of conduct disorder (CD) or attention-deficit hyperactivity disorder (ADHD).

Hilke (1999) gives a case report of a 16-year-old boy who belonged to a radical group and showed symptoms of socialised conduct disorder, and who received individual music therapy as part of an in-patient treatment. Since he was prejudiced against using the musical instruments and refused to use them, music therapy primarily consisted of practising to perceive and describe instruments without judging them. Musical improvisations became possible at a later stage in the process. By developing more differentiated views of the instruments, the patient was able to question his prejudices against other people, and also to confront himself with his negative identity and his need for praise that he had sought in the radical peer group.

Lefebvre (1991) reports of a 16-year-old girl who showed conduct problems at home, refusal to attend school and drug abuse, and was referred to individual music therapy as part of her in-patient treatment because she was interested in music. Structured active and receptive music therapy techniques were used to encourage

emotional expression and to enable insight. At the end of the treatment programme, the client had an improved self-esteem, more appropriate peer relations and more control over some of her behaviour problems. A follow-up contact several years later showed that she was academically successful.

Hibben (1991) describes the process in a group music therapy with a special education class of eight six to eight-year-old children, where most of them suffered from ADHD and learning disabilities. Music therapy was provided twice a week for one year and included the use of games and body movement together with musical activities. Music making was considered helpful in establishing a safe structure, and boundaries in which the children could try out new behaviour. They developed feelings of self-worth and made progress in their social, emotional, cognitive, and perceptual-motor development, as evaluated by the therapist with the use of developmental stage theory.

2.3.3.4 Clinical music therapy for children with mental retardation or disorders of psychological development

This group includes learning disabilities (mental retardation), characterised by a delayed development of cognitive functions in all areas, and disorders of psychological development (learning disorders), characterised by a delayed development of cognitive functions in one or several specified areas.

Robbins & Robbins (1991) describe the case of a nine-year-old girl with moderate mental retardation who was emotionally unstable and showed fearful, stereotypic, and self-injurious behaviour. Music therapy was provided in individual and group settings and aimed at developing her musical expressivity and interresponsiveness. Techniques used in therapy included structured and song-based improvisations. After about 40 sessions of music therapy, the girl had developed better functioning at home, improved self-confidence, and a general maturation of her personality, as observed by the therapists. These changes could still be observed in a follow-up session 14 months after termination of therapy.

Strange (1999) gives three case examples of music therapy with adolescents with moderate learning disabilities suffering from emotional disturbances. Music therapy was provided for a period of 18 to 24 months, mostly in an individual setting, but sometimes including group work as well. Free improvisations were used to allow the clients to develop at their own pace. The progress and changes within music therapy

were evaluated using musical transcripts. After music therapy, these clients had improved their emotional balance, showed better adjusted behaviour and progressed at school. An example of music therapy with a three-year-old girl with severe learning disabilities is given by Voigt (1999).

Oldfield (1991) describes the case of a five-year-old boy with a specific language disorder and autistic symptoms. Group and individual music therapy was provided over a period of two years, aimed at motivating the boy to communicate, either non-verbally or verbally. Techniques used in music therapy included free improvisations and structured musical activities. Structured activities, especially at the beginning and end of sessions, were used to provide a safe and familiar framework and to reassure the client. Free improvisations, including vocalisations, provided opportunities for experimenting and communicating with sound. The boy developed and improved non-verbal and verbal communicative skills and started to use verbal communication both within music therapy and in other situations. The author asserts that this boy responded exceptionally well to music therapy, and demonstrated the unique value of music therapy in comparison with other interventions such as special teaching or play therapy.

2.3.3.5 Evaluation of clinical case examples

The clinical cases reviewed above are examples of successful courses of music therapy for mentally ill children and adolescents. Clients who had received music therapy were reported to have improved in their presenting symptoms as well as in general aspects of the development of their personality. Evaluation of changes was frequently based on the therapists' judgements of the clients' development within the music therapy sessions, using narrative analyses or analyses of musical material. Their judgement was often informed by external observations as well, for example from the clients' families or schools. Changes were observed during the course of music therapy, and in some cases at a follow-up after termination. Usually the evaluation included a narrative pre and post comparison with non-standardised methods. In some cases, music therapy was part of a multi-disciplinary treatment programme. Case studies are a good source for revealing how processes within music therapy are connected with clinically relevant changes in the patients. However, they are less useful to evaluate the efficacy of music therapy as they suffer a variety of weaknesses, such as:

- *Retrospective choice of successful cases:* All cases were chosen to be reported in case studies after completion of therapy (or after completion of a successful period of therapy). Two of the authors stated explicitly that the case they described had responded exceptionally well. But even where the authors did not say that, it may be assumed that successful cases had a much greater likelihood of being chosen for a report than cases that were less successful.

- *Pre and post comparisons in long-term therapy of children:* Many authors reported their clients' progress over several years. When reporting that children developed and matured during a long-term course of music therapy, it must be considered that a part of these changes might be a result of their normal development that may have occurred independently of music therapy.

- *Subjective judgement of outcomes:* Narrative reports of changes without the use of standardised tools may be distorted by subjective bias (seeing what one wants to see), by recall effects (remembering things differently when they are a longer time ago), and by retrospective choice of outcomes (describing domains that improved and omitting those that didn't improve).

- *Multiple treatments:* In cases where music therapy was provided as part of an in-patient treatment or another setting where more than one form of therapy was provided at the same time, any treatment effects are those from a combination of treatments, and it is not possible to separate out to what extent they occurred exclusively as a result of music therapy.

2.4 Outcome research in therapy for mentally ill children and adolescents

This section starts with an overview of general issues in outcome research on psychosocial interventions, including the different questions that are addressed in efficacy and effectiveness studies, the validity of conclusions drawn from such studies, and ways to improve the clinical meaningfulness of statistical results. This will be followed by a summary of previous research findings on psychotherapy with children and adolescents. Findings of research on music therapy with children and adolescents are summarised in the following chapter (2.5).

2.4.1 Basic methodological concepts

2.4.1.1 Efficacy and effectiveness

Studies on the effects of treatment interventions can substantially be divided into two main sub-groups that are usually labelled efficacy studies and effectiveness studies, respectively.

Efficacy is defined as "the extent to which an intervention produces a beneficial result *under ideal conditions*. Clinical trials that assess efficacy are sometimes called explanatory trials and are *restricted to participants who fully co-operate*." (The Cochrane Collaboration, 2001; italics added)

Effectiveness is defined as "the extent to which a specific intervention, when used *under ordinary circumstances*, does what it is intended to do. Clinical trials that assess effectiveness are sometimes called management trials." (The Cochrane Collaboration, 2001; italics added)

Therefore efficacy addresses the more basic question of whether or not a new treatment has an effect per se (under ideal conditions). They are typically carried out for treatments that have not been used in routine clinical practice. Effectiveness studies, in contrast, address the question if, and to what extent, a treatment service, as implemented in practice (under ordinary circumstances), helps the clients for whom it is provided. Typically they are the next step after a new treatment has shown its efficacy and has been implemented in clinical practice. Effectiveness is a more applied issue, and gives answers that directly relate to actual treatment settings (Hoagwood, Hibbs, Brent, & Jensen, 1995).

2.4.1.2 *Validity issues*

While there are many differences between these two types of studies, the basic issues of internal and external validity are the same for both of them. The typical threats to validity, however, are different.

Internal validity is defined as “the validity of inferences about whether observed covariation between A [...] and B [...] reflects a causal relationship from A to B [...]” (Shadish, Cook, & Campbell, 2002).

External validity is defined as “the validity of inferences about whether the cause-effect relationship holds over variation in persons, settings, treatment variables, and measurement variables” (Shadish, Cook, & Campbell, 2002).

Two other concepts are closely related to these: Statistical conclusion validity, the validity of statistical inferences, is a prerequisite to internal validity. Construct validity, the validity of inferences about the constructs that are represented in a sample, is related to external validity in that both address a generalisation beyond the variables as they were manipulated or measured. – The problem with internal and external validity in practical terms is that it is rarely possible to get both a high internal and external validity in any one study. Efforts to increase internal validity will usually result in a decrease of external validity and vice versa. However, none of them must be neglected. A study without any internal validity will in fact not answer any question at all, no matter how high its external validity might be. A study without any external validity might answer the question it addresses, but will the answer have any meaning?

2.4.1.3 *Threats to internal validity*

The most simple study designs that have been used in music therapy research are one-group pre-test post-test studies without control groups. Internal validity of these studies is generally low because the observed changes could have occurred even without treatment, representing effects of maturation or re-testing rather than treatment effects.

Study designs that have been used in music therapy research and that allow one to control for the effects of maturation and re-testing have a control group that receives no treatment, standard care, or a “placebo” treatment. However, the necessary assumption in these studies is that the subjects in the different conditions are initially equivalent, i.e. have the same prognosis. Otherwise the observed difference could in fact be an effect of differential selection. The strongest tool to get equivalent groups is

random assignment, i.e. the sample is divided randomly into a treatment and a control group. However, this only works well for large samples. The idea of random assignment is based on the law of large numbers, and – as its name suggests – it does not hold for small numbers (cf. Cohen, 1988). Although random assignment has been used in studies on music therapy with children, this does not guarantee equivalent groups in the face of their usually small sample sizes. Examination of pre-tests on the intended outcome measures and other descriptive data that might predict outcome is a useful way to verify the equivalence of the groups. Virtually all music therapy studies with control groups have used pre-tests.

Another important threat to internal validity is differential attrition. This occurs, for example, if those with the worst prognosis tend to drop out of the study before post-test assessments more often in the control group than in the treatment group. This cannot be prevented by random assignment or any other design feature, only by trying to keep drop-out rates as low as possible.

The study design that has the highest internal validity, with the restrictions mentioned, is the RCT (randomised controlled trial). Because of the importance of internal validity, the RCT has been dubbed the “gold standard” of efficacy studies. RCTs can give the most reliable answers to the question of therapeutic efficacy, but they say little about the effectiveness of service provision.

2.4.1.4 Threats to external validity

The negative side of most efforts to increase internal validity is that they have an influence on the object that is being studied. Especially in psychotherapeutic treatments the setting in which therapy takes place plays an important role. But also the clients may differ between experimental studies and clinical practice, because not all psychotherapy clients would agree to be randomly assigned to a condition. Other important differences between psychotherapy in experimental settings and psychotherapy in clinical practice are severity of disorder and comorbidity on the client’s level, caseload and intensity of clinical supervision on the therapist’s level, and on the level of therapy the duration, broadness of goals, and degree of standardisation or manualisation (Weisz & Weiss, 1993). Whether the results of an RCT hold for such variations of client, therapist, and therapy variables, that is, whether external validity is present, is generally not answered by the RCT itself. Often this question can only be answered by clinical intuition and experience.

Effectiveness studies do provide a more systematic way to investigate whether a form of therapy helps in clinical practice. The object of an effectiveness study is a form of therapy as it is actually conducted, with the patients to whom it is provided. Therefore, patients with severe disorders or comorbidity are usually not excluded in effectiveness studies. Also, the duration of therapy is not restricted for purposes of the research design, and neither are any goals of therapy or interventions that may be used restricted for research purposes. In contrast to efficacy studies, there are usually no manuals for treatment accuracy, although there may be some monitoring of therapy contents. These features usually preclude the use of a randomised controlled experimental design in effectiveness studies, and therefore most effectiveness studies have a lower internal validity than efficacy studies. Quasi-experimental designs, in which experimental procedures are sought to approximate, are used to improve the internal validity of such observational studies where the researcher has no influence on the procedures that are evaluated.

2.4.2 Effect sizes³

Research on music therapy outcomes frequently involves a comparison between two groups, such as an experimental group and a control group. The characteristics that are chosen to represent the outcomes of the groups are typically psychological constructs, most commonly measured on continuous scales. Examples of such scales include severity of psychiatric symptoms, degree of social functioning, and level of self-esteem, among others. The purpose of outcome research that involves comparisons between groups is to draw conclusions about the clinical effects of a treatment procedure (e.g., a music therapy programme), when compared with a different procedure (e.g., no treatment, standard care, verbal therapy, or another music therapy programme). Whenever the means of two groups are compared, there are various ways of describing the difference. The first question that can be addressed is the size of the difference between these two groups. This question is related to the clinical relevance of the difference (or the effect of treatment) and can be answered using an effect size (*ES*) calculation. If the two groups represent random samples drawn from larger populations, the second question that can be asked is whether one can be sure that there is a

³ A different version of this section has been submitted for publication (Gold, 2002).

difference between the populations from which our sample was drawn. This question refers to inferences that can be made of the generalisability of the results from a representative sample to a larger population, and can only be answered indirectly with a test of statistical significance, which tells us how likely – or unlikely – the sample would be drawn in the absence of a difference between the populations. Researchers in the social sciences have often addressed differences between groups only in terms of inferential statistics, without undertaking a descriptive analysis of the differences in their sample, possibly because they were not aware of the potential for calculating the size of an effect (Cohen, 1988).

2.4.2.1 Problems with statistical tests

There are several problems with the exclusive use of inferential statistics. First, since tests of significance are designed to accept or reject a null hypothesis, they lead to a dichotomous decision, such as between "yes" and "no", or between "black" and "white": either there is an effect or there is no effect. This is inappropriate for research questions where it is relevant to what degree a null hypothesis may be wrong. To stay with this scenario, deciding between black and white ignores the many shades of grey that may exist in between. Second, the statistical indices that a test of significance provides are, by nature, not useful (and not intended) as descriptive statistics, because they depend on effect size and sample size. For example, the t-statistic of a t-test increases when either the effect size or the sample size is increased. Finally, a significant finding confirms that an effect was not achieved "by chance" in the sense of sampling error, but this may not conclude that the effect was meaningful or relevant for any practical or clinical purpose. Nevertheless, the word "significant" implies such a meaning and has often led to misinterpretations of test results. When statistical tests are used in a mechanical and stereotypical way to reject a null hypothesis that does not reflect the implications of the research question under investigation, the impression of an 'empty ritual' may arise where the null hypothesis is not much more than a "straw man to be knocked down" (Carver, 1978; cit. Cooper & Hedges, 1994). Using statistical tests in such a way has been referred to as "one of the worst things that ever happened in the history of psychology" (Meehl, 1978; cit. Bortz, 1999). Such criticism has led to the demand to "provide the reader not only with information about statistical significance but also with enough information to assess the magnitude of the observed effect" (American Psychological Association, 2001).

2.4.2.2 *The concept of effect size*

The interpretation of a difference does not present as a problem when there is a common scale in which it can be expressed, such as centimetres or centigrade. But how can one understand a quantified value of self-esteem? Unlike many physical measurement units, many scales used in music therapy outcome research cannot be directly interpreted because they have not been standardised or because their scaling and their point of zero are arbitrary and not clearly specified. Also, to speak of "twice as much" or "ten percent more" self-esteem would not make any sense because this assumes an absolute point of zero. The use of effect sizes provides an elegant and appropriate way out of this dilemma and allows one to make intuitive judgements about differences on scales like this.

Effect sizes are based on the concept that the actual size of a given difference depends on the spread of the values within the groups or within conditions. For example, if all subjects have a self-esteem score between 50 and 60, a difference of five points appears greater than if the scores are spread between 0 and 100. The most common indicator of the spread of values within a group is the standard deviation. In effect sizes, the standard deviation is used as the "yardstick" to which a difference is compared. In this way, even different scales that measure the same construct become comparable. The effect size is calculated by the raw difference between the means of two sets of comparable scores (experimental vs. control or baseline vs. treatment), divided by the standard deviation of the raw values within the sets of scores. To facilitate comparisons between different scales, it is common practice to reverse signs so that a positive effect size always means an effect in the expected direction (e.g., subjects in the experimental condition respond or score better than those in the control condition), while a negative effect size means an effect in the opposite of the expected direction (e.g., subjects in the experimental condition are worse than those in the control condition).

The further away from zero an effect size is, the larger is the effect. Cohen (1988) suggested the following "rule of thumb" for interpreting effect size in the behavioural sciences: An effect size of 0.20 is interpreted as a small effect, 0.50 as a medium effect, and 0.80 as a large effect. These benchmarks are no more than guidelines which need to be interpreted within a given context. A small effect size on a measure that is an essential outcome can be more important than a large effect size on a less relevant measure. Nonetheless, Cohen's benchmarks are useful as a general

orientation. They enable intuitive comparisons and interpretations and have gained widespread use and acceptance in psychotherapy research (Bergin & Garfield, 1994; Weisz & Weiss, 1993).

A psychological measure that does have a common scaling is the intelligence quotient (*IQ*), where an *IQ* of 100 equals the Mental Processing Composite of an average person at a given age, with a standard deviation of 15. Therefore, if a treatment existed that could increase *IQ* by 15 points, it would have an effect size of 1.00, which could be interpreted as a very large effect. A treatment that increases the *IQ* by 7.5 points would have a medium effect size ($ES = 0.50$).

2.4.2.3 *Effect sizes in music therapy research: An example*

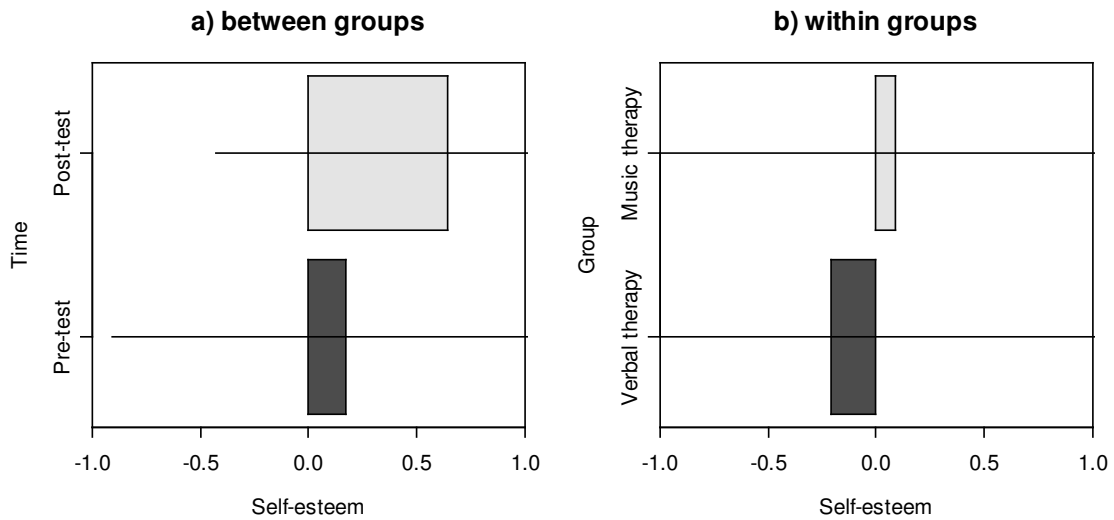
In a study on music therapy with emotionally disturbed adolescents (Haines, 1989), the effect of music therapy on the self-esteem of a group of subjects ($n = 9$) versus the effect of verbal therapy on a comparable group of subjects ($n = 7$) was investigated. An analysis of variance found no statistically significant effect. The author concluded that the quantitative data did not show any evidence of a specific treatment effect, while the verbal information, as given in the adolescents' daily logs, revealed greater satisfaction with music therapy than with verbal therapy. The author concluded further that the treatment might have been too short to be effective, and a longer period of treatment should be tried. In an unrelated study exploring qualitative research methods, Amir (1993) cited Haines' study as an example where quantitative analyses might not be appropriate in music therapy research, and qualitative research methods should be preferred. However, if one uses a descriptive analysis of the effect size as it was present in the sample, one finds that the effect size between the two groups at post-test in Haines' study was

$$ES = \frac{64.44 - 56.57}{16.66} = 0.47$$

This would be interpreted as almost a medium effect. The effect was not statistically significant, but it was clinically relevant.

Displaying an effect size together with its confidence interval adds the information of precision when generalising to the population the sample was drawn, as shown in Figure 1.

Figure 1. An example of displaying effect sizes with confidence intervals



Note. Positive effect sizes in (a) indicate that music therapy is better than control group. Positive effect sizes in (b) indicate improvement over time. Horizontal lines represent 95% confidence intervals.

Figure 1 shows that while the differences in this example apparently point into the direction of the hypothesis (the music therapy group performing better than the control group), there is a great amount of variability and insecurity when generalising to the population, as indicated by the wide confidence intervals. However, if an effect of the same size can be replicated with a larger sample, it will be statistically significant. With the use of effect sizes, Haines' study would be considered as a successful pilot study instead of a partial failure.

2.4.2.4 *Effect size and meta-analysis*

Effect sizes have increasingly come to our attention since the advent of meta-analysis, which is a statistical summary of the findings of several studies. Since different studies can frequently use different scales even if they address the same outcomes, transformation of the results into effect sizes is necessary before a meta-analysis can be conducted. The results of meta-analyses are usually given as an average effect size across studies. The first meta-analyses were conducted in psychotherapy research (Hunt, 1997; Smith & Glass, 1977). They helped to produce unbiased

summaries of research results of a broader field of research than in any single trial, to obtain estimates of average effect sizes with a higher precision than in any single trial, and to enable comparisons between conditions (e.g., different models of psychotherapy). Other meta-analyses of psychotherapy for more specific client groups or specific interventions followed (Bergin & Garfield, 1994; Weisz & Weiss, 1993). Recent developments in evidence-based medicine promote smaller and more specific meta-analytic reviews for pre-specified diagnoses, interventions, control conditions, and outcomes (The Cochrane Collaboration, 2002a) to inform clinical decisions directly.

Meta-analyses in music therapy have been conducted in general medical and dental treatment (Standley, 1986; Dileo, Bradt, Murphy, Keith, & Zanders, 2002) and in dementia care (Koger, Chapin, & Brotons, 1999). A meta-analysis on music therapy in child mental health is part of this thesis (section 2.5; Gold, Voracek, & Wigram, 2002). These reviews have led to the conclusion that music therapy in these fields has an average effect of a medium to large effect size, and that the effect size is moderated by various predictor variables, including diagnosis and other patient characteristics, and characteristics of the music therapy treatment programme. Any such comparisons would not be possible without the use of effect sizes. While imperative in meta-analysis, the use of effect sizes is by no means restricted to this type of research. They are equally useful in primary studies, whenever a question concerns the magnitude of a difference, rather than purely whether a difference is present or absent.

2.4.2.5 *Types of effect sizes*

Effect sizes of the type explained above are standardised mean differences. Although a standardised mean difference is always the difference of the raw scores divided by the standard deviation of the raw scores within the group, there are different possibilities of which exact standard deviation to use. No matter which of the following is used, the idea is always to divide by the standard deviation of the population. However, since the latter is usually not known, it needs to be estimated from the sample. Cohen (1988) suggested using the pooled standard deviation of both groups:

$$SD = \sqrt{\frac{n_1SD_1^2 + n_2SD_2^2}{n_1 + n_2}}$$

An effect size of this type is known as Cohen's *d*.

Glass, McGaw, and Smith (1981; cit. Cooper & Hedges, 1994) suggested a different type of effect size. They argued that Cohen's *d* may not be adequate for

psychotherapy research because some patients benefit more from psychotherapy than others, resulting in an inflated standard deviation of the treated group at post-test. The suggested alternative, Glass' Δ , is an effect size where only the standard deviation of the control group is used. The disadvantage of Glass' Δ is that in small samples, the standard deviation of the control group gives an imprecise estimate due to sampling error.

Both of these effect size indices only use post-test data. However, if standard deviations of pre-tests are available, there is another possibility that combines the advantages of both Cohen's d and Glass' Δ : The pooled standard deviation at pre-test can be used. Unlike Cohen's d , it can't be distorted by the treatment because it was taken before, and it is more precise than Glass' Δ because data from all subjects were used. This method was applied in the above example of the effects of music therapy on self-esteem.

Another effect size index for standardised mean differences is known as Hedges' g . It is basically the same as Cohen's d , but with a correction formula that is applied to correct for a bias which is present in small samples (Cooper & Hedges, 1994). Hedges' g is smaller than Cohen's d , and it is not frequently used in psychotherapy research.

All these types of effect size are essentially based on Cohen's d and are therefore sometimes referred to as d -based effect sizes. They address comparisons between two groups, or two conditions, on continuous outcomes, and are most familiar in psychotherapy outcome research. Table 5 shows other measures of the magnitude of an effect.

Table 5. Cohen's rules for interpreting magnitudes of effects

Measure	small effect	medium effect	large effect
d	0.20	0.50	0.80
r	.10	.30	.50
η^2	.010	.059	.138

Note. Based on Cohen (1988), chapters 2, 3, and 8.

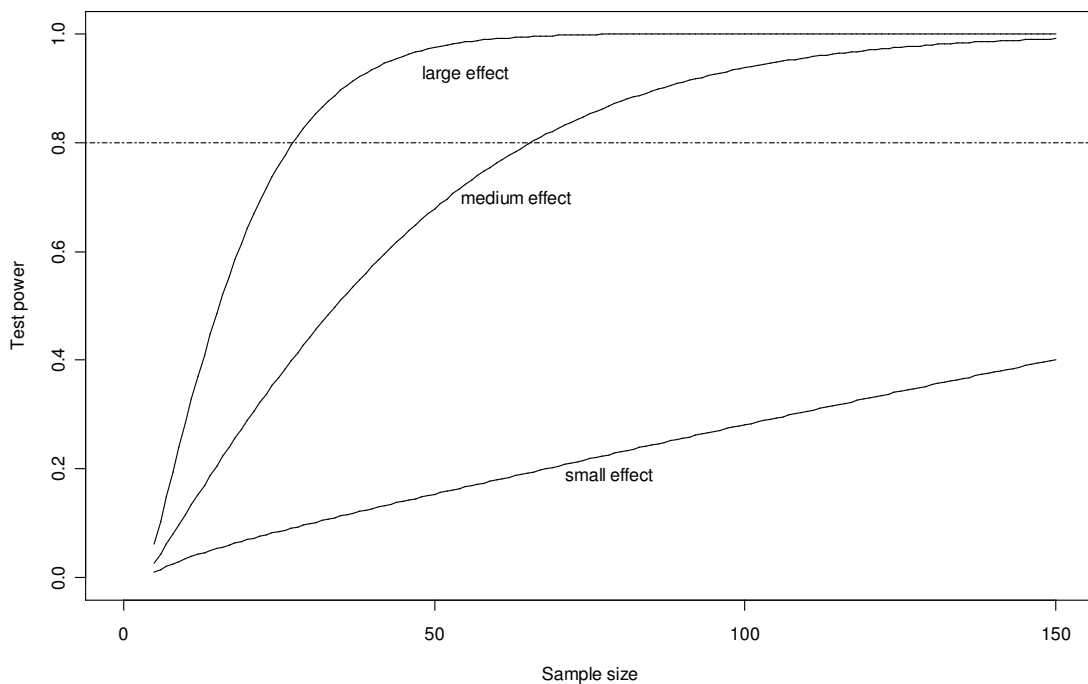
Correlations (r) are used for describing relationships between variables, and proportions of explained variance (η^2) are used for factorial and multivariate designs. In contrast to d -based effect sizes, these measures are not linear, which makes their use and interpretation more difficult and less straightforward. What all measures of the

magnitude of effects do have in common is that they are descriptive indices and independent of sample size. Table 5 shows Cohen's rules of thumb for interpreting different measures of the magnitude of an effect.

2.4.2.6 Effect sizes for planning research

In addition to the description of results, there is another important application of effect sizes. In the planning phase of research projects, effect sizes can help to find the required sample size. This is possible because the results of statistical tests depend on effect size and sample size. Clinical knowledge and/or findings of previous research may help to estimate the magnitude of the expected effect. After deciding on alpha error (the probability of finding a significant effect in the sample if there is no effect in the population; a typical choice is 0.05) and desired test power (the probability of finding a significant effect in the sample if there is an effect in the population; a typical choice is 0.80), the required sample size can be calculated. Figure 2 shows the relationship between effect size, sample size, and test power.

Figure 2. Test power by effect size and sample size



Note. Displays the test power of a t-test for independent samples with two-sided alpha of 0.05. Based on an approximate formula (Cohen, 1988, p. 544, formula 12.2.1).

With a given effect size, the test power increases with sample size, and the smaller the expected effect, the larger is the required sample size. Typically, sample sizes need to be large in order to have sufficient test power. With the typically small samples in music therapy research, the chance of a statistically significant finding is very low, even if the therapy is very effective. If we plan a study where we expect a medium effect (e.g., a study that compares music therapy with another therapy), and we want to have an 80% chance of finding an effect that is significant at the 0.05 level, we will need 66 subjects in each group. If we go on conducting the study with only 10 subjects per group, we need to be aware that we only have an 11% chance of a significant result. The practical conclusions from this may be to increase efforts to get a larger sample. If this is not possible, one might consider conducting a small-sample study and using primarily descriptive statistics, such as effect sizes. When interpreting results of completed small-sample studies that were not significant, one needs to consider that their test power was very low.

2.4.2.7 Conclusions

Effect sizes are a valuable tool that has been neglected too long in music therapy outcome research. The main advantages of effect size calculations over the exclusive use of tests of significance are:

- They help to identify what research findings are clinically relevant.
- They help to compare and summarise findings across studies.
- They can help to communicate research findings to other disciplines in health care and compare the effectiveness of alternative treatments.
- Because of their intuitiveness, they may help to bridge the "gap" between research and clinical practice, and facilitate the use of research results to inform clinical decisions directly.
- They are invaluable in the planning of successful and effective research endeavours.

Consequently, effect size calculations not only provide a clear measure of difference indicating effect, they can also reveal therapeutic effects that would provide some of the evidence searched for in evidence based medicine, and suggest a clinical benefit that warrants further investigation.

2.4.3 Effects of psychotherapy with children

2.4.3.1 Findings from meta-analyses of psychotherapy with children

Music therapy is only one of many forms of psychotherapy that are provided to children. More than 230 forms of psychotherapy for children have been counted (Weisz & Weiss, 1993), and several systematic reviews on the efficacy of child psychotherapy in general have been conducted.

The first broad-based meta-analysis on psychotherapy with children (Casey & Berman, 1985) included 75 controlled outcome studies that had been published between 1952 and 1983. The subjects in the studies were between 3 and 15 years old and received psychotherapy for a period of 1 to 37 weeks. The average effect of psychotherapy, as compared to the control group, had an effect size of $d = 0.71$ which was significantly different from zero. The effect was greater for behavioural ($d = 0.91$) than for client centred ($d = 0.49$) and psychodynamic ($d = 0.21$) therapies. However, this difference was to a great extent caused by outcome measures that were very similar to the specific procedures that had been used in therapy, something that was frequently present in studies on behavioural therapy. Excluding such outcomes led to much smaller effects of behavioural ($d = 0.55$), as well as non-behavioural ($d = 0.34$) therapies. Further comparisons included treatment modes (such as play vs. non-play and individual vs. group), target problem (social adjustment, impulsivity and hyperactivity, phobia, somatic problems), outcome measure (fear or anxiety, cognitive skills, global adjustment, social adjustment, achievement, personality, and self-concept), and source of outcome measure (including ratings by parents, therapists, subjects, and others). While the comparisons addressing primarily clinical differences did not reveal any dramatic differences between sub-groups, there were some methodologically interesting findings. Measures of overt behaviour produced large effects, whereas only minimal effects were found on measures of personality and self-concept. In a similar way, measures using subjects' self reports showed only marginal effects compared to ratings by observers, therapists, or parents.

Three subsequent replications of this first meta-analysis (Kazdin, Bass, Ayers, & Rodgers, 1990; Weisz, Weiss, Alicke, & Klotz, 1987; Weisz, Weiss, Han, Granger, & Morton, 1995) confirmed the overall finding that psychotherapy with children produces a medium to large average effect.

Weisz et al. (1987) reviewed 108 studies that compared psychotherapy with an untreated or minimally treated control condition. The age range of the subjects was extended up to 18 years, the range of diagnoses was somewhat more restrictive, with mentally retarded subjects being excluded. The average effect size was $d = 0.79$. The findings concerning behavioural versus non-behavioural therapies, with and without therapy-like outcome measures, as well as the findings on differences between raters, were similar to Casey and Berman's (1985) findings.

Kazdin et al. (1990) identified 223 studies published between 1970 and 1988, but not all of them provided sufficient information for the calculation of effect sizes. The average effect size mirrored previous findings ($d = 0.88$ when compared to a group receiving no treatment; $d = 0.77$ when compared to an active control group). This review also aimed at identifying what areas of psychotherapy are well documented by empirical research and where there is an increased need for further research. Most subjects of outcome studies were solicited from and treated in schools instead of clinically referred. Certain forms of psychotherapy, such as behavioural therapy and short-term treatment, were over-represented in empirical research, while other therapies that are frequently used in clinical practice, such as psychodynamically oriented psychotherapy, family therapy, and eclectic treatment, as well as psychotherapy over a longer period of time, were rarely evaluated.

Weisz et al. (1995) conducted a meta-analysis of 150 outcome studies which confirmed previous findings of an overall positive effect of psychotherapy with children. Interactions between variables that might be relevant clinically, and for further research, were also examined in this review. For example, when the sample was divided into male and female adolescents and male and female children, the results showed that the effects of psychotherapy were greater in adolescent girls than in the other three groups.

Other systematic reviews of studies on psychotherapy with children have examined more specifically the effects of a particular form of psychotherapy or the effects of psychotherapy for children with a particular diagnosis. A review of 43 controlled studies of non-behavioural psychotherapy for children and adolescents (Barnett, Docherty, & Frommelt, 1991) led to the conclusion that "summary impressions from this body of literature cannot be made due to the magnitude of the flaws in basic research methodology". A meta-analysis of group treatment for children and adolescents of ages 4 to 18 (Hoag & Burlingame, 1997) which included 56 outcome

studies, found that group treatment had a significant effect ($d = 0.61$) when compared to a waiting list or placebo control group. Findings from meta-analytic reviews of psychotherapy for children and adolescents with specific disorders have been summarised above (2.2.1 to 2.2.4).

2.4.3.2 *Limitations of meta-analyses of psychotherapy with children*

The meta-analyses on psychotherapy with children and adolescents that have been conducted to date show considerable variation in terms of scientific rigour. Especially the broad-based meta-analyses were very inclusive, and in some cases unspecific of their inclusion criteria, such as sample characteristics, types of interventions, and types of outcomes. For example, results from studies that are based on analogue samples (where subjects were not clinically referred but recruited for participation in an experimental treatment) may not be directly generalised to patients who are clinically referred. However, analogue samples were pooled together with clinical samples in the broad-based meta-analyses, and in fact, a majority of the studies were based on analogue samples (see above; Kazdin et al., 1990).

In non-randomised studies there may be systematic (other than random) differences between experimental and control groups at pre-test that may have an impact on the effect size at post-test and should therefore be considered when summarising effect sizes across studies. Most of the meta-analyses reviewed above included non-randomised studies without taking pre-test differences into account. The summary effect size is also likely to depend on the types of outcome measures included. Some studies have used outcome measures that are very similar to the procedures involved in the interventions. While such outcome measures are very specific to the particular treatment and are likely to be very sensitive, they may be of doubtful clinical relevance. Including outcome measures of this kind has led to inflated effect sizes, especially for behaviour therapy and cognitive behaviour therapy (see above; Casey & Berman, 1985).

Finally, the allegiance of a researcher may have a strong influence on the results. Such a bias can rarely be prevented, but needs to be considered carefully in conducting and interpreting research. An obvious subjective bias resulting from researcher's allegiance is evident in Casey & Berman's (1985) review when they conclude that "previous doubts about the overall efficacy of psychotherapy with children can be laid to rest".

2.4.3.3 *Efficacy versus effectiveness of psychotherapy with children*

The meta-analyses reviewed above have confirmed the efficacy of psychotherapy for children and adolescents under ideal conditions, but not their effectiveness in clinical practice (see section 2.4.1.1). There are only a few studies that have examined the clinical effectiveness of psychotherapy, and most of them suffer considerable methodological flaws (Weisz, Weiss, & Donenberg, 1992). In effectiveness studies, random assignment is rarely possible due to legal and ethical constraints. Alternative methods of assigning patients to groups that have been used in the field include matching children from a population survey, comparing children who complete therapy to drop-outs, and comparing treatments of different "dosage" or duration (Weisz & Weiss, 1993). However, none of these approaches is able to eliminate systematic differences between the groups. The findings of effectiveness studies of psychotherapy for children were in most cases not significant and of an effect size near zero. For example, a study (Weisz & Weiss, 1989) compared 93 children who completed psychotherapy to 60 children who dropped out of treatment. The outcome measures, which included the Child Behaviour Checklist, indicated small negative to small positive, but non-significant effects. The effects that were found in meta-analyses of efficacy studies could not be replicated in effectiveness studies. Reliable conclusions about the effectiveness of psychotherapy cannot be drawn from these studies.

2.5 A meta-analysis of the effects of music therapy with mentally ill children⁴

Meta-analytic reviews on music therapy in other fields have shown the efficacy of music therapy procedures in the treatment of dementia (Koger, Chapin, & Brotons, 1999) and the efficacy of music interventions in general medical treatment (Standley, 1986). A meta-analysis on the effects of music therapy with mentally ill children and adolescents has not been performed to date. Therefore a meta-analysis was conducted to summarise systematically the findings of previous studies that examined the efficacy of music therapy with children and adolescents with mental health problems. The goal of

⁴ A different version of this section has been submitted for publication (Gold, Voracek, & Wigram, 2002).

this systematic review was to examine the overall efficacy of music therapy with mentally ill children and adolescents. An additional aim was to identify how the size of the effect of music therapy is influenced by the type of illness, client's age, music therapy approach, and type of outcome.

2.5.1 Method of the meta-analysis

2.5.1.1 Literature search

All studies that focused on mentally ill children and adolescents, and compared music therapy with no treatment or with a different treatment, or that compared before and after music therapy treatment, were considered as possibly relevant. Eligible designs included treatment versus control group pre-test post-test designs and treatment group only pre-test post-test designs.

A systematic literature search, both computerised and manual, was undertaken. Databases were searched for the term "music therap*", crossed with "child*", "effect*" or synonyms of these. Issues of relevant journals were browsed by hand. Documents in any language were considered, as were unpublished and published articles. Searched databases included Medline (1966-2000), Psynindex (1977-2000), PsycInfo (1887-2000), the Cochrane Library (2001, issue 3), Music Therapy Info CD-ROM 1 (1996), 2 (1999), and 3 (2001), a printed register of music therapy studies (Jellison, 2000), various databases for ongoing and unpublished studies, and programmes of music therapy conferences. The hand searched journals included Music Therapy (1981-1996), Journal of Music Therapy (1964-2000), Music Therapy Perspectives (1982-2000), British Journal of Music Therapy (1968-2000), Nordic Journal of Music Therapy (1992-2000), Musiktherapeutische Umschau (1980-2000), and Revista Internacional Latinoamericana de Musicoterapia (1995-2000). Reference lists of the included studies were also checked to identify any additional studies. Twenty-nine potentially relevant studies were identified via these search strategies.

2.5.1.2 Inclusion and exclusion criteria for studies

Studies were excluded if they addressed effects of music alone (Braithwaite & Sigafos, 1998; Cripe, 1986; Underhill, 1974) or effects of music education (Standley & Hughes, 1997) rather than music therapy as defined above (2.3.1). Since the focus was on clinically relevant changes in the individual, studies addressing interactions between

group members rather than individual outcomes (Gunsberg, 1988; Humpal, 1991) were deemed ineligible. One study (Parker Hairston, 1990) could not be included because it addressed combined effects of music therapy with another therapy, without separate therapeutic results being reported. Two studies were excluded where the presence of a mental illness was not clear (Harding & Ballard 1982; Ulfarsdottir, 1999). Studies with only one subject (Bruscia, 1982; Wimmer-Ilner, 1996) were excluded because their results would not allow for effect size computation. Two studies (Krout, 1987; Wylie, 1996) were excluded because the procedures used to measure outcomes were very close and similar to the activities in therapy sessions, making it likely that the size of clinically relevant change was overestimated. Papers were not included if they did not report results of a complete outcome study (Standley & Hughes, 1996; Steele, 1977), or if complete results were not reported and efforts to retrieve the missing information directly from authors failed (Henderson, 1983; Lerner, 2001; Roskam, 1979). The characteristics of the eleven studies that remained for inclusion in the meta-analysis are summarised in Table 6.

Table 6. Characteristics of studies on music therapy with children and adolescents

a) Study characteristics

Author	Year	Country	Design	valid <i>n</i>
Aldridge et al.	1995	Germany	crossover design, both groups received music therapy ^a	8
Clendenon-Wallen	1991	USA	no control group	11
Edgerton	1994	USA	no control group	11
Eidson	1989	USA	no-treatment control	25
Gregoire et al.	1989	USA	no control group	11
Haines	1989	USA	music therapy vs. verbal therapy	16
Johnson	1981	USA	music therapy vs. other music activities	26
Laserer-Tschann	1992	Austria	music therapy plus functional training vs. functional training	14
McQueen	1975	UK	no-treatment control	24
Michel & Martin	1970	USA	no-treatment control	26
Montello & Coons	1998	USA	parallel groups, all received music therapy ^a	16

Note. ^a Classified as a one-group pre-test post-test design.

b) Client characteristics and outcomes

Author	Age	Problem/ Diagnosis
Aldridge et al.	4-6.5 years	developmental delay
Clendenon-Wallen	14-19 years	sexual abuse ^a
Edgerton	6-9 years	autism
Eidson	11-16 years ^b	emotionally handicapped ^c
Gregoire et al.	4 th grade	affective problems in gifted children
Haines	11-16 years ^b	emotional disturbance
Johnson	juvenile	juvenile delinquents ^d
Laserer-Tschann	6 - 10 years	specific developmental disorder
McQueen	children	mentally handicapped
Michel & Martin	10-12 years ^b	learning and behaviour problems ^a
Montello & Coons	11-14 years ^b	emotional, learning, and behavioural disorders

Note. ^a Classified as mixed problems. ^b Classified as adolescents. ^c Classified as emotional problem. ^d Classified as behaviour problem.

c) Therapy characteristics

Author	Approach	Setting and Modality	Number of sessions	Outcome
Aldridge et al.	CMT ^a	individual, active	unknown (6 months)	Griffiths developmental scale
Clendenon-Wallen	eclectic	group, active and receptive	12	self-confidence adjective checklist ^b
Edgerton	CMT ^a	group, active	12	communicative behaviour ^c
Eidson	behavioural	group, active	10	social behaviour in classroom ^c
Gregoire et al.	GIM ^d , Orff ^e			Piers-Harris self-concept scale
Haines	eclectic	group, active	12	Coopersmith self-esteem inventory ^b
Johnson	behavioural	group, active and receptive	22	interpersonal self-concept checklist
Laserer-Tschann	Orff ^e	individual, active	13	Hamburg-Wechsler intelligence test ^f ; Marburg behaviour list
McQueen	psychodynamic and humanistic	group, active	17; 30	identification of pictures ^f
Michel & Martin	behavioural	group, active	15	Coopersmith self-esteem inventory and behaviour rating form ^b
Montello & Coons	eclectic	group, active and receptive	24	Achenbach teacher report form ^g

Note. ^aCreative Music Therapy, classified as psychodynamic/humanistic music therapy. ^bClassified as self-concept. ^cClassified as social skills. ^dGuided Imagery and Music, classified as psychodynamic/humanistic music therapy. ^eOrff music therapy, classified as psychodynamic/humanistic music therapy. ^fClassified as development. ^gClassified as behaviour.

Table 6 shows that the included studies were conducted between 1970 and 1998. Eight of them were conducted in the USA, and the remaining three in Austria, Germany, and the UK. A wide range of clinical diagnoses ranging from developmental disorders to conduct disorders were addressed. Outcomes included behavioural observations, tests of development, and self-reports of self-esteem. Music therapy was provided either in group or in individual settings, and based on one of several music therapy models or a mixture of them. Between eight and twenty-six subjects were in each study.

2.5.1.3 *Data extraction and analysis*

The included studies were coded systematically. Child age and gender, type of illness, type of intervention, type of comparison group, type of outcome, and publication status were extracted and categorised. Treatment effects were extracted separately for post-test and follow-up. Effect sizes were calculated as standardised mean differences (Cohen's d) at post-test, and were corrected for pre-test differences. When a study had more than one outcome measure, the average of all outcome measures was calculated to avoid inappropriate multiple weighting of these studies.

Cohen's d is the most widely used effect size index in psychotherapy research and was used for the sake of comparability. However, since Cohen's d produces biased estimates in small samples, the effect sizes were also transformed into Hedges' g for an unbiased, conservative estimate. Effect sizes were weighted for inverse variance (this is related to sample size; see Appendix 9.2) and combined using a fixed effects model. The degree of heterogeneity between studies was examined using Q tests (cf. Borenstein & Rothstein, 1999; Cooper & Hedges, 1994).

One-group studies were included in the meta-analysis because of the limited number of studies. The comparison of their results with those of two-group studies could be criticised if there was a systematic change in control groups, because the effects of one-group studies would include both treatment effects and changes over time which might have occurred without music therapy. Therefore, the changes over time in experimental and control conditions were examined using within-group effect sizes (Appendix 9.1; see Becker, 1988). In this procedure, the correlation between pre-test and post-test values needs to be known to estimate an effect size's variance. In studies where this correlation was not known, the average of all known correlations in the respective condition was used. The influence of moderator variables was examined

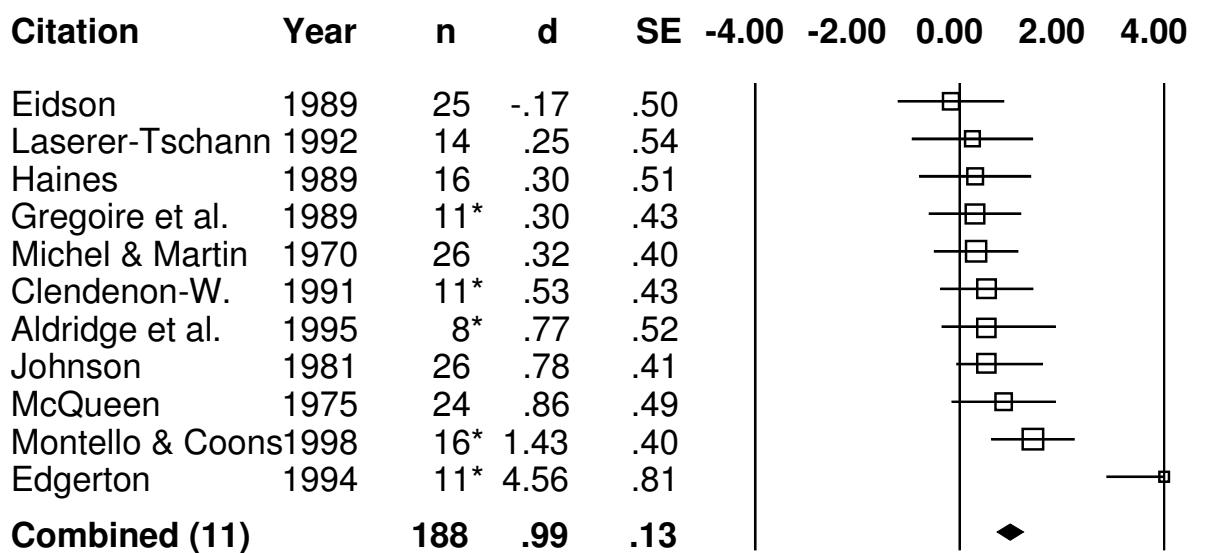
through sub-group analyses and analysis of variance (ANOVA) Q tests (Borenstein & Rothstein, 1999).

2.5.2 Results of the meta-analysis

2.5.2.1 Average effect of music therapy

The overall results are shown in figure 3.

Figure 3. Effects of music therapy with children and adolescents: Overall results of previous studies



Note. The graph displays effect size estimates of each study as boxes and their 95% confidence intervals as whiskers. The effect size estimate of the combined result with its confidence interval is displayed as a rhombus. The mean effect when the largest effect size is excluded is $d = 0.61$ ($SE = 0.14$). Samples marked with an asterisk indicate one-group studies. See Appendix 9.1 and 9.2 for computational details.

Figure 3 shows that the overall mean effect size of all included studies at post-test was $d = 0.99$ ($SE = 0.13$). Following Cohen's (1988) benchmarks for interpretation and evaluation, this is a large effect, and the effect was significantly different from zero ($t = 7.47$; $df = 243$; $p < .001$). However, it was not statistically homogeneous, as indicated by a significant Q test for homogeneity ($\chi^2 = 88.02$; $df = 10$; $p < .001$).

The distribution of the values, as presented in Figure 3, suggests that the heterogeneity between studies was caused by one outlying value. Edgerton's study showed an extremely large effect size compared to the other studies. One might assume the presence of a floor effect which would artificially decrease the SD and thereby artificially increase the effect size (ES). This assumption would be supported by the fact that the pre-test SD was much smaller than the post-test SD . However, the pre-test mean was more than two standard deviations away from zero (the lowest possible value), and the distribution of the values was not skewed or cut off at the lower end. Therefore the large ES was not explained by a floor effect. An alternative explanation is that observers may have been biased towards a more positive evaluation of later sessions. It is also possible that this study produced a larger effect because the clients' behaviour within music therapy may be more subject to change than their behaviour in other situations. The study was excluded from the analysis. The remaining studies provide a consistent indicator of the effects of music therapy, as can be seen from Figure 3.

The overall mean effect size after exclusion of Edgerton's study was $d = 0.61$ ($SE = 0.14$), which is interpreted as a medium to large effect. The bias-corrected, conservative effect size index Hedges' g was 0.56 ($SE = 0.14$). The results remained statistically significant ($t = 4.37$; $df = 221$; $p < .001$), and they were statistically homogeneous after the exclusion of Edgerton's study ($\chi^2 = 10.31$; $df = 9$; $p = .48$). The observed effect size is attenuated by imperfect reliability of outcome measures (cf. Hunter & Schmidt, 1990). No reliability correction was performed, thereby making the reported effect size estimate a conservative one. In Figure 3, it can also be seen that while most of the primary studies found a positive effect, few of them were statistically significant because test power was low in these small-sample studies. The summary effect size, in contrast, is highly significant because the larger total sample size of the meta-analysis resulted in much greater power.

To examine whether control groups improved over time, in which case the inclusion of one-group studies would lead to biased results, effects under different conditions were examined (Table 7).

Table 7. Changes over time in children and adolescents by treatment condition

Study	<i>n</i>	<i>r</i>	<i>d</i>	<i>SE</i>
Music therapy				
Haines	9	NA	0.09	0.19
Eidson	20	NA	0.12	0.13
Gregoire	11	0.93	0.30	0.11
Michel	14	NA	0.36	0.15
Clendenon	11	0.81	0.53	0.19
Laserer	6	NA	0.58	0.23
Johnson	13	0.42	0.59	0.30
McQueen	18	0.82	0.71	0.14
Aldridge	8	0.93	0.77	0.13
Montello	16	NA	1.43	0.14
Total	126		0.54	0.05
Other treatment				
Haines	7	NA	-0.21	0.29
Johnson	13	0.6	-0.14	0.25
Laserer	8	NA	0.33	0.27
Total	28		-0.01	0.16
No treatment				
McQueen	6	0.8	-0.12	0.26
Michel	12	NA	0.04	0.22
Eidson	5	NA	0.29	0.34
Total	23		0.03	0.16
All control groups	51		0.01	0.11

Note. NA = not available. Average values were substituted for missing values.

For computational details see Appendix 9.1 and 9.2.

Table 7 shows that while music therapy clients improved, subjects in the control groups did not improve, regardless of the type of control condition. A re-inspection of problem types (Table 6) did not reveal any systematic relationship between severity or perseverance of the problems and study designs. Therefore, the inclusion of the one-group studies appeared justified.

2.5.2.2 Moderator variables

The absence of statistical heterogeneity suggested that the average effect size mentioned above was representative for all conditions. However, clinical heterogeneity between the included studies could not be denied, and therefore the influence of moderator variables was examined for exploratory purposes (Table 8).

Table 8. Effect sizes of music therapy with children and adolescents by study characteristics

Variable	<i>n</i> (studies)	<i>n</i> (subjects)	<i>d</i>	<i>SE</i>
Problem				
emotional	3	52	0.16	0.27
development	3	46	0.65	0.29
behaviour	1	26	0.78	0.39
mixed	3	53	0.82	0.22
Age				
children	4	57	0.54	0.24
adolescents	6	120	0.64	0.17
Approach				
behavioural	3	77	0.38	0.24
psychodynamic /humanistic	4	57	0.54	0.24
mixed	3	43	0.89	0.24
Outcome				
social skills	1	25	-0.17	0.50
self-concept	5	90	0.46	0.19
development	3	46	0.76	0.29
behaviour	2	30	0.96	0.30

Note. *Q* tests for homogeneity revealed no significant heterogeneity either between or within any of the above groups. One study (Laserer-Tschann, 1992) had two outcome measures. The associated effect sizes were used separately in the sub-group analysis by outcome, while in all other analyses the average of both measures was used.

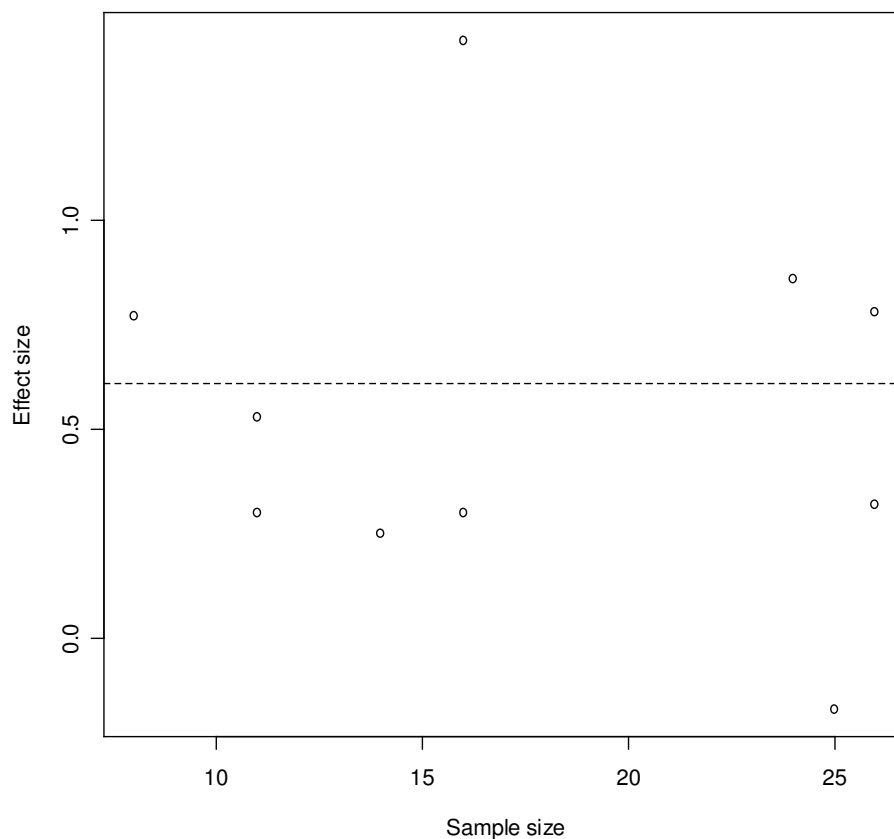
Music therapy had the largest effect for subjects who had mixed diagnoses ($d = 0.82$), such as behavioural and developmental disorders together, or mental illness stemming from a traumatic experience. Large effects were found for developmental ($d = 0.65$) or behavioural problems ($d = 0.78$) alone. Subjects with only emotional problems appeared to benefit least ($d = 0.16$). Music therapy was equally effective for children ($d = 0.54$) as for adolescents ($d = 0.64$).

Measures of the children's overt behaviour, including their development ($d = 0.76$) and problem behaviour ($d = 0.96$), were associated with larger effects than measures of subjective experiences, such as self-concept ($d = 0.46$) or social skills ($d = -0.17$). This difference is consistent with findings from meta-analyses of child psychotherapy (e.g., Casey & Berman, 1985). Clearly, overt behaviour is easier to assess than subjective experiences. Thus, there might be an increased amount of random error in the latter measures, thereby artificially deflating the effects. Reliability of

outcome measures was not reported in most of the studies and hence, could not be considered. Eclectic approaches of music therapy showed the largest effects ($d = 0.89$), and the smallest effects were found in behavioural approaches ($d = 0.38$). None of these moderator variables (age, type of illness, type of music therapy, and type of outcome measure) had a statistically significant influence on the effect. Follow-up data were only reported in one study (McQueen, 1975). The findings of this study suggested that the effects of music therapy tend to increase after termination, with effect sizes being larger in longer-term music therapy (30 sessions: post-test $d = 1.19$, follow-up $d = 1.38$; 17 sessions: post-test $d = 0.53$, follow-up $d = 0.66$).

The presence of a publication bias was examined with a funnel plot where effect size was plotted against sample size (Figure 4).

Figure 4. Funnel plot: Effect size by sample size in music therapy studies



If studies with significant findings were more likely to be published than others, a funnel plot would show an asymmetry and a tendency for smaller effects in larger samples. The funnel plot in Figure 4 showed no such asymmetry, therefore there was no evidence of a publication bias.

2.5.3 Discussion of the meta-analysis

This study was the first comprehensive meta-analytic review on the effects of music therapy with mentally ill children and adolescents. The study showed that music therapy with these clients has a highly significant, medium to large effect on clinically relevant outcomes. This finding remained when sources of positive bias were examined and eliminated. Alternatively, sources of negative bias were not eliminated, making the observed effect size a conservative estimate of the true effect (cf. Hunter & Schmidt, 1990).

Because of the comprehensive literature search, it is likely that this meta-analysis contained all relevant studies that have been conducted in the field. It is possible that there are unpublished studies which were not retrieved, however it is unlikely that their existence would significantly alter the findings as no evidence of a publication bias was observed. Therefore, the sample of studies included can be considered a representative sample of all studies conducted.

A particularly large effect was found for children who suffer from either developmental or behavioural disorders. The reason for this might be that music therapy, especially active music making, helps these children to focus and sustain attention. The non-invasive, non-judgmental setting in music therapy gives them opportunities to show capacities that may be hidden in other situations. Music therapy brings them into a situation where they are “set up to succeed”. Music making is a highly motivational factor for many of these children, as is documented in anecdotal evidence (e.g., Wigram & De Backer, 1999).

The results of the meta-analysis suggest that eclectic approaches to music therapy, where techniques from different models or theories are mixed, are particularly effective. As an interpretation of this finding, it may be important that therapists have a flexible attitude and openness to what a child brings into the music therapy situation. Individualised music therapy treatment, where a therapist chooses from a variety of music therapy techniques to match the individual client’s needs, may be more helpful than a fixed treatment regimen. Behavioural models of music therapy showed smaller

effects than other approaches. This contrasts with findings of psychotherapy meta-analyses (e.g., Casey & Berman, 1985).

Effects were larger when overt behaviour rather than subjective experience was used as the outcome measure. While the American tradition of music therapy emphasises a more controlled and experimental style both in practice and research, and has therefore often looked at changes in behaviour, European music therapy researchers have focused more on the value of music therapy as seen from the patient's and the therapist's subjective experience. The findings of this review highlight the importance of evaluating behavioural changes even in treatments that focus mainly on subjective experiences.

2.5.3.1 Limitations

The strength of a research review's findings is necessarily limited by the quality of the included primary studies. For example, several studies included in this review were not randomised, and in others, randomisation procedures were not adequately reported. In some studies, diagnoses and music therapy procedures were described with less than the desired precision and detail. In other studies the data were inadequately reported for the calculation of effect sizes. However, these problems are likely to cause random error rather than bias, i.e. they are unlikely to have a systematic influence on the findings.

The small number of studies did not permit an analysis of interactions between diagnoses, types of music therapy interventions, and outcomes. It is quite possible that the effect of music therapy in general may depend on the specific combination of diagnosis, type of music therapy, and type of outcome. For example, scales of self-esteem were found to produce small effects, and these scales were often used in children with emotional disorders. Therefore, the small effect found for music therapy with emotional disorders might actually be an artefact of study design. Studies that include multiple diagnoses, interventions, and outcomes, would be needed to examine these influences.

The application of the findings of this meta-analysis is restricted to settings that are similar to those in the primary studies. Most of the included studies were conducted in the United States, and the majority of studies examined the effects of an experimental treatment rather than clinical practice. Music therapy models used in Europe tend to be more improvisational and less structured than those used in America (Wigram, 2002).

Also, clinical practice in psychotherapeutic interventions differs from experimental therapy in various aspects. For example, patient populations in clinics tend to be more diverse, more severely disturbed, and more often comorbid; therapists have higher caseloads and less intense supervision; the goals of therapy and techniques used may cover a broader range than in experimental therapy (Weisz & Weiss, 1993).

2.5.3.2 Conclusion

The clinical implication of this meta-analysis is that music therapy is an effective intervention for children and adolescents with mental disorders. Music therapy produces a clinically relevant effect of considerable size and can therefore be recommended for clinical use.

Specifically, clients with behavioural or developmental disorders, or with multiple mental diagnoses may benefit from music therapy. Music therapy for mentally ill children and adolescents appears to be especially helpful when techniques from different music therapy approaches are combined.

This review suggests the need for studies on the efficacy of models of music therapy that are currently practised in Europe, and the effectiveness of music therapy in clinical settings. If the findings can be replicated for varying models and settings, this will strengthen their clinical applicability. The findings provide an empirical basis for planning and conducting larger scale studies on music therapy with children. Studies with larger sample sizes will not only have the advantage of increased statistical power, they will also help answering the question how the different variables involved influence each other. Further, it is important to use multiple outcome measures to reflect the various domains that are involved in the disorders and addressed in music therapy. Scales that address overt behaviour and were successfully used in previous studies (such as the Child Behaviour Checklist) are very valuable tools that can facilitate comparisons of research results across studies in a growing culture of music therapy research. However, irrespective of the measure, research results can be used most efficiently if design and reporting of music therapy studies is in compliance with the general standards for clinical trials (cf. Moher, Schulz, & Altman, 2001).

While one would like to see larger scale studies on music therapy emerge in the future, this does not mean that small scale studies will be worthless. Studies with small sample sizes formed the basis for this review and will continue to contribute to our knowledge — if effect sizes are reported. Tests of statistical significance alone might

not be useful for small scale studies and may be misleading if their low test power is not considered (see 2.4.2).

2.6 Summary: State of the art

The findings of the meta-analysis (section 2.5) suggest that music therapy is an effective treatment for children and adolescents with mental health problems. This fact does not explain why or how music therapy is effective. Consequently, further issues that need to be addressed relate to methods and techniques that are used in music therapy, the variability of which is quite wide, even between therapists graduating from the same training course. One also needs to consider the setting and context of the therapy and how that might influence the children's responsiveness to the intervention. This study did attempt to include consideration of these factors. Details of how this was done are included in the method section (chapter 4).

3 Research questions and hypotheses

The research questions of this study were introduced above (section 1.4). Based on findings from previous research (chapter 2), and on the findings of the meta-analysis of previous studies (section 2.5), it was possible to further develop these questions and to formulate more specific hypotheses for the present study.

3.1 Overall effectiveness of music therapy

Based on the limited number of studies that exist, the efficacy (as defined in 2.4.1) of music therapy with mentally ill children and adolescents has been shown (2.5). The present study addressed the effectiveness (as defined in 2.4.1) of individual music therapy in clinical practice.

Question A: Is there an average effect on clinically relevant outcomes that is statistically significant?

H0: There is no average effect that is significantly different from zero.

H1: There is an average effect that is significantly different from zero.

Confidence intervals and statistical significance of the effect size estimates obtained from the sample of this study and probability were examined.

Question B: How large is the effect of individual music therapy, as provided in out-patient treatment, for mentally ill children and adolescents? Is it large enough to be clinically relevant?

H0: The effects of music therapy treatment are too small to be considered as clinically relevant.

H1: The effect is large enough to be considered clinically relevant.

The judgement of a given effect size as clinically relevant or not relevant depends on a variety of circumstances, such as type of disorder and accompanying problems, individual goals of therapy, and the size of effect of alternative available

treatments. Benchmarks for this judgement should be based on findings of related studies or, if these are not available, on general recommendations.

Average effect sizes of music therapy, as well as of several other forms of psychotherapeutic treatments, are known from meta-analyses and range most often in the range of medium to large effect sizes. However, little is known about the size of effects of psychotherapeutic interventions in actual clinical treatment settings. Music therapy studies have not addressed this question to date. Studies addressing clinical effectiveness of psychotherapy with children suggest that the effects of therapy may be considerably smaller in typical clinical practice than in laboratory settings (2.4.3). It is reasonable to assume that there are a variety of factors that make therapy in clinical settings different from therapy in laboratory settings (2.5.3).

In the absence of more reliable evidence of the sizes of effects of psychotherapy in clinical settings, but informed by the existing evidence, the clinical relevance of the effects of music therapy versus no psychotherapeutic intervention was evaluated based on Cohen's (1988) suggestions: Any effect smaller than the benchmark for a "small" effect was interpreted as clinically not relevant. Effects between "small" and "medium" were regarded as potentially clinically relevant, and effects larger than "medium" size as clearly clinically relevant.

Question C: In which domains of the outcome is the effect especially large or small, when expressed in effect sizes?

H0: There is no difference between the domains concerning their effect size.

H1: In some domains music therapy produces larger effects than in others.

Findings from the meta-analysis (2.5) suggest that measures of overt behaviour may show larger effects than measures of subjective experiences, but the meta-analysis did not compare different outcomes for the same subjects, and therefore the results on client groups and types of outcomes were confounded. For clinical decisions, it is important to know in which domains clients can expect to improve and benefit from a type of therapy.

3.2 Effects of music therapy with specific groups of clients

The findings from the meta-analysis suggested that there may be considerable differences in the size of effects of music therapy between different groups of diagnoses, but this question needs further inquiry. One of the goals of the present study was to compare the effectiveness of music therapy for different conditions.

Question A: Are there any groups of mental disorders which respond especially well to individual music therapy, so that they are especially indicated?

H0: Patients with all kinds of problems respond equally well.

H1: Patients with certain kinds of problems respond better than others.

The primary categories of clinical conditions were based on groups of psychiatric diagnoses (2.1.1). Other influences, such as presence of an Axis 4 or 5 diagnosis and clients' age and gender were also examined.

Question B: Are there any groups of mental disorders for which individual music therapy is contraindicated?

H0: There are no groups which develop worse with than without individual music therapy, and therefore no contraindications.

H1: There are groups for which individual music therapy is harmful and should not be prescribed.

Question C: Does the effect of individual music therapy depend on other patient characteristics, such as age or gender?

H0: All age groups and both genders benefit equally from individual music therapy.

H1: The effect of individual music therapy depends on age or gender.

3.3 Effects of specific types of treatment

Question A: Does the effect depend on type of individual music therapy or on frequency and duration, or on characteristics of the therapist?

H0: All types of individual music therapy used are equally helpful.

H1: The effect depends on characteristics of therapy or therapist.

Characteristics of music therapy included in the analysis were the "dosage" of treatment (number and frequency of sessions), the status at post-test (finished vs. ongoing), and the predominant music therapy techniques used (improvisation, songs, receptive techniques, other media, verbal discourse, as reported by the therapists). When clients received any other treatments, or when parent counselling was provided, this was also included in the analysis.

Characteristics of the music therapist included in the analysis were their gender, professional experience, whether they took clinical supervision, and whether they had an additional psychotherapy training.

Question B: Is the effect of individual music therapy related to the primary carers' satisfaction with music therapy?

H0: The effect is unrelated to how the primary carers are satisfied with therapy.

H1: The effect is related to their satisfaction.

Correlations between the treatment satisfaction of primary carers and the outcome were analysed.

In the following chapter, the details of how these questions and hypotheses were addressed are clarified by the method that was used in this research.

4 Method

4.1 Study design

The present study addressed the effectiveness of individual music therapy with mentally ill children and adolescents. Effectiveness in the sense as defined above (see 2.4.1.1) refers to the effects of a therapy under normal circumstances and with a representative clinical population. This has implications for the design.

4.1.1 Multi-centre, quasi-experimental study design

Since the focus of the study was on the effectiveness of typical clinical practice, it was crucial to have a design that would allow the collection of data from a sample that is representative of typical practice, and that would have as little influence as possible that might distort these procedures. To make the sample as representative as possible, the study was planned as a multi-centre study where music therapists from a variety of institutions, from clinics and schools to private practice, could participate, so that the influence of a particular setting, as well as of a therapist's individual personality, could be reduced.

A quasi-experimental, observational design was preferred over an experimental design. A randomised experiment (or "true" experiment) is characterised by controlling the provision of treatment, the "experimental stimulus" or independent variable. Under ideal conditions, randomised experiments have high internal validity, but the procedures involved may have a strong influence on the object being studied (cf. 2.4.1.2 to 2.4.2.4). In the quasi-experimental design used in the present study, the researcher did not have active control over an independent variable, but met characteristics of experimental designs by choosing an appropriate schedule of data collection.

4.1.2 Broadness and size of study sample

Music therapists provide individual music therapy for a broad range of mental disorders, and the same broadness applies to many of the places where music therapists work, such as child psychiatric units that cover all ages and diagnoses on one ward. Comorbidity is also frequently present in mentally ill children (cf. 2.1.1) Therefore, the

present study focused on children and adolescents between 4 and 18 years of age with any kind of mental disorder, with or without comorbidity.

However, it was clear that it would be necessary to split the sample according to diagnostic and other sub-categories. In order to still have sufficient test power (cf. 2.4.2.6), a large sample size was given a high priority in the planning of the study.

4.1.3 Non-manualised therapy procedures

In experimental studies, all experimental stimuli need to be replicable. In studies on psychotherapeutic interventions, including music therapy, this is sometimes done by developing a therapy manual and controlling whether the therapists adhere to this manual. However, therapy manuals are not a typical part of clinical music therapy practice. Contrarily, clinical music therapy is usually characterised by an individual adaptation of music therapy procedures within each client's therapy process, and therefore not replicable by its nature. For the present study, it was neither possible nor desirable to develop therapy manuals and to predetermine the protocol and the precise techniques or activities used in therapy, because the goal was to observe courses of therapy without influencing them actively. Therapists reported their goals for each client at intake and gave a description of the techniques and interventions they had used after completion of therapy.

4.1.4 Domains of outcome assessment

The focus of the outcomes addressed for this study was on clinically relevant effects, i.e. effects that transcend the therapy room and become evident in the client's daily life, and effects that relate to the client's problems and needs. Measures for the general assessment of mental disorders and that had already shown their validity and reliability were preferred over new measures specifically designed for music therapy. The measures were also chosen to fit the broad range of ages and diagnoses. Relevant domains for the evaluation of psychotherapeutic treatment services that were addressed in this study include level of symptoms and level of functioning, but also consumer perspectives such as quality of life, satisfaction with care, and family strain or burden (cf. Hoagwood et al., 1996).

4.1.5 Development and pilot testing of questionnaires

Questionnaires were developed to collect variables of patients, therapists, therapy, and surroundings and circumstances of therapy. A pilot study was conducted to check whether these questionnaires, as well as the questionnaires chosen for outcome assessment, were clearly comprehensible and covered all relevant topics. The pilot study also served to explore other design features and their practical feasibility (Gold, Wigram, & Berger, 2001).

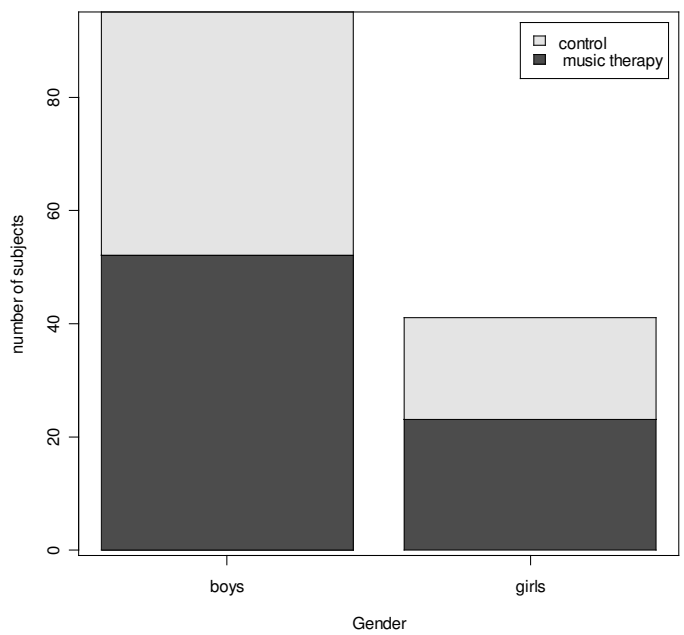
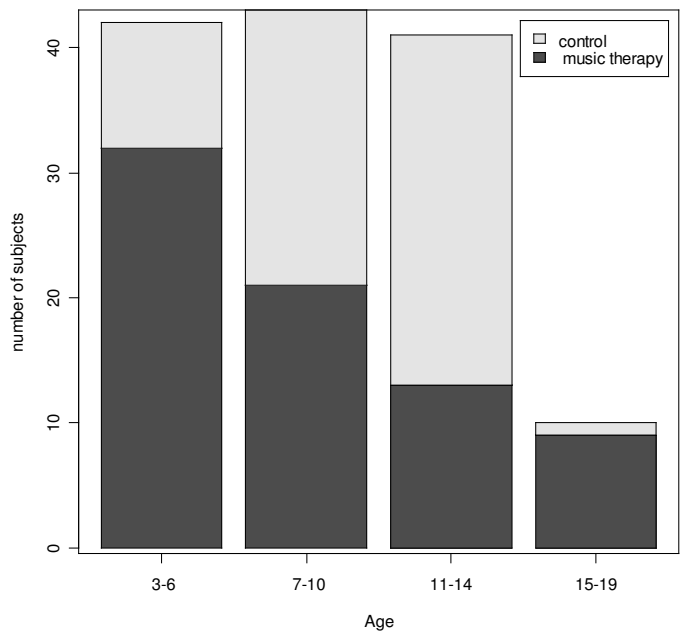
4.2 Participants

Participants of the study were 136 children and adolescents with mental disorders or mental problems. The intervention group consisted of 75 mentally ill children who began an individual music therapy. The control group consisted of 61 children who would not receive therapy during the data collection period. Some of the subjects in the control group were on a waiting list ($n = 19$), while others were recommended to have music therapy but were not yet referred for it ($n = 42$). They were assessed and treated in out-patient clinics and out-patient units of clinics, in schools and special education services, and in private practices.

4.2.1 Age and gender

The participants were between 3 years and 4 months and 19 years and 3 months of age ($M = 9.5$ years), 70% of them were boys. Figure 5 shows the distribution of age and gender in the sample.

Figure 5. Age and gender distribution in the sample



4.2.2 Primary diagnoses

Data of diagnoses and problems were collected through questionnaires that were completed by music therapists in the intervention group, and by therapists or referring professionals, such as psychiatrists, psychologists, or specialist teachers, in the control group. Therapists or referrers were asked to give the child's diagnosis, either coded according to ICD-10 where available, or as a freely formulated diagnostic description where a coded diagnosis was not available. They were also asked to give a description of the child's secondary problems, as a free description in the intervention group, and as a free description plus a list of possible problems in the control group.

Additional information on each child's problems was provided by their parents who completed the Child Behaviour Checklist (Döpfner, Schmeck, & Berner, 1994) which included a list of 120 psychiatric symptoms, questions on the child's social competencies and academic achievement, and two open questions where parents could describe what they considered their child's main problems and strengths.

In only a few cases, a formally coded diagnosis was available (the caution of many clinicians in Austrian child psychiatric services has been described under 2.1.1). A diagnosis coded according to ICD-10 was specified in only three cases (2% of the total sample). In ten other cases (7% of the total sample), a diagnosis coded according to ICD-9 was reported. In the remaining cases, the child's primary diagnosis and main problems were reported only in a descriptive form. Therefore, it was necessary to transform the free verbal descriptions, as collected from therapists or referrers and from primary carers, into coded diagnoses or coded diagnostic groups. A system of diagnostic categories that was developed specifically for the use in the evaluation of psychotherapy with children and adolescents (see Table 1) was employed for these purposes. Two persons independently coded the free verbal descriptions according to these categories (see Appendix 9.4 for the coding form). Where the two coders disagreed, the case was discussed until agreement was found. The frequencies of diagnostic categories are shown in Figure 6, and the specific diagnoses within these categories are displayed in Table 9.

Figure 6. Frequencies of diagnoses in the sample

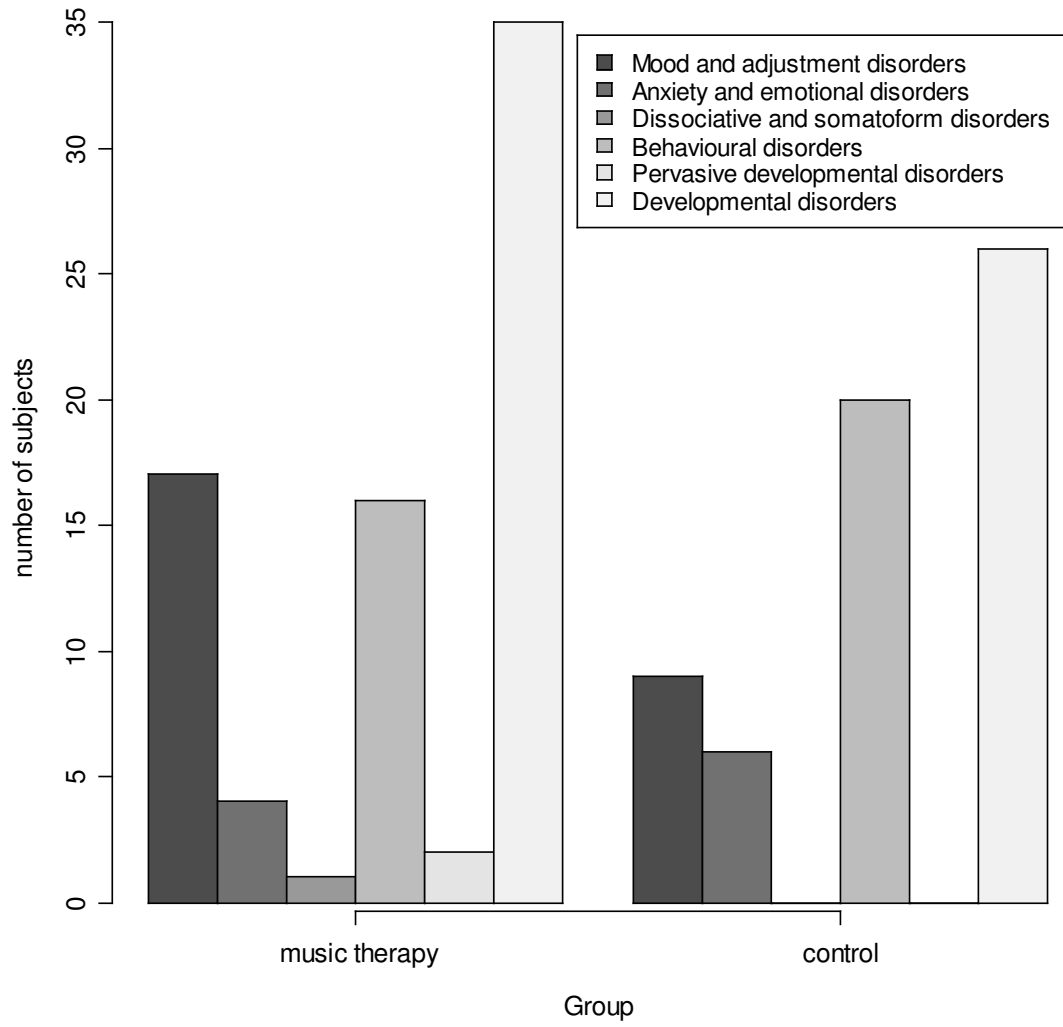


Table 9. Frequencies of diagnoses in the sample

Diagnosis	<i>N</i>	<i>n₁</i>	<i>n₂</i>
Mood and adjustment disorders			
- F43 Adjustment disorders	23	15	8
- unknown	3	2	1
Total	26	17	9
Anxiety and emotional disorders			
- F41 Anxiety disorders	1	0	1
- F93 Emotional disorders specific to childhood and adolescence	5	2	3
- unknown	4	2	2
Total	10	4	6
Dissociative and somatoform disorders			
- F45 Somatoform disorders	1	1	0
Total	1	1	0
Behavioural disorders			
- F90 Hyperkinetic disorders	14	4	10
- F91 Conduct disorders	1	0	1
- F92 Mixed disorders of conduct and emotions	3	2	1
- F94 Disorders of social functioning	2	2	0
- F98 Other behavioural and emotional disorders	2	1	1
- unknown	14	7	7
Total	36	16	20
Pervasive developmental disorders			
- F84 Pervasive developmental disorders	2	2	0
Total	2	2	0
Developmental disorders			
- F07 Personality and behavioural disorders due to brain disease	2	0	2
- F80 Specific developmental disorders of speech and language	4	4	0
- F81 Specific developmental disorders of scholastic skills	7	0	7
- F83 Mixed specific developmental disorders	26	16	10
- unknown	22	15	7
Total	61	35	26
Total	136	75	61

Note. *N* - number of subjects in total sample. *n₁* - number of subjects in intervention group. *n₂* - number of subjects in control group.

The most frequently reported disorders were developmental disorders (mental retardation and disorders of psychological development, $n = 61$), behavioural disorders (conduct and attention deficit disorders, $n = 36$), mood and adjustment disorders ($n = 26$), and emotional disorders ($n = 10$). Three subjects had other diagnoses (two cases had an autistic spectrum disorder, one case a somatoform disorder).

Therefore, the sample fell into three main categories - mood and adjustment disorders, behavioural disorders, and developmental disorders - that contained many

subjects in both the intervention group and the control group. A fourth category - anxiety and emotional disorders - consisted of only ten subjects, making this category too small to be analysed separately. According to the definition by Knölker et al. (2000, cf. 2.1.1) who suggest one can regard depressive disorders in childhood as a form of emotional disorder, the subjects in the first two categories were summarised under a broader, composite category that will be referred to as "adjustment and emotional disorders" in the following text. The third category included only one child who was diagnosed with persistent somatoform pain disorder. This child was also included in the broader, composite category of adjustment and emotional disorders.

Another category - pervasive developmental disorders - contained only two subjects in the intervention group and none in the control group. These children were included together with those of the last category - mental retardation and disorders of psychological development - under a new and broader, composite category that will be referred to "developmental disorders".

The numbers of cases in the three broader, composite categories are summarised in Figure 7 and Table 10.

Figure 7. Frequencies of broad, composite diagnostic groups in the sample

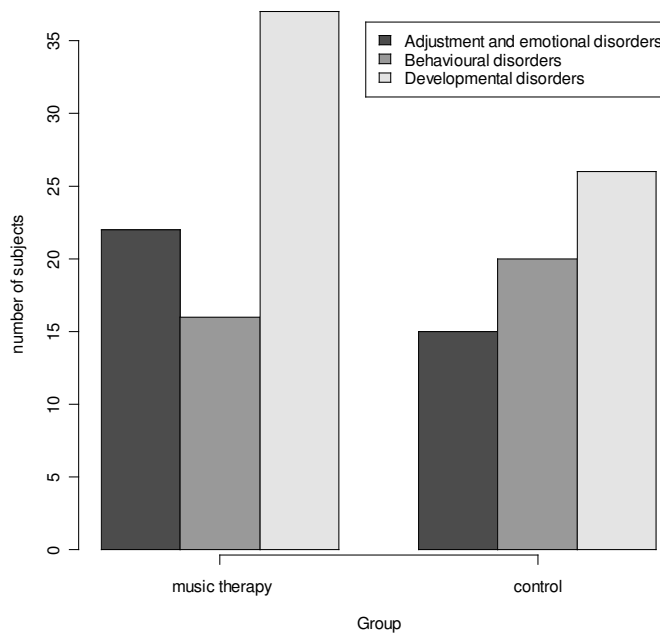


Table 10. Frequencies of broad, composite diagnostic groups in the sample

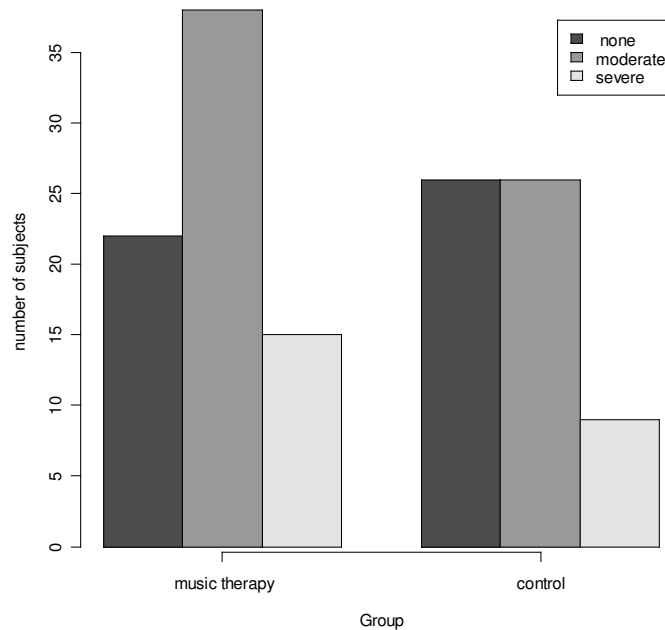
	<i>N</i>	<i>n₁</i>	<i>n₂</i>
Group A: Adjustment and emotional disorders (most frequent diagnosis: F43 Adjustment disorders)	37	22	15
Group B: Behavioural disorders (most frequent diagnosis: F90 Hyperkinetic disorders)	36	16	20
Group C: Developmental disorders (most frequent diagnosis: F83 Mixed specific developmental disorders)	63	37	26
Total	136	75	61

These broad, composite categories also reflect Achenbach & Edelbrock's (1983; cf. 2.1.1) classification into internalising problems (group A) and externalising problems (group B), extended with a third category, developmental problems (group C).

4.2.3 Secondary diagnoses (axis 4 and 5)

The coders also made a judgement of the presence or absence and the severity of associated abnormal psychosocial situations, as defined in axis 5 of the ICD-10 multi-axial classification (Remschmidt & Schmidt, 1994; see section 2.1.1). Possible ratings were: 0 - none known; 1 - mild to moderate (i.e., psychosocial situations that cannot explain a mental disorder alone but can impose additional risk); 2 - severe to very severe (i.e. psychosocial situations that may explain a mental disorder alone: e.g., child abuse and neglect). Where the coders disagreed by more than one point, agreement was sought in discussion; where they disagreed by only one point, the average of both ratings was used. The results are shown in Figure 8.

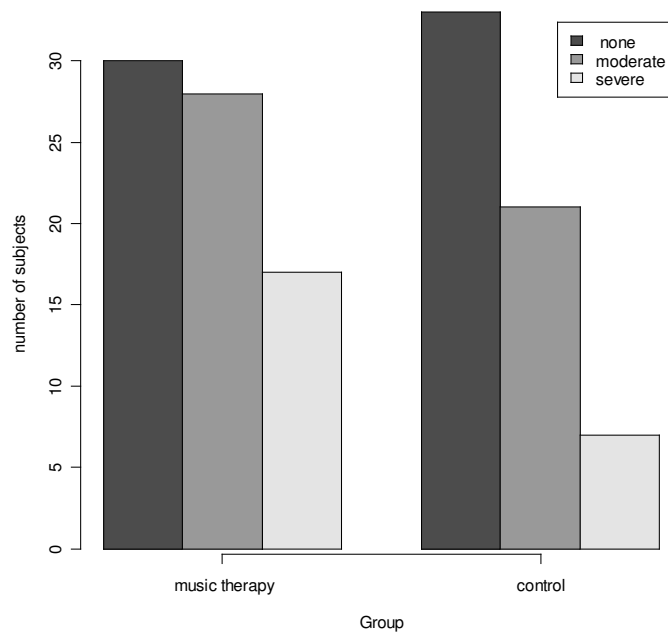
Figure 8. Frequencies of abnormal psychosocial situations in the sample



In 48 subjects, no abnormal psychosocial situations were known; 64 subjects suffered from mild or moderate (average rating of 0.5 or 1) and 24 subjects from severely or very severely abnormal psychosocial situations (average rating of 1.5 to 2). There was a tendency for subjects in the intervention group to be more severely disturbed than those in the control group.

A similar rating was applied to judge presence or absence and severity of medical conditions (mild to severe somatic problems, neurological or sensory impairments, including brain damage, motor dysfunctions, etc.), as defined in axis 4 of the ICD-10 multi-axial classification (Remschmidt & Schmidt, 1994). Possible ratings were: 0 - none known; 1 - mild to moderate (i.e. with a minor impact on daily life or social life); 2 - severe to very severe (i.e. with a high impact on daily life or social life). The results are shown in Figure 9.

Figure 9. Frequencies of medical conditions in the sample



In 63 subjects, no somatic problems were known. 49 subjects suffered from mild or moderate and 24 subjects from severe or very severe somatic symptoms. Similarly as above, there was a tendency for the subjects in the intervention group to be more severely disturbed than those in the control group.

4.3 Therapy procedures

4.3.1 The music therapists

Fifteen music therapists (12 female, 3 male) between 24 and 48 years of age ($M = 33.9$, $SD = 6.9$) conducted music therapy for the subjects of the intervention group. All of them had completed the music therapy training course at the Music University of Vienna (7 of them the old form, "Lehrgang", and 8 of them the new form, "Kurzstudium", which was established in 1992). Their professional clinical experience in music therapy (not including internships) at the beginning of the study ranged from 5 months to 21 years ($Mdn = 3.5$, $M = 7.6$, $SD = 7.6$). Twelve therapists had completed or were currently engaged in additional training courses related to their music therapy work. Additional training included (see Table 11):

Table 11. Additional training of music therapists

Additional training	Number of therapists (<i>n</i> = 15)
psychotherapy or psychotherapy-related training, completed (individual psychology, art therapy, client-centred counselling)	3
psychotherapy or psychotherapy-related training, ongoing (Gestalt therapy, client-centred psychotherapy)	2
preparatory training course in psychotherapy, ongoing or completed ("Psychotherapeutisches Propädeutikum")	4
post-graduate training in music therapy, ongoing	1
training in music education	4
other educational training (social or special education, school teacher, play school educator)	4

Note. Multiple responses were possible.

Twelve therapists reported that they took regular clinical supervision.

When asked for the theoretical orientation of their clinical work, the therapists described their approach as follows:

Table 12. Theoretical orientation of music therapists

Theoretical orientation	Number of therapists (<i>n</i> = 15)
psychotherapeutic	11
eclectic	6
psychoanalytic or depth psychological	6
humanistic	4
systemic	1
educational ("heilpädagogisch")	2

Note. Multiple responses were possible.

Most therapists reported more than one theory on which their work was based. Therefore, the typical theoretical orientation of the participating therapists is eclectic, with a strong psychotherapeutic orientation that is mostly based on psychoanalytic and humanistic models, but includes ideas from other models as well. Their approach to

music therapy reflects the general orientation of the music therapy training in Vienna, as reported in section 2.3.1.

The therapists were also asked what techniques they typically use in music therapy with mentally ill children and adolescents. The techniques they mentioned are displayed in Table 13.

Table 13. Music therapy techniques typically used with mentally ill children and adolescents

Music therapy technique	Number of therapists (<i>n</i> = 15)
improvisation	15
- free improvisation	15
- structured or thematic improvisation	7
- vocal improvisation	8
- partner improvisation	2
songs	13
- "Situationslied" (play songs, with improvised text)	5
- other songs	11
receptive techniques	2
other media	13
- role play or theatre play (including puppet play)	8
- games	4
- ball games	2
- other creative media (such as painting and drawing)	5
verbal discourse, verbal interpretation	11

Note. Multiple responses were possible.

The techniques most frequently mentioned were improvisation, songs, other media, and verbal reflection. In addition, the order in which the specific techniques were mentioned was also examined in order to evaluate their relative importance. Thirteen therapists reported improvisation techniques in the first place, while the remaining two reported other media in the first place. Therefore, improvisation and other media are the most common techniques used by the participating therapists in music therapy with mentally ill children and adolescents.

4.3.2 Music therapy setting and goals

The 75 subjects in the intervention group received music therapy in various settings for out-patient treatment, as described above (3.2). At the beginning of each therapy intervention, the music therapists reported: on whose initiative the referral was based, the reason for referral, the indication for and aims of music therapy, the planned frequency and duration of sessions, and the planned duration of the therapy as a whole. Table 14 summarises on whose initiative the referral to music therapy was based.

Table 14. Referral to music therapy

Person on whose initiative referral was based	Number of cases (<i>n</i> = 75)
parent or grandparent	30
educator	13
school teacher	14
youth welfare department	2
doctor (psychiatrist or general)	7
psychologist	17
specialist department of hospital	2
functional therapist (occupational therapist, speech and language therapist, physiotherapist)	10
other music therapist (new music therapist's predecessor)	5
client	1

Note. Multiple responses were possible.

The therapists were also asked whether the child and the parents began this therapy voluntarily. In most cases, the therapists reported that the children as well as their parents wanted music therapy for their child. However, there were three cases in the sample where either the child or the mother did not agree that there was a need for therapy.

Indications for music therapy and the specific goals of music therapy are related to the clients' diagnoses and problems and are therefore summarised separately for each group of diagnoses in Table 15.

Table 15. Goals of music therapy

	Group A (n = 22)	Group B (n = 16)	Group C (n = 37)	Total (n = 75)
build up contact and relationship, improve client's ability to build and sustain contact and relationship	7 (32%)	9 (56%)	13 (35%)	29 (39%)
improve self-esteem or self-confidence, build trust	9 (41%)	4 (25%)	10 (27%)	23 (31%)
improve client's general ability for emotional expression, (incl. ability to play)	6 (27%)	4 (25%)	9 (24%)	19 (25%)
improve social behaviour, interaction with others (incl. tolerance towards frustration)	3 (14%)	4 (25%)	8 (22%)	15 (20%)
maturation of personality, development of identity	3 (14%)	3 (19%)	7 (19%)	13 (17%)
improve ability to recognise own feelings, perception of self and others	2 (9%)	2 (13%)	6 (16%)	10 (13%)
facilitate speech development	2 (9%)	2 (13%)	5 (14%)	9 (12%)
work through a traumatising experience (e.g., bereavement, sexual abuse)	4 (18%)	3 (19%)	1 (3%)	8 (11%)
enable client to express specific emotions (e.g., aggression)	6 (27%)	0 (0%)	2 (5%)	8 (11%)
enable client to develop personal autonomy or to take initiatives	1 (5%)	2 (13%)	5 (14%)	8 (11%)
improve ability to communicate with others	0 (0%)	2 (13%)	5 (14%)	7 (9%)
work through intra-personal conflicts or conflicts in specific relationships (e.g., with mother)	1 (5%)	1 (6%)	3 (8%)	5 (7%)
goals on family level (e.g., stabilise family system, improve client's independence from parents)	4 (18%)	0 (0%)	1 (3%)	5 (7%)
stabilisation (of development)	2 (9%)	1 (6%)	1 (3%)	4 (5%)
reduce anxiety (social anxiety or achievement/performance)	2 (9%)	1 (6%)	1 (3%)	4 (5%)
improve ability to concentrate	0 (0%)	1 (6%)	3 (8%)	4 (5%)
work through the problem of having a disability	2 (9%)	0 (0%)	0 (0%)	2 (3%)
improve motor functions or body perception	0 (0%)	0 (0%)	2 (5%)	2 (3%)

Note. Group A - adjustment and emotional disorders, group B - behavioural disorders, group C - developmental disorders. Goals that were reported frequently for a specific sub-group (at least 15% of the cases within the specific group, and at least 10% more often than in the total sample) are marked in bold. Multiple responses were possible.

Table 15 shows the categories of goals that were found in the therapist's free verbal descriptions of their goals of music therapy for each client, and the absolute and relative frequency of these goals within the groups of diagnoses (more than one goal could be reported for a case). The categories are sorted by their relative frequency in the total sample. The most frequent goals of therapy were:

- to improve clients' ability to build and sustain contact and relationship (39%)
- to improve their self-esteem or self-confidence (31%)
- to improve their general ability to express themselves emotionally (25%)
- to improve their social behaviour and interaction with others (20%).

These goals were consistently present across all of the groups.

Specific goals that were more frequently reported for a particular diagnostic group than for the total sample were identified. Goals that were frequently mentioned for subjects with emotional or adjustment disorders ($n = 22$) were:

- to improve self-esteem (41%)
- to help the child to express specific emotions (27%)
- to work through a traumatising experience (18%)
- goals on the family level (18%).

Goals that were reported specifically for children with behavioural disorders ($n = 16$) were:

- to improve their ability for contact and relationship (56%)
- to improve their social behaviour and interaction with others (25%)
- to work through a traumatising experience (19%)
- to develop their personality and identity (19%).

For children with developmental disorders ($n = 37$), frequently reported goals included:

- to improve social behaviour and interaction with others (22%)
- to enable maturation of personality and development of identity (19%)
- to improve their self-perception and perception of the other (16%).

There was some variability in the frequency and duration of therapy sessions in the treatment group. This depended on the clients' pathologies, identified needs of the clients, and the working practice of the therapists. A breakdown of the frequency of sessions in the intervention group is as follows (Table 16):

Table 16. Planned number of music therapy sessions

Number of sessions per week as planned	Number of cases (<i>n</i> = 75)
1	65
2	5
0.5	3
between 1 and 2	1
1 at first, with possible increase to 2	1

The average planned frequency was 1.06 sessions per week ($SD = 0.28$).

A breakdown of the duration of therapy sessions in the intervention group is as follows (Table 17):

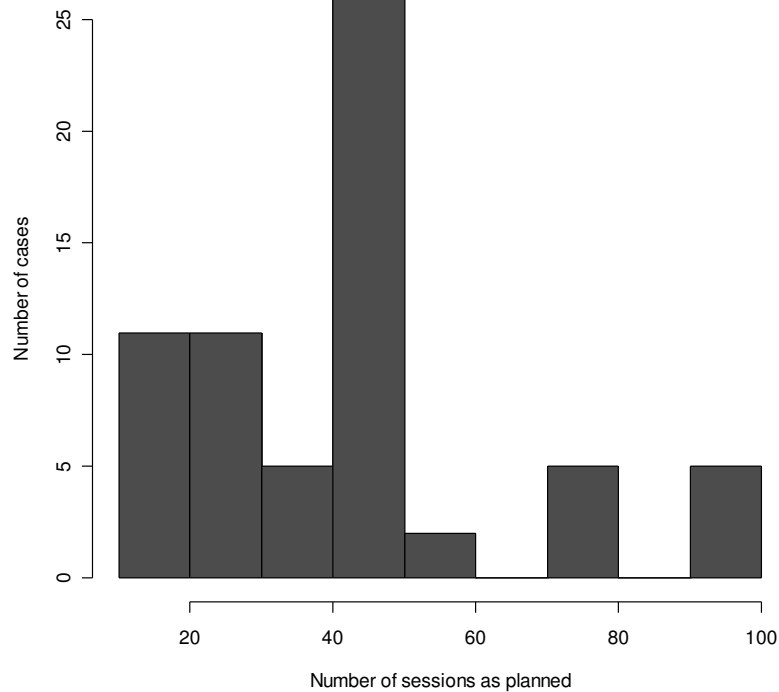
Table 17. Planned length of music therapy sessions

Duration of therapy sessions as planned (minutes)	Number of cases (<i>n</i> = 75)
50	40
45	21
30	7
30 to 45	4
20	1
not specified	2

The average planned duration per session was 45.5 minutes ($SD = 6.9$). Duration below 45 minutes tended to be reported for very young children or for children with developmental disorders.

When asked for the planned duration of the music therapy treatment as a whole, for some cases the number of sessions was given, for others the time span of the treatment, and in some cases both were given. A time span was specified in 49 cases and ranged from 4.5 to 24 months ($M = 12.0$, $SD = 4.2$). The most frequent time span, one year, was reported in 28 cases. The number of sessions was specified in 20 cases and ranged from 10 to 100 sessions ($Mdn = 15$). For those cases where the planned number of sessions was not specified, but the frequency and the duration in months were, frequency and duration were multiplied to obtain an estimate of the planned number of sessions in these cases. The resulting planned numbers of sessions for cases in the intervention group are displayed in Figure 10.

Figure 10. Planned number of music therapy sessions



From the 75 cases in the intervention group, 10 cases are missing because the therapists reported they were unable to estimate the duration of therapy in advance. In 23 of the cases displayed in Figure 10, the estimate given by the therapist was the minimum duration and therapists expected to continue the therapy after that period.

Every case was evaluated at pre-test (when music therapy began) and post-test (at the end of therapy or after 25 sessions, whichever came first). The decision to take post-tests no later than after 25 sessions was based on clinical intuition and experience (the assumption was that this amount of music therapy - over the according time span of approximately seven months - is necessary to allow changes that occur in music therapy to be transferred to the child's daily life), and on considerations of feasibility of the study.

4.3.3 Control condition

The control condition was defined as a condition where the subjects received no psychotherapeutic intervention (i.e. no music therapy and no other form of psychotherapy) during data collection, i.e. between pre-test (when the child was referred to or recommended for therapy) and post-test (i.e. when therapy began or after a time span of seven months, whichever came first).

4.3.4 Duration and "dosage" of treatment

For the participants in the intervention group, the therapists gave details about the therapy as it was actually conducted at post-test. This included the number of sessions, and, in cases where the therapy was finished at post-test, the reason for termination. For participants of both groups, the time span between pre-test and post-test was recorded.

4.3.5 Contents of music therapy

As the object under investigation was a mostly process-oriented form of music therapy, the contents of music therapy developed during the course of each individual therapy. Therefore, the contents of music therapy were reported by the therapists at post-test for each participant of the intervention group. This included:

- whether there were any changes to the setting, and if yes, of what kind
- which three music therapy techniques were used most frequently, in order of frequency
- which three music therapy techniques were judged as most successful, in order of importance
- what other interventions were used within music therapy

4.3.6 Treatment contamination/concurrent treatments

Since music therapy and other psychotherapeutic interventions may directly address the same or similar outcomes, subjects who received any form of psychotherapy (including family therapy and group psychotherapy) except the individual music therapy programme being evaluated were not allowed to participate in the study. However, some participants began psychotherapy between pre-test and post-test. This is sometimes referred to as treatment contamination. Excluding these subjects from the study after intake would not be adequate and might lead to biased results (The Cochrane

Collaboration, 2002b). The subjects were analysed on an "intention-to-treat" basis, but the proportion of subjects who received psychotherapy during their participation in the study was recorded, as was the proportion of those who received other treatments, such as functional or pharmacological treatment.

Parent counselling may be offered as an integral part of music therapy for a child or as a supplementary strategy either during music therapy or during the waiting time. Therefore the therapists or referrers, respectively, reported at post-test whether there was any counselling for parents, and if so, by whom it was provided and with what frequency.

4.3.7 Drop-outs

Drop-outs were defined as cases where the therapist or referrers were unable to obtain a post-test questionnaire from either parents or children. Parents who failed to complete the post-test questionnaire were reminded at least twice, by post, telephone, or personal contact. The reasons why cases dropped out were reported by therapists or referrers, respectively.

4.4 Outcome assessment

As noted above (3.1.4), the concept was to include multiple domains of adequate outcomes to mirror the multidimensional complexity of both the problems of mentally ill children and adolescents, and of the domains of outcomes that are possibly addressed in music therapy. Moreover, perspectives obtained from a number of different observers were to be included as the source of the data might have an influence on the results. Evaluations by people who see a child in different situations typically show only low to moderate correlations, not only because of a possible subjectivity in their judgements, but also because the behaviour of children depends much on their social environment (Döpfner et al., 1994, p. 59). A comparison between different observers should help to examine these influences. However, the possibilities to include multiple observer perspectives in the present study were limited due to the wide range of ages, diagnoses, and settings where the assessments were taken.

4.4.1 Psychiatric symptoms/behaviour problems

An assessment of the presence, absence or degree of symptoms is the most obvious and, traditionally, the most frequently used outcome of the various domains that may be addressed in a study, since the symptoms are the most directly related evidence of the presenting problem. The German version of the Child Behaviour Checklist (CBCL; Achenbach & Edelbrock, 1983; Döpfner et al., 1994) was used to measure to what extent the subjects presented clinically relevant behaviour problems and psychiatric symptoms. It was chosen because it is the best and most widely used standardised scale in this domain, and because it covers a very wide range of different problems and symptoms that are relevant for the diverse sample of this study.

The measure has a total problem scale which contains internalising, externalising, and other problems. The sub-scale of internalising problems contains three more narrow scales, withdrawn behaviour, somatic symptoms, and symptoms of anxiety and depression, while the sub-scale of externalising problems is made up from two narrow-band scales, aggressive behaviour and delinquent behaviour. The other narrow-band scales that belong to neither of the two broad-band scales are social problems, thought problems (including schizoid and obsessive-compulsive symptoms), social problems, and sexual problems. The scales and sub-scales of the Child Behaviour Checklist were empirically derived through factor analysis and independently confirmed for the German version (Döpfner et al., 1994, p. 28). The measure consists of a list of 120 behaviour problems, each of which is rated as "not true", "somewhat or sometimes true", or "often or very true", all within six months prior to completion of the questionnaire. Convergent and discriminant validity of the CBCL have been demonstrated (Döpfner et al., p. 38). Its reliability is excellent, both for the total scale (internal consistency in clinical samples: $r_{tt} = .94$, retest reliability within 5 weeks: $r_{tt} = .81$; Döpfner et al., p. 19), and for the two broad-band sub-scales (internal consistency: $r_{tt} = .86$ for internalising problems, $r_{tt} = .93$ for externalising problems; *ibid.*, p. 24) are excellent. The narrow-band scales, except the scale for sexual problems, also have sufficient reliabilities (ranging from $r_{tt} = .61$ to $r_{tt} = .92$).

The raw values are transformed into T-scores, where the values have a normal distribution with $M = 50$ ($SD = 10$) in the normal (non-clinical) population. A T-score of 60 and above means that the child has more behaviour problems than 84% of all children in his or her age group, a T-score of 70 and above means that the child shows more problems than 97% of all children. (Therefore T-scores are directly related to

percentiles.) These values can be used to discriminate clinically relevant disturbances from variations within the normal range. The authors of the CBCL suggest to regard values of 63 and above for the total scale and the two broad-band sub-scales, and values of 70 and above for the eight syndrome scales, as indicators for clinical disturbance (Arbeitsgruppe Deutsche Child Behaviour Checklist, 1993, p. 14).

The total T-score was used in the overall analysis of effects in the whole sample of the study. Additionally, the broad-band sub-scale that matched the child's diagnosis was examined for a more specific analysis of their presenting problems and any changes in these domains.

The CBCL was completed by parents, or by a primary carer with parent function for the child, for all cases. A self-rating by the participants was not possible because of their, in many cases, limited capacities to fill out extensive questionnaires. A second observer perspective was included in the intervention group, where the music therapists gave a general evaluation of changes in symptoms within the music therapy situation, and of changes in symptoms in the child's daily life (as far as they knew). For each of these two questions, a visual analogue scale (VAS) was used where the left and right extreme point of a 100 mm horizontal line represented "much worsened" and "much improved", respectively, and the appropriate point between the extremes was to be marked on the line.

4.4.2 General and social functioning/competencies and intra-personal resources

The general and social functioning of a child is another clinically relevant variable that is related to the development of, the recovery from, and the ability to cope with mental disorders. Furthermore, this domain is related to the commonly understood intra-personal "resources" ("Ressourcen") that may be important within the process of music therapy. The competence scale of the CBCL (Achenbach & Edelbrock, 1983; Döpfner et al., 1994) was used to assess levels of functioning in the participants of the study. This scale consists of a list of items addressing (a) activities the child engages in (e.g., hobbies, sports, and duties at home), (b) social competencies (e.g., friends, getting along with siblings, with adults), and (c) school performance. The reliability of this scale (internal consistency: $r_{tt} = .65$; Döpfner et al., p. 24) is not as good as the reliability of the behaviour problems scale on the CBCL, but has been judged to be sufficient for research based on groups (Döpfner et al., p. 57).

Since a substantial number of participants in this study were either below school age or attended special classes where the items on school performance could not be adequately answered, the last of the three competence sub-scales was dropped, and only a compound of the two other sub-scales was used (Gold et al., 2001). The reliability of this compound is unknown, but it should lie between the reliabilities of the two sub-scales, activities ($r_{tt} = .43$) and social competencies ($r_{tt} = .53$), and the reliability of the total competence scale ($r_{tt} = .65$). The scale was used in this study because no other adequate scale was found. However, it should be noted that low reliabilities reduce effect sizes and test power considerably because of an increased proportion of random error (Hunter & Schmidt, 1990).

As in the symptom scale, the raw values of the competence scale (and its sub-scales) can be transformed into T-scores, where the values have a normal distribution with $M = 50$ ($SD = 10$) in the normal (non-clinical) population. The authors suggest to regard scores of 37 and below for the total scale, and values of 30 and below for the sub-scales, as indicators of clinical disturbance (Arbeitsgruppe Deutsche Child Behaviour Checklist, 1993, p. 10). For all cases, the scale was completed by parents, or by a primary carer with a parent function for the child. Similar to the symptoms scale, a self-rating by the participants was not possible, but a second observer perspective was included in the intervention group, where the music therapists gave a general evaluation of changes in the client's intra-personal resources, within the music therapy situation and in daily life (as far as they knew). For each of these two questions, a visual analogue scale (VAS) was used in the same way as described above.

4.4.3 Quality of life

Quality of life as an outcome of health interventions has gained increased attention in recent years, especially in the treatment of chronic conditions where recovery or even alleviation of symptoms may not be a reasonable outcome to expect. Quality of life was measured with the KINDL health-related quality of life questionnaire for children (KINDL; Bullinger, von Mackensen, & Kirchberger, 1994, Ravens-Sieberer & Bullinger, 1998). The authors define health-related quality of life as a construct containing the mental, physical, social, and everyday life aspects of subjective well-being and functioning, and the questionnaire contains a list of questions for each of these domains. Each of the 40 items is rated on a five-point Likert scale (from 1 for "never" to 5 for "always"). Convergent and discriminant validity of the

KINDL have been demonstrated (Bullinger et al.), and its reliability as a standardised tool is excellent (internal consistency in clinical sample: $r_{tt} = .95$; Ravens-Sieberer & Bullinger).

The scale was completed by parents, or by a primary carer with parent function for the child, for all cases. The self-rating form was also used where this was possible. The short length and the relatively easy wording of the questionnaire, compared to the symptoms and competence scales, enabled a number of subjects in the sample (total: 78 cases (57%); intervention group: 32 (43%); control group: 46 (75%)) to complete this questionnaire.

Another observer perspective was included in the intervention group, where the music therapists gave a general evaluation of changes in the client's quality of life (in his/her daily life, as far as they knew). For this question, a visual analogue scale (VAS) was used in the same way as described above.

4.4.4 Consumer perspectives

Consumer perspectives that are relevant outcomes in studies of the clinical effectiveness of health services for children include satisfaction with care and family strain or burden (Hoagwood et al., 1996). However, since these outcomes have come into the focus only recently, adequate instruments to assess these outcomes are rare. In the intervention group, treatment satisfaction and burdens on family and society were assessed with a list of questions based mainly on the non-standardised HZFB satisfaction questionnaire for music therapy (Bolay, 1999; Bolay & Hillecke, 2000), with three additional questions and minor changes in wording. All questions were answered with a scale from zero to ten points, which appeared to be easier to comprehend for parents than visual analogue scales. The use of the questionnaire on satisfaction and burdens was tested in a pilot study (Gold et al., 2001). Although a reliability analysis of the original HZFB questionnaire was available (Bolay & Hillecke, 2000), the reliability of the modified version as used in this study remained to be tested.

4.4.4.1 Parent satisfaction with music therapy

At post-test, parents were asked the following questions on their satisfaction with music therapy (Table 18; see Appendix 9.3.6 for the original questions in German):

Table 18. Parent satisfaction with music therapy: Questionnaire items

Item	Response
1. How much does your child like to go to music therapy?	great reluctance ... great pleasure
2. How strong is the impact of music therapy on your child's daily life?	none ... very high
3. Is the impact of music therapy on your child desirable?	disturbing ... very desirable
4. Can you see any behaviour changes in your child that are due to music therapy?	none ... very much
5. How are the changes of your child's behaviour within the family since music therapy started?	very negative ... very positive
6. How are the changes of your child's behaviour at school/in kindergarten/at work since music therapy started?	very negative ... very positive
7. Are the contents, structures and frame conditions of music therapy for your child comprehensible to you?	not at all ... very well
8. Are you satisfied with the process of your child's music therapy?	not at all ... very much
9. How often have you thought about whether a different therapy method might be more valuable for your child?	never... very often
10. How well does the current music therapy fit the child's needs?	not at all ... very well
11. How big are the changes in your child that you recognise immediately after the music therapy session?	no changes ...very big changes
12. How are the changes in your child that you recognise immediately after the music therapy session?	very negative ... very positive

Responses to item no. 9 were reversed because of the negative wording of the question. The scale was then constructed using the mean of all completed items. A reliability analysis was performed (see section 5.2.1). It is important to note that while all the other questionnaires for parents addressed conditions in the child, these questions addressed the satisfaction of parents with their child's music therapy, which may well be different from the child's satisfaction with music therapy. As Kächele (personal communication, Ulm, February 12, 2000) pointed out, parents may be dissatisfied with an improvement of their child if this means that the child becomes "too self-confident". Nevertheless, parents' satisfaction with care is an important outcome as they are usually responsible for the start of therapy, and they decide about the continuation or termination of a therapy for their child.

4.4.4.2 *Burdens on family and society*

Burdens refer to the effects or impact of a child's behaviour on their family and others in society, and should be understood as the way these behaviours cause conflicts, hardship, considerable extra work, restrictions to everyday life, emotional traumas, and difficulties in educational provision and educational processes. Both at pre-test and at post-test, parents were asked the following questions on burdens on family and society (Table 19):

Table 19. Burdens on family and society: Questionnaire items

Item	Response
1. How severe are the disturbances of the daily life in the family that may be caused by your child's behaviour?	not significant ... very much
2. How often do conflicts in the family occur because of your child's behaviour?	never ... several times a day
3. How much are family members restricted in their personal needs because of your child?	no restrictions ... very strong restrictions
4. How dominant is your child in the family due to his or her illness or disability?	no dominance ... very high dominance
5. How independent is your child in the family's daily life?	no independence ... complete independence
6. How hard is it for your child to attend school/kindergarten/work?	not hard ... very hard
7. How important are friendships at school/kindergarten/work for your child?	not important ... very important
8. How well is your child integrated into his or her peer group at school/kindergarten/work?	not integrated ... very well integrated
9. How large is the impact of your child's illness or disability on daily problems at school/kindergarten/work?	no impact ... very large impact
10. Does your child have any advantages due to his/her illness or handicap at school/kindergarten/work?	no advantages ... very big advantages

Items no. 5, 7, and 8 were reversed, and the scale was constructed by the mean of all completed items. A reliability analysis was performed (see 5.2.1).

4.4.5 **Description of development**

The outcome measures were complemented by a free verbal evaluation of the changes and developments between pre-test and post-test. Music therapists (in the intervention group) or referrers (in the control group) answered a question about the general success of music therapy or the general development of the child, and reported

whether the child had received any new clinical diagnosis since pre-test. Music therapists (intervention group) reported the three most important changes in the child within music therapy, and the three most important changes in the child in its daily life (in order of importance). Referrers (control group) reported whether any new problems emerged during the waiting period. These verbal responses were compared to the results of the quantitative measures.

The general verbal judgement of clients' success or development over time was coded as follows:

Table 20. Coding of general rating of success and development

Description	Code
negative development or success	-1
no (visible) development or success	0
little positive development or success	1
(relatively) good development or success (with limitations)	2
very good development or success	3

4.5 Statistical analyses

4.5.1 List of included variables

The following variables were included in the statistical analyses:

Table 21. List of variables included in the analysis

a) Patient characteristics (pre-test)

Variable name	Type of variable	Available
age	linear	all participants
gender	2 levels categorical	all participants
primary diagnosis (original categories)	6 levels categorical	all participants
primary diagnosis (composite categories)	3 levels categorical	all participants
somatic problems	linear	all participants
abnormal psychosocial situations	linear	all participants
group (intervention vs. control)	2 levels categorical	all participants
type of control condition (waiting list vs. not referred)	2 levels categorical	control group

b) Therapist characteristics (pre-test)

Variable name	Type of variable	Available
music therapist gender	2 levels categorical	intervention group
music therapist experience	linear	intervention group
music therapist supervision	2 levels categorical	intervention group
music therapist psychotherapy training	2 levels categorical	intervention group

c) Treatment characteristics (post-test)

Variable name	Type of variable	Available
number of sessions	linear	intervention group
frequency of sessions	linear	intervention group
status of music therapy at post-test (finished vs. ongoing)	2 levels categorical	intervention group
frequent use of improvisation	2 levels categorical	intervention group
frequent use of songs	2 levels categorical	intervention group
frequent use of receptive techniques	2 levels categorical	intervention group
frequent use of other media	2 levels categorical	intervention group
frequent use of verbal discourse	2 levels categorical	intervention group
parent counselling	linear	all participants
concurrent psychotherapy	2 levels categorical	all participants
concurrent functional therapy	2 levels categorical	all participants
concurrent medical treatment	2 levels categorical	all participants
concurrent educational interventions	2 levels categorical	all participants

d) Outcomes (post-test)

Variable name	Type of variable	Available
symptom pre-test/post-test (parent rating)	linear	all participants
symptom change within music therapy (therapist rating)	linear	intervention group
symptom change in daily life (therapist rating)	linear	intervention group
competencies pre-test/post-test (parent rating)	linear	all participants
resources change within music therapy (therapist rating)	linear	intervention group
resources change in daily life (therapist rating)	linear	intervention group
quality of life pre-test/post-test (parent rating)	linear	all participants
quality of life pre-test/post-test (self-report)	linear	parts of both groups
quality of life change in daily life (therapist rating)	linear	intervention group
treatment satisfaction (parent rating)	linear	intervention group
burdens pre-test/post-test (parent rating)	linear	intervention group

4.5.2 Reliability analysis

For the two non-standardised scales of consumer perspectives (parent satisfaction with music therapy and burdens on family and society) that were used, a reliability analysis was performed. Internal consistency (Cronbach's alpha) was computed for each scale as a whole, and with every one item deleted. If deleting an item led to a considerable improvement of a scale's reliability, the item was deleted.

4.5.3 Data screening

For cases where either pre-test or post-test scores were missing for an outcome variable, the reasons why the variable was missing were analysed, and the variable was removed from the data set for both pre-test and post-test. Scores of the same case on other variables were retained.

The distributions of the outcome variables were inspected using qq-plots (where the sample distribution is plotted against a normal distribution) to examine whether there were any clear deviations from normal distribution or any obvious outlying values.

4.5.4 Change scores

For all outcomes that involved pre-tests and post-tests, standardised change scores were computed (i.e. differences from pre-test to post-test, standardised by pre-test within-group standard deviations). The pooled standard deviations of intervention group and control group at pre-test were used for the computation of these scores, so that the same difference in raw scores on a given measure always resulted in the same change score (which would not be the case if separate *SDs* had been used for each sub-group). Signs were reversed where appropriate, so that positive change scores always represented improvement and negative change scores represented deterioration. For the analyses of sub-groups, it was important that the outcomes were standardised on a common standard deviation (rather than on separate standard deviations for each sub-group) in order to retain a common basis for comparisons between groups. Pre-test scores were included as covariates in the later analyses in order to control for the influence of any pre-test differences (although simple additive influences were already controlled for in the change scores).

4.5.5 Inter-observer agreement

Although classical psychological test theory demands that a scale be objective, rating scales always allow subjective distortion, and it is therefore useful to compare the judgements of several observers. However, low agreement between observers does not necessarily reflect subjective bias, since the behaviour of children is highly dependent on their social environment, and agreement between observers who see a child in different situations is usually lower than of observers who see the child in similar situations. A meta-analysis of studies identified a correlation of $r = .60$ between observers who see the children in similar contexts, $r = .28$ between observers who see the child in different contexts, $r = .22$ between self-ratings and ratings by others (Achenbach, McConaughy, & Howell, 1987; cit. Achenbach, 2002). Although the persons who gave ratings of outcomes in this study included parents, therapists, and children, not all of these different observers were available for all cases, and parents were the only source of information that was always available. Correlations between different observers or informants were compared to the benchmarks cited above.

4.5.6 Multivariate and univariate general linear models

For each analysis that involved influences of multiple variables on multiple dependent variables, multivariate analysis of covariance (MANCOVA) was used where appropriate, to examine whether there were any effects on the set of variables as a whole. Based on each MANCOVA, a series of univariate multiple ANCOVAs were then performed to examine which factors and covariates had a significant influence on which specific outcomes. The following criteria and abbreviations for levels of statistical significance were used in this research:

- n.s. not significant ($p \geq .05$)
- * significant ($p < .05$)
- ** highly significant ($p < .01$).

In analyses where exact p -values are not shown, a trend toward statistical significance was displayed in the following way:

- (*) non-significant trend ($p < .10$).

4.5.7 Descriptive analysis

Descriptive analyses were conducted to obtain results that are clinically interpretable. For some analyses, the choice of variables to be included in a descriptive analysis was based on the results of one of the statistical tests explained above, while for others, a descriptive analysis was used independently of the test results.

Descriptive analyses that were performed independently of the results of a statistical test included:

Table 22. List of unconditional descriptive analyses

Variable	Group	Type of analysis
length and contents of music therapy	intervention group	<i>M, SD, Mdn</i> , relative frequencies
concurrent treatments	all participants	relative frequencies
drop-outs	all participants	relative frequencies
overall outcome	all participants	effect sizes with 95% <i>CI, p</i>
treatment satisfaction → outcome	intervention group	correlations, <i>p</i>
inter-observer agreement	all participants	correlations, <i>p</i>

Descriptive analyses based on the results of a statistical test included:

Table 23. List of conditional descriptive analyses

Variable	Group	Type of analysis
patient variables → therapy and therapist variables	intervention group	effect sizes with 95% <i>CI, p</i>
therapy and therapist variables → outcome	intervention group	effect sizes with 95% <i>CI, p</i>

For these analyses, only variables that showed a statistically significant influence were included in the descriptive analyses. When the influence of a continuous variable on an outcome was addressed in an effect size analysis, the continuous predictor variable was split into subsets (e.g., age groups, severity of axis 4 and axis 5 problems).

4.5.8 Sensitivity analysis

In some of the analyses that were performed, the decision to exclude, include, or group together subjects, prior to an analysis, was based on clinical assumptions that were considered worth examining. Such decisions included

- whether or not to pool participants with different diagnoses into broader, composite categories
- whether or not to include participants who received other psychotherapy
- whether or not to include participants of the control group who did not wait for music therapy.

Whether the results were sensitive to the choices made in such situations was analysed by a sensitivity analysis, i.e. the analysis was repeated with subjects excluded or not pooled that were before included or pooled, respectively.

5 Results

This chapter begins with a documentation of the analysis of the treatment procedures. This includes the extent of music therapy that was provided as well as the primary contents of music therapy, based on therapists' reports at post-test. Further aspects of treatment provision addressed are accompanying and additional interventions, including parent counselling and other treatments. This part of the results section also includes a statistical analysis of how characteristics of music therapy depend on patient characteristics (section 5.1).

Section 5.2 addresses the necessary preparatory statistical analyses that were conducted, including the reliability of the non-standardised scales, the analysis of missing values, the examination of the distribution of variables, and correlations between outcomes.

The following analysis of the effects of music therapy begins with the overall effects that were found when comparing the groups and analysing their development as a whole (section 5.3). This is followed by more specific analyses that address the question how the effects of music therapy differ depending on patient characteristics (section 5.4) and characteristics of music therapy (section 5.5).

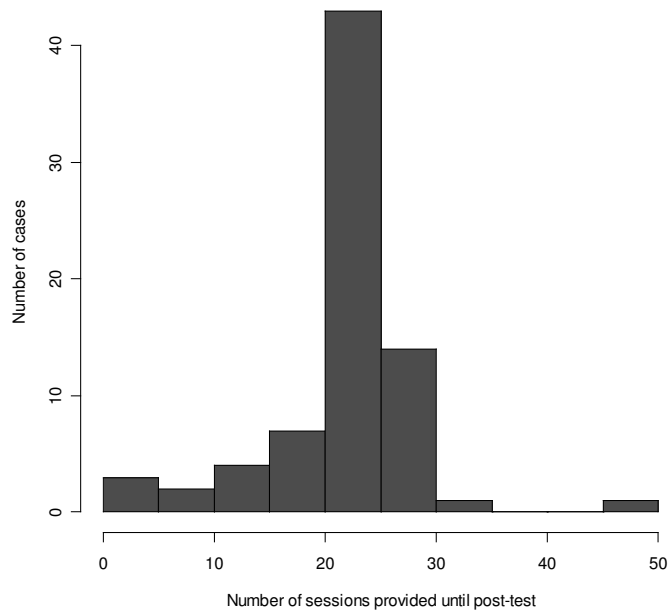
The remaining sections address further specific questions. Section 5.6 addresses the role of treatment satisfaction of primary carers for the processes and outcomes of music therapy. Section 5.7 examines relationships between therapists' and referrers' general impression of the clients' development and the outcomes. The last part of the results section (section 5.8) examines more closely possible contraindications of music therapy, based on a result reported in a previous section.

5.1 Treatment procedures

5.1.1 Duration and "dosage" of treatment

At post-test, the therapists gave details about the therapy as it was actually conducted. The results are shown in Figure 11.

Figure 11. Provided number of music therapy sessions



The number of music therapy sessions provided until post-test ranged from 3 to 47 ($M = 23.2$, $SD = 6.5$), with a median of 25.

Post-tests after less than 25 sessions occurred when a therapy was finished earlier, while post-tests after more than 25 sessions were due to delays in returning the questionnaires in cases where music therapy was continued.

In 39 cases (52%), the therapy was terminated at post-test, after 3 to 31 sessions ($M = 20.4$, $SD = 7.3$). For each of these cases, one or more of the following reasons for termination of therapy was reported by the music therapist:

Table 24. Reasons for termination of therapy, as reported by therapists

Reason for termination	Number of cases (<i>n</i> = 39)
goals of therapy were met	7
- completely	6
- partly	1
referral to other therapy	8
child's wish	10
parent's wish	8
organisational problems	10
therapist quits position	8

Note. Multiple responses were possible.

In a part of the sample (*n* = 13), the parents were asked the same question independently. They agreed with the therapists on the reasons for terminating the music therapy for their child.

In 36 cases (48%), music therapy was still ongoing at post-test assessment. The number of sessions that the clients who continued had received until completion of the second evaluation ranged from 25 to 47 ($M = 26.2$, $SD = 3.8$, $Mdn = 25$).

The time span between pre-test and post-test in the intervention group ranged from 1.4 to 17.7 months ($M = 8.9$, $SD = 3.3$, $Mdn = 9$). The average frequency of sessions was 2.9 sessions ($SD = 1.5$) per month, or 0.73 sessions ($SD = 0.37$) per week.

In the control group, the time span between pre-test and post-test ranged from 1.7 to 12.9 months ($M = 7.39$, $SD = 2.2$, $Mdn = 7.3$).

5.1.2 Contents of music therapy

5.1.2.1 Changes to the setting

At post-test, the therapists were asked if there were any changes to the setting which they had reported when they started the therapy. In most cases (*n* = 56, 75%) they reported that there were no changes. In the remaining 19 cases, the following changes were reported:

- frequency of sessions: 11 cases
 - reduced: 4 cases
 - increased: 3 cases
 - unintended interruptions (longer phases without music therapy): 5 cases

- different therapy room or partly outside therapy room: 4 cases
- partly together with mother in therapy room: 2 cases
- other: 2 cases.

5.1.2.2 Music therapy techniques

The therapists were also asked to name the three most frequently used techniques for each case, in order of frequency. The results are displayed in Table 25.

Table 25. Most frequently used techniques in music therapy

	number of cases	average position
improvisation	47	1.6
- free	26	1.6
- structured or thematic	19	1.6
- vocal	8	1.9
- partner improvisation	2	2.5
songs	25	1.8
- "Situationslied" (situation song)	11	1.7
receptive techniques	19	2.0
other media, not primarily musical	51	1.7
- role play, puppet play	13	1.8
- movement, ball games, dancing	14	2.1
- free play, games	34	1.8
- other creative media	6	2.5
verbal discourse	24	2.2

Note. Multiple responses were possible (up to three per case).

Table 25 shows that the predominant techniques were various forms of improvisation (47 cases, 63%) and various forms of non-musical or not primarily musical playing and creating (50 cases, 67%). Singing songs (33%), listening to music (25%), and verbal reflection (32%) were other techniques that were frequently used in a number of cases. A technique that is used frequently within a course of therapy is not necessarily one that is judged as particularly successful when looking back on the therapy process. Therefore, the therapists were asked for the three music therapy

techniques they thought were most successful for each case. The results are displayed in Table 26.

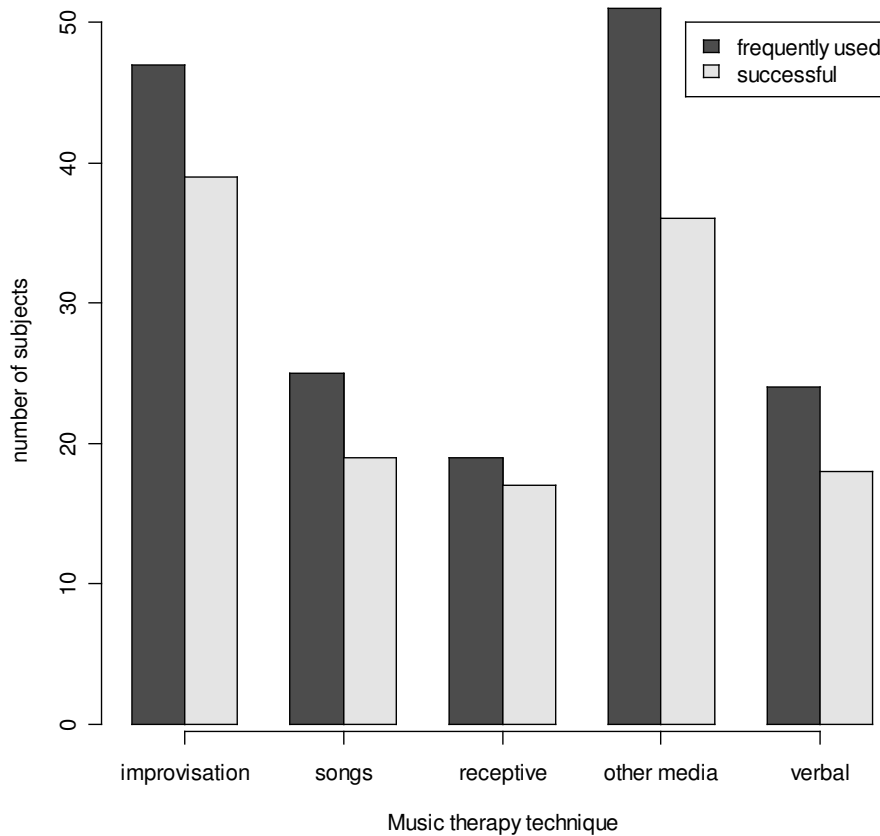
Table 26. Most successful techniques in music therapy

	number of cases	average position
improvisation	39	1.5
- free	14	1.6
- structured or thematic	12	1.8
- vocal	7	2.0
- partner improvisation	2	1.0
songs	19	1.4
- Situationslied	12	1.7
receptive techniques	17	1.7
other media, not primarily musical	36	1.7
- role play, puppet play	14	1.9
- movement, ball games, dancing	11	1.7
- free play, games	14	1.7
- other creative media	6	2.0
verbal discourse	18	1.9

Note. Multiple responses were possible (up to three per case).

The frequencies with which techniques were reported as being frequently used and successfully used, respectively, are compared in Figure 12.

Figure 12. Techniques used in music therapy



It can be seen that the frequency with which a technique was reported as being successfully used was consistently a little lower than the frequency with which it was reported as being frequently used. The greatest difference can be seen in the use of other media which were used most frequently of all categories, but not most successfully. Looking back at tables 23 and 24 shows that the greatest discrepancy was found in free play and games. These techniques were used frequently in almost every second case ($n = 34$, 45% of all cases), but only for less than half of them successfully ($n = 14$, 19% of all cases).

5.1.2.3 Other interventions within music therapy

The therapists were asked what other interventions they thought were successful for each case. The answers to this question were highly diverse - which was to be

expected as it reflects much of the individual processes that occur in each case. However, a few categories of interventions could be found that were reported for several cases:

- giving boundaries and rules: 10 cases
- giving structure and safety: 8 cases
- supportive interventions: 2 cases
- confronting or interpreting: 5 cases
- accepting client's behaviour, offering contact without demanding it: 5 cases
- enabling client's regression: 3 cases
- fostering client's perception of own boundaries: 2 cases
- interventions on the family level: 5 cases

Other interventions frequently involved specific changes to the relationship between the therapist and the client.

5.1.3 Other concurrent treatments (treatment contamination)

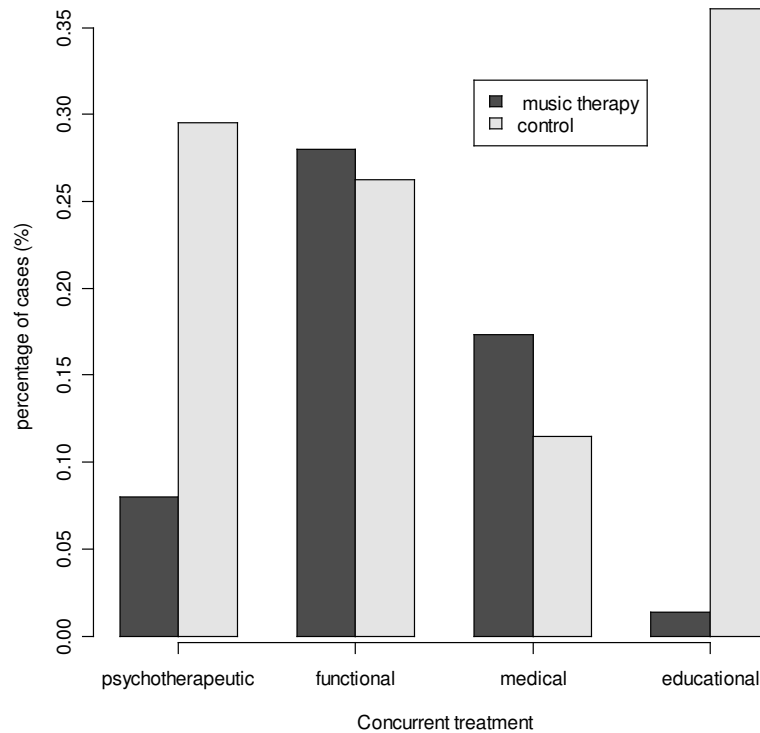
The proportion of subjects who received other treatments during their participation in the study was recorded at post-test. The results are shown in Table 27 and Figure 13.

Table 27. Other concurrent treatments

	Intervention group (<i>n</i> = 75)	Control group (<i>n</i> = 61)	Total group (<i>n</i> = 136)
psychological/psychotherapeutic counselling or treatment	6 (8 %)	18 (30 %)	24 (18 %)
functional therapy (e.g., speech and language, occupational, physiotherapy)	21 (28 %)	16 (26 %)	37 (27 %)
medical treatment (only for mental health problems)	13 (17 %)	7 (11 %)	20 (15 %)
educational interventions (with a focus on psychosocial problems)	1 (1 %)	22 (36 %)	23 (17 %)
any of the above	34 (45 %)	45 (74 %)	79 (58 %)

Note. Multiple responses were possible.

Figure 13. Other concurrent treatments



It can be seen that a considerable number of participants received other interventions concurrently. The relative frequencies of functional and medical treatment in the two groups were comparable, but psychotherapeutic interventions and interventions on the educational level were much more frequent in the control group than in the intervention group. Together, 9% of the participants in the intervention group and 59% of the participants in the control group were provided with at least one of these two interventions (eliminating the overlap). Psychotherapeutic interventions in the control group included music therapy in five cases. The research design did not allow prevention of such unplanned interventions.

Counselling for parents was offered for 63% of all cases (intervention group: 56 cases, 75%, control group: 30 cases, 49%). It was provided by music therapists (only in the intervention group), by psychologist or psychotherapist, by medical doctors, or by teachers, social workers, educators, or other therapists. The intensity of parent counselling varied greatly and ranged from occasional meetings to weekly therapy sessions (Table 28).

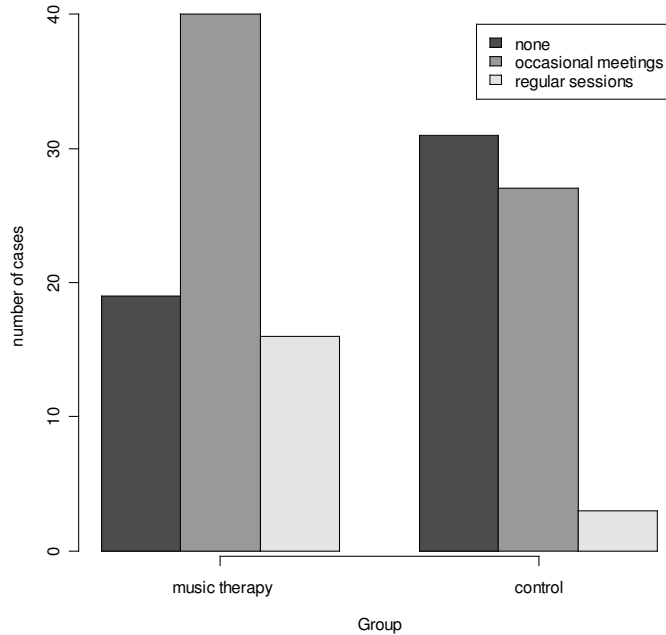
Table 28. Counselling for parents: Providers and frequency of sessions

	Intervention group (<i>n</i> = 56)	Control group (<i>n</i> = 30)	Total (<i>n</i> = 86)
Provider			
music therapist	36 (64 %)	0 (0 %)	36 (42 %)
psychologist/psychotherapist	22 (39 %)	7 (23 %)	29 (34 %)
medical doctor	3 (5 %)	5 (17 %)	8 (9 %)
other (e.g., teacher, social worker, educator, other therapist)	4 (7 %)	17 (57 %)	21 (24 %)
not specified	7 (13 %)	3 (10 %)	10 (12 %)
Frequency			
at least every six weeks	11 (20 %)	2 (7 %)	13 (15 %)
at least every three months	5 (9 %)	1 (3 %)	6 (7 %)
occasional (less than every three months)	28 (50 %)	5 (17 %)	33 (38 %)
short contacts (e.g., telephone)	5 (9 %)	1 (3 %)	6 (7 %)
offered, but rejected	2 (4 %)	2 (7 %)	4 (5 %)
not specified	5 (9 %)	19 (63 %)	24 (28 %)

Note. Only cases where some form of parent counselling was offered are listed in the table. Multiple responses were possible for providers.

The intensity of parent counselling was categorised as to whether no parent counselling, occasional meetings, or regular sessions were provided. Sessions taking place at least every three months were coded as "regular sessions". Where parent counselling was offered with less intensity, or where it was offered but rejected by parents, this was coded as "occasional meetings". The results are shown in Figure 14.

Figure 14. Parent counselling



5.1.4 Predictors of therapy characteristics

An analysis of covariance was performed to analyse how patient characteristics influenced contents of therapy. Patient characteristics included were the variables age, gender, psychiatric diagnosis, and axis 4 and 5 diagnoses (see Table 21 a). Therapy characteristics included number and frequency of sessions, status of therapy at post-test (finished or ongoing), use of music therapy techniques, parent counselling, and concurrent treatments (see Table 21 c). The results are shown in Table 29.

Table 29. Therapy characteristics by patient characteristics

a) Multivariate Tests

Effect	<i>F</i>	Hypothesis <i>df</i>	Error <i>df</i>	<i>p</i>	η^2
Intercept	17.157	13	47	.000 **	.826
age	2.563	13	47	.009 **	.415
diagnosis	1.388	26	94	.129	.277
axis 4	0.407	13	47	.960	.101
axis 5	2.511	13	47	.011 *	.410
gender	1.922	13	47	.052	.347
diagnosis x gender	1.032	26	94	.436	.222

b) Tests of between-subjects effects

Source	Dependent Variable	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	number of sessions	8	0.865	.551	.105
	frequency of sessions	8	0.457	.881	.058
	continued/finished	8	1.034	.421	.123
	improvisation	8	0.618	.760	.077
	songs	8	3.607	.002 **	.328
	receptive techniques	8	2.533	.019 *	.256
	other media	8	0.966	.471	.116
	verbal discourse	8	2.552	.018 *	.257
	parent counselling	8	3.485	.002 **	.321
	psychotherapy	8	1.620	.139	.180
	functional therapy	8	1.431	.203	.162
	medical treatment	8	1.886	.079	.204
	educational interventions	8	0.974	.465	.117
Intercept	number of sessions	1	119.757	.000 **	.670
	frequency of sessions	1	20.962	.000 **	.262
	continued/finished	1	6.007	.017 *	.092
	improvisation	1	8.014	.006 **	.120
	songs	1	20.185	.000 **	.255
	receptive techniques	1	10.725	.002 **	.154
	other media	1	30.066	.000 **	.338
	verbal discourse	1	0.489	.487	.008
	parent counselling	1	44.086	.000 **	.428
	psychotherapy	1	0.003	.957	.000
	functional therapy	1	7.427	.008 **	.112
	medical treatment	1	2.365	.129	.039
	educational interventions	1	1.640	.205	.027
age	number of sessions	1	0.021	.885	.000
	frequency of sessions	1	1.390	.243	.023
	continued/finished	1	0.454	.503	.008
	improvisation	1	0.239	.627	.004
	songs	1	6.773	.012 *	.103
	receptive techniques	1	0.117	.734	.002
	other media	1	4.930	.030 *	.077
	verbal discourse	1	10.905	.002 **	.156
	parent counselling	1	5.020	.029 *	.078
	psychotherapy	1	0.008	.928	.000
	functional therapy	1	4.495	.038 *	.071
	medical treatment	1	5.420	.023 *	.084
	educational interventions	1	0.862	.357	.014

Tests of between-subjects effects (cont.)

gender	number of sessions	1	1.094	.300	.018
	frequency of sessions	1	0.020	.888	.000
	continued/finished	1	4.550	.037 *	.072
	improvisation	1	1.253	.267	.021
	songs	1	13.639	.000 **	.188
	receptive techniques	1	0.702	.405	.012
	other media	1	0.261	.611	.004
	verbal discourse	1	4.555	.037 *	.072
	parent counselling	1	2.358	.130	.038
	psychotherapy	1	0.017	.898	.000
	functional therapy	1	0.101	.751	.002
	medical treatment	1	0.053	.818	.001
	educational interventions	1	0.943	.335	.016
diagnosis	number of sessions	2	0.634	.534	.021
	frequency of sessions	2	0.760	.472	.025
	continued/finished	2	0.431	.652	.014
	improvisation	2	1.677	.196	.054
	songs	2	0.327	.723	.011
	receptive techniques	2	0.451	.639	.015
	other media	2	0.078	.925	.003
	verbal discourse	2	1.534	.224	.049
	parent counselling	2	6.531	.003 **	.181
	psychotherapy	2	0.137	.872	.005
	functional therapy	2	2.506	.090	.078
	medical treatment	2	1.410	.252	.046
	educational interventions	2	0.925	.402	.030
axis 4	number of sessions	1	0.591	.445	.010
	frequency of sessions	1	0.023	.880	.000
	continued/finished	1	0.009	.926	.000
	improvisation	1	0.054	.818	.001
	songs	1	0.864	.356	.014
	receptive techniques	1	0.249	.620	.004
	other media	1	0.042	.838	.001
	verbal discourse	1	0.014	.906	.000
	parent counselling	1	0.240	.626	.004
	psychotherapy	1	0.433	.513	.007
	functional therapy	1	0.354	.554	.006
	medical treatment	1	1.375	.246	.023
	educational interventions	1	0.481	.491	.008
axis 5	number of sessions	1	0.572	.452	.010
	frequency of sessions	1	0.133	.716	.002
	continued/finished	1	0.338	.563	.006
	improvisation	1	0.008	.928	.000
	songs	1	0.449	.505	.008
	receptive techniques	1	14.444	.000 **	.197
	other media	1	0.319	.575	.005
	verbal discourse	1	0.001	.975	.000
	parent counselling	1	0.004	.952	.000
	psychotherapy	1	7.705	.007 **	.116
	functional therapy	1	0.027	.870	.000
	medical treatment	1	1.891	.174	.031
	educational interventions	1	2.348	.131	.038

Tests of between-subjects effects (cont.)

diagnosis x gender	number of sessions	2	1.042	.359	.034
	frequency of sessions	2	0.091	.913	.003
	continued/finished	2	1.914	.157	.061
	improvisation	2	0.254	.777	.009
	songs	2	3.097	.053	.095
	receptive techniques	2	2.287	.110	.072
	other media	2	0.960	.389	.032
	verbal discourse	2	1.203	.308	.039
	parent counselling	2	0.471	.627	.016
	psychotherapy	2	1.362	.264	.044
	functional therapy	2	0.612	.545	.020
	medical treatment	2	0.596	.554	.020
	educational interventions	2	0.923	.403	.030
Error	number of sessions	59			
	frequency of sessions	59			
	continued/finished	59			
	improvisation	59			
	songs	59			
	receptive techniques	59			
	other media	59			
	verbal discourse	59			
	parent counselling	59			
	psychotherapy	59			
	functional therapy	59			
	medical treatment	59			
	educational interventions	59			
Total	number of sessions	68			
	frequency of sessions	68			
	continued/finished	68			
	improvisation	68			
	songs	68			
	receptive techniques	68			
	other media	68			
	verbal discourse	68			
	parent counselling	68			
	psychotherapy	68			
	functional therapy	68			
	medical treatment	68			
	educational interventions	68			
Corrected Total	number of sessions	67			
	frequency of sessions	67			
	continued/finished	67			
	improvisation	67			
	songs	67			
	receptive techniques	67			
	other media	67			
	verbal discourse	67			
	parent counselling	67			
	psychotherapy	67			
	functional therapy	67			
	medical treatment	67			
	educational interventions	67			

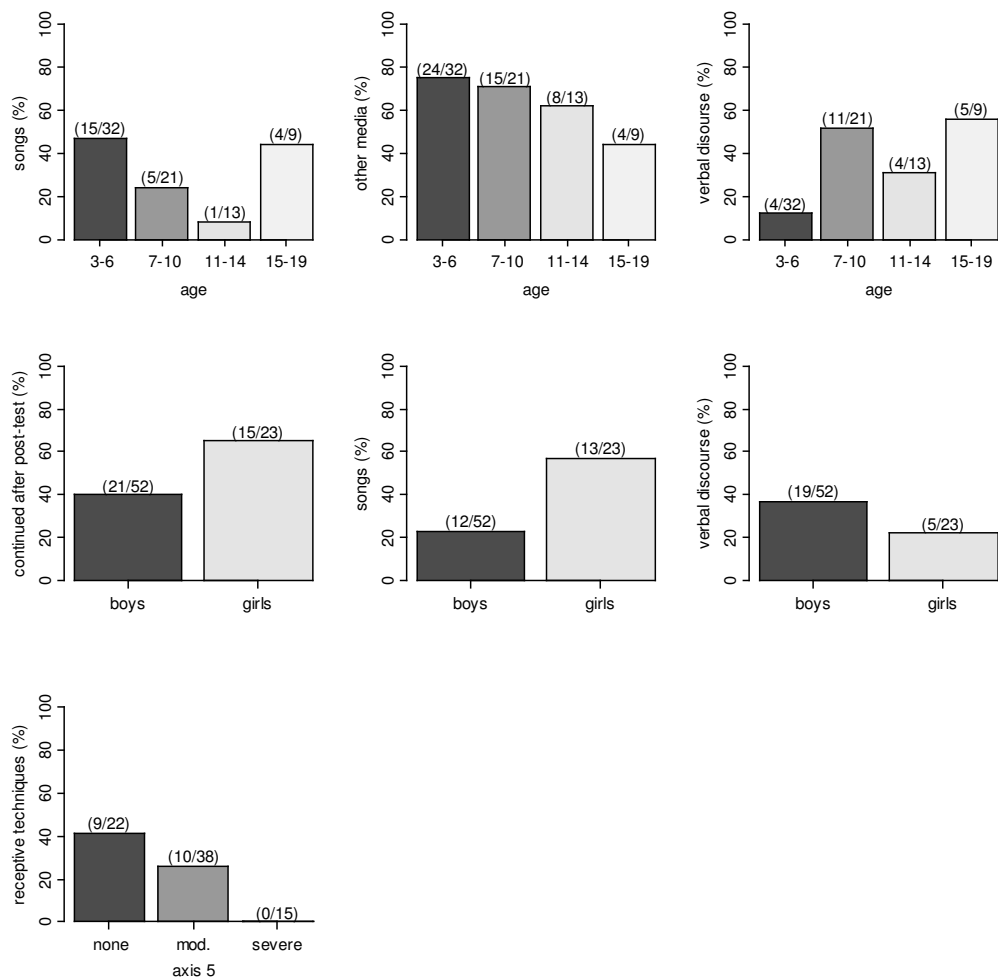
Note. Wilks' Lambda was used in the multivariate analysis.

The results of the ANCOVA displayed in the table above suggest that there were specific relationships between patient characteristics and characteristics of treatment.

Clients' age had a significant influence on the use of songs ($p = .01$), other media ($p = .03$), and verbal discourse ($p = .002$) within music therapy, and on the additional provision of parent counselling ($p = .03$), functional therapy ($p = .04$), and medical treatment ($p = .02$). The gender of clients influenced the continuation of music therapy after post-test ($p = .04$) and the use of songs ($p < .001$) and verbal discourse ($p = .04$) within music therapy.

Primary diagnosis predicted the additional provision of parent counselling ($p = .003$). Axis 5 diagnosis predicted the use of receptive techniques within music therapy ($p < .001$) and the additional provision of other forms of psychotherapy ($p = .007$). The directions of these relationships are displayed in Figures 15 and 16.

Figure 15. Music therapy techniques by patient characteristics

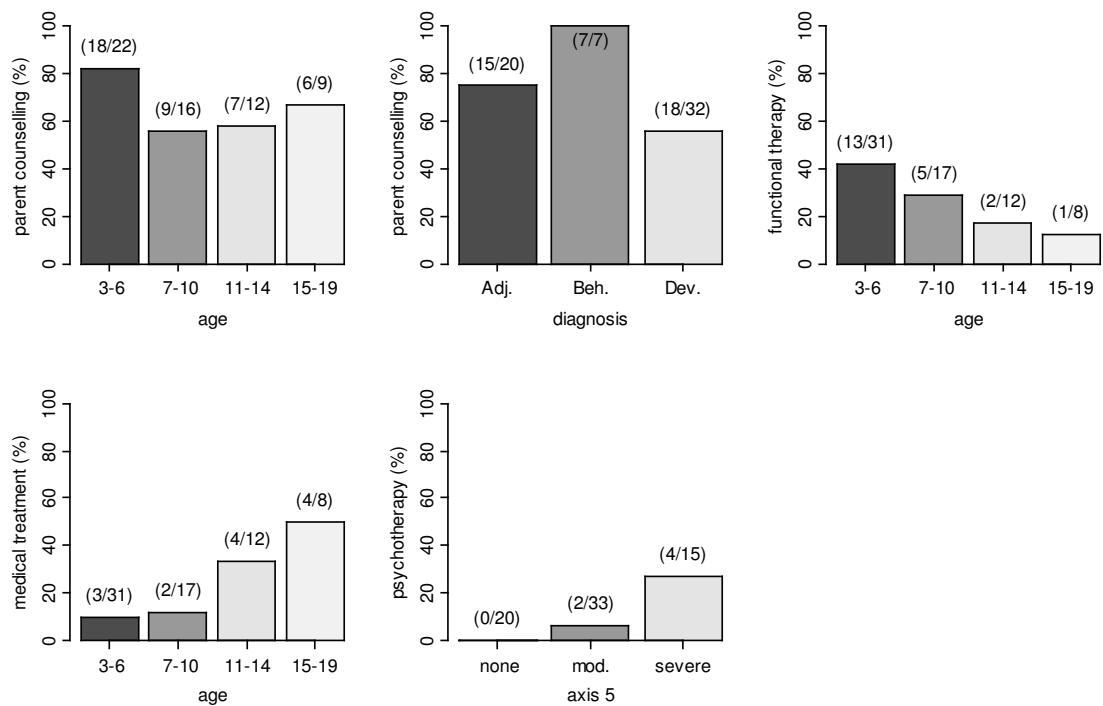


Note. Based on intervention group cases with complete post-test data ($n = 68$).

The graphs in Figure 15 show the following:

- Songs are frequently used with younger children and with adolescents, but rarely with preadolescents (7-14 years), and more often with girls than with boys.
- The use of other media decreases with age.
- The use of verbal discourse increases with age and is more common with boys than with girls.
- Receptive techniques are not used with clients who suffer severely abnormal psychosocial situations.
- Music therapy with girls is more likely to be continued for an extended period than music therapy with boys.

Figure 16. Parent counselling and other treatments by patient characteristics



Note. Based on intervention group cases with complete post-test data ($n = 68$).

Figure 16 shows the following:

- Parent counselling is more often provided for young children than for other the age groups, and more often for children with behavioural disorders than with other disorders.
- The frequency of functional therapy decreases with age.

- The frequency of medical treatment increases with age.
- Additional psychotherapy is usually provided for children in severely abnormal psychosocial situations.

5.1.5 Drop-outs

Post-test assessments included questionnaires completed by parents, questionnaires completed by children (in children who were able to complete a questionnaire), and questionnaires completed by therapists (in the intervention group) or referrers (in the control group). While post-test information from therapists or referrers was available for all cases, questionnaires for parents and children were missing in some cases.

Parent questionnaires were missing in 18 (13%) of all cases (intervention group: 7 cases, 9%, control group: 11 cases, 18%). The reasons for the missing parent questionnaire were:

- The therapist or other professionals in the institution forgot or lost the questionnaire: 6 cases (intervention group: 4, control group: 2)
- Parents refused or forgot repeatedly to complete or send back the questionnaire: 12 cases (intervention group: 3, control group: 9)

From those 78 cases (intervention group: 32, control group: 46; see 3.4.3) where the children were able to complete a self-report questionnaire at pre-test, 12 (15%) of all self-report questionnaires were missing at post-test. The reasons for missing self-report questionnaires were:

- The therapist forgot to give the questionnaire to the child: 2 cases (both intervention group)
- Parents refused or forgot repeatedly to send back the questionnaire: 8 cases (intervention group: 2, control group: 6)
- The child was reportedly not able to complete the questionnaire at post-test: 2 cases (both control group)

5.2 Preparation of the data for statistical analysis

Statistical analyses were undertaken to evaluate the reliability of non-standardised scales, to take into account the influence of missing values, and to look carefully at the distribution of variables. An analysis was also undertaken to look at correlations between outcomes.

5.2.1 Reliability of scales

As noted above (4.4), the scales that were used to assess symptoms, competencies, and quality of life, had known reliability, but this was not the case for the scales that were used for consumer perspectives (parent satisfaction with music therapy and burdens on family and society). Therefore, the reliability (internal consistency) of these scales was analysed on the basis of the sample of this study. The results are shown in Table 30.

Table 30. Internal consistencies of non-standardised scales

Scale/Item	Corrected item-total correlation	Squared multiple correlation	Alpha (if item deleted)
a) Treatment satisfaction (<i>n</i> = 45)			0.89
Item 1	0.59	0.59	0.88
Item 2	0.68	0.63	0.87
Item 3	0.56	0.57	0.88
Item 4	0.76	0.80	0.87
Item 5	0.80	0.85	0.87
Item 6	0.69	0.69	0.87
Item 7	0.46	0.59	0.88
Item 8	0.67	0.54	0.88
Item 9	0.25	0.54	0.90
Item 10	0.75	0.69	0.87
Item 11	0.64	0.60	0.87
Item 12	0.55	0.53	0.88
b) Burdens, pre-test (<i>n</i> = 63)			0.62
Item 1	0.60	0.66	0.52
Item 2	0.59	0.60	0.53
Item 3	0.41	0.60	0.57
Item 4	0.46	0.35	0.56
Item 5	0.32	0.25	0.59
Item 6	0.28	0.23	0.60
Item 7	-0.11	0.23	0.67
Item 8	0.02	0.23	0.66
Item 9	0.41	0.34	0.57
Item 10	0.02	0.14	0.65
c) Burdens, post-test (<i>n</i> = 58)			0.78
Item 1	0.62	0.66	0.73
Item 2	0.72	0.76	0.72
Item 3	0.72	0.78	0.72
Item 4	0.69	0.69	0.72
Item 5	0.20	0.26	0.79
Item 6	0.29	0.28	0.78
Item 7	0.02	0.25	0.80
Item 8	0.29	0.34	0.78
Item 9	0.59	0.45	0.74
Item 10	0.32	0.17	0.77

5.2.1.1 *Parent satisfaction with music therapy*

The responses to the twelve questions on satisfaction with music therapy were analysed based on those 45 cases where all items were available. The mean per item (with item no. 9 reversed, see 4.4.4.1) ranged from 5.87 (item 4) to 8.91 (item 8). The reliability was good (internal consistency: Cronbach's alpha $r_{tt} = .89$). All items were positively correlated with the total scale (Table 30 a). Item no. 9 showed the lowest correlation with the total score, and its deletion would lead to a marginal further increase of the scale's reliability, but all items were included in the scale to keep all information. For the following analyses, the scale was regarded as valid if no more than three items were missing.

5.2.1.2 *Burdens on family and society*

The responses to the ten questions addressing the burdens on family and society at pre-test were analysed based on those 63 cases where all items were available. The mean per item (with items 5, 7, and 8 reversed, see 4.4.4.2) ranged from 1.89 (item 10) to 5.94 (item 9). The reliability (Cronbach's alpha) was $r_{tt} = .62$ (Table 30 b). Item 7 showed a negative correlation with the total scale and was therefore excluded from the scale. Its deletion increased the reliability (Cronbach's alpha) to $r_{tt} = .67$, which was a sufficient level for the purposes of this research. The reliability analysis was repeated on the basis of post-test data, which led to the same conclusions as above (Table 30 c). For the following analyses, the scale was regarded as valid if no more than two items were missing.

5.2.2 **Complete and missing data**

Before undertaking the actual analysis of the results addressing the research questions, the data matrix was prepared and a 'diagnostic' inspection of the data set was performed. This included a verification of the data matrix that was obtained, and especially the examination of any missing values. Table 31 shows frequencies and proportions of cases that had complete data, missing items within completed questionnaires (i.e. enough missing items to invalidate the measure), or that were drop-outs (i.e. where questionnaires were missing as a whole, as reported in more detail in 5.1.5).

Table 31. Missing data

measure	<i>n</i>	complete	missing items	drop-outs
symptoms ^a	136	114 (84%)	4 (3%)	18 (13%)
symptom change in therapy ^b	75	75 (100%)	0 (0%)	0 (0%)
symptom change daily life ^b	75	72 (96%)	3 (4%)	0 (0%)
competencies ^a	136	109 (80%)	9 (7%)	18 (13%)
resources change in therapy ^b	75	74 (99%)	1 (1%)	0 (0%)
resources change daily life ^b	75	72 (96%)	3 (4%)	0 (0%)
quality of life ^a	136	115 (85%)	3 (2%)	18 (13%)
quality of life ^c	78	63 (81%)	3 (4%)	12 (15%)
quality of life change ^b	75	69 (92%)	6 (8%)	0 (0%)
treatment satisfaction ^d	75	62 (83%)	6 (8%)	7 (9%)
burdens ^d	75	61 (81%)	7 (9%)	7 (9%)

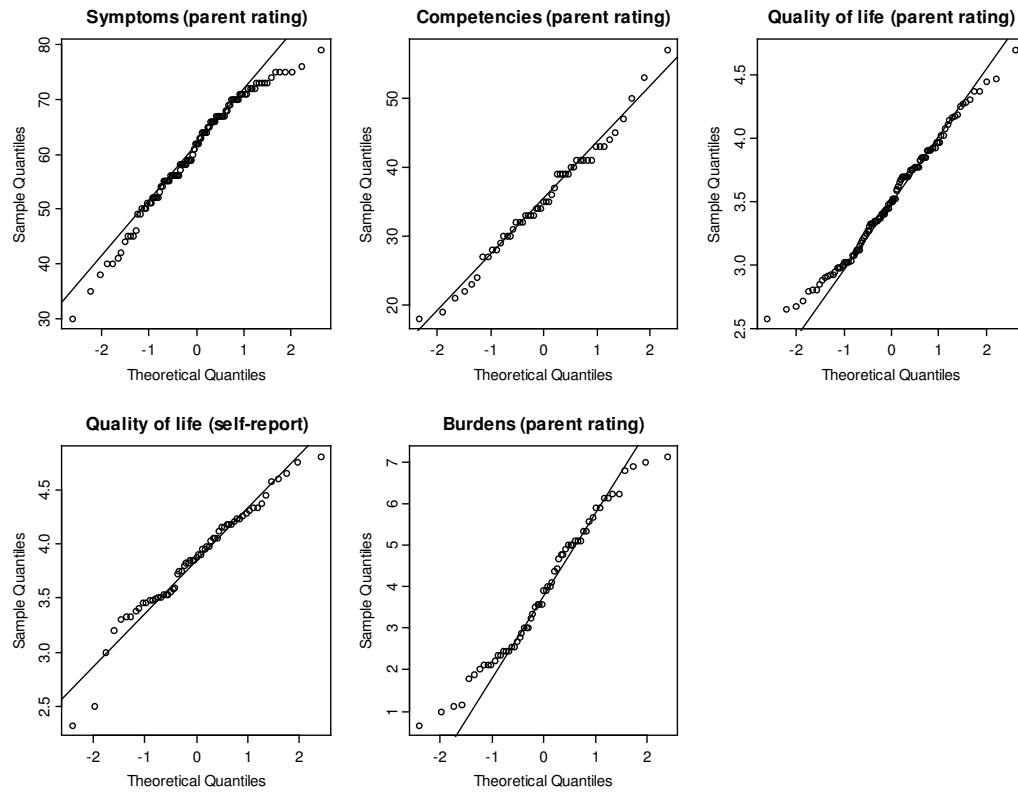
Note. ^a parent rating, used for all cases. ^b therapist rating, used only in the intervention group. ^c self-report, used for subjects who were able to complete questionnaire. ^d parent rating, used only in the intervention group. All frequencies refer to complete sets of data per outcome measure and case (including both pre-test and post-test data, where appropriate).

The proportions of cases with complete data varied from 80% to 85% where the data came from either parents or children, and from 92% to 100% where they came from the therapists.

5.2.3 Distribution of variables

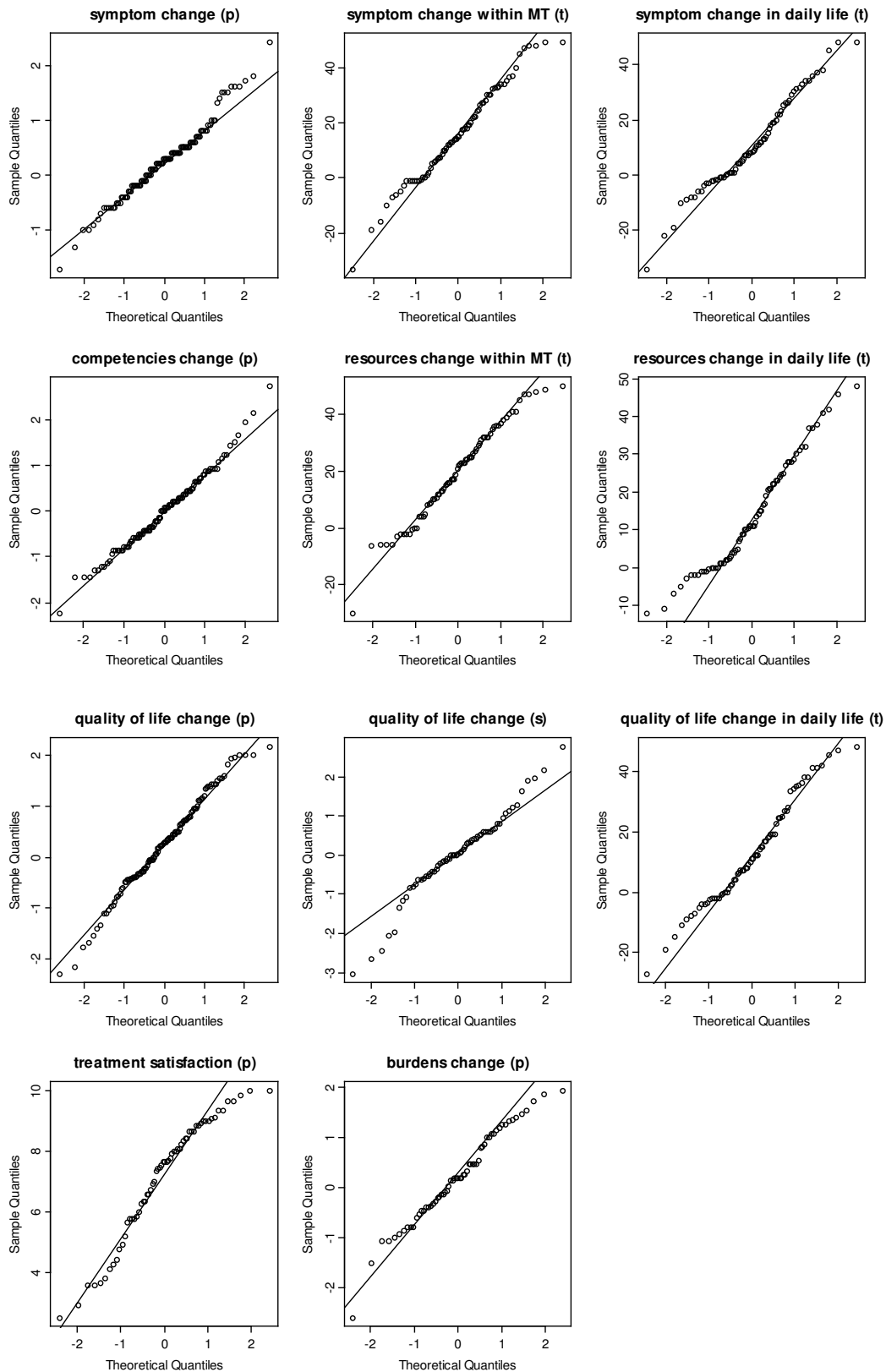
The distributions of outcome variables at pre-test and change scores were examined using qq-plots where the observed distribution of values were plotted against a normal distribution. If the observed distribution follows a normal distribution, the dots in the graph are expected to follow the line. Parametric statistical tests such as the analysis of variance and covariance are based on assumptions of normal distributions. However, the tests have been shown to be robust to violations of these assumptions if sample sizes are sufficiently large (Bortz, 1999, and Venables & Ripley, 2002). The qq-plots were examined to identify deviations from normal distribution and unrealistic outlying values (Figure 17 and 18).

Figure 17. Distribution of pre-test scores



Note. The graphs display the values of outcome variables at pre-test, plotted against the normal distribution.

Figure 18. Distribution of change scores



Note. The graphs display the values of change scores, plotted against the normal distribution. p - parent rating; t - therapist rating; s - self-report.

Inspection of figures 15 and 16 showed that there were slight deviations from normal distributions. However, no extreme outliers were identified. Therefore, no values were excluded, and parametric statistical models were deemed appropriate for the subsequent analyses.

5.2.4 Inter-observer agreement

Table 32 shows the correlations between judgement from different informants for each outcome domain. Change scores (see 4.5.1.4) were used where appropriate.

Table 32. Inter-observer agreement

a) Symptoms			
	parent	therapist: in therapy	therapist: daily life
parent	1.00	.00	.21 (*)
therapist: in therapy		1.00	.59 **
therapist: daily life			1.00

b) Competencies/Resources			
	parent	therapist: in therapy	therapist: daily life
parent	1.00	-.01	.07
therapist: in therapy		1.00	.57 **
therapist: daily life			1.00

c) Quality of Life			
	parent	child	therapist
parent	1.00	.31 *	.05
child		1.00	.33
therapist			1.00

Note. The table displays correlations between ratings of change from different observers. Missing variables were excluded for each comparison separately.

There were strong correlations between ratings by the same person that addressed related outcomes (therapist ratings of symptoms within therapy/in daily life: $r = .59$; therapist ratings of resources within therapy/in daily life: $r = .57$). Child self-reports showed a medium correlation with therapist ratings (quality of life: $r = .33$) and with parent ratings (quality of life: $r = .31$). Correlations between therapist and parent ratings tended to be positive, but were low for all except one comparison where a small

to medium correlation was found (parent ratings of symptoms/therapist ratings of symptoms in daily life: $r = .21$). Parent ratings correlated stronger with therapist ratings of the same outcome in daily life than with therapist ratings of the outcome within therapy.

None of the correlations were large enough to regard any of the outcome measures as redundant. The lowest agreement was found between parents and therapists. Beside subjective bias, there is another plausible explanation for low correlations between observers: Clients' behaviour may depend heavily on the situation in which the behaviour was observed. Specifically, the development of their behaviour within music therapy and in daily life may be two different (but related) outcome domains. Overall, the correlations were within the expected range. The analysis showed that parents, children, and therapists agreed to a certain extent on clients' development.

5.2.5 Agreement between general rating of success and outcome measures

Correlations between this general rating of success and development (as described in section 4.4.5) and the outcome measures are shown in Table 33.

Table 33. Correlation of general rating of success and outcomes

	<i>r</i>	<i>p</i>	<i>n</i>
Symptoms change (parent)	0.140	0.142	112
Competencies change (parent)	0.116	0.234	107
Quality of life change (parent)	0.262	0.005 **	113
Quality of life change (self)	0.180	0.157	63
Burdens change (parent)	0.223	0.084	61
Symptoms change in MT (therapist)	0.684	0.000 **	75
Symptoms change daily life (therapist)	0.454	0.000 **	72
Resources change in MT (therapist)	0.684	0.000 **	74
Resources change daily life (therapist)	0.556	0.000 **	72
Quality of life (therapist)	0.484	0.000 **	69

All outcomes tended to be positively correlated with the general rating of success and development. The correlations with quality of life parent rating ($p = .005$) and with all therapist ratings (all $p < .001$) were highly significant.

5.3 Overall effects of music therapy

The results documented in this section come from the analysis of variance that was undertaken to look at the overall effect of music therapy on all subjects. Following this, effect sizes with confidence intervals were calculated and overall effects based on change ratings by therapists are presented.

5.3.1 Overall effects: ANOVA

Four separate repeated measures analyses of variance (ANOVAs) were performed to address the question whether development over time, membership in intervention or control group, or the interaction of both factors (the treatment effect) accounted for any differences in outcomes. A multivariate test was not used as this would have resulted in the exclusion of all subjects where at least one of the outcome variables was missing. The results of the ANOVAs are shown in Table 34.

Table 34. Overall effects of music therapy

Effect		<i>F</i>	<i>df</i>	<i>p</i>	η^2
<i>CBCL Symptoms (parent rating)</i>					
between subjects	intercept	3981.900	1, 112	.000**	.973
	group ^a	4.442	1, 112	.037*	.038
within subjects	time ^b	13.522	1, 112	.000**	.108
	time x group	0.597	1, 112	.442	.005
<i>CBCL Competencies (parent rating)</i>					
between subjects	intercept	4241.431	1, 107	.000**	.975
	group ^a	13.532	1, 107	.000**	.112
within subjects	time ^b	0.001	1, 107	.977	.000
	time x group	0.020	1, 107	.887	.000
<i>KINDL Quality of Life (parent rating)</i>					
between subjects	intercept	7818.915	1, 113	.000**	.986
	group ^a	3.612	1, 113	.060	.031
within subjects	time ^b	6.810	1, 113	.010*	.057
	time x group	2.857	1, 113	.094	.025
<i>KINDL Quality of Life (child self-report)</i>					
between subjects	intercept	5252.540	1, 61	.000**	.989
	group ^a	1.686	1, 61	.199	.027
within subjects	time ^b	0.270	1, 61	.605	.004
	time x group	2.593	1, 61	.112	.041

Note. The table shows the results of four independent univariate repeated measures analyses of variance. Missing values were excluded for each analysis separately. *df* - displayed as: numerator *df*, denominator *df*. ^a Intervention group vs. control group. ^b pre-test vs. post-test.

Table 34 shows that existing differences between the two groups accounted for differences in symptoms (parent rating, $p = .04$) and competencies (parent rating, $p < .001$). There were changes over time in symptoms (parent rating, $p < .001$) and quality of life (parent rating, $p = .01$). Interactions between group membership and development over time, which would be indicative of a treatment effect, were not significant. They accounted for a small to medium proportion of the variation in quality of life self-reports (4.1%) and parent reports (2.5%), but for less than 1% of the variation in symptoms and competencies (see Table 5). By contrast, differences between groups accounted for 11.2% of the variation in competencies, and for 2.7% to 3.8% of the variation in the other outcome variables. Changes over time alone accounted for

150

10.8% of the variation in symptoms, and for smaller proportions of the variation in the quality of life measures.

5.3.2 Development within groups

Table 35 shows means and standard deviations of all outcome variables and includes effect sizes and inferential statistics of the developments within groups for those variables that involved a pre-test and a post-test.

Table 35. Overall effects of music therapy: Development over time

Measure	Group	<i>n</i>	<i>M</i> _{pre}	<i>SD</i> _{pre}	<i>M</i> _{post}	<i>SD</i> _{post}	<i>d</i>	<i>p</i>	<i>p</i> _{corr}
<i>Symptoms</i>									
parent: total ^a	intervention	68	62.35	10.09	59.46	11.48	0.29	.000 **	.000 **
parent: total ^a	control	46	57.91	9.58	56.02	9.73	0.20	.093 (*)	1.000
therapist: in therapy ^b	intervention	75			15.87	17.22		.000 **	.000 **
therapist: daily life ^b	intervention	72			8.55	20.20		.000 **	.000 **
<i>Competencies</i>									
parent ^a	intervention	62	36.39	6.80	36.48	6.63	0.01	.884	1.000
parent ^a	control	47	40.83	7.15	40.77	6.60	-0.01	.947	1.000
therapist: in therapy ^b	intervention	74			18.77	18.36		.000 **	.000 **
therapist: daily life ^b	intervention	72			11.21	18.91		.000 **	.000 **
<i>Quality of Life</i>									
parent ^a	intervention	66	3.43	0.44	3.59	0.48	0.36	.001 **	.014 *
parent ^a	control	49	3.65	0.48	3.68	0.53	0.06	.577	1.000
child ^a	intervention	25	3.70	0.37	3.84	0.45	0.38	.098 (*)	1.000
child ^a	control	38	3.95	0.52	3.88	0.52	-0.13	.441	1.000
therapist ^b	intervention	69			7.73	23.74		.000 **	.000 **
<i>Consumer perspectives</i>									
burdens ^a	intervention	61	3.89	1.68	3.54	1.82	0.21	.071 (*)	.994
treatment satisfaction	intervention	62			7.14	1.96			

Note. Headings: *d* - Effect size, standardised by the separate pre-test *SD*s per group (positive effect sizes indicate improvement over time). *p* - Two-sided probability level (using paired samples t-test). *p*_{corr} - Conservative probability level with Bonferroni correction for multiple tests. ^a Test hypothesis: $\mu_{(post - pre)} = 0$. ^b Test hypothesis: $\mu_{post} = 0$.

Table 35 shows that statistically significant improvement over time was reported for the intervention group on a number of variables. Parent ratings of symptoms decreased significantly in the intervention group ($p < .001$), but not in the control group.

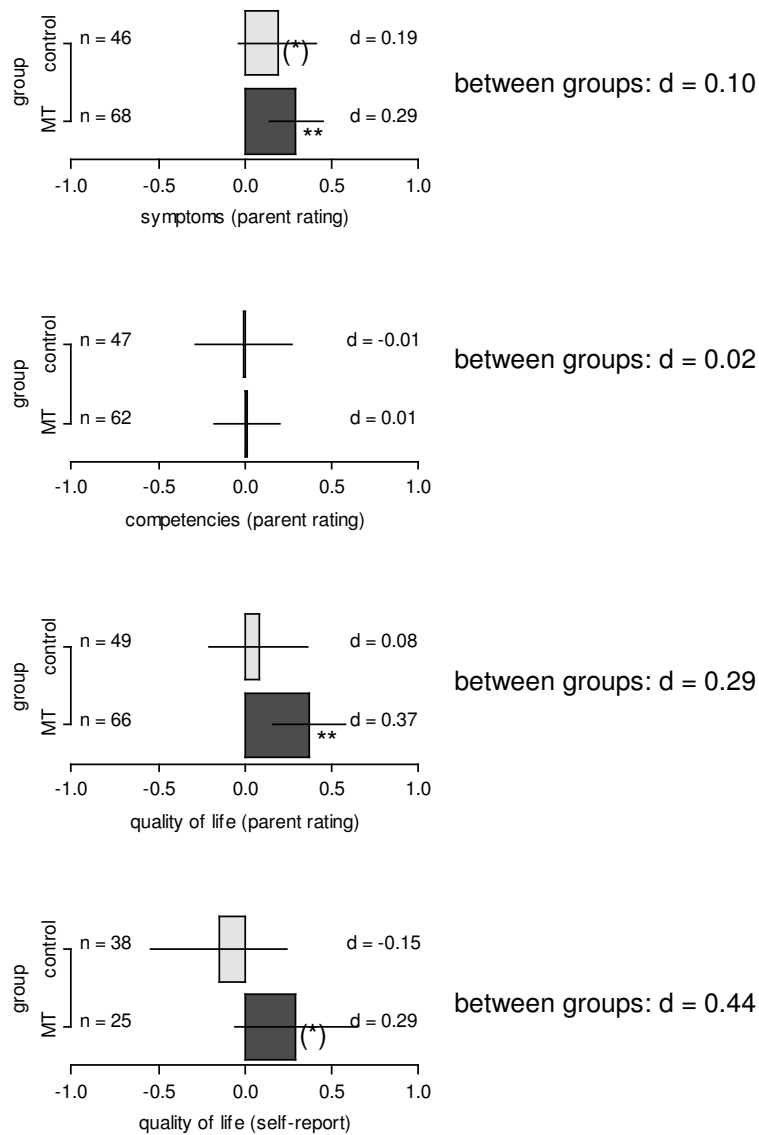
Parent ratings of quality of life also showed a significant improvement in the intervention group ($p = .001$), while changes in the control group were not significant. No significant changes in either group were identified in parent ratings of competencies and in self-reports of quality of life. When the pre-test means of the four main outcome measures were compared between groups, this showed that the intervention group tended to be worse than the control group. The intervention group had higher symptoms ($M = 62.4$ vs. 57.9) and lower competencies ($M = 36.4$ vs. 40.8) and quality of life (parent rating: $M = 3.43$ vs. 3.65 , self-report: $M = 3.70$ vs. 3.95) than the control group.

In the outcomes that were only used in the intervention group, changes in parent ratings of burdens were not significant, while retrospective ratings of therapists were significant (all $p < .001$).

5.3.3 Descriptive analysis: Effect sizes and change ratings

Figure 19 shows the effect sizes of developments over time in intervention group and control group.

Figure 19. Overall effects: Effect sizes of parent ratings and self-reports

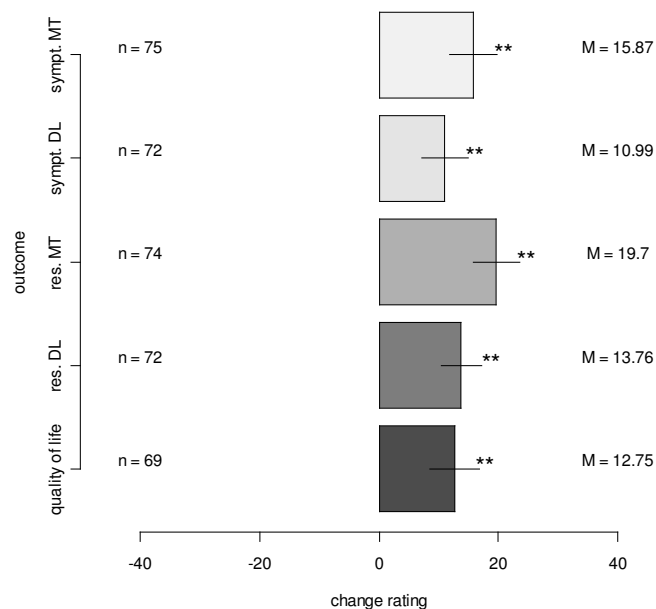


Note. The figure displays effect sizes (standardised change scores) with 95% confidence intervals. Positive effect sizes indicate improvement.

Figure 19 shows that effects tended to be greater in the intervention group than in the control group. Changes in symptoms showed a small to medium effect size ($d = 0.29$, $p < .01$) in the intervention group and a small effect size ($d = 0.19$, n.s.) in the control group. The difference between changes within groups showed a very small effect size ($d = 0.10$). Changes in competencies in the intervention group ($d = 0.01$, n.s.) and in the control group ($d = -0.01$, n.s.), as well as the difference between the groups ($d = 0.02$), were close to zero.

Changes in quality of life (parent reports) showed a small to medium effect size in the intervention group ($d = 0.37, p < .01$) and a very small effect size in the control group ($d = 0.08, n.s.$). The difference between the groups showed a small to medium effect size ($d = 0.29$). Self-reports of quality of life showed a small to medium effect size in the intervention group ($d = 0.29, n.s.$) and a small negative effect size in the control group ($d = -0.15, n.s.$). The difference between groups reached almost a medium effect size ($d = 0.44$). Figure 20 shows the average change ratings of therapists (intervention group only).

Figure 20. Overall effects: Change ratings by therapists



Note. The figure displays retrospective VAS change scores with 95% confidence intervals. Positive scores indicate improvement.

Figure 20 shows that therapists reported a significant improvement of their clients in all outcome domains. They reported greater improvement for behaviours within music therapy than in the clients' daily life. The greatest improvement was reported for resources within music therapy. These measures were only used for the intervention group. They may be biased because of the retrospective judgement.

5.3.4 Sensitivity analysis

5.3.4.1 *Exclusion of subjects who received other psychotherapy*

Although the included subjects were not to receive other psychotherapeutic interventions during the assessment period, for some subjects it was reported at post-test that they had received such treatment. The analysis above was carried out on an intention to treat basis, but the results may be biased by treatment contamination. Therefore the ANOVAs and the descriptive analyses were repeated with these participants excluded. The complete results are shown in the appendix (section 9.5.1.1).

The analysis showed similar results to the analysis presented above. Interactions between treatment condition and development over time were not significant in predicting outcomes (Table 49). Effect sizes tended to be greater in the intervention group than in the control group and showed a significant improvement in two outcomes for the intervention group (Figure 32). Therefore the results did not appear to be substantially influenced by any additional psychotherapy the clients received.

5.3.4.2 *Exclusion of control group subjects not referred to music therapy*

A second issue to be tested in a sensitivity analysis was the inclusion of subjects in the control group who were recommended to have music therapy, but were not yet referred and did not wait for therapy. The ANOVAs and the descriptive analyses were repeated with these participants excluded. The complete results are shown in the appendix (section 9.5.1.2).

The exclusion of the non-referred subjects in the control group did not alter the results substantially. No interactions between group and time were significant (Table 50). Effect sizes tended to be greater in the intervention group than in the control group (Figure 33). However, from the sample sizes displayed in the figure, it can be seen that the remaining control group was very small (between 7 and 13 subjects) when the non-referred subjects were excluded. Therefore the confidence intervals were very wide, and statistical test power was low. Furthermore, the drop-out rate for this part of the control group was very high (32% or 6 of 19 subjects), which may have distorted the results.

5.3.4.3 *Controlling for the influence of other treatments and type of control group*

The last sensitivity analysis of the overall results addressed the question whether the provision of other treatments (psychotherapy, functional therapy, medical treatment,

educational interventions), parent counselling, and type of control group had an influence on the overall results. Separate ANCOVAs were used for the change scores of each outcome, testing for individual effects and controlling for the influence of pre-test levels. The complete results are shown in the appendix (section 9.5.1.3, Table 51).

Psychotherapy and parent counselling influenced quality of life (parent rating) significantly. The effect of the factor that specified the group (treatment vs. waiting list vs. non-referred) was not significant.

5.4 Effects of music therapy for specific groups of clients

The second set of questions for this study addressed the influence of client characteristics, including primary diagnosis, axis 4 and 5 diagnoses, age, and gender, on the effectiveness of music therapy.

5.4.1 Music therapy versus control condition

Separate ANCOVAs for each outcome variable were used to address these questions. (A multivariate test was not used as this would have resulted in the exclusion of all subjects where at least one of the outcome variables was missing.) Main effects and interactions of each patient factor with the factor "group" were included in the analysis. The results are shown in Table 36.

Table 36. Effects of music therapy by patient characteristics

a) Dependent Variable: Symptoms change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	22	1.558	0.075	0.274
Intercept	1	2.873	0.093	0.031
symptoms pre-test (parent)	1	4.316	0.041 *	0.045
group	1	0.172	0.679	0.002
age (factor)	3	1.939	0.129	0.060
gender	1	1.891	0.172	0.020
diagnosis	2	1.877	0.159	0.040
axis 4 (factor)	2	0.534	0.588	0.012
axis 5 (factor)	2	0.649	0.525	0.014
group * age (factor)	3	0.380	0.767	0.012
group * gender	1	1.108	0.295	0.012
group * diagnosis	2	0.071	0.932	0.002
group * axis 4 (factor)	2	5.154	0.008 **	0.102
group * axis 5 (factor)	2	0.193	0.825	0.004
Error	91			
Total	114			
Corrected Total	113			

b) Dependent Variable: Competencies change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	22	2.514	0.001 **	0.391
Intercept	1	24.776	0.000 **	0.224
competencies pre-test (parent)	1	30.216	0.000 **	0.260
group	1	0.268	0.606	0.003
age (factor)	3	1.605	0.194	0.053
gender	1	1.603	0.209	0.018
diagnosis	2	0.753	0.474	0.017
axis 4 (factor)	2	1.003	0.371	0.023
axis 5 (factor)	2	0.289	0.750	0.007
group * age (factor)	3	2.261	0.087	0.073
group * gender	1	1.942	0.167	0.022
group * diagnosis	2	1.364	0.261	0.031
group * axis 4 (factor)	2	1.788	0.173	0.040
group * axis 5 (factor)	2	0.878	0.420	0.020
Error	86			
Total	109			
Corrected Total	108			

c) Dependent Variable: Quality of life change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	22	1.774	0.031 *	0.298
Intercept	1	18.462	0.000 **	0.167
quality of life pre-test (parent)	1	15.315	0.000 **	0.143
group	1	0.768	0.383	0.008
age (factor)	3	0.688	0.562	0.022
gender	1	0.087	0.769	0.001
diagnosis	2	0.238	0.789	0.005
axis 4 (factor)	2	1.693	0.190	0.036
axis 5 (factor)	2	0.525	0.593	0.011
group * age (factor)	3	0.300	0.825	0.010
group * gender	1	0.204	0.653	0.002
group * diagnosis	2	2.014	0.139	0.042
group * axis 4 (factor)	2	1.934	0.150	0.040
group * axis 5 (factor)	2	2.259	0.110	0.047
Error	92			
Total	115			
Corrected Total	114			

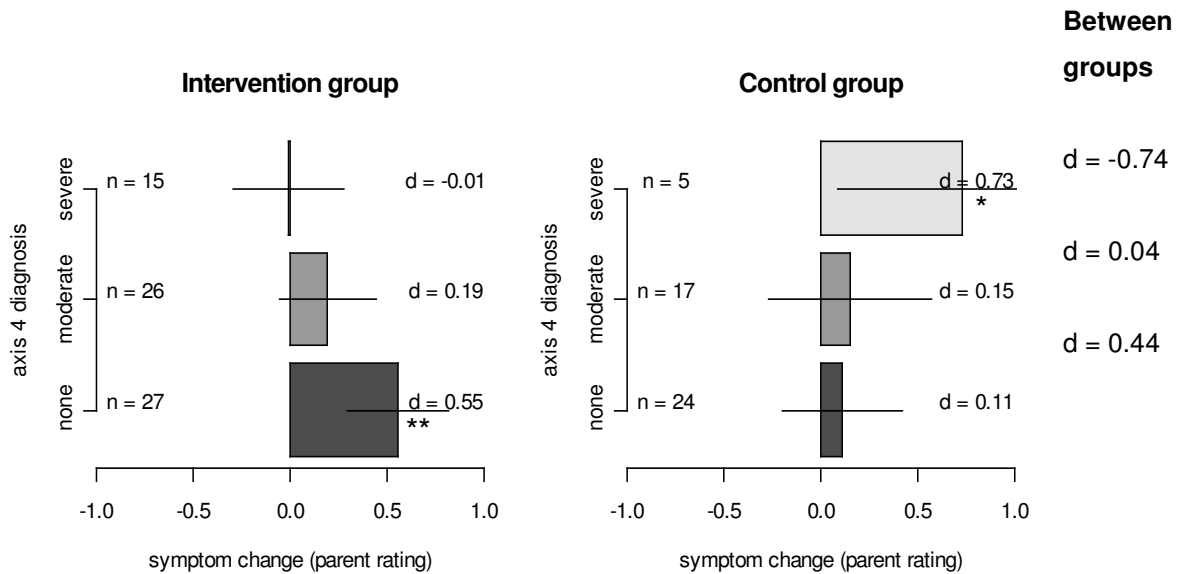
d) Dependent Variable: Quality of life change (self)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	22	1.174	0.322	0.392
Intercept	1	13.015	0.001 **	0.245
quality of life pre-test (self)	1	13.101	0.001 **	0.247
group	1	0.454	0.504	0.011
age (factor)	3	0.403	0.752	0.029
gender	1	0.668	0.419	0.016
diagnosis	2	0.074	0.928	0.004
axis 4 (factor)	2	0.207	0.814	0.010
axis 5 (factor)	2	0.123	0.884	0.006
group * age (factor)	3	0.303	0.823	0.022
group * gender	1	1.251	0.270	0.030
group * diagnosis	2	0.013	0.987	0.001
group * axis 4 (factor)	2	0.562	0.574	0.027
group * axis 5 (factor)	2	0.663	0.521	0.032
Error	40			
Total	63			
Corrected Total	62			

Table 36 shows that there was a significant interaction of group and axis 4 diagnosis for the outcome symptoms (parent rating, $p = .008$). Therefore, the effects of music therapy appeared to be different for clients with different levels of axis 4 diagnosis. No significant main effects of patient variables were identified. Therefore there was no evidence from this analysis that the development over time (regardless of

treatment) depended on patient characteristics. The interaction of group and axis 4 diagnosis in predicting symptom change is shown in Figure 21.

Figure 21. Effects on psychiatric symptoms by axis 4 diagnosis



Note. The figure displays effect sizes (standardised change scores) with 95% confidence intervals. Positive effect sizes indicate improvement.

Figure 21 shows that the level of psychiatric symptoms in children in the intervention group who had no somatic disorder improved significantly and by a medium to large effect size ($d = 0.55$, $p < .01$). The improvement of patients in the intervention group decreased with the severity of their axis 4 comorbidity, so that those with severe somatic problems did not improve over time ($d = -0.01$, n.s.). The opposite was true in the control group where children with severe somatic problems improved significantly and by a medium to large effect size ($d = 0.73$, $p < .05$), while those without a somatic comorbidity did not improve ($d = 0.11$, n.s.). The comparison between groups showed a positive effect of music therapy of almost a medium size in patients without axis 4 diagnosis ($d = 0.44$) and a negative effect of almost a large size in patients with severe somatic problems ($d = -0.74$).

5.4.2 Development over time in music therapy clients

The analysis above addressed the effects of music therapy as compared to the control condition, using only the variables that were available for both groups. For the variables that were only available for the intervention group, the analyses presented in this section addressed the question how the development of specific client groups in music therapy differed. Table 37 shows the results.

Table 37. Development over time in music therapy by patient characteristics

a) Dependent Variable: Burdens change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	11	3.782	0.001 **	0.459
Intercept	1	11.210	0.002 **	0.186
burdens pre-test (parent)	1	14.249	0.000 **	0.225
age (factor)	3	5.812	0.002 **	0.262
gender	1	0.183	0.670	0.004
diagnosis	2	4.175	0.021 *	0.146
axis 4 (factor)	2	0.974	0.385	0.038
axis 5 (factor)	2	0.515	0.601	0.021
Error	49			
Total	61			
Corrected Total	60			

b) Dependent Variable: Symptoms change in MT (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	10	1.384	0.208	0.178
Intercept	1	20.704	0.000 **	0.244
age (factor)	3	3.204	0.029 *	0.131
gender	1	0.713	0.402	0.011
diagnosis	2	0.370	0.692	0.011
axis 4 (factor)	2	2.101	0.131	0.062
axis 5 (factor)	2	0.469	0.628	0.014
Error	64			
Total	75			
Corrected Total	74			

c) Dependent Variable: Symptoms change daily life (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	10	1.318	0.242	0.178
Intercept	1	9.120	0.004 **	0.130
age (factor)	3	3.126	0.032 *	0.133
gender	1	0.898	0.347	0.015
diagnosis	2	1.431	0.247	0.045
axis 4 (factor)	2	0.063	0.939	0.002
axis 5 (factor)	2	0.155	0.857	0.005
Error	61			
Total	72			
Corrected Total	71			

d) Dependent Variable: Resources change in MT (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	10	0.781	0.647	0.110
Intercept	1	52.443	0.000 **	0.454
age (factor)	3	0.857	0.468	0.039
gender	1	1.201	0.277	0.019
diagnosis	2	0.209	0.812	0.007
axis 4 (factor)	2	1.243	0.295	0.038
axis 5 (factor)	2	0.247	0.782	0.008
Error	63			
Total	74			
Corrected Total	73			

e) Dependent Variable: Resources change daily life (therapist)

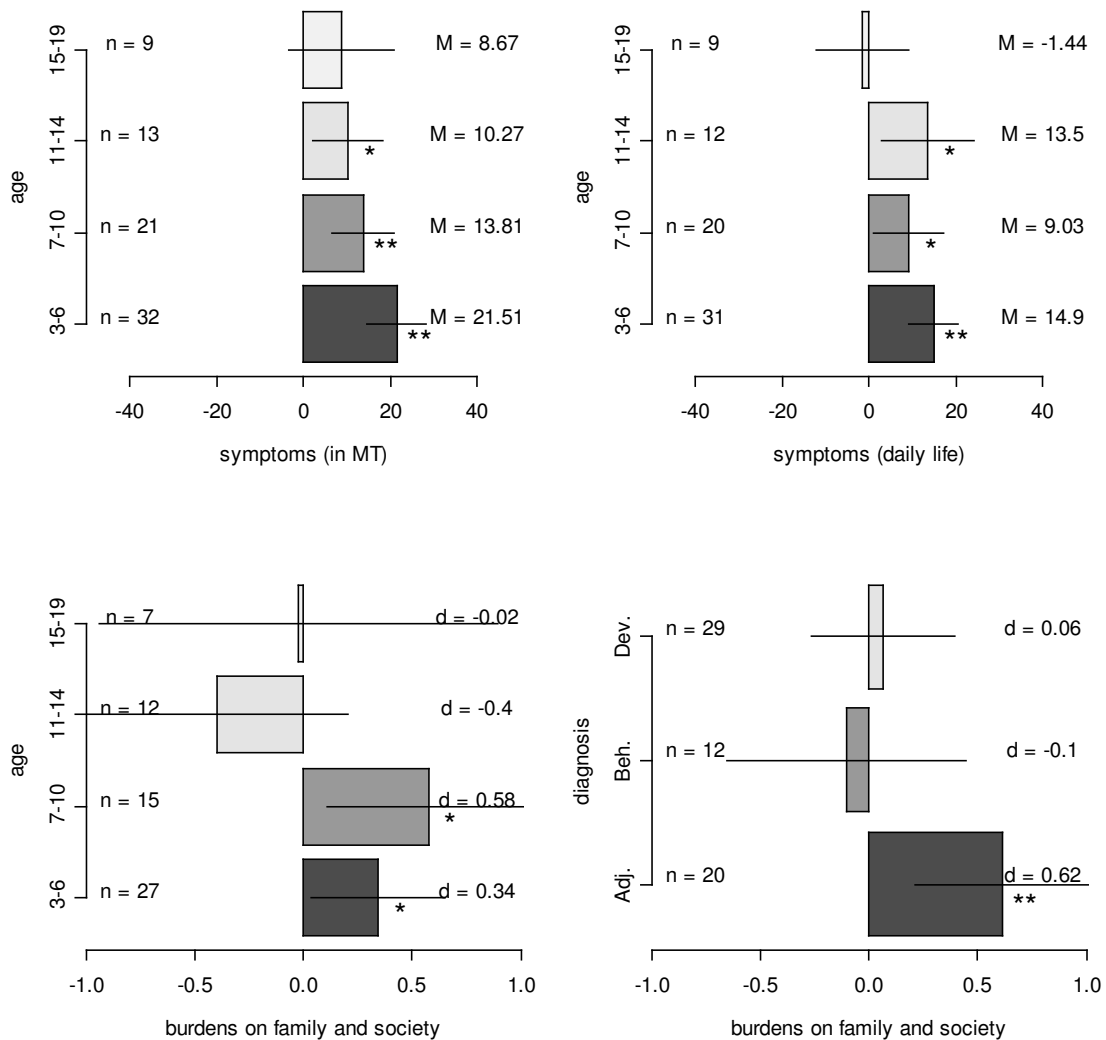
Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	10	1.100	0.376	0.153
Intercept	1	23.917	0.000 **	0.282
age (factor)	3	2.331	0.083	0.103
gender	1	0.224	0.638	0.004
diagnosis	2	1.130	0.330	0.036
axis 4 (factor)	2	0.166	0.847	0.005
axis 5 (factor)	2	0.555	0.577	0.018
Error	61			
Total	72			
Corrected Total	71			

f) Dependent Variable: Quality of life (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	10	0.539	0.856	0.085
Intercept	1	16.414	0.000 **	0.221
age (factor)	3	1.329	0.274	0.064
gender	1	0.018	0.892	0.000
diagnosis	2	0.053	0.948	0.002
axis 4 (factor)	2	0.191	0.826	0.007
axis 5 (factor)	2	0.116	0.890	0.004
Error	58			
Total	69			
Corrected Total	68			

The analysis in Table 37 shows several predictors of clients' development over time: Age and diagnoses predicted changes in burdens ($p = .002$ and $p = .02$, respectively). Age also predicted changes of symptoms within music therapy ($p = .03$) and in daily life ($p = .03$). The way in which these variables influenced the outcomes is shown in Figure 22.

Figure 22. Development over time in music therapy by patient characteristics



Note. The figure displays effect sizes and VAS change scores with 95% confidence intervals. Positive scores indicate improvement.

The first three graphs of Figure 22 show that younger children who receive music therapy tend to improve more than adolescents. There was significant improvement in symptoms within music therapy and in daily life for clients between 3 and 14 years of age, but not for clients of 15 years and above. Burdens on family and society improved significantly for children between three and ten years of age, but tended to increase for clients between 11 and 14 years. The fourth graph of the figure shows that burdens on family and society decreased significantly for clients with

adjustment and emotional disorders while remaining stable in clients with other diagnoses.

5.4.3 Sensitivity analysis

The analyses in this section were based on broad, composite groups of diagnoses which may not reflect differences in the primary diagnoses adequately. Therefore the analyses were repeated with the original groups of diagnoses. This resulted in four different groups of primary diagnoses. Three subjects of the intervention group who had other diagnoses that were not matched in the control group were excluded from the analysis (see Appendix 9.5.2). The results of this sensitivity analysis were the same for the effects of music therapy versus control condition (section 9.5.2.1, Table 52). However, for development over time (section 9.5.2.2, Table 53), only age predicted changes in burdens significantly, while the influence of age on changes in symptoms within music therapy and in daily life, and the influence of diagnosis on changes in burdens, did not remain significant.

5.5 Effects of different kinds of music therapy

The following analyses addressed specific aspects of the contents of music therapy, and therefore compared subsets of the intervention group with each other. The participants of the control group were therefore excluded for these analyses. Therefore, all outcome variables could be used. Again, each outcome was addressed separately as a multivariate test would have excluded all subjects where at least one of the outcome variables was missing.

5.5.1 Influence of therapy characteristics: ANCOVA/ANOVA

The analyses above suggested that the contents of specific music therapy are influenced by patient characteristics (see section 5.1.4), and that the outcome of music therapy is also influenced by patient characteristics (see section 5.4). Therefore, patient characteristics were taken into account in the following analyses.

The characteristics of music therapy included in the analysis were:

- three variables of the extent of music therapy (number and frequency of sessions, status at post-test),

- five variables of music therapy techniques (frequent use of improvisation, songs, receptive techniques, other media, verbal discourse),
- one variable of parent counselling,
- four variables of the music therapist (gender, experience, clinical supervision, additional psychotherapy training),
- and one interaction of variables (gender therapist x gender client).

The results of the analysis are shown in Table 38.

Table 38. Effects of music therapy by therapy characteristics

a) Dependent Variable: Symptoms change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	21	1.374	0.182	0.386
Intercept	1	0.143	0.707	0.003
symptoms pre-test (parent)	1	0.222	0.640	0.005
age	1	0.307	0.582	0.007
gender	1	0.916	0.343	0.020
diagnosis	2	2.449	0.098	0.096
axis 4	1	6.210	0.016 *	0.119
axis 5	1	1.425	0.239	0.030
number of sessions	1	1.294	0.261	0.027
frequency of sessions	1	1.174	0.284	0.025
status at post-test	1	0.082	0.776	0.002
improvisation	1	0.524	0.473	0.011
songs	1	0.778	0.382	0.017
receptive techniques	1	0.451	0.505	0.010
other media	1	8.813	0.005 **	0.161
verbal discourse	1	1.826	0.183	0.038
parent counselling	1	1.896	0.175	0.040
therapist gender	1	1.439	0.236	0.030
therapist experience	1	0.378	0.542	0.008
therapist supervision	1	0.065	0.800	0.001
therapist training	1	0.149	0.701	0.003
gender * therapist gender	1	0.303	0.585	0.007
Error	46			
Total	68			
Corrected Total	67			

b) Dependent Variable: Competencies change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	21	1.402	0.176	0.424
Intercept	1	9.987	0.003 **	0.200
competencies pre-test (parent)	1	14.903	0.000 **	0.271
age	1	3.596	0.065	0.082
gender	1	1.161	0.288	0.028
diagnosis	2	0.571	0.570	0.028
axis 4	1	3.538	0.067	0.081
axis 5	1	2.007	0.164	0.048
number of sessions	1	1.931	0.172	0.046
frequency of sessions	1	0.400	0.531	0.010
status at post-test	1	0.663	0.420	0.016
improvisation	1	0.312	0.580	0.008
songs	1	1.291	0.263	0.031
receptive techniques	1	0.601	0.443	0.015
other media	1	0.020	0.889	0.000
verbal discourse	1	0.945	0.337	0.023
parent counselling	1	0.306	0.583	0.008
therapist gender	1	0.149	0.701	0.004
therapist experience	1	0.264	0.611	0.007
therapist supervision	1	0.101	0.752	0.003
therapist training	1	0.072	0.790	0.002
gender * therapist gender	1	0.287	0.595	0.007
Error	40			
Total	62			
Corrected Total	61			

c) Dependent Variable: Quality of life change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	21	1.334	0.206	0.389
Intercept	1	8.348	0.006 **	0.159
quality of life pre-test (parent)	1	8.402	0.006 **	0.160
age	1	0.958	0.333	0.021
gender	1	0.052	0.820	0.001
diagnosis	2	1.171	0.320	0.051
axis 4	1	3.911	0.054	0.082
axis 5	1	3.299	0.076	0.070
number of sessions	1	0.208	0.651	0.005
frequency of sessions	1	0.109	0.743	0.002
status at post-test	1	0.329	0.569	0.007
improvisation	1	1.995	0.165	0.043
songs	1	0.008	0.929	0.000
receptive techniques	1	0.420	0.520	0.009
other media	1	0.972	0.330	0.022
verbal discourse	1	0.097	0.757	0.002
parent counselling	1	0.981	0.327	0.022
therapist gender	1	0.036	0.850	0.001
therapist experience	1	0.342	0.562	0.008
therapist supervision	1	0.026	0.874	0.001
therapist training	1	1.006	0.321	0.022
gender * therapist gender	1	0.175	0.678	0.004
Error	44			
Total	66			
Corrected Total	65			

d) Dependent Variable: Quality of life change (self)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	21	0.237	0.983	0.623
Intercept	1	0.039	0.855	0.013
quality of life pre-test (self)	1	0.186	0.695	0.059
age	1	0.000	0.990	0.000
gender	1	0.068	0.812	0.022
diagnosis	2	0.035	0.966	0.023
axis 4	1	0.187	0.695	0.059
axis 5	1	0.181	0.699	0.057
number of sessions	1	0.539	0.516	0.152
frequency of sessions	1	0.555	0.510	0.156
status at post-test	1	0.624	0.487	0.172
improvisation	1	0.049	0.839	0.016
songs	1	0.173	0.705	0.055
receptive techniques	1	0.259	0.646	0.079
other media	1	0.067	0.812	0.022
verbal discourse	1	0.055	0.830	0.018
parent counselling	1	0.041	0.853	0.013
therapist gender	1	0.506	0.528	0.144
therapist experience	1	0.393	0.575	0.116
therapist supervision	1	0.337	0.602	0.101
therapist training	1	0.335	0.603	0.101
gender * therapist gender	1	0.012	0.920	0.004
Error	3			
Total	25			
Corrected Total	24			

e) Dependent Variable: Burdens change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	21	2.105	0.022 *	0.531
Intercept	1	1.206	0.279	0.030
burdens pre-test (parent)	1	9.544	0.004 **	0.197
age	1	10.805	0.002 **	0.217
gender	1	1.458	0.235	0.036
diagnosis	2	4.270	0.021 *	0.180
axis 4	1	0.387	0.538	0.010
axis 5	1	0.010	0.921	0.000
number of sessions	1	0.696	0.409	0.018
frequency of sessions	1	2.385	0.131	0.058
status at post-test	1	1.083	0.305	0.027
improvisation	1	0.036	0.851	0.001
songs	1	0.082	0.776	0.002
receptive techniques	1	0.077	0.782	0.002
other media	1	4.175	0.048 *	0.097
verbal discourse	1	3.354	0.075	0.079
parent counselling	1	0.021	0.886	0.001
therapist gender	1	1.192	0.282	0.030
therapist experience	1	0.062	0.804	0.002
therapist supervision	1	0.091	0.764	0.002
therapist training	1	0.111	0.741	0.003
gender * therapist gender	1	1.288	0.263	0.032
Error	39			
Total	61			
Corrected Total	60			

f) Dependent Variable: Symptoms change in MT (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	20	2.426	0.005 **	0.473
Intercept	1	1.041	0.312	0.019
age	1	10.761	0.002 **	0.166
gender	1	0.073	0.788	0.001
diagnosis	2	5.839	0.005 **	0.178
axis 4	1	3.548	0.065	0.062
axis 5	1	0.493	0.486	0.009
number of sessions	1	5.494	0.023 *	0.092
frequency of sessions	1	0.553	0.460	0.010
status at post-test	1	0.107	0.744	0.002
improvisation	1	0.019	0.890	0.000
songs	1	2.091	0.154	0.037
receptive techniques	1	0.397	0.532	0.007
other media	1	0.075	0.785	0.001
verbal discourse	1	7.224	0.010 **	0.118
parent counselling	1	2.095	0.154	0.037
therapist gender	1	0.873	0.354	0.016
therapist experience	1	4.663	0.035 *	0.079
therapist supervision	1	0.051	0.822	0.001
therapist training	1	11.069	0.002 **	0.170
gender * therapist gender	1	4.098	0.048 *	0.071
Error	54			
Total	75			
Corrected Total	74			

g) Dependent Variable: Symptoms change daily life (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	20	2.051	0.020 *	0.446
Intercept	1	0.378	0.542	0.007
age	1	7.651	0.008 **	0.130
gender	1	0.888	0.350	0.017
diagnosis	2	2.269	0.114	0.082
axis 4	1	0.345	0.560	0.007
axis 5	1	0.029	0.866	0.001
number of sessions	1	3.054	0.087	0.057
frequency of sessions	1	0.240	0.627	0.005
status at post-test	1	1.187	0.281	0.023
improvisation	1	4.550	0.038 *	0.082
songs	1	0.001	0.978	0.000
receptive techniques	1	0.060	0.807	0.001
other media	1	0.277	0.601	0.005
verbal discourse	1	2.899	0.095	0.054
parent counselling	1	0.208	0.651	0.004
therapist gender	1	0.845	0.362	0.016
therapist experience	1	1.503	0.226	0.029
therapist supervision	1	0.923	0.341	0.018
therapist training	1	1.509	0.225	0.029
gender * therapist gender	1	0.855	0.359	0.016
Error	51			
Total	72			
Corrected Total	71			

h) Dependent Variable: Resources change in MT (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	20	2.096	0.017 *	0.442
Intercept	1	0.721	0.400	0.013
age	1	5.327	0.025 *	0.091
gender	1	0.479	0.492	0.009
diagnosis	2	3.325	0.044 *	0.111
axis 4	1	3.038	0.087	0.054
axis 5	1	0.001	0.981	0.000
number of sessions	1	6.240	0.016 *	0.105
frequency of sessions	1	3.089	0.085	0.055
status at post-test	1	0.001	0.977	0.000
improvisation	1	0.028	0.867	0.001
songs	1	3.036	0.087	0.054
receptive techniques	1	0.374	0.544	0.007
other media	1	0.381	0.540	0.007
verbal discourse	1	4.782	0.033 *	0.083
parent counselling	1	3.690	0.060	0.065
therapist gender	1	0.682	0.413	0.013
therapist experience	1	0.324	0.572	0.006
therapist supervision	1	0.206	0.652	0.004
therapist training	1	5.115	0.028 *	0.088
gender * therapist gender	1	2.331	0.133	0.042
Error	53			
Total	74			
Corrected Total	73			

i) Dependent Variable: Resources change daily life (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	20	1.330	0.204	0.343
Intercept	1	0.006	0.937	0.000
age	1	2.816	0.099	0.052
gender	1	0.345	0.559	0.007
diagnosis	2	1.614	0.209	0.060
axis 4	1	0.024	0.877	0.000
axis 5	1	0.007	0.935	0.000
number of sessions	1	2.395	0.128	0.045
frequency of sessions	1	0.257	0.614	0.005
status at post-test	1	2.456	0.123	0.046
improvisation	1	2.451	0.124	0.046
songs	1	0.078	0.782	0.002
receptive techniques	1	1.436	0.236	0.027
other media	1	0.014	0.906	0.000
verbal discourse	1	0.535	0.468	0.010
parent counselling	1	1.776	0.189	0.034
therapist gender	1	0.804	0.374	0.016
therapist experience	1	0.235	0.630	0.005
therapist supervision	1	0.614	0.437	0.012
therapist training	1	0.087	0.769	0.002
gender * therapist gender	1	0.611	0.438	0.012
Error	51			
Total	72			
Corrected Total	71			

j) Dependent Variable: Quality of life (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	20	1.259	0.252	0.344
Intercept	1	1.151	0.289	0.023
age	1	1.401	0.242	0.028
gender	1	0.056	0.815	0.001
diagnosis	2	1.462	0.242	0.057
axis 4	1	0.054	0.818	0.001
axis 5	1	0.013	0.910	0.000
number of sessions	1	2.104	0.153	0.042
frequency of sessions	1	0.018	0.895	0.000
status at post-test	1	0.058	0.810	0.001
improvisation	1	2.903	0.095	0.057
songs	1	0.022	0.883	0.000
receptive techniques	1	0.008	0.927	0.000
other media	1	0.017	0.896	0.000
verbal discourse	1	1.830	0.182	0.037
parent counselling	1	0.312	0.579	0.006
therapist gender	1	0.115	0.736	0.002
therapist experience	1	0.097	0.757	0.002
therapist supervision	1	0.684	0.412	0.014
therapist training	1	0.972	0.329	0.020
gender * therapist gender	1	0.548	0.463	0.011
Error	48			
Total	69			
Corrected Total	68			

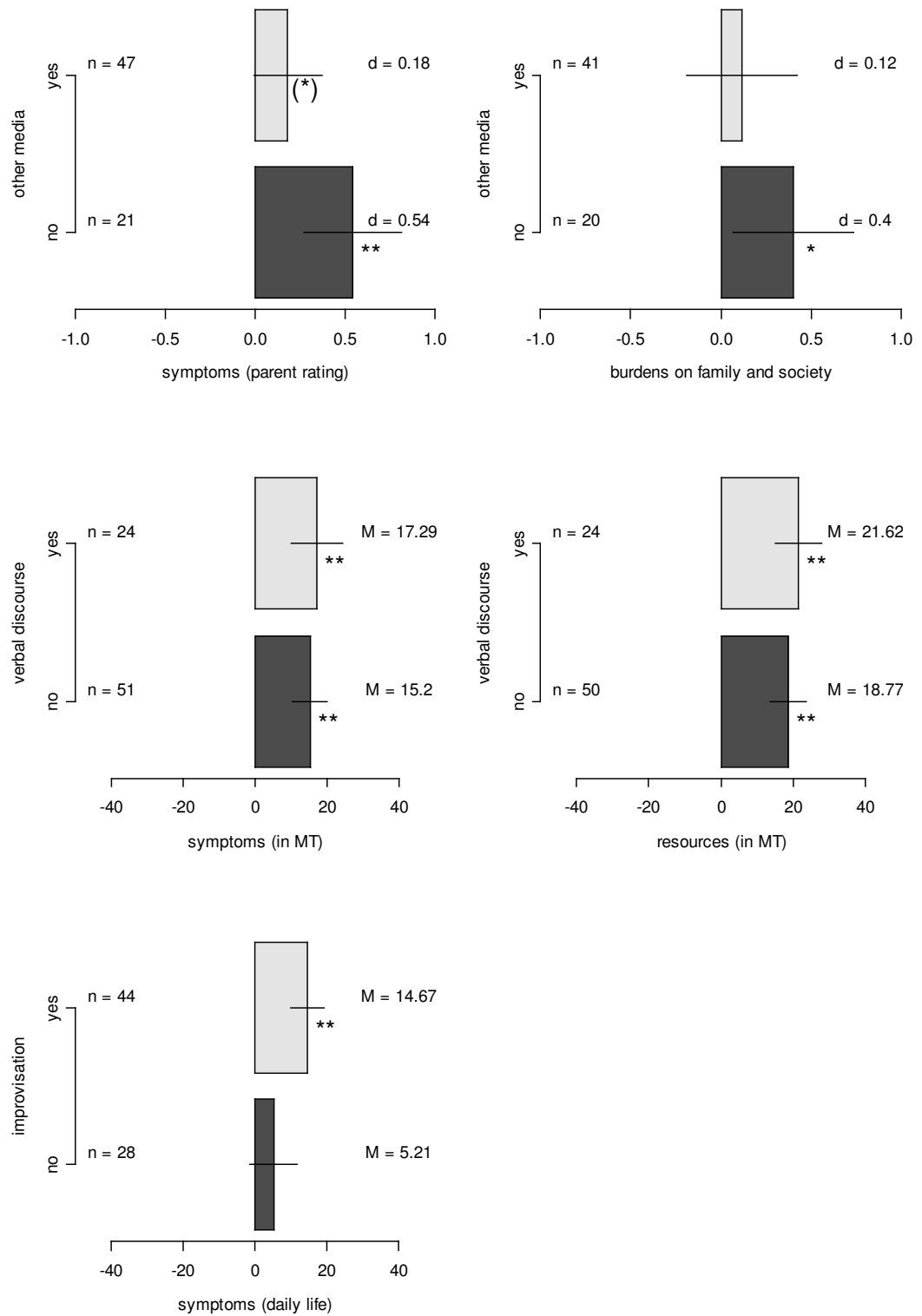
The analysis displayed in Table 38 revealed a number of significant influences of therapy characteristics on the outcome. The use of improvisation influenced the development of symptoms in daily life ($p = .04$). The use of verbal discourse influenced changes in symptoms within music therapy ($p = .01$) and resources within music therapy ($p = .03$). The use of other media predicted changes in symptoms, parent rating ($p = .005$), and burdens ($p = .05$). The number of music therapy sessions provided was significantly related to changes of symptoms within therapy ($p = .02$) and resources within therapy ($p = .02$).

Additional psychotherapy training of the therapist influenced the rating of changes in symptoms and resources within therapy ($p = .002$ and $p = .03$, respectively). Therapist's experience was also related to changes of symptoms within therapy ($p = .04$). The interaction of the therapist's and the client's gender had an influence on the development of symptoms within music therapy ($p = .05$).

5.5.2 Influences of therapy characteristics: Graphical analysis

The therapy variables that showed a significant influence on the outcome in the analysis in Table 38 were analysed graphically (Figure 23 to 25). Figure 23 shows how outcome variables differed depending on music therapy techniques.

Figure 23. Effects of music therapy by therapy contents



Note. The figure displays effect sizes and VAS change scores with 95% confidence intervals. Positive scores indicate improvement.

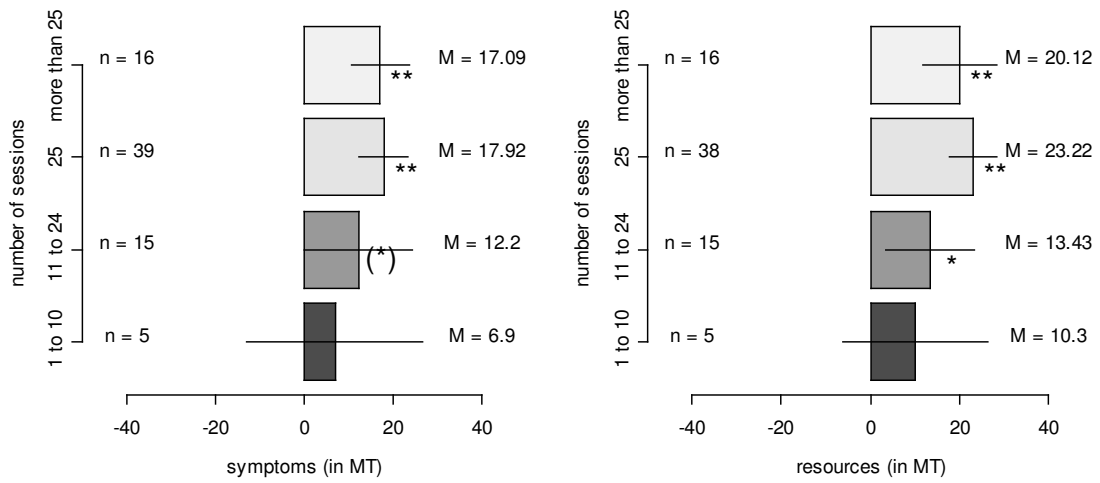
The first two graphs in Figure 23 show differences in outcomes between clients where media other than music (such as free play and games, but also including other artistic media) were among the three most frequently used techniques and those where this was not the case. In about two thirds of the sample, these other media were frequently used - but there were much larger effect sizes on symptoms and burdens (both parent ratings) for the remaining part of the sample where other media were not used or used less frequently. The effects for the latter were significant, while the effects of the first were not significant. A re-inspection of the original data revealed that the specific types of other media and activities used, as reported by the therapists, were most frequently free play and games (45% of all cases, multiple responses possible), followed by ball and movement games (19%), role play (17%), and other creative media such as painting and drawing (8%).

The third and fourth graph in the figure show similar comparisons for clients where verbal discourse was and was not among the most frequently used techniques. Changes in symptoms and resources within music therapy (both therapist ratings) are larger for the smaller part of the sample where verbal discourse was frequently used than for the rest of the sample - but the differences are not very large.

The last graph of the figure compares clients where improvisation was and was not among the most frequently used techniques. Symptoms in daily life (therapist rating) improved more in the larger part of the sample where improvisation was frequently used than where it was not frequently used. The improvement was significant in cases where improvisation was used. A re-inspection of the original data showed that the specific types of improvisation used, as reported by the therapists, were most frequently free improvisation (35% of all cases, multiple responses possible) and structured improvisation (25%). Less frequently reported forms of improvisation included vocal improvisation (11%), partner improvisation (3%), and unspecified types of improvisation (5%).

Influences of the number of sessions provided on outcome variables are shown in Figure 24.

Figure 24. Effects of music therapy by number of sessions

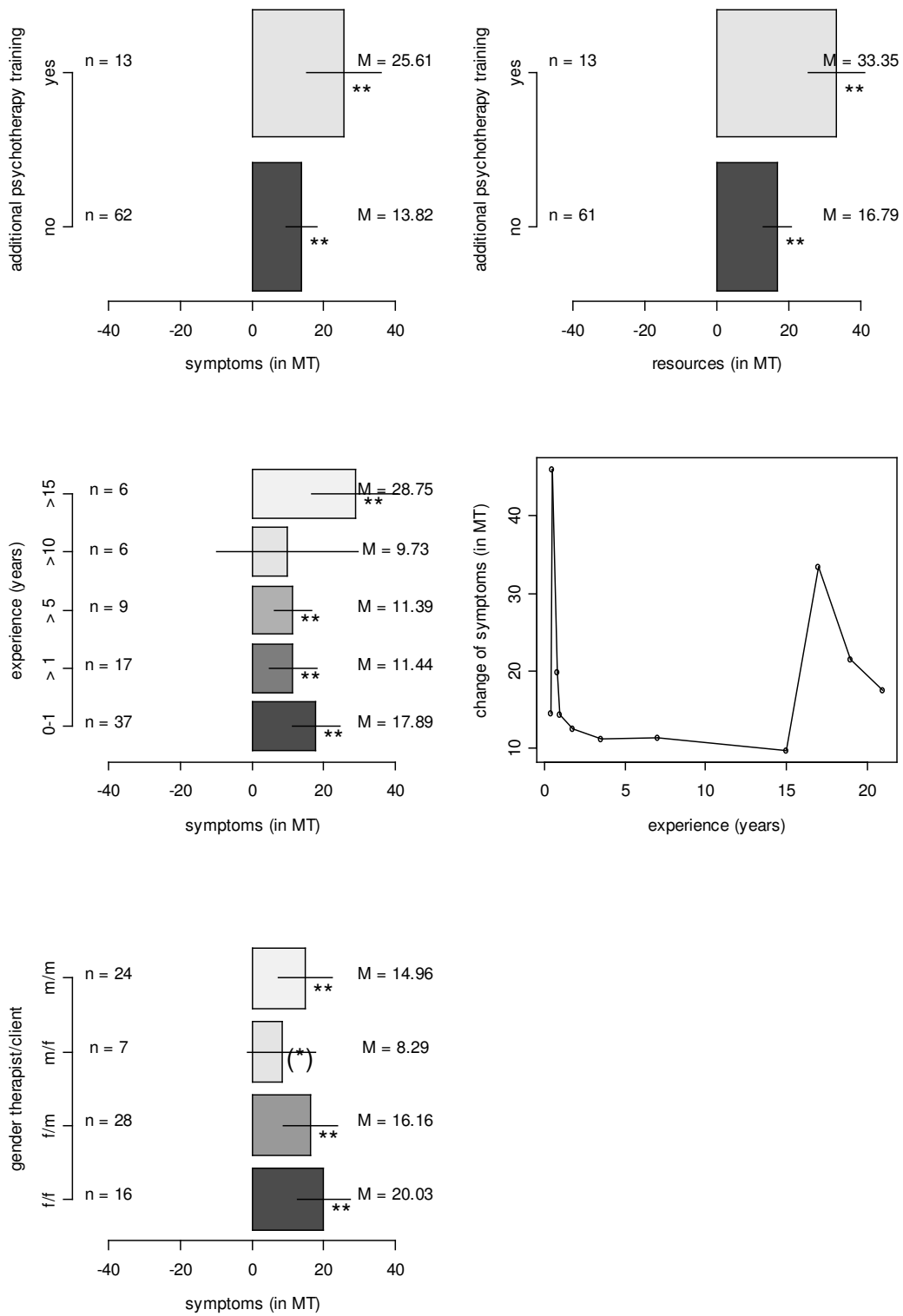


Note. The figure displays retrospective VAS change scores with 95% confidence intervals. Positive scores indicate improvement.

The two graphs in Figure 24 compare outcomes of music therapy according to the number of sessions provided. Symptoms and resources the clients showed within music therapy improved more when more sessions were provided.

Influences that the characteristics of the therapist had on the outcome of music therapy are shown in Figure 25.

Figure 25. Effects of music therapy by therapist characteristics



Note. The figure displays retrospective VAS change scores with 95% confidence intervals. Positive scores indicate improvement.

Figure 25 compares outcomes of music therapy between therapists. The first two graphs show that symptoms and resources (therapist rating) improved more when music therapy was conducted by a therapist who had an additional psychotherapeutic training. The third graph shows the relation between the therapist's experience and the development of the client's symptoms within music therapy (therapist rating). There is a relationship between the amount of the client's improvement on this outcome and the therapist's experience, but it does not seem to be linear. The fourth graph shows the relationship between therapist's experience and client's symptom change within music therapy more clearly: Therapists with moderate clinical experience see much smaller changes than those with either no or very long experience.

The last graph of Figure 25 shows how the combination of the therapist's and the client's gender influences the development of symptoms within therapy, suggesting that girls may benefit more from female than from male therapists.

5.5.3 Relationship between therapy as planned and therapy as conducted

Since some of the comparisons in this section addressed relationships between variables that were taken at post-test, the direction of causality is not automatically clear. For example, was therapy more successful when and because techniques such as improvisation and verbal discourse were used (and other media not used), or could the successful techniques only be used with some cases because the others were resistant? And were the more successful therapies continued or were the longer therapies more successful?

5.5.3.1 Music therapy techniques

The use of techniques (improvisation, other media, verbal discourse) in the subjects of the study was compared to the typical techniques used in music therapy, as reported by the participating music therapists (see section 4.3.1 and Table 13). Improvisation was mentioned as a typical technique by all therapists, but while thirteen of them emphasised its use by mentioning it first, two others mentioned it at a later position. The use of other media was emphasised in the same way by two therapists, mentioned at a later place by eleven therapists, and not mentioned by two other therapists. Verbal discourse was mentioned by eleven of the fifteen therapists. Cross-tabulations of typically used and actually used music therapy techniques are shown in Table 39.

Table 39. Typical versus actual use of music therapy techniques

a) Improvisation			
frequent use (in actual case)	typical use (with population)		
	emphasised	not emphasised	
mentioned	44	3	
not mentioned	25	3	

b) Other media			
frequent use (in actual case)	typical use (with population)		
	emphasised	mentioned	not mentioned
mentioned	4	45	2
not mentioned	2	21	1

c) Verbal discourse		
frequent use (in actual case)	typical use (with population)	
	mentioned	not mentioned
mentioned	24	0
not mentioned	39	12

Note. In part a and b, χ^2 -test not applicable (expected cell frequencies < 5). In part c, $\chi^2 = 5.086$, $df = 1$, $p = .024$ * (with Yates' continuity correction)

Table 39 shows that almost all subjects received music therapy from therapists who emphasised the use of improvisation and mentioned the use of other media (Table 39 a-b). For the third variable, verbal discourse, there was a significant relationship ($p = .02$). Therapists who did not mention its use in general also did not mention its use in the actual cases either.

5.5.3.2 Dosage of music therapy

Table 40 shows a cross-tabulation of the treatment length as planned and as provided.

Table 40. Planned versus provided number of sessions

provided	planned		
	1 to 10	11 to 24	25 or more
1 to 10	2	0	1
11 to 24	1	1	9
25 or more	7	3	41

Note. Missing values result from cases where no expected duration was specified ($n = 10$). χ^2 -test not used (expected cell frequencies < 5)

This table indicates that 44 cases were in the same category with respect to the planned and the actually provided number of sessions. There were 11 cases who received more, and 10 cases who received less than the planned number of sessions. Seven cases received substantially more (at least 25 sessions when no more than 10 were planned), and one case received substantially less (no more than 10 when at least 25 were planned). The imbalance towards an extended length is not astonishing as the number of sessions specified at the beginning of therapy frequently constituted a minimum rather than the expected average length of therapy (see section 4.3.2). The general tendency that can be seen from the table is that most patients received at least the planned number of sessions.

5.6 Treatment satisfaction of parents

Since treatment satisfaction is not an outcome in itself, but related to outcome, the issue of parents' satisfaction with music therapy was addressed in this separate section. The overall mean of the satisfaction scale was $M = 7.14$ ($SD = 1.96$), as shown previously (Table 35). The questions addressed in this section were: what factors predict parents' treatment satisfaction, and how is it related to the outcome of music therapy?

The following tables show the results of the analyses addressing the influence of patient characteristics (Table 41) and therapy characteristics (Table 42) on treatment satisfaction.

Table 41. Treatment satisfaction by patient characteristics

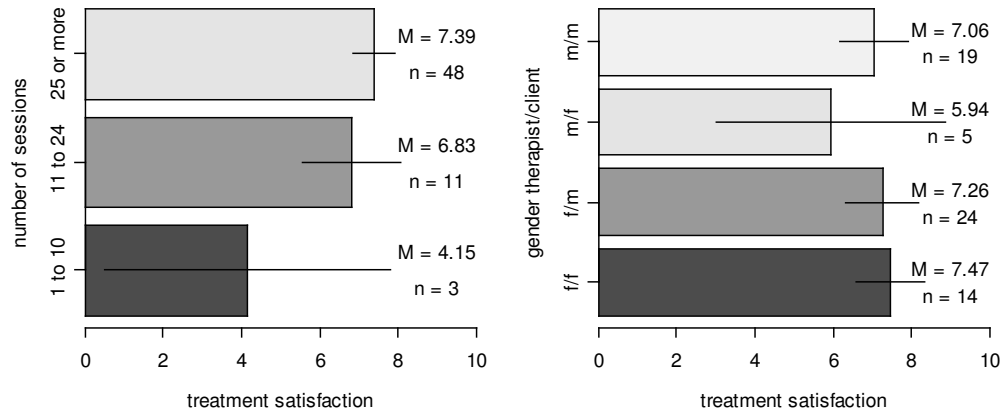
Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	10	1.044	0.422	0.170
Intercept	1	392.282	0.000 **	0.885
age (factor)	3	1.994	0.127	0.105
gender	1	0.025	0.875	0.000
diagnosis	2	0.282	0.756	0.011
axis 4 (factor)	2	1.237	0.299	0.046
axis 5 (factor)	2	0.098	0.906	0.004
Error	51			
Total	62			
Corrected Total	61			

Table 42. Treatment satisfaction by therapy characteristics

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	20	2.532	0.006 **	0.553
Intercept	1	2.630	0.113	0.060
age	1	0.340	0.563	0.008
gender	1	0.407	0.527	0.010
diagnosis	2	1.350	0.271	0.062
axis 4	1	0.288	0.595	0.007
axis 5	1	0.013	0.909	0.000
number of sessions	1	6.586	0.014 *	0.138
frequency of sessions	1	1.316	0.258	0.031
status at post-test	1	0.318	0.576	0.008
improvisation	1	2.415	0.128	0.056
songs	1	0.874	0.355	0.021
receptive techniques	1	1.111	0.298	0.026
other media	1	0.112	0.740	0.003
verbal discourse	1	0.236	0.629	0.006
parent counselling	1	2.493	0.122	0.057
therapist gender	1	1.333	0.255	0.031
therapist experience	1	2.751	0.105	0.063
therapist supervision	1	3.364	0.074	0.076
therapist training	1	2.262	0.140	0.052
gender * therapist gender	1	4.850	0.033 *	0.106
Error	41			
Total	62			
Corrected Total	61			

The two tables above revealed no significant influences of patient characteristics on treatment satisfaction. However, there were two significant predictors of treatment satisfaction among the therapy variables. These are illustrated in Figure 26.

Figure 26. Treatment satisfaction by therapy and therapist characteristics



Note. The figure displays post-test means with 95% confidence intervals.

From the first graph of the figure, one can see that treatment satisfaction increases with the number of sessions provided. The second graph shows the influence of the interaction of therapist gender and patient gender: parents were less satisfied with treatment of girls, provided by male therapists, than with the other three combinations.

Table 43 shows how parents' satisfaction with treatment is related to outcome.

Table 43. Correlation of treatment satisfaction and outcomes

	Correlation	<i>p</i>	<i>n</i>
Symptoms change (parent)	.012	.924	62
Competencies change (parent)	.013	.920	59
Quality of life change (parent)	.088	.503	60
Quality of life change (self)	.072	.752	22
Burdens change (parent)	-.149	.274	56
Symptoms change in MT (therapist)	.355	.005 **	62
Symptoms change daily life (therapist)	.282	.030 *	59
Resources change in MT (therapist)	.309	.015 *	61
Resources change daily life (therapist)	.208	.114	59
Quality of life (therapist)	.286	.031 *	57

One can see from Table 43 that parents' treatment satisfaction tended to be positively correlated with most of the outcomes. While the correlations with parent ratings were not significantly different from zero, there were significant positive correlations with therapist ratings of change. Parents were more satisfied with treatment when therapists saw more positive changes in symptoms (within music therapy: $r = .36$, $p = .005$; in daily life: $r = .28$, $r = .03$), in resources (within music therapy: $r = .31$, $p = .02$), and in quality of life ($r = .29$, $p = .03$).

5.7 General rating of success and development

The general judgement of success and development was not included as an outcome variable in the analyses above, as it was based on verbal descriptions which were then coded with numbers. However, this overall judgement is a clinically important variable. Therefore, the analyses above were repeated for the general rating of success and development.

5.7.1 Overall effects

Table 44 shows the comparison between the means of the general rating of success and development for the two groups.

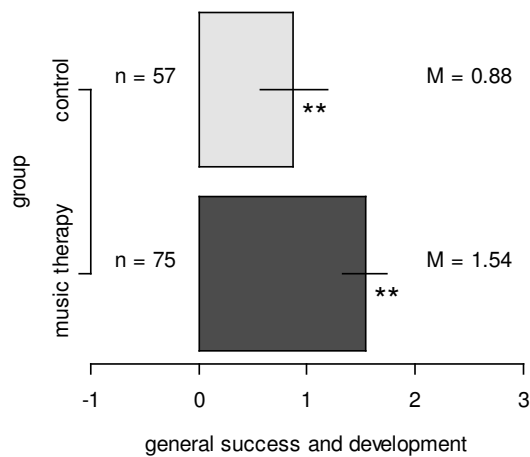
Table 44. General success and development: Overall effects

group	<i>n</i>	<i>M</i>	<i>SD</i>
intervention	75	1.54	0.88
control	57	0.88	1.18

Note. Comparison of means: $t = 3.557$, $df = 99.506$, $p = .001$ ** (two-sided test, equal variances not assumed)

The average ratings were significantly different ($p = .001$) between the two groups. Average ratings and their confidence intervals are displayed in Figure 27.

Figure 27. General success and development: Overall effects



Note. The figure displays coded retrospective change ratings with 95% confidence intervals. Positive scores indicate improvement.

These data suggest that clients of both groups improved over time, but clients in the intervention group improved more than clients in the control group.

5.7.2 Effects by client group

Table 45 shows the results of the statistical analysis to address the influences of patient characteristics on the general success and development.

Table 45. General success and development by patient characteristics

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	21	1.857	0.021 *	0.262
Intercept	1	46.083	0.000 **	0.295
group	1	1.972	0.163	0.018
age (factor)	3	0.429	0.732	0.012
gender	1	0.219	0.641	0.002
diagnosis	2	2.845	0.062	0.049
axis 4 (factor)	2	0.689	0.504	0.012
axis 5 (factor)	2	2.573	0.081	0.045
group * age (factor)	3	1.340	0.265	0.035
group * gender	1	1.557	0.215	0.014
group * diagnosis	2	0.136	0.873	0.002
group * axis 4 (factor)	2	0.447	0.641	0.008
group * axis 5 (factor)	2	0.269	0.765	0.005
Error	110			
Total	132			
Corrected Total	131			

The analysis above identified no patient characteristics that had a significant influence on the general success and development, either alone or in interaction with the treatment.

5.7.3 Effects by therapy characteristics

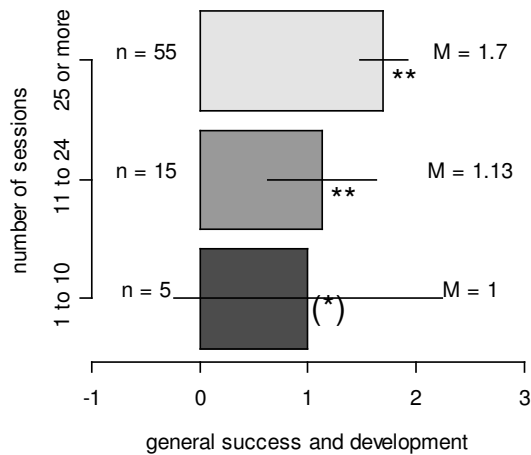
The analysis of influences of therapy characteristics on the general success and development in the intervention group is shown in Table 46.

Table 46. General success and development by therapy characteristics

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	20	1.617	0.082	0.375
Intercept	1	3.006	0.089	0.053
age	1	3.033	0.087	0.053
gender	1	0.146	0.704	0.003
diagnosis	2	4.785	0.012 *	0.151
axis 4	1	1.709	0.197	0.031
axis 5	1	0.185	0.669	0.003
number of sessions	1	7.900	0.007 **	0.128
frequency of sessions	1	3.533	0.066	0.061
status at post-test	1	0.242	0.625	0.004
improvisation	1	0.137	0.713	0.003
songs	1	0.011	0.915	0.000
receptive techniques	1	0.025	0.875	0.000
other media	1	2.779	0.101	0.049
verbal discourse	1	1.956	0.168	0.035
parent counselling	1	2.394	0.128	0.042
therapist gender	1	1.695	0.199	0.030
therapist experience	1	0.826	0.367	0.015
therapist supervision	1	0.019	0.890	0.000
therapist training	1	2.833	0.098	0.050
gender * therapist	1	2.420	0.126	0.043
gender				
Error	54			
Total	75			
Corrected Total	74			

This analysis identified a significant influence of the number of sessions ($p = .01$) on the general success of music therapy. This influence is shown in Figure 28.

Figure 28. General success of music therapy by number of sessions



Note. The figure displays coded retrospective change ratings with 95% confidence intervals. Positive scores indicate improvement.

The figure illustrates that the therapist's rating of the general success of therapy increased with the number of sessions provided.

5.8 Examination of possible contraindications

In the analysis of the influence of patient characteristics on the outcome of music therapy (see section 5.4), a possible contraindication was identified that merited further investigation: The level of symptoms in children with severe somatic comorbidity (axis 4 diagnoses) appeared to be negatively influenced by music therapy (see Figure 21). In this section, the nature of this influence was further examined.

To identify whether the somatic problems were of a similar kind in both groups, the original questionnaires were re-examined for the part of the sample with severe axis 4 diagnosis and valid symptom change score. Table 47 shows the categories of axis 4 diagnoses and their frequencies.

Table 47. Types of severe axis 4 comorbidity

	Intervention group (n = 15)	Control group (n = 5)
brain damage, epilepsy, asphyxia	6 (40%)	2 (40%)
hearing impairment	4 (27%)	0 (0%)
motor dysfunction, ataxia	3 (20%)	5 (100%)
other diseases and symptoms (incl. Down syndrome, hyperphenylalaninemia, dermatitis, incontinence, pain)	5 (33%)	0 (0%)

Note. Multiple categories were possible.

The table shows that severe axis 4 diagnoses in the intervention group covered a broad range of disorders and symptoms, including brain damage (40%), hearing impairment (27%), motor dysfunction (20%), and others (33%). In the control group, severe axis 4 diagnoses were restricted to motor dysfunction (100%) and brain damage (40%). The most frequent goals of music therapy for the clients in the intervention group with severe axis 4 comorbidity are shown in Table 48.

Table 48. Most frequent goals of music therapy for clients with axis 4 comorbidity

Goal of music therapy	Number of cases (n = 15)
self-esteem, self-confidence, trust	8 (53%)
maturation of personality, development of identity	4 (27%)
ability to build and sustain contact and relationship	4 (27%)
ability for emotional expression	4 (27%)
ability to recognise feelings	3 (20%)

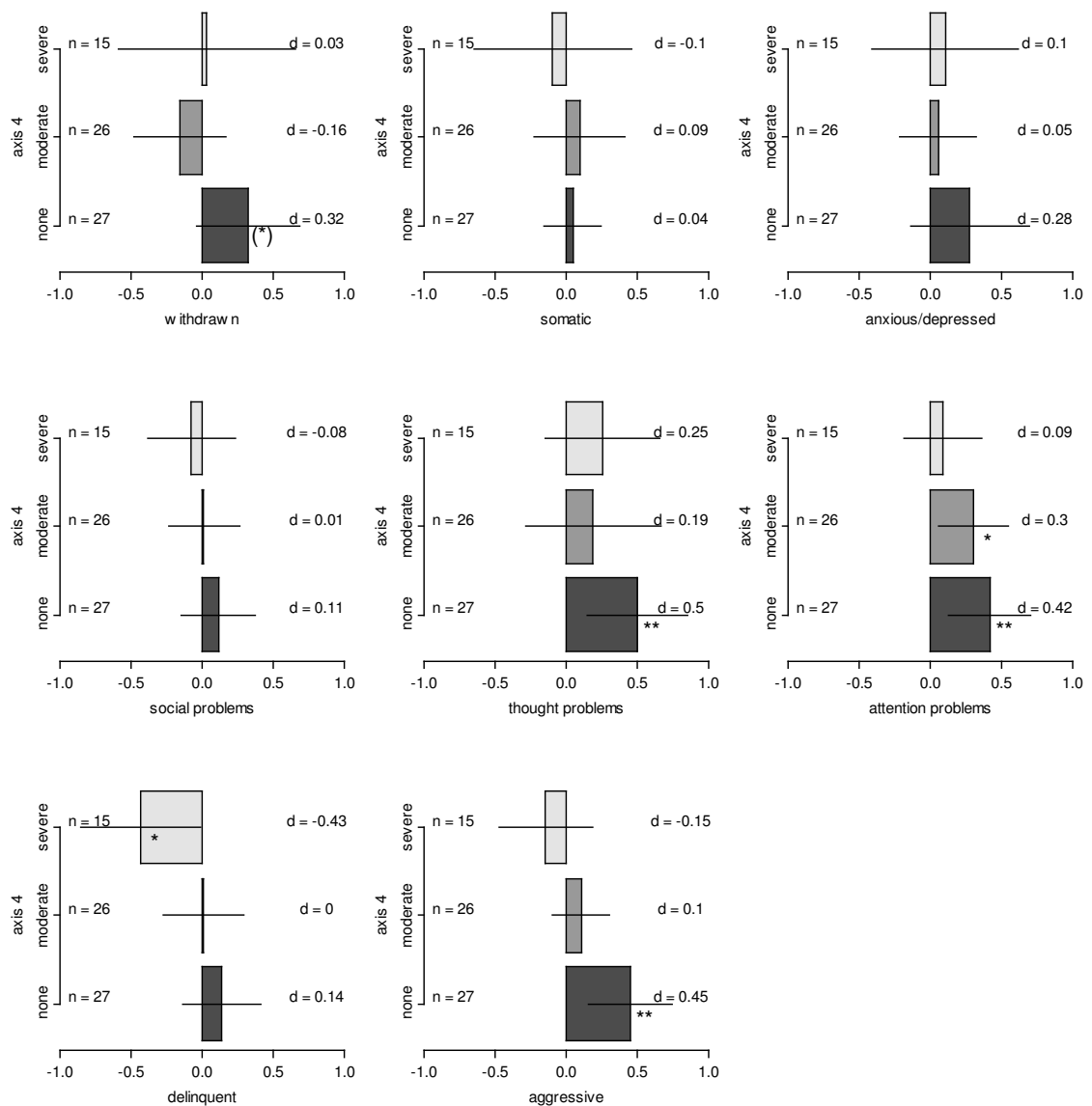
Note. Multiple categories were possible.

Improving self-esteem and self-confidence was the most important goal of music therapy for these clients. Other goals that were frequently mentioned addressed the recognition and expression of emotions and the development of contact, relationship, personality, and identity.

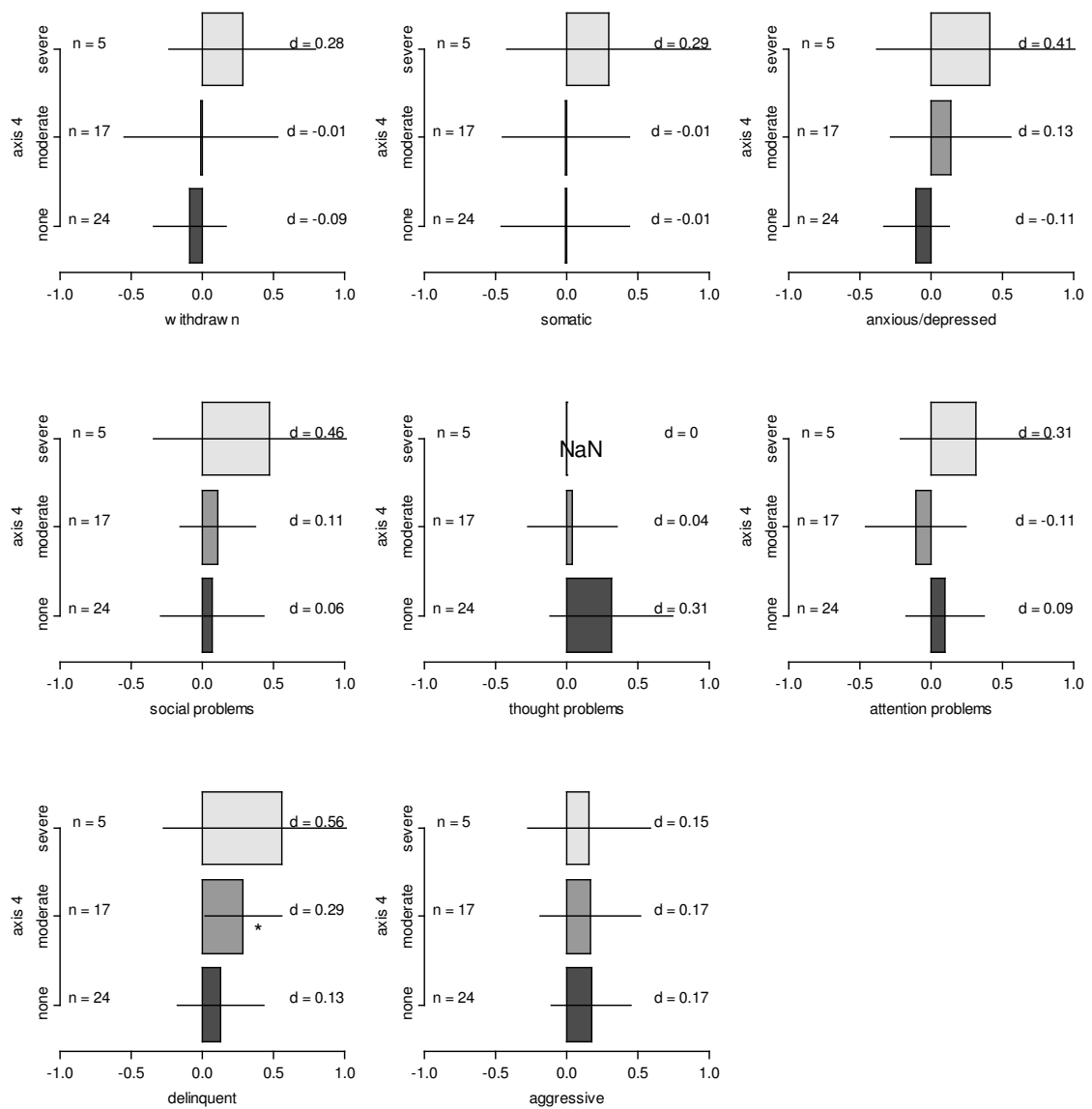
Figure 29 shows change scores of all sub-scales of the symptom scale, separately for children in the intervention group and the control group, by level of axis 4 comorbidity.

Figure 29. Effects on symptom sub-scales by axis 4 diagnosis

a) Change scores in the intervention group



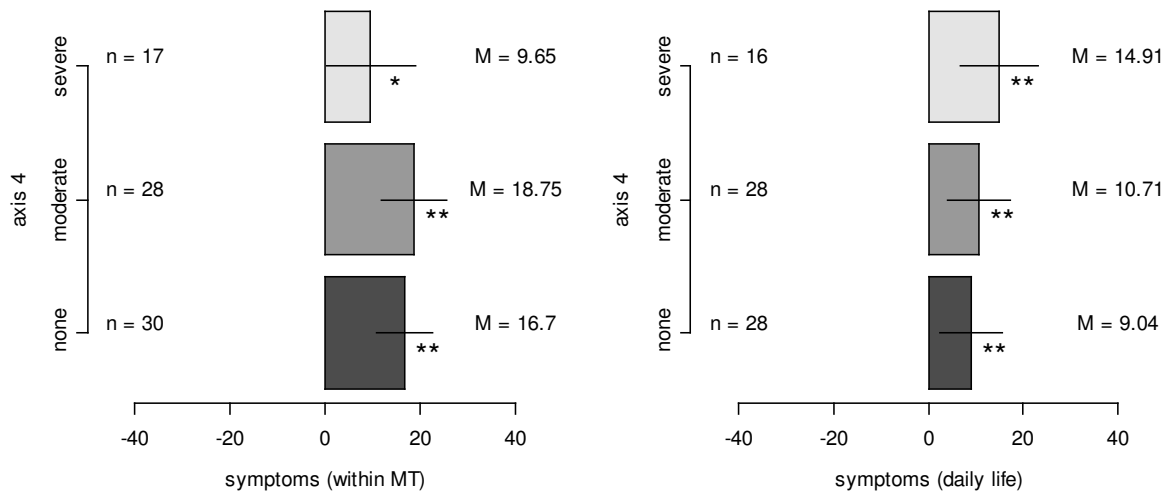
b) Change scores in the control group



Note. The figure displays effect sizes (standardised change scores) with 95% confidence intervals. Positive effect sizes indicate improvement. NaN - not a number (confidence interval and *p*-value were NaN if *SD* = 0).

A strong interaction of treatment and axis 4 diagnosis can be seen on the delinquency sub-scale, where there is improvement of a medium to large effect size ($d = 0.56$) in the control group and deterioration of a small to medium effect size ($d = -0.43$) in the intervention group. Figure 30 shows therapist ratings of the development of symptoms, in the intervention group, by level of axis 4 diagnosis.

Figure 30. Development of symptoms over time by axis 4 diagnosis

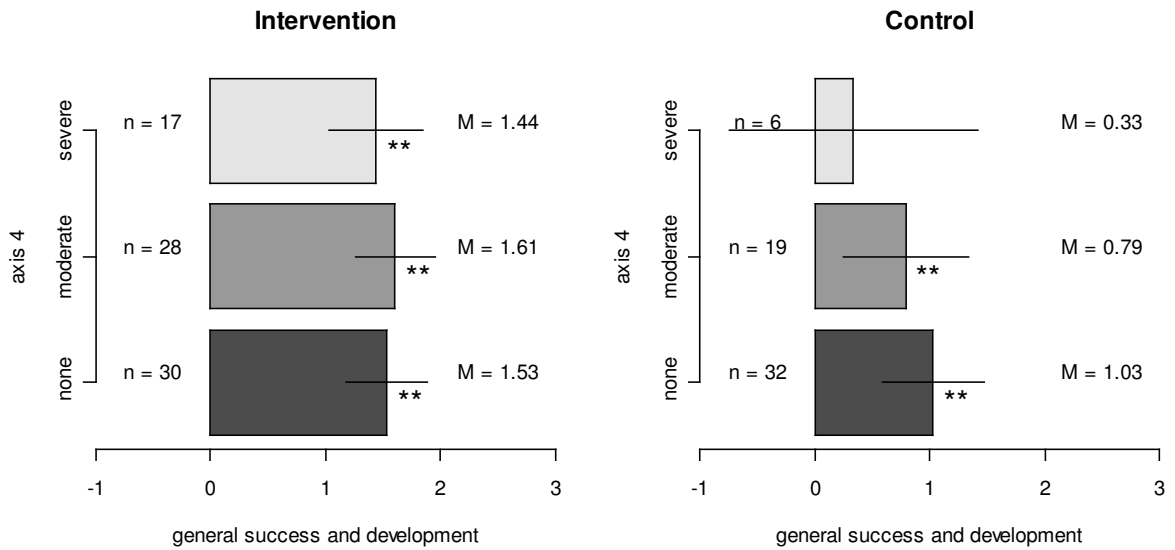


Note. The figure displays retrospective VAS change scores with 95% confidence intervals. Positive scores indicate improvement.

The figure shows that therapist ratings of changes of symptoms in daily life tended to be more positive for clients with severe axis 4 comorbidity (although the tendency in symptoms within music therapy was different). This seems to contradict the negative development of these clients in the CBCL symptom scale completed by parents.

Figure 31 shows the coded general rating of success and development as given by therapists and referrers.

Figure 31. Effects on general success and development by axis 4 diagnosis



Note. The figure displays coded retrospective change ratings with 95% confidence intervals. Positive scores indicate improvement.

For clients in the intervention group, this figure shows similar ratings independently of the level of axis 4 diagnosis. For control group cases, there was a clear relationship suggesting that children who had more somatic problems improved less. This result also contradicts the parent rating of total level of symptoms.

6 Discussion

This discussion begins by summarising the main findings of the study, using the main research questions and sub-questions to document these in a systematic way. Following that, the discussion will focus on the implications of these results in relation to previous studies and theoretical assumptions. The limitations of the study will be addressed in order to consider some of the aspects of the validity and reliability of the findings and to make a judgement about the direction in which the findings may have been distorted. Finally, the implications of the findings for clinical practice and potential future research will be explored, leading to recommendations for referral criteria, treatment procedures, and clinical evaluation, and showing pathways for further experimental and non-experimental music therapy outcome research.

6.1 Findings

The study was set up to address specific hypotheses regarding the clinical effectiveness of individual music therapy as a treatment for mentally ill children and adolescents. The research questions concerned the overall effectiveness of music therapy across all variations of therapy procedures and clinical conditions as well as the effectiveness of music therapy for specific clinical conditions and the effectiveness of specific music therapy approaches for this population.

6.1.1 Overall effectiveness of music therapy

The first set of questions addressed the overall effectiveness of individual music therapy versus no treatment, across all included clinical conditions and all types of music therapy provided. A comparison of a group of children who received music therapy with a group of children who received no treatment, as planned, was not possible as every third subject in the control group received psychotherapy during the assessment period. Ethical approval requiring the prevention of any newly introduced treatment for the control group, psychotherapy or other, was neither sought nor gained. This continues to present problems in undertaking experimental or quasi-experimental studies with children on the effects of longer-term interventions, and will be addressed later in the limitations of the study. The findings summarised in the following

paragraphs are based on comparisons between the treatments as they were provided for intervention group and control group, respectively.

Does individual music therapy with mentally ill children and adolescents, as provided in clinical practice, have an overall effect, as compared to no treatment?

Using the planned comparisons with the primary outcome variables (CBCL symptoms parent rating, CBCL competencies parent rating, KINDL quality of life parent rating and self-report), the findings were ambiguous: The overall statistical tests showed significant improvement over time in the symptom scale ($p < .001$) and the quality of life parent rating ($p = .01$), and a significant difference between intervention group and control group in symptoms ($p = .04$) and competencies ($p < .001$), but no significant interaction between group and time. However, effect sizes tended to be greater for all variables in the intervention group than in the control group. Patients in the intervention group improved significantly in symptoms ($p < .001$) and in quality of life ($p = .001$), but no significant improvement was identified in the control group. (However, the average effect is not representative for all conditions and types of music therapy, as explained below in section 6.1.2 and 6.1.3.)

In summary, the findings showed some, but limited evidence that individual music therapy may be effective in reducing symptoms and quality of life. The analysis of variance failed to identify a treatment effect, possibly due to existing differences between intervention group and control group.

Is the effect of individual music therapy with mentally ill children and adolescents, as provided in clinical practice, clinically relevant?

Changes over time in the intervention group showed potentially clinically relevant improvement of small to medium effect sizes in symptoms ($d = 0.29$, $p < .01$) and in quality of life (parent rating: $d = 0.37$, $p < .01$; self-reports: $d = 0.29$, n.s.). Changes over time in competencies were not clinically relevant ($d = 0.01$, n.s.). Changes over time in the control group were too small to be regarded as clinically relevant (symptoms: $d = 0.19$, n.s., competencies: $d = -0.01$, n.s., quality of life parent rating: $d = 0.08$, n.s., quality of life self-report: $d = -0.15$, n.s.). Differences between developments in the groups showed a potentially clinically relevant effect of a small to medium effect size in quality of life (parent ratings: $d = 0.29$; self-reports: $d = 0.44$),

while the effect sizes in symptoms ($d = 0.10$) and competencies ($d = 0.02$) were too small to be considered as clinically relevant.

In conclusion, the observed effect sizes showed some evidence that individual music therapy has a clinically relevant effect on quality of life.

In which dimensions is the effect of music therapy especially large or small?

The effect sizes found in the sample (as summarised above) were larger in quality of life than in symptoms and competencies. Change ratings of therapists suggested that changes in all outcome domains are of similar size, but changes of symptoms and resources the children show within music therapy are larger than changes of the children's behaviour in daily life.

Consequently, the findings suggest that the changes in different outcome domains differ in size. Music therapy, as provided in clinical practice, produces larger effects on quality of life than on symptoms and resources. Changes within music therapy tend to be greater than changes in everyday life.

6.1.2 Effects of music therapy by patient characteristics

The sample of the present study included a wide range of clinical conditions, some of which might respond better or worse to an intervention than others. The second set of questions for this research addressed differences in the effectiveness of music therapy that depend on the clients' primary diagnoses, associated clinical conditions, age, and gender.

Are there any groups of mental disorders that respond especially well to individual music therapy, so that this treatment is especially indicated for them?

a) Clients without axis 4 comorbidity:

The results of the study suggest that children and adolescents with mental disorders who have no axis 4 comorbidity (associated medical conditions, somatic disorders) respond well to music therapy. The level of symptoms in clients in the intervention group improved significantly and with a medium to large effect size ($d = 0.55, p < .01$), while clients in the control group showed no improvement ($d = 0.11, n.s.$). The difference between these changes, interpreted as the effect of music therapy for children and adolescents without axis 4 comorbidity, was of almost a medium effect size ($d = 0.44$).

Consequently, music therapy reduced the level of a broad range of psychiatric symptoms (ranging from depression and anxiety to aggressive behaviour) substantially in patients without associated medical conditions. There was evidence that individual music therapy is more effective for mentally ill children and adolescents without associated medical conditions than for those who do exhibit such comorbidity.

b) Clients with adjustment and emotional disorders:

There was some evidence that music therapy may be especially indicated for clients with adjustment or emotional disorders. During music therapy, the level of burdens on family and society decreased significantly and with a medium to large effect size ($d = 0.62, p < .01$). The improvement was larger in these cases than in those with other mental disorders. However, this outcome was only used in the intervention group. It is quite possible that clients with adjustment or emotional disorders have a better prognosis on this outcome, regardless of treatment. Furthermore, the relationship between diagnosis and changes in burdens did not remain significant in the sensitivity analysis where the original groups of diagnoses were used.

In conclusion, there was some, but limited evidence that the effectiveness of individual music therapy on burdens may be greater for children with adjustment and emotional disorders than with behavioural and developmental disorders.

Are there any groups of mental disorders that respond negatively to individual music therapy, so that this treatment is contraindicated for them?

Severe axis 4 comorbidity:

A possible contraindication was identified in children with severe axis 4 comorbidity. The associated disorders included neurological disorders, hearing impairment, and other disorders (see Table 38). In clients in the intervention group with these conditions, there was no change in the level of symptoms ($d = -0.01, n.s.$), while clients in the control group improved significantly and with a medium to large effect size ($d = 0.73, p < .05$). The difference between the groups was a medium to large negative effect ($d = -0.74$). This negative effect on symptoms stemmed mainly from the delinquency sub-scale (intervention group: $d = -0.43$; control group: $d = 0.56$; difference: $d = -0.99$). More general ratings by therapists and referrers contradicted the finding of a negative effect. The results of these ratings suggested that higher levels of axis 4 comorbidity were related to a more positive development of symptoms in daily

life and a greater positive effect on general development (see figure 28 and 29). These findings raise the question to what extent the broad symptom scale of the CBCL matched the primary problems of children with severe axis 4 disorders. The main focus of therapists and referrers when rating the development of these children may have been on other aspects, such as self-esteem and self-confidence. These domains were included as goals of music therapy for these children, among others (see table 49). However, for some of these children, a temporary increase in behaviour problems (such as delinquency) could also be understood as a consequence of increased self-confidence, because of the potential of music therapy to build ego strength and allow hidden or suppressed emotions and behaviours to emerge. For all children, this is an important part of their developmental process.

In conclusion, the findings show that individual music therapy leads to a (possibly temporary) increase in behaviour problems, especially delinquent behaviour, in children with severe somatic comorbidity. As these behaviour problems are not a focus of therapy for these clients, this is most likely not a contraindication, but it can be seen as a negative side effect of music therapy.

Does the effectiveness of individual music therapy differ depending on age and gender of the client?

The results of the study suggested that improvement over time during music therapy is greater in younger children than in adolescents. The younger the clients, the greater was the improvement in level of symptoms, both within music therapy and in daily life. Burdens on family and society also decreased significantly in children of up to ten years of age (3 to 6 years: $d = 0.34$, $p < .05$; 7 to 10 years: $d = 0.58$, $p < .05$), while remaining stable or tending to increase in older children and adolescents (11 to 14 years: $d = -0.40$, n.s.; 15 to 19 years: $d = -0.02$, n.s.). Apparently, improvement of symptoms and burdens is more likely to occur in younger children. However, it remains unclear whether this reflects a difference in the effectiveness of music therapy or a difference in the clients' prognosis which is present regardless of treatment as these outcomes were only used in the intervention group.

In summary, there was some, but limited evidence that the effectiveness of individual music therapy may be greater for younger children than for older children and adolescents.

6.1.3 Effects of music therapy by characteristics of music therapy

The last set of questions for this research addressed the influence of characteristics of music therapy on its effectiveness. This included the dosage of music therapy, the use of techniques within music therapy, the provision of parent counselling, and characteristics of the therapist. An additional question was how the treatment satisfaction of primary carers interacted with characteristics and outcomes of music therapy.

A preparatory analysis revealed that characteristics of music therapy depended on patient characteristics. Specifically, the continuation of music therapy after post-test depended on clients' gender; the use of songs and of verbal reflection depended on age and gender; the use of other media than music depended on age; and the use of receptive music therapy techniques depended on the presence and the level of associated abnormal psychosocial situations (axis 5 diagnoses). The provision of parent counselling depended on age and primary diagnosis, and the provision of other treatments depended on age and axis 5 diagnosis. The influences of patient characteristics were therefore controlled for in the statistical analysis.

Does the effectiveness of individual music therapy depend on characteristics of music therapy and characteristics of the therapist?

The influences of fourteen different variables describing the extent and contents of therapy and characteristics of the therapist were analysed simultaneously. Seven of these variables showed a significant influence on one or more of the outcomes (see table 39 and figures 23 to 25). Using improvisation and verbal reflection, not using other media and activities, and providing more sessions improved the outcome of music therapy. Therapist variables that influenced the outcome included experience, training, and gender match with client. The specific influences are described below.

a) Using improvisation

The level of symptoms in daily life, as reported by therapists, improved significantly in clients where improvisation was used ($M = 14.7$, $p < .01$) but remained stable in clients where it was not used ($M = 5.2$, n.s.). The types of improvisation used included mainly free improvisation (35%) and structured improvisation (25%), but also other techniques, such as vocal improvisation and partner improvisation. Although all

therapists mentioned the use of improvisation as one of the most important techniques in their clinical work, in only two thirds of the cases was improvisation frequently used.

In summary, the results suggest that improvisation is an effective technique which helps clients to achieve changes in their daily life behaviour. However, it remains unclear whether the influential effect of improvisation as a tool would have gained better results with the clients where it was not actually used as much.

b) Using verbal reflection

The use of verbal discourse in music therapy significantly influenced changes in symptoms within music therapy ($p = .01$) and resources within music therapy ($p = .03$; both therapist ratings). However, the size of the difference was relatively small. Both groups improved significantly on both measures (all $p < .01$), but those where verbal reflection was frequently used improved slightly more than those where verbal techniques were less important (symptoms: $M = 17.3$ vs. 15.2 ; resources: $M = 21.6$ vs. 18.8). The use of verbal techniques was more common in older than in younger clients and more common in boys than in girls (figure 15), but it was not significantly influenced by primary or secondary diagnosis (table 29). The data suggested that the use of verbal techniques depended on the therapist. Their opinion of the importance of verbal discourse significantly predicted its use in therapy ($p = .02$). Therefore it appears less likely that the use of verbal reflection was just a consequence, rather than a cause, of the differences in outcomes.

In summary, the results suggest that verbal reflection is effective in enhancing improvements of behaviours within music therapy. The size of this specific effect is small, and improvement occurs with and without the frequent use of verbal reflection.

c) Not using other media and activities

A strong relationship was identified between the use of other media and the development of symptoms ($p = .005$) and burdens on family and society ($p = .05$; both parent ratings). In subjects where other media were *not* frequently used, the level of symptoms decreased significantly and with a medium to large effect size ($d = 0.54$, $p < .01$), while showing only a slight and non-significant tendency towards improvement in the clients where other media were frequently used ($d = 0.18$, n.s.). A difference in the same direction was found in burdens on family and society, which showed significant improvement of a small to medium size where other media were not

frequently used ($d = 0.40, p < .05$) while showing no improvement for the others ($d = 0.12, n.s.$). Other media included mainly free play and games (45%), but also ball and movement games, role play, and other creative media such as painting and drawing. Almost all therapists reported the use of other media as being central in their typical clinical work. Therefore, it appears unlikely that these activities were only used when a child was resistant towards music therapy or refused to use musical forms of interaction. The use of other media was reported in about two thirds of the total sample, with higher rates for younger than for older patients. Therapist variables, such as clinical experience, which may also be related to the use of other media, were included in the statistical test and did not account for the differences in outcomes.

Consequently, the results suggest that the use of other media and activities (i.e. forms of interaction that are neither musical nor verbal) is an ineffective and counter-productive ingredient in individual music therapy for mentally ill children and adolescents. Music therapists are most practised and trained to carry out interventions within musical interactions that promote reciprocity, relationship building and subtle levels of engagement. Therefore, they are not necessarily able to incorporate these subtle levels of intervention into other media, or the other media themselves are not as good in deploying these techniques (see also 6.2.3 and 6.4.2). The frequent employment of such media within music therapy has negative effects on the development of the clients' symptoms and on the development of burdens on family and society, when compared to music therapy where these media were not used. However, the use of other media has become a typical part of current music therapy practice, rather than being used only in resistant clients.

d) Providing more sessions

The number of music therapy sessions provided until post-test was significantly related to the magnitude of changes in symptoms and resources within music therapy (both $p = .02$, therapist ratings). The amount of improvement in these outcomes increased steadily with the numbers of sessions. Changes in resources were significant for the groups where at least 11 sessions were provided. Changes in symptoms were significant when at least 25 sessions were provided. A comparison between the planned and the actual extent of therapy suggested that there were only few patients who received substantially less than the planned numbers of therapy sessions. Therefore, it

appears unlikely that the differences in outcomes are explained by the premature termination of therapy with clients who did not respond well to therapy.

Consequently, the results suggest that changes of behaviours within therapy grow with the extent of therapy provided. Medium- and long-term therapy may be more effective in improving symptoms and resources than short-term interventions. Other factors, such as patient characteristics or early drop-out of unresponsive patients, are unlikely to have caused this difference. However, the results did not show whether this dose-response relationship also applies to changes in behaviours in daily life.

The three remaining variables that had a significant influence on outcomes were therapist characteristics, and all of the following significant effects were based on therapist ratings of behaviour changes within music therapy. For the interpretation of these findings, the problem emerged that any observed difference may reflect not only differences in clients' actual development, but also differences in therapists' perceptions of their clients' development. The implications are addressed separately in each of the three sections.

e) Matching gender of therapist and client

The interaction of therapist's and client's gender had a significant influence on the development of symptoms within therapy ($p = .05$). Comparisons between therapists suggested that boys showed similar development on this outcome regardless of therapist's gender (male therapists: $M = 15.0$, $p < .01$, female therapists: $M = 16.2$, $p < .01$), but girls showed more improvement when treated by women (male therapists: $M = 8.3$, n.s., female therapists: $M = 20.0$, $p < .01$). Therapists reported greater changes for patients of the same sex than for patients of the opposite sex. However, as this finding is based on ratings of different therapists, an alternative explanation is that therapists may evaluate the changes of their same-sex patients more positively than therapists of the opposite sex would do.

In summary, the results show some, but limited evidence that individual music therapy for girls with mental illness may be more effective when conducted by female than by male therapists.

f) Having additional psychotherapy training

Ratings of changes in symptoms and resources within music therapy differed significantly depending on additional psychotherapy training of therapists (symptoms within therapy: $p = .002$, resources within therapy: $p = .03$). Therapists with additional training had either completed or were at an advanced level of training in individual psychology, art therapy, or client-centred counselling. In comparison with therapists who had no such additional training, these therapists reported greater improvement in symptoms within music therapy ($M = 25.6$ versus $M = 13.8$, both $p < .01$) and in resources within music therapy ($M = 33.4$ versus $M = 16.8$, both $p < .01$). This may imply that their treatment was more effective, but an alternative explanation is that they have developed skills in recognising subtle behaviour changes.

In summary, there was some, but limited evidence that individual music therapy with mentally ill children and adolescents may have better effects on behaviours within therapy when the treatment is conducted by a music therapist who has an additional training with a psychotherapeutic orientation.

g) The influence of therapist's experience

The experience of the therapist had a significant influence on ratings of changes in symptoms within music therapy ($p = .04$). The graphical analysis suggested that change ratings decreased dramatically during the first two years of clinical experience, stabilised on a low level for over 10 further years, and then increased again when therapists had accrued more than 15 years of clinical experience. This may reflect differences in actual changes in the clients as well as differences in the therapist's opinion of these changes.

In summary, there was some, but limited evidence that the development of clients' symptoms within music therapy may depend on the therapist's experience.

How is treatment satisfaction of primary carers related to characteristics and outcomes of music therapy?

Parents' treatment satisfaction with music therapy showed significant positive correlations with therapist ratings of changes in symptoms and resources within music therapy, symptoms in daily life, and quality of life. The statistical analysis suggested that treatment satisfaction was related to the number of sessions provided and to the interaction of therapist's and client's gender. Parents of female patients were less

satisfied with male than with female therapists, while parents of male patients were equally satisfied with therapists of both genders. Parents showed a greater satisfaction after therapies that were continued for a longer period; a possible explanation is that parents were more likely to continue music therapy for their child when they were more satisfied.

Consequently, the results suggest that primary carers' satisfaction with individual music therapy for mentally ill children and adolescents is positively related to the extent and outcome of music therapy. Primary carers' satisfaction with music therapy for girls also depends on therapist's gender.

The following section explains how the findings of the present study relate to findings of previous research. The implications of the study results for understanding processes and outcomes of music therapy, in comparison to previous knowledge, are discussed.

6.2 The findings of this study in relation to previous findings

6.2.1 Efficacy versus clinical effectiveness of music therapy

The results of previous studies on the efficacy of music therapy interventions with mentally ill children and adolescents, as summarised in the meta-analysis, demonstrated that music therapy is an effective intervention for this population. The average effect size of music therapy was in the medium to large range ($d = 0.61$), even with the most conservative methods (such as excluding a positive outlier). However, findings from efficacy studies cannot necessarily be generalised directly to the effectiveness of a method in actual clinical settings. The findings of the current study suggest that the effectiveness of individual music therapy, as practised in current clinical out-patient treatment, is not as good as the efficacy of music therapy with this population in experimental settings. The effect sizes were in the small to medium range for quality of life outcomes (parent rating: $d = 0.29$, self-report: $d = 0.44$), but close to zero for symptoms ($d = 0.10$) and competencies ($d = 0.02$).

This is consistent with previous findings on the efficacy and effectiveness of psychotherapy with children and adolescents. While meta-analyses of experimental efficacy studies showed that psychotherapy is an efficacious treatment, most

effectiveness studies on actual clinical implementations of psychotherapy for this population failed to show a positive effect. There is a discrepancy between efficacy and effectiveness, both in music therapy and in other forms of psychotherapy for children. Reasons for this discrepancy may include differences in patient characteristics, differences in treatment characteristics, differences in the setting and context where the therapy is conducted, and methodological artefacts. The results of the present study identified some of these factors as having a significant influence on the effects of music therapy.

In terms of patient characteristics, the problem of comorbidity was identified as having a major impact on the effectiveness of music therapy. Moreover, comorbidity is certain to influence the effectiveness of other forms of intervention (e.g., other psychotherapies, medication, etc.) as well. Since patients with comorbidity are often excluded from efficacy studies, this is one of the reasons for the discrepancy (see the following section, 6.2.2).

Of the included treatment characteristics, the use of specific music therapy techniques versus non-specific media and activities had a significant influence on the effectiveness of music therapy. As the procedures used are usually restricted to specific music therapy techniques in efficacy studies, this is another reason for the discrepancy between efficacy and effectiveness (see section 6.2.3).

6.2.2 The problem of comorbidity

The results of the present study showed that the effect of individual music therapy on the total level of symptoms in mentally ill children and adolescents depends highly on the presence or absence of comorbidity with somatic diseases (axis 4 diagnoses in the ICD-10 multiaxial classification). Axis 4 comorbidity is a frequent problem in clinical practice - in the study sample, somatic disorders were present in more than half of all children, with every fifth child showing severe somatic symptoms. Cases with comorbidity are usually excluded from experimental studies. For example, Aldridge et al. (1995) reported that a child with hearing impairment was excluded from the sample. Not all studies that were included in the meta-analysis, however, stated their exclusion criteria explicitly. The sample of the present study had no such exclusion criteria and contained subjects with brain damage and other neurological disorders, hearing impairment, and a variety of other axis 4 disorders.

Individual music therapy, as compared to the control condition, had a positive effect on the level of psychiatric symptoms in subjects without axis 4 comorbidity ($d = 0.44$), no effect in subjects with mild to moderate somatic symptoms ($d = 0.04$), and a negative effect in subjects with severe somatic symptoms ($d = -0.74$). It can therefore be concluded that the positive effect of music therapy that is found in experimental settings does in fact generalise to clinical settings, but only for a population of subjects without comorbid somatic disorders.

In clinical practice, however, many clients come with a multitude of problems and disorders. Therefore, it becomes necessary and important to find models of treatment that take into account the influence of comorbid disorders. Laboratory studies discarding patients with these conditions in order to eliminate influencing variables do not address the problem adequately.

When clients with axis 4 comorbidity are referred to music therapy, it may be unreasonable to expect great improvement in their psychiatric symptoms. Within the first 25 sessions, individual music therapy shows no effect or even a negative effect on symptom levels of these children, depending on the severity of their comorbidity. Music therapists aim at improving self-esteem and self-confidence and tend to make a positive judgement of symptom changes and general success of therapy in these children. However, other problems, such as delinquent behaviour, may increase. A possible interpretation of this is that music therapy has negative side effects in children with severe somatic problems. However, it is another possible interpretation that by improving their self-esteem, other problems become visible that were previously below the surface, and therefore an increase in the level of psychiatric symptoms may be a necessary step in their development (as mentioned previously). The additional data, as reported above, suggest that the main goals and outcomes for these children are found on a different dimension, and individual music therapy is therefore not contraindicated for them. It is, however, important that music therapists as well as primary carers are prepared for the possibility that music therapy makes these children more difficult to handle, and that new problems may emerge that may require further therapy.

6.2.3 The effectiveness of specific music therapy techniques

The results of the study suggest that the treatment procedures used in clinical music therapy are different from the procedures used in experimental therapy - specifically, the techniques cover a broader range and include the use of other media

and activities, such as free play, playing games, role play, or painting and drawing. In two thirds of all cases in the sample, other media were among the three most frequently used techniques. This is clearly different from music therapy as implemented in experimental studies where musical interaction and verbal reflection formed the main components of therapy.

The results of the present study suggest that music therapy is far more effective when other media are *not* frequently used - as shown by medium effect sizes on symptoms ($d = 0.54, p < .01$) and on burdens ($d = 0.40, p < .05$) in these cases, compared to only marginal and non-significant improvement in cases where other media were an important part of the therapy procedures (symptoms: $d = 0.18$; burdens: $d = 0.12$). For the use of improvisation and verbal discourse, the opposite influence was identified. Clients' symptoms in daily life improved significantly when improvisation was frequently used, but showed no improvement in the other cases. Symptoms and resources within music therapy improved more when verbal reflection was an important component of music therapy. The results further suggest that music therapists actively strove to include other media, rather than merely allowing their use when clients were resistant towards musical interaction.

These findings indicate that the effectiveness of individual music therapy in clinical out-patient treatment is good if - and only if - techniques that are central to music therapy theory (such as improvisation and verbal reflection, but also songs and receptive techniques) are used, and other media that are not central to music therapy theory are not used. This does not necessarily mean that the use of other media should be avoided under all circumstances. There may be exceptional situations where it is helpful to include using other media, but using them regularly or over extended periods of time reduces the effectiveness of music therapy significantly.

In previous clinical reports, the value of improvisation in clinical work is well reported. In relation to the findings from this study of improvements in symptoms, improvisational methods were also reported to promote improvements in self-confidence and functioning at home (Robbins & Robbins, 1991), emotional balance and adjusted behaviour and progress at school (Strange, 1999), and improvements in non-verbal and verbal communicative skills (Oldfield, 1991). There are many such clinical reports (Etkin, 1999; Roeske, 1999; Voigt, 1999) and some research reports (Aldridge, 1995; Edgerton, 1994) in the literature that underpin the value of improvisational music therapy as an effective tool for facilitating expressivity and communication. The

findings from this study contribute towards the validation of these anecdotal reports of the transferability of the beneficial outcome of improvisational music therapy into other situations.

The finding of the study that verbal reflection improved symptoms and resources in daily life is also well supported in the literature. From a psychotherapeutic perspective, it has frequently been argued that verbalisation is necessary to bring to conscious awareness the experiences in musical improvisation. This has come to form an essential part of music therapy theory (Eschen, 2002; Priestley, 1994).

6.2.4 Conclusions on the specificity of the effect of music therapy

The findings cited above also allow another conclusion about the specificity of the effect of music therapy. Previous studies, as summarised in the meta-analysis, were able to show that music therapy is effective, but these studies did not answer the question of whether the effect of music therapy was due to specific music therapy techniques or mainly due to "common" or "unspecific" factors. Common or unspecific factors are variables that are shared by different therapy methods - for example, the therapist's warmth and empathy may be a factor that contributes to the effects of music therapy and the effects of other forms of psychotherapy in a similar way. There have been some attempts to address this question in previous studies by investigating the effects of active versus receptive music therapy (Montello & Coons, 1998; see also Hooper, 1990) and the effects of music therapy versus verbal therapy (Haines, 1989), but the present study included a much more complex examination of multiple treatment characteristics, based on current clinical music therapy practice. The findings of the present study suggest that there is a specific effect of music therapy, as music therapy was more effective if genuine music therapy techniques, rather than other media and activities, were applied.

6.2.5 Short-term versus long-term music therapy

In this study, typically the children had sessions once a week. While the majority had 25 sessions or more, a quarter of them received less therapy sessions. The findings suggest that symptoms and resources of mentally ill children and adolescents, as they present within music therapy, show significantly greater improvement when more therapy sessions are provided. This confirms the findings of a previous study (McQueen, 1975) where 30 sessions of music therapy produced larger effects than 17

sessions of music therapy. The dose-response relationship found in the present study was limited to behaviours within music therapy. As the assessment in the present study was limited to the first 25 therapy sessions, any changes that might occur later were not evaluated.

It is likely that not only the magnitude of effects, but also their nature, as well as the structure and the goals of individual music therapy, differ between short-term and long-term interventions. While short-term therapy is usually more focused on one or a few quite specific goals, long-term therapy more often aims at changes in general personality traits. This may explain why changes of behaviours in daily life during the first 25 sessions were not significantly related to the extent of therapy provided, but behaviours within music therapy were. One might speculate that profound changes of personality structure need to emerge and become visible within the music therapy sessions first, before a patient is able to transfer these achievements to other situations in his or her daily life. Conversely, in some instances changes that occur may never transfer to the everyday situation because they are an exclusive product of experiences within music therapy sessions.

One can conclude that this finding lends support to the value of longer-term therapy, which is increasingly under threat in modern health care. The problems evident in the population included in this study have built up over time, and in many cases have become entrenched and rigid. Consequently, therapeutic process will also take a lengthier period of time before alleviation of symptoms can realistically be expected.

6.2.6 The importance of early intervention

The findings of the study suggested that younger children who receive individual music therapy can expect to improve more than adolescents, although the effectiveness of treatment, as compared to the control condition, did not depend on the patient's age. This implies that symptoms and burdens are more subject to change in younger children. Findings of previous studies, as summarised in the meta-analysis, suggested that music therapy is equally effective for children and for adolescents. The present study confirmed this finding, but showed further that although the effectiveness itself may not depend on age, clients benefit more if the intervention begins early.

Two different mechanisms are likely to have influenced this result. Firstly, younger children may be more easily influenced by an intervention because their pathological behaviour has not stabilised over many years. Symptoms may become

more rigid and unchangeable the longer a condition persists. Secondly, the differences are also likely to reflect aspects of the normal development at different ages. For example, burdens on family and society tended to increase over time in the age group of 11 to 14. The importance of early intervention has recently been emphasised as a referral criterion when prioritising music therapy for children with developmental disability or pervasive developmental disorder (Wigram, 2002). Although individual music therapy is equally effective for all age groups, changes are greater in younger children than in adolescents.

6.2.7 The role and development of music therapists

The study revealed that the therapist's gender, experience and training have an influence on the amount of change in the patients' behaviour within music therapy sessions. The improvement increased with additional psychotherapy training, decreased with growing experience (up to 15 years) but increased again with very long experience (more than 15 years), and increased when the therapist had the same sex as the client. From previous research, little is known about the influences of therapist variables on the effects of music therapy.

Same-sex combinations of therapist and client have been recommended in clinical guidelines, but previous research has failed to identify any differences in outcomes (Körlin & Wrangsjö, 2001). The present study showed that music therapists see greater changes in their same-sex than in their opposite-sex patients. This may reflect a difference in actual changes as well as a difference in the therapists' sensitivity in seeing existing changes.

With growing experience, music therapists become more cautious in the evaluation of their clients' changes. It appears likely that inexperienced music therapists tend to exaggerate the amount of improvement in their clients and develop a more realistic view over the years. However, after many years of humbleness and modesty, they seem to rediscover their confidence and see greater changes in their clients again. (The finding seems to fit with the saying that a therapist's development goes from "unjustified self-confidence" through "justified lack of self-confidence" and "unjustified lack of self-confidence" to "justified self-confidence".) It is also important to consider the way therapists gain knowledge and experience and improve their clinical judgements as well as developing a more conservative and cautious way of explaining

therapy outcome. This can perhaps be seen even more significantly where therapists work within multidisciplinary teams.

It may also be that those who thought of their therapeutic interventions as being less successful stopped doing therapy after some years, while the others continued. However, while it remains unclear why it seems to take more than 15 years for these processes to occur, the need for ongoing professional development to build up clinical skills and evaluation methodology in therapists could be one important factor in explaining this phenomenon.

When music therapists undertake an additional training with a psychotherapeutic orientation, this also seems to sharpen their senses for clients' changes in therapy. (Conversely, the therapists may become more orientated towards their own experiences.) Again, the finding may reflect differences in actual changes as well as differences in the therapists' ability to recognise existing changes.

Together, these findings imply that gender, experience and training of music therapists are important variables that influence the changes they see occurring within individual music therapy with mentally ill children and adolescents, although the effects of music therapy on behaviours in other situations did not depend significantly on therapist's gender, experience or additional training.

6.2.8 The role of primary carers

Although parents of mentally ill children play an important role in treatment provision, little is known from previous research about the relationship between parents' satisfaction with treatment and treatment outcomes. Parents may have both a positive and a negative influence (e.g., initiating as well as breaking off therapy, enabling healthy development as well as unintentionally promoting pathological behaviour), therefore they can be part of the problem as well as part of the solution.

The results of the present study suggest that parents are more satisfied with longer courses of music therapy than with short-term interventions. This implies both that an increased length of treatment increases treatment satisfaction, and that parents decide to continue or discontinue music therapy based on their treatment satisfaction. (As the provided number of sessions was in most cases similar to the planned number of sessions, it is unlikely that only the second explanation is true.)

Parents showed greater satisfaction when therapists reported better outcomes. While this appears to imply that they are more satisfied if and because the therapy is

successful, it is also possible that parents were more compliant if they were more satisfied, and subsequently allowed the treatment to be successful. The finding that parents of girls were more satisfied with female therapists is related to the finding above that changes within therapy are greater when patient and therapist have the same gender. Together, these findings imply that parents' treatment satisfaction is crucial for the success of individual music therapy with mentally ill children and adolescents.

6.2.9 Summary

This study suggests that music therapy in clinical practice is less effective than in experimental settings for two primary reasons. The first reason is that music therapy in clinical practice includes many patients with comorbidity, who are excluded from experimental studies. The second reason is that the treatment is less "pure" than in experimental treatment, with other media and activities that are not genuinely typical for music therapy being actively incorporated. This raises the question which disorder(s) are you treating and with what. One might argue that music therapy would be more effective when comorbid patients or altered forms of treatments using other media are excluded. This finding also shows the specificity of the effect of music therapy.

Further findings highlight the relevance of early intervention and long-term intervention, and the importance of the therapist's gender, experience, and training, as well as the treatment satisfaction of parents, for the processes and outcomes of music therapy in out-patient services for mentally ill children and adolescents.

6.3 Limitations

The study has several limitations that need to be discussed. The first limitations to be mentioned are those that stem directly from the choice of a non-experimental design. The second point addresses the limited comparability of the groups, which is partly a consequence of the design. The remaining sections discuss the limited validity of the conditions and the outcome measures, and the limited number of data points.

6.3.1 Limitations of the quasi-experimental design

The present study was conducted using an observational rather than an experimental design, first because the object of investigation was the effectiveness of

therapy as conducted in typical clinical work, and second because the influences of a multitude of variables were to be addressed, which would have been impossible to do with an experimental design. In other words, the study was designed for maximum external validity (generalisability or applicability of findings to clinical practice), but at the price of a loss of internal validity (rigour of causal inferences drawn from the results). Although differences in variables that were observed at pre-test (e.g., age, gender, diagnosis, pre-test-scores) were balanced statistically, there may have been other, unobserved variables that influenced and distorted the results and could not be balanced. A randomised controlled study design would have balanced the influences of unobserved variables, as well as non-linear influences of observed variables.

From relationships between variables that were observed at post-test, such as the influence of therapy contents and duration, causal inferences cannot be directly drawn. Therefore the limitations stemming from the observational, non-experimental design are especially important for the findings addressing comparisons of different kinds of music therapy. The post-test variables that were thought to have an influence on the outcome variables were therefore compared to the available pre-test information. Since the results of these comparisons suggested that the actual therapy characteristics reflected characteristics of the treatment as planned, causal inferences could be drawn with some confidence, even in the absence of an experimental design.

The chosen design made it possible to explore much more complex relationships of variables than would have been possible in an experimental study, and the results are much more likely to reflect typical clinical practice than if an experimental design had been used. However, some of the findings, especially those on the influences of therapy contents, will certainly stand on stronger ground if they are replicated in an experimental study.

6.3.2 Limited comparability of intervention and control group

As a consequence of the quasi-experimental design that involved no random assignment but relied on observing existing groups, an equivalence of the two groups could not be assumed. In the intervention group there was a larger proportion of subjects with developmental disorders, and also larger proportions of subjects who, in addition to their primary diagnosis, suffered from axis 4 and axis 5 disorders, than in the control group. The pre-test scores of all outcome variables (parent ratings of symptoms, competencies, and quality of life, and self-reports of quality of life) tended to be worse

in the intervention group than in the control group, with a significant difference in symptoms and competencies. This suggested that the subjects in the intervention group were more severely disturbed than those in the control group. Moreover, as only a part of the control group were actually waiting for therapy, there may have been further qualitative differences that were likely to be in favour of the control group clients as well. Therefore, it appears likely that there were unobserved variables influencing the results without the possibility of balancing them statistically.

It is, however, difficult to say in which direction the differences between the groups influenced the results. From the statistical point of view, there is the phenomenon of regression to the mean which makes it more likely for higher scores to decrease than for lower scores. This means that the effect sizes representing effects of music therapy versus the control condition may have been inflated in favour of the intervention group and therefore there may have been some influences leading to an overestimated effect. In the analysis of variance, however, regression to the mean was controlled for, yielding a non-significant result.

From the clinical point of view, on the other hand, there is the phenomenon that more severe disturbances tend to be more persistent than less severe disturbances. As there were not only differences in the scores of the outcome measures, but also qualitative clinical differences, such as diagnosis or referral status, this influence may be more meaningful than the regression effect. For example, those children in the control group who were identified by teachers as having a problem that merits treatment with music therapy, but whose parents had not yet referred their child to therapy, may be more likely to have temporary and transient rather than persistent problems, and they may also have more resources, either intrapersonal or in their social environment, to cope with their problems on their own. The larger proportion of associated abnormal psychosocial situations in the intervention group also suggests that they may have had less support from their family and were confronted with more additional problems than the subjects in the control group. This suggests that the effects of music therapy versus the control condition were deflated because of the clinical differences.

It is therefore possible that the results were distorted in both directions by the observed differences between the groups. It cannot be concluded which phenomena exerted a greater distortion. The results may be either deflated or inflated. A randomised design would have avoided these problems, but possibly at the cost of having other

limitations, as described above. It should be mentioned that the existing effectiveness studies on psychotherapy with children had similar problems (see 2.4.3.3).

6.3.3 Treatment contamination and patient attrition

The term treatment contamination refers to all deviations of the actual treatment from the treatment to be investigated, including failing to provide the treatment to the intervention group, providing treatment to the control group, and providing other treatments. While all subjects in the intervention group received at least some music therapy, there were many subjects in the control group who also received other treatments, including psychotherapy. Therefore the actual control condition was quite different from the "no-treatment" condition that was defined for the study.

Almost two thirds of the control group received some form of psychosocial intervention, and every third child in the control group received psychotherapy in a narrower sense. The distortion that may be caused by treatment contamination could not be adequately controlled or balanced, as it must be assumed that treatment provision is related to patient characteristics and excluding such a large part of the control group would therefore most likely lead to other distortions (this strategy was still used in a sensitivity analysis, but led to an extremely reduced control group sample from which no reliable conclusions could be drawn). Therefore, the complete control group was retained, but it was more an alternative treatment comparison group than a no-treatment control group. However, the study did not include monitoring the frequency, duration or consistency of those alternative treatments. Assuming that the interventions that were provided additionally had a positive effect on the subjects, it is likely that the effect sizes of music therapy versus no treatment were reduced by treatment contamination in the control group.

Attrition or drop-out rates may have caused further distortion, but their influence was limited as the drop-out rate was relatively low (although the rate was a little higher in the control group, see 5.1.5 and 5.2.2).

6.3.4 Reliability and validity of assessment procedures and tools

Several limitations were inherent in the assessment procedures that were chosen for the study. This includes a limited reliability and validity of the outcome measures, a limited specificity of these measures to the range of diagnoses included, and the limited

number of data points at which the clients were assessed. It also includes the possibility of misclassification of cases, for example to a diagnosis-specific category.

Although outcome measures with sufficient reliability and validity were chosen for the study, the reliability of one scale - the competence scale - was reduced because only two of three sub-scales that were appropriate for the sample could be used. All measures used were open to subjective influences, making it possible that parents, therapists, and children intentionally or unintentionally distorted the results. Furthermore, there may have been differences in the raters' implicit concepts and definitions of the outcome domains, especially in health-related quality of life and intra-personal resources, as evident in the low inter-observer agreement on clients' development in these two domains.

Even if the measures were valid, it is possible that they did not fit the clinical sample or were not specific or sensitive enough. A large part of the sample, specifically including some of the more severe disturbances, some developmental disorders, and clients with comorbidity, may have had limited potential for improvement of symptoms and competencies, which may have limited the sensitivity of the instruments. Furthermore, measures such as the Child Behaviour Checklist total symptom scale might have been too broad to reflect the clients' specific problems. Broad measures were chosen in order to have the same measure for very different types of disorders and clinical problems. Using sub-scales that match the specific problems of clients with particular disorders was not a part of the research design.

As the number of data points was limited to a pre-test and a post-test, it is possible that changes were missed because they happened at different times during the process of therapy and potentially at follow-up. A design with more data points may have shown more clearly the developments over time. It is quite possible that music therapy has delayed effects that become evident after a longer time, either with or without further treatment. Especially the fact that every second case in the intervention group continued to receive music therapy after post-test makes this an important point. In long-term music therapy, therapists' goal for the first phase of treatment may be that the clients become more aware of, and begin to work with, their problems. This may lead to little improvement, or even a temporary increase, of symptoms, as a necessary first step in a therapy process. The phases and processes of long-term music therapy could be covered more adequately with a longitudinal research design involving a sequence of multiple data points.

Another issue related to the validity of the assessment procedures involves the classification of characteristics into groups, based on a category system being applied to a set of verbal data. It is possible, for example, that some cases were classified into the wrong category of primary and secondary diagnosis. However, the procedure of duplicate categorisation of diagnoses provided a means of improving the reliability of coding procedures.

6.3.5 Summary

We have seen that there were several limitations to this study, emerging from the characteristic features of the design, the clients, the treatment conditions, and the assessment procedures. While all of these limitations add uncertainty to the results, some of them are more likely to lead to an overestimation, others to an underestimation of the effects. A limitation that is likely to have overestimated the effect sizes (but not the ANOVAs) is the problem of regression to the mean (see 6.3.2). Limitations that are likely to have underestimated the effects of music therapy (both effect sizes and ANOVAs) are differences in severity and persistence of the included disorders (6.3.2), treatment contamination (6.3.3), limited reliability of outcome measures (6.3.4; see also Hunter & Schmidt, 1990), lack of adaptation of measures to specific disorders, and limited number of data-points (6.3.4). Therefore, it can be concluded that the effects of music therapy were probably underestimated in the present study.

6.4 Suggestions for clinical practice

Based on the findings of this research, suggestions can be given as to what disorders music therapy is indicated for, what specific models and techniques are most effective, and how the use of standardised tools can aid in routine clinical evaluation.

6.4.1 Indications of individual music therapy

Individual music therapy is a viable treatment for children and adolescents with a broad range of mental disorders, ranging from adjustment, affective, and emotional disorders through conduct and hyperactivity disorders to specific and mixed developmental disorders. The effectiveness of individual music does not depend

significantly on the primary diagnosis; however, it does depend on associated medical conditions.

Individual music therapy is recommended for children and adolescents with all the above groups of mental disorders who do not suffer from severe associated medical problems. These patients benefit substantially from individual music therapy. On average, individual music therapy, as provided in out-patient treatment, improves the level of symptoms in these patients by a medium effect size. For patients with these conditions, individual music therapy can now be recognised as an empirically supported treatment which has been shown to be effective both in experimental laboratory studies and in clinic-based effectiveness studies.

For patients who have comorbid somatic diseases (associated medical conditions), the effectiveness of individual music therapy cannot be confirmed from the results of this study. Depending on the severity of the associated condition, music therapy has little or even a negative impact on their level of psychiatric symptoms. Reports suggest that there may be positive effects in relation to the specific goals of therapy, which include the development of self-esteem and self-confidence as the most frequent goals, among others (see Table 48). However, individual music therapy may have the side effect of increasing or prolonging behaviour problems and symptoms in this particular population. For patients with associated medical conditions, individual music therapy cannot be regarded as an empirically supported treatment. Increased caution and awareness of the possible side effects are required when providing individual music therapy to this group of patients. Since it is possible that patients become more difficult to handle as a consequence of becoming more self-confident, it may be worthwhile to put increased emphasis on teamwork and family work. Including clinical evaluation and quality control procedures may also help improving the outcome and reducing the harm of possible side effects of individual music therapy for children with comorbidity.

6.4.2 Effective models and techniques of music therapy

In the ongoing discussion about whether other activities that are not "typical" for music therapy should be used in music therapy with children, the findings of this study very clearly support the view that such activities should not be included. The study showed that individual music therapy is not effective when other media and activities, such as playing games or painting, are used, but is effective when the activities in music

therapy are limited to the various forms of musical interaction, accompanied by verbal reflection.

This does not contradict the finding of the meta-analysis of previous efficacy studies that suggested that eclectic approaches to music therapy, where techniques from different approaches are used, may be more effective than approaches where a single method is more purely or more rigorously applied (Clendenon-Wallen, 1991; Haines, 1989; Montello & Coons, 1998; see Tables 2 and 8). Rather, the findings of the meta-analysis and the study together suggest that an effective treatment strategy in music therapy needs to be individually adapted to the needs of the patient (rather than following a pre-determined treatment protocol), but within a well-defined and specific music therapy setting and structure.

Other authors argued that the use of other media may be useful, even inevitable, in phases of resistance or in the beginning of a therapy process (Fak & Schmidtmayr, 1997). As they aptly point out, it is not a very promising strategy in music therapy to put pressure on a child to use music. However, the present study suggests that using other media and activities in individual music therapy has become quite usual and is not limited to such exceptional situations any more. It is true that it is possible to perceive and respond to seemingly non-musical situations in musical ways (*ibid.*), and the present study has shown that using forms of musical improvisation with varying degrees of structure is an effective component of individual music therapy. It is important to lead the patient towards the medium that constitutes the essence of music therapy and that makes this therapy most effective.

6.4.3 Tools for clinical evaluation

In the clinical field of music therapy with mentally ill children, there is an ongoing search for appropriate systems and tools for assessment and evaluation (Wigram, 2000; Wigram & De Backer, 1999). The results of the present study may help in the selection of instruments for the evaluation. As this study examined the effectiveness of routine music therapy treatment, the assessment procedures and tools that were used in the study have already proven to be feasible within typical clinical contexts, without disturbing the clinical work too much or producing an unreasonable amount of additional work for clinical staff.

The problem scale of the Child Behaviour Checklist (parent version) has been shown to be a useful scale for judging the general development of the patients'

behaviour problems. It has excellent reliability and contains scales that are highly relevant for the success of therapy. In the study, the total scale showed success of music therapy as well as its negative effects, and it helped to identify differences between the effectiveness for different clinical conditions (with vs. without comorbidity) and different types of music therapy (with vs. without using other media). For clinical evaluation purposes, the sub-scales of the CBCL are perhaps even more useful, in addition to the total scale, because for a given patient, some problems will be more relevant than others. For example, one might wish to look specifically at the development of anxiety and depression, aggressive behaviour, or attention problems, using the CBCL sub-scales. Because the scales included in the CBCL can be transformed into T-scores that are linked to percentiles in the normal (non-clinical) population, they give information about the severity of a client's problems in comparison with healthy children of the same sex and age group (see section 4.4.1). The questionnaire items themselves are a more comprehensive list of possible behaviour problems than what can be covered in a typical meeting with parents. Especially for music therapists who do not work closely within a multidisciplinary clinical team, this questionnaire provides background information that would be hard to obtain otherwise and is useful at the beginning of a new therapy, as well as after a period of therapy has been provided.

In contrast to the scale above, the KINDL quality of life questionnaires, both for self-report and for parent rating, ask questions that are more indirectly related to the main problems of mentally ill children and adolescents. It has a very good reliability and promises to be useful for clinical evaluation for mainly two reasons. First, it focuses on subjective experiences more than on objectively observable behaviour, which is relevant because this is what the treatment does. Second, the results of the study suggest that the KINDL is sensitive to the effects of individual music therapy in out-patient treatment. Although this scale has been standardised with a non-clinical population, it is not as well-suited for comparing the score of an individual patient with the average child as the CBCL problem scale because it does not provide T-scores and percentiles. Nevertheless, in addition to a scale like the CBCL problem scale, the KINDL is a useful tool as well.

The competence scale of the CBCL is less useful for clinical evaluation and showed many disadvantages, including low reliability, limited applicability, and possible validity problems. It was used in the study because there was no comparable

scale with better properties. The scale is ultimately not so appropriate for patients below or above school age and for patients with severe learning disabilities who attend special classes. The authors assert that the scale should not be used for clinical evaluation of individual patients, although some of its items may add useful background information (Döpfner et al., 1994; see section 4.4.2).

One of the non-standardised scales that may be useful for clinical evaluation is the scale of burdens on family and society. In the results of the study, it showed good reliability and adequate sensitivity to changes in individual music therapy, and it was able to distinguish different types of patients (primary diagnosis, age) as well as different types of therapy (with vs. without other media). Burdens on family and society are a relevant outcome and may be directly related to the need for, and referral to, music therapy. As it has not been standardised, however, the scale is less useful for assessing the severity of a client's disturbance in comparison to others.

As noted above, clinical evaluation demands - and allows - more flexibility in the choice of specific measures. For example, the results of the present study identified a negative effect of music therapy on behaviour problems in patients with severe somatic comorbidity, but the goals of therapy for this group of patients included mainly the improvement of self-esteem and self-confidence, an outcome that was not included in the study design. In the clinical evaluation of individual cases, tools can and should be more specifically matched with clinical conditions and goals of therapy. The interpretation of test scores in clinical evaluation will also differ from research evaluation, as in clinical evaluation the results can be discussed together with team members and/or caregivers, involving adaptability and flexibility of interpretation.

Research results can guide the decision for clinical evaluation tools, and the results of clinical evaluation can again build the data for further research. If many music therapists use the same instruments in their routine clinical evaluation, they could also contribute with their cases to a larger and continuously growing database that could then be used for further research into the clinical effectiveness of music therapy.

6.5 Suggestions for future research

The findings of the present study show pathways for future research in several directions. First, some of the findings of the study should be replicated in randomised and more specifically focused studies. Second, the general and broad focus of the methodology could be used for further clinic-based longitudinal studies. Further types of research that may help to contribute to our understanding of some of the processes investigated here are addressed in a third section. From a methodological perspective, the findings of the study highlight the importance of using effect sizes for the interpretability and clinical relevance of research results.

6.5.1 Replication of the findings with randomised controlled trials

With the observational design and the possibility to explore relationships between many variables, the study showed a number of ways in which the effectiveness of individual music therapy for mentally ill children and adolescents is influenced, but causal inferences from such observational data cannot be drawn with the same rigour as from experimental studies. Therefore, it would be useful to replicate the findings of this study in randomised studies.

Random allocation to groups is the most powerful method for ensuring that intervention group and control group are equivalent, which was clearly not the case in the present study. On the other hand, randomised studies require much greater resources than observational studies of the same sample size, because they involve changing and extending the clinical procedures, and therefore not every clinical institution may be able and willing to co-operate. The present study relied on the co-operation of many different institutions, some of them being very small, and was conducted with very limited financial resources. The results of the study are preliminary because of the lack of randomisation, but may provide the basis for larger randomised research projects in the future.

Some of the specific questions to be addressed by future randomised studies, based on the findings of this research, may be: How can individual music therapy have positive effects for children with severe somatic comorbidity, for example regarding their self-esteem? Are there specific treatment approaches for this population that are more effective than others? Is individual music therapy for mentally ill children and adolescents really less effective when other media and activities are frequently used, i.e.

does this difference hold under random allocation to music therapy with versus without other media?

Further questions for randomised studies based on the findings of this study may address the influence of other therapy contents (improvisation, verbal reflection), the influence of short-term versus long-term music therapy (and in relation to this, the influence of the number as well as the frequency of therapy sessions), and the influence of therapist variables (gender, experience, training). Each of these influences could be addressed in a separate randomised trial.

6.5.2 Clinic-based longitudinal studies

Another issue worth following in future research, based on the findings of this study, is the evaluation of music therapy in longitudinal studies where the development of patients is evaluated throughout the process of therapy. In the present study, the assessment span was limited to the first 25 sessions of music therapy, but the therapy was often continued after this period. By using several assessment points at given time intervals during the therapy process and also including follow-up assessments at a given time after termination of therapy, future studies may help to explain how the extent of therapy is related to its outcome and to identify the role of specific phases in the therapy process for the outcome.

Such studies would be more directly related to quality control research than to experimental outcome research. They may not necessarily need a control group (although they might do so in principle), because the focus would be more on the specific development over time than on the efficacy or effectiveness of therapy. Databases of cases in music therapy, assessed with standardised instruments as described above (6.4.3), could build the basis for this type of applied research.

6.5.3 Further types of research

Case study research may well be useful in exploring in more detail both processes and outcomes of individual music therapy, given the results from this study. Particularly, any side effects that were noted might be more clearly understood by case studies and case series. The individual differences one sees in children even when they belong to an identified clinical population demand some attention in order to explore more intensively the complex nature of development through long-term therapy, and the

inevitable differences (as well as similarities) one will see in comparable children that meet similar inclusion criteria.

6.5.4 Methodological issues for future studies

The findings of the study highlight the importance of a few methodological qualities for future studies: First, it is important to have large sample sizes in order to increase statistical precision and test power - especially when there are many sub-groups involved or when there are few data points for each participant. Second, the findings also show that it is useful to include multiple outcome domains, as it is usually not known which outcomes will be most sensitive to the therapy procedure. Multiple observer perspectives are equally important, especially in therapy for children, as their behaviour is different in different situations and inter-observer agreement is generally low. Finally, the study showed that using effect sizes is important, in addition to the testing of hypotheses through tests of significance, in order to improve the clinical interpretability and usability of research results.

6.6 Conclusion

Studying the outcomes of music therapy with a controlled quasi-experimental design has shown that the clinical effectiveness of treatment is highly dependent on patients' comorbidity and on the specific procedures used in therapy. The study showed that individual music therapy effectively reduces the level of psychiatric symptoms in mentally ill children without associated medical conditions, while there may be no effect or negative side effects for mentally ill children suffering from severe medical conditions. Individual music therapy effectively reduces symptoms if the procedures used are limited to musical and verbal techniques of therapy, without including other media. The study design and analyses attempted to take into account much of the complexity of the clinical world, rather than excluding the influences that might be troublesome (such as comorbidity).

While the analysis of the overall effects of music therapy averaged across all these clinical variations was comparatively straightforward, analysing how these clinical variations may influence the effectiveness of treatment has been the more challenging part of the research. The features of this fairly major study, involving

relatively large numbers of both participants and included variables, enabled the examination of multiple possible influences on the effectiveness of music therapy. In this process, it was very important to be clear and specific about the clinical questions and hypotheses to be addressed. Choices had to be made about the inclusion of variables (and interactions of variables) in the analyses, and it was important that these decisions were clinically informed in order to produce results that are clinically meaningful and usable in clinical work.

In my efforts to keep the research procedures connected to the "clinical world" and to improve the clinical usability of the findings, one of the central methodological aspects of this research was the use of effect sizes. In the meta-analysis that was included as a preparation for this study, findings from previous studies were first transformed into effect sizes in order then to be able to combine them systematically. These transformations showed how useful effect sizes can be in helping to identify clinically relevant information and presenting this information in a comprehensible way. In the original research reports of these previous studies, such information was sometimes not identified (as in the main results of Haines' study) or not adequately described (as in the short-term versus long-term comparison in McQueen's study). Similarly as in the meta-analysis, effect sizes with confidence intervals were also used in the analysis of the present study, and proved to be a useful means of describing research results in a way that retains the clinically relevant information of magnitude without losing the statistically relevant information of precision.

The process of doing this research was a valuable experience that taught me a lot about all the steps that are involved in conducting an empirical study - from the development of research questions and hypotheses that are clinically meaningful and "to the point", through the practical problem of motivating colleagues, as well as keeping them motivated, to participate in data collection for such a study, to the choice and development of the most appropriate statistical methods and the clinically meaningful interpretation of the results. It has further taught me that although the results of a study may be different from what one expects, it is necessary to move on with an attitude of openness in order to be able to find out something new. Or, as David Aldridge once put it, "the risk of doing research is that you may find something out".

The main findings of the study have now been received by some of the music therapists in the Vienna area, and have started to influence their work. According to the personal reports of some of these music therapists, the finding that music therapy is less

effective when other media are often used has caused them to rethink their therapeutic strategies and made them focus more on musical forms of interaction. Over the years, with the increasingly psychotherapeutic orientation of music therapy, the knowledge of the specific effectiveness of music in music therapy may have been partly lost, and some music therapists seemed to be relieved to hear that ultimately there is evidence of a specific effect of using music, as opposed to other media, within music therapy.

If the interpretation of this study result is correct, this recent development also means that music therapy is now carried out in a more effective way than it was before. This may be a good example of the positive role of evidence-based practice in improving health care procedures.

7 Summary

7.1 English summary

The aim of this research was to investigate the effectiveness of individual music therapy for children and adolescents with various kinds of mental disorders in out-patient treatment, and to identify factors that influence its effectiveness.

Various interventions are available for mentally ill children and adolescents. For children with mood and adjustment disorders, systematic reviews show that psychosocial interventions are an effective treatment. Pharmacological therapy is not effective for children but may have benefits in adolescents (Hazell, O'Connell, Heathcote, & Henry, 2002; Michael & Crowley, 2002; Recker, Ensing, & Elliott, 1997). For children with anxiety and emotional disorders, no systematic reviews of treatment outcome studies were identified; however, psychotherapy, accompanied by parent counselling, is recommended as the central treatment for this population (Steinhausen, 2000). For children with behavioural disorders, including conduct disorders and attention deficit hyperactivity disorders, findings from systematic reviews support the efficacy of psychosocial interventions and family and parenting interventions (Barlow, 1997; Montgomery, 2002; Woolfenden, Williams, & Peat, 2002). Research shows that adults with learning disabilities benefit more from behavioural training than from medication (Didden, Duker, & Korzilius, 1997).

Music therapy is defined as an intervention where a therapist uses musical experiences and the relationships developing through them to achieve health goals in a client (Bruscia, 1998). Models of music therapy are based on psychoanalytic, humanistic, cognitive-behavioural, or developmental theory, and differ in their use of active and receptive techniques, level of structure, and importance of verbal reflection in relation to music (Drieschner & Pioch, 2001). In music therapy with children, other media and activities are frequently included as well (Fak & Schmidtmayr, 1997). Music therapy is provided for children and adolescents with various emotional, behavioural, and developmental disorders, as well as undiagnosed mental health problems, addressing goals that range from emotional expression to social skills, identity, and quality of life, and using techniques such as free and structured improvisation and songs (Wigram, Nygaard Pedersen, & Bonde, 2002).

There are numerous case studies of music therapy for mentally ill children and adolescents, showing how the clients improved in their presenting symptoms, as well as being able to develop their personality, through the processes of music therapy (Bruscia, 1991; Wigram & De Backer, 1999). As evidence of therapeutic effects of therapy, however, the value of case studies is limited by the retrospective choice of successful cases, the lack of control for development and maturation that may occur independently of therapy, the subjective and retrospective choice and evaluation of outcomes for a given client, and in some cases the simultaneous provision of multiple treatments. Studies on the effects of treatments can be divided into efficacy and effectiveness studies, where efficacy is defined as the effect of a treatment under ideal conditions, while effectiveness is understood as the effect of a treatment under ordinary circumstances (The Cochrane Collaboration, 2001). Effectiveness studies are typically conducted when a treatment has been shown to be efficacious in previous efficacy studies.

Considering the relevance of the question of the magnitude of a treatment effect, effect sizes are an important concept to be considered in music therapy research in mental health. Presenting research results as effect sizes with confidence intervals is a way of retaining the clinically important information of the magnitude of an effect without losing the probabilistic information that is given in a statistical test. Existing guidelines for the interpretation of effect sizes (Cohen, 1988) may be used to transport research results in an intuitively comprehensible way. Previous examples of music therapy research show that important information may be overlooked when failing to use effect sizes (e.g., Haines, 1989; see also Amir, 1993).

Meta-analyses of previous efficacy studies on psychotherapy with mentally ill children and adolescents have shown that the various forms of psychotherapy have an average effect of a medium size, which may differ according to treatment approach, patient population, and outcome measure (Casey & Berman, 1985; Kazdin, Bass, Ayers, & Rodgers, 1990; Weisz, Weiss, Alicke, & Klotz, 1987; Weisz, Weiss, Han, Granger, & Morton, 1995). Limitations of these meta-analyses include unspecific inclusion criteria, limited generalisability (e.g., due to the inclusion of analogue studies), lack of correction for pre-test differences, and allegiance of the researcher. The few effectiveness studies that have been conducted to date in this field failed to replicate the findings from the efficacy studies (Weisz & Weiss, 1993).

A meta-analysis of music therapy for mentally ill children and adolescents was conducted as part of this research. The objectives of this review were to examine the overall efficacy of music therapy with mentally ill children and adolescents, and to examine how the size of the effect of music therapy is influenced by the type of illness, client's age, music therapy approach, and type of outcome. Eleven studies were included for analysis, which resulted in a total of 188 subjects for the meta-analysis. Effect sizes from these studies were combined, with weighting for sample size, and their distribution was examined. For a conservative result, an extremely positive outlying value was excluded. The analysis revealed that music therapy has a medium to large positive effect ($d = 0.61$) on clinically relevant outcomes. This was statistically highly significant ($p < .001$) and statistically homogeneous. Effects tended to be greater for behavioural and developmental problems than for emotional disorders; greater for eclectic, psychodynamic, and humanistic approaches than for behavioural models; and greater for behavioural and developmental outcomes than for social skills and self-concept.

Based on these previous findings, the research questions for this study addressed the question of the clinical effectiveness of individual music therapy in out-patient treatment of mentally ill children and adolescents, and aimed at examining how its effectiveness is influenced by patient and therapy characteristics. The first set of questions addressed the statistical significance and clinical relevance of the average effectiveness of music therapy in clinical practice. The second set of questions addressed the influence of primary and secondary diagnosis as well as age and gender, and based on that, the differential indication and contraindication of individual music therapy. The third set of questions centred around the influences of specific features of music therapy, including the "dosage" of treatment, the use of specific music therapy techniques, specific circumstances of therapy, and personal and professional characteristics of the music therapist.

Method

The main methodological features of the study, including a controlled quasi-experimental pre-test post-test design, a broad and inclusive sample, non-manualised therapy procedures, and multiple domains of outcome assessment, were developed to best match the study's focus on the effectiveness of typical clinical treatment procedures

with typical patients. The feasibility of this design was tested in a pilot study (Gold, Wigram, & Berger, 2001).

The participants of the study totalled 136 mentally ill children and adolescents, with an intervention group of 75 subjects who began music therapy and a control group of 61 other subjects who were either waiting for therapy or for whom therapy was recommended. The participants were between 3 ½ and 19 years of age, and two thirds of them were male. Where a coded diagnosis was not available, descriptive diagnoses were coded into predefined categories by two independent coders. There were 37 subjects with an adjustment or emotional disorder (most frequent diagnosis in this group: F43 adjustment disorder), 36 subjects with a behavioural disorder (most frequent diagnosis: F90 hyperkinetic disorder), and 63 subjects with a developmental disorder (most frequent diagnosis: F83 mixed specific developmental disorder). Secondary diagnoses included medical conditions (axis 4 diagnoses) in 73 cases and abnormal psychosocial situations (axis 5 diagnoses) in 88 subjects, with both types of conditions being more frequent in the intervention group than in the control group.

Subjects in the intervention group received music therapy with one out of 15 qualified music therapists with different amounts of experience and additional training. The therapists described their professional background as psychotherapeutic and eclectic, often based on psychoanalytical and humanistic theory, and reported that they most typically use improvisation, songs, verbal discourse, and other media and activities (such as role play, games, and painting and drawing) in their work with children and adolescents. The content of music therapy sessions with the actual cases was reported separately at post-test.

The goals of music therapy most frequently reported for the subjects in the intervention group were to foster the ability to build and sustain relationship, to improve self-esteem and self-confidence, to increase the potential for emotional expression, and to improve social behaviour and interaction with others. Typically music therapy sessions of 45 minutes were offered once a week, with the planned duration of therapy varying greatly from ten sessions to two years. Post-test assessments in the intervention group were to be taken after 25 sessions (or at the end of therapy, whichever came first). The control condition was defined as a condition where the subjects received no psychotherapeutic intervention (including music therapy) between pre-test and post-test. Post-tests in the control group were to be taken after seven months (or at the end of the waiting period, whichever came first).

Outcome assessment included multiple domains and multiple observer perspectives, using standardised scales with high reliability where available. The level of psychiatric symptoms was measured using the total problem T-score of the parent version of the Child Behaviour Checklist (CBCL; Döpfner et al., 1994), which addresses a broad range of behaviour problems and has excellent reliability. A second observer perspective was included in the intervention group where therapists evaluated symptom change within therapy and in daily life using visual analogue scales (VAS). The second outcome domain, general and social competencies and intra-personal resources, was assessed using the competencies scale of the parent version of the CBCL and therapists' change ratings using VAS as above. The third outcome domain, quality of life, was measured with the parent version and the self-report form of the standardised instrument KINDL (Ravens-Sieberer & Bullinger, 1998), which has an excellent reliability and has demonstrated discriminant validity. In addition, therapists evaluated changes in quality of life using a VAS rating as above. In the intervention group, burdens on family and society (at pre-test and post-test) and treatment satisfaction (at post-test) were rated with non-standardised scales by parents. Therapists and referrers also reported a general verbal judgement of the child's development.

Preparatory statistical analyses included a reliability analysis for the two non-standardised scales, data screening, computation of standardised change scores, and calculation of inter-observer agreement. The statistical analysis of the results included analyses of covariance and descriptive analyses of relative frequencies, effect sizes, and change ratings.

Results

On average, the subjects in the intervention group received 23 sessions of music therapy until post-test, with music therapy being continued after post-test in every second case. In most cases, therapists reported improvisation and other media as the techniques that were most frequently as well as most successfully used. An analysis of covariance revealed that the use of songs, receptive techniques, other media, and verbal discourse in music therapy, and the continuation of music therapy after post-test, depended on the subjects' age, gender, and axis 5 diagnosis.

Almost two thirds of the control group (59%), but only a small proportion of the intervention group (9%), received other interventions on a psychotherapeutic or educational level. Parent counselling was provided as an accompanying intervention for

about two thirds of all cases. The provision of parent counselling, psychotherapy, functional therapy, and medical treatment depended on their age, primary diagnosis, and axis 5 diagnosis. The drop-out rate in the whole sample was 13%.

The reliability of the two non-standardised scales was good (satisfaction: $r_{tt} = .89$; burdens: $r_{tt} = .67$). The distributions of pre-tests and change scores of all variables were close to the normal distribution, justifying the use of parametric statistics. Ratings of the same outcomes by different persons showed moderate correlations, which was within the expected range.

An analysis of variance revealed no significant effects of music therapy when compared with the control condition, but found significant differences between the groups, suggesting that the intervention group was initially more disturbed. However, the descriptive analysis showed considerable effect sizes on quality of life (parent rating: $d = 0.29$; self report: $d = 0.44$) and small effect sizes on symptoms ($d = 0.10$) and competencies ($d = 0.02$). Significant improvement over time was found in the intervention group on symptoms ($p < .01$) and quality of life ($p < .01$) (parent ratings), while the control group showed no such improvement. Retrospective rating of change by therapists suggested an improvement of symptoms, intra-personal resources, and quality of life in the intervention group.

An analysis of covariance addressing the influence of patient characteristics revealed that the effectiveness of music therapy on symptoms was heavily influenced by the presence of a medical condition (axis 4 diagnosis) ($p < .01$). Music therapy had a medium positive effect for subjects without such comorbidity ($d = 0.44$), no or little effect for those with moderate medical conditions ($d = 0.04$), and a medium to large negative effect for subjects with severe somatic symptoms ($d = -0.74$). The development of symptoms and burdens in the intervention group also depended on the clients' age and primary diagnosis.

Another analysis of covariance was performed to examine the influence of therapy characteristics, revealing a strong influence of the use of other media on the development of symptoms ($p < .01$) and burdens ($p < .05$). Both outcomes improved more when other media were not among the frequently used techniques (symptoms: $d = 0.54$ vs. $d = 0.18$; burdens: $d = 0.40$ vs. $d = 0.12$). Conversely, the use of improvisation and verbal reflection had a positive influence on symptoms and intra-personal resources. Further significant influences included the number of therapy sessions, the amount of experience and additional training of the therapist, and the interaction of

therapist's and client's gender. Parents' satisfaction with treatment was significantly related to the number of sessions and the interaction of therapist's and client's gender.

Based on the results above, the influences of severe medical conditions as possible contraindications of individual music therapy were more closely examined. There were 20 subjects suffering from severe somatic comorbidity, including brain damage ($n = 8$), motor dysfunction ($n = 8$), hearing impairment ($n = 4$), and other conditions. Music therapy for these clients was primarily aimed at improving self-esteem and related goals. An examination of the eight symptom sub-scales of the CBCL showed the strongest interaction on the delinquency sub-scale, revealing no direct relationship with the specific problems or therapy goals of these clients. The more general ratings of symptoms in daily life and general success and development, as provided by therapists and referrers, suggested that the effects of music therapy for these clients were similar or better than for clients without such comorbidity, which contrasted with the results from the parent rating of symptoms.

Discussion

The findings of the study show some, but limited evidence that individual music therapy, as currently provided in out-patient treatment, may be effective in reducing symptoms and improving quality of life. Comorbidity with medical conditions and the use of other media in music therapy were identified as the two main factors reducing the effectiveness of music therapy in current clinical practice.

Findings from efficacy studies are not necessarily directly generalisable to the effectiveness of a method in actual clinical settings. The results of the meta-analysis demonstrated convincing evidence that music therapy is an effective treatment for mentally ill children and adolescents, but the findings of the present study suggest that its effectiveness in clinical practice is not as good as its efficacy. This is consistent with previous findings on the efficacy and effectiveness of psychotherapy with children.

Comorbidity with medical conditions is a frequent problem in clinical practice, as shown by its presence in more than half of all children in the sample of this study. However, cases with comorbidity are usually excluded from efficacy studies (Aldridge, Gustorff, & Neugebauer, 1995). The present study demonstrated the effectiveness of music therapy for children without comorbidity, but failed to identify a positive effect for those who have comorbid medical conditions.

The use of specific music therapy techniques is another feature that distinguishes music therapy in experimental studies (where music and verbal reflection form the main components) from music therapy in clinical practice (where other media are among the most typically used techniques). The study showed that music therapy is far more effective when other media are not used much than when they are included as a central technique. Conversely, there was some evidence that the frequent use of improvisation and verbal reflection was positively related to outcomes of music therapy. In the ongoing discussion on specific versus common factors of psychotherapy, these findings allow the conclusion that there is a specific effect of music therapy, i.e. that it is based on specific techniques, rather than being merely a consequence of the therapist's warmth or empathy (cf. Haines, 1989; Montello & Coons, 1998).

Further findings of the study confirm the importance of long-term therapy work (cf. McQueen, 1975) and underline the value of early intervention. The professional development of music therapists, including experience and additional training, as well as their gender in relation to the client's gender, also seem to have an influence on the effectiveness of music therapy (cf. Körlin & Wrangsjö, 2001). Finally, the findings imply that parents' satisfaction with music therapy is crucial for the success of music therapy with mentally ill children and adolescents.

The study used a quasi-experimental, observational design, and therefore causal inferences from its findings require some caution. Subjects were not randomly assigned to conditions, and therefore existing differences between the groups may have influenced the results. Although linear influences were balanced statistically in the analysis, it is possible that there were non-linear influences, as well as influences from further, unobserved or even unobservable variables. The higher proportions of axis 4 and axis 5 comorbidity and the pre-test scores indicated that the intervention group was more severely disturbed than the control group. Another influence that could not be controlled in the observational study design was the provision of other psychotherapeutic and educational interventions to a large proportion of the control group. A further limitation of the study was inherent in the limited reliability of some of the measures as well as their limited specificity to the broad range of clinical conditions involved. Most of these limitations were more likely to reduce than to inflate the observed effects.

The results support individual music therapy for children and adolescents with a broad range of mental disorders, including adjustment, emotional, behavioural, and

developmental disorders, who do not suffer from comorbid medical conditions. It is recommended that individual music therapy for mentally ill children and adolescents be focused on music and verbal reflection, without including the routine use of other media. Although other media may be useful in phases of resistance (cf. Fak & Schmidtmayr, 1997), it is important to lead the patient towards the medium that constitutes the essence of music therapy and that makes this form of therapy most effective.

Directions of future research on the basis of this study include a replication of the findings on the influence of comorbidity and specific therapeutic techniques with randomised controlled trials. The study may also serve as a model for further clinic-based longitudinal studies addressing clinical effectiveness and quality control issues. Furthermore, the study findings highlight a few methodological issues for future research, including the importance of large samples, multiple outcome domains and perspectives, and effect sizes. This study has shown evidence of the effectiveness of music therapy with mentally ill children and adolescents, and has provided explanations on how and why the effectiveness of this therapy differs from its experimental efficacy. The findings provide empirically based hypotheses for research on different forms of therapy for this population and may also directly help therapists to make their clinical work more effective.

7.2 Dansk resumé

Formålet med dette forskningsprojekt har været at undersøge effekten af individuel musikterapi med børn og unge med diverse mentale forstyrrelser i ambulante behandling, samt at identificere faktorer der har en indflydelse på dens effekt.

Diverse tiltag står til rådighed for psykisk syge børn og unge. For børn med psykiske tilpasnings forstyrrelser viser systematiske litteraturgennemgange at psykosociale tiltag er en effektiv behandling. Farmakologisk behandling er ikke effektiv for børn men kan være til nytte for voksne (Hazell, O'Connell, Heathcote, & Henry, 2002; Michael & Crowley, 2002; Recker, Ensing, & Elliott, 1997). For børn med angst og følelsesmæssige forstyrrelser er ingen systematiske litteraturgennemgange af behandlings effektstudier blevet identificeret. Imidlertid er psykoterapi, i sammenhæng med forælderadgivning, anbefalet som den væsentligste behandling for denne målgruppe (Steinhausen, 2000). For børn med adfærdsforstyrrelser, indbefattet AD/HD (som omtrent svarende til DAMP på dansk), understøtter fund fra systematiske litteraturgennemgange effektiviteten af psykosociale tiltag samt familie og forældre tiltag (Barlow, 1997; Montgomery, 2002; Woolfenden, Williams, & Peat, 2002). Forskning viser at voksne med indlærings vanskeligheder har mere gavn af adfærdstræning end af medicinering (Didden, Duker, & Korzilius, 1997).

Musikterapi er defineret som et tiltag hvor en terapeut benytter musikalske oplevelser og den relation der udvikles gennem disse til at opnå helbredsmæssige mål hos en klient (Bruscia, 1998). Musikterapeutiske modeller er baseret på psykoanalytiske, humanistiske, kognitiv-adfærdsmæssige eller udviklings-teorier, og adskiller sig fra hinanden i deres brug af aktive og receptive teknikker, grad af struktur samt betydningen af verbal refleksion i forhold til musik (Drieschner & Pioch, 2001). I musikterapi med børn inddrages ofte andre udtryksmidler og aktiviteter (Fak & Schmidtmayr, 1997). Musikterapi tilbydes børn og unge med forskellige emotionelle, adfærdsmæssige og udviklingsmæssige forstyrrelser, samt udiagnosticerede psykiske problemer, med målsætninger som spænder fra emotionelle udtryk til sociale evner, identitet og livskvalitet, og med brug af teknikker såsom fri og struktureret improvisation og sange (Wigram, Nygaard Pedersen, & Bonde, 2002).

Der er et stort antal casestudier omhandlende musikterapi med psykisk syge børn og unge der viser hvordan klienterne udviste færre symptomer, ligesom de var i stand til at udvikle deres personlighed, i musikterapiprocessen (Bruscia, 1991; Wigram & De

Backer, 1999). Som bevismateriale for terapeutisk effekt af terapien er værdien af caseundersøgelser imidlertid begrænset af det retrospektive valg af succesfulde cases, manglen på kontrol i forhold til udvikling og modning som kan forekomme uafhængigt af terapien, det subjektive og retrospektive valg og evaluering af resultater for en given klient, og i nogle tilfælde adskillige og samtidige behandlinger. Undersøgelser af behandlingseffekt kan opdeles i virknings (efficacy) og effekt undersøgelser, hvor virkningen er defineret som effekten af en behandling under de mest ideelle betingelser, mens effekt er forstået som effekten af en undersøgelse under almindelige omstændigheder (The Cochrane Collaboration, 2002). Effekt undersøgelser udføres typisk når en behandling viser sig at være virkningsfuld i tidligere virknings (efficacy) undersøgelser. I betragtning af relevansen af spørgsmålet om vigtigheden af behandlingseffekt er effektstørrelser (effect sizes) et vigtigt koncept at tage i betragtning i musikterapiforskning inden for psykiatrien. At fremlægge resultater som effektstørrelser sammen med konfidensintervaller giver mulighed for at bibeholde klinisk vigtige informationer af størrelsesordenen på en effekt, uden at miste informationer om sandsynlighed som gives i en statistisk test. Eksisterende retningslinier for fortolkningen af effektstørrelser (Cohen, 1988) kan bruges til at formidle forskningsresultater på en intuitivt forståelig måde. Tidligere eksempler fra musikterapiforskning viser at vigtig information kan blive overset når der ikke bruges effektstørrelser (f.eks. Haines, 1989; se også Amir, 1993).

Meta-analyser af tidligere udførte effekt undersøgelser vedrørende psykoterapi med psykisk syge børn og unge har vist at adskillige former for psykoterapi har en gennemsnitlig middel effekt, hvilket kan variere alt efter behandlingsmetode, antallet af patienter, samt resultater (Casey & Berman, 1985; Kazdin, Bass, Ayers, & Rodgers, 1990; Weisz, Weiss, Alicke, & Klotz, 1987; Weisz, Weiss, Han, Granger, & Morton, 1995). Begrænsninger i disse meta-analyser omfatter manglende angivelse på inklusionskriterier, begrænset generaliserbarhed (f.eks. som følge af inddragelse af analoge studier), mangel på korrektion for pre-test afvigelser, samt forskerens forudindtagetethed. De få effektundersøgelser der foreløbig er udført indenfor dette felt viste sig ikke i stand til at replicere resultater fra virknings-undersøgelserne (Weisz & Weiss, 1993).

En meta-analyse af musikterapi for psykisk syge børn og unge blev udført som led i denne forskning. Formålet med analysen var at undersøge den samlede effekt af musikterapi med psykisk syge børn og unge, og at undersøge hvorledes størrelsen af

musikterapiens effekt er influeret af sygdommens art, klientens alder, musikterapeutisk metode og resultatyper. 11 undersøgelser blev medtaget i analysen hvilket gav 188 personer til meta-analysen. Effekttørrelser fra studierne blev kombineret, stikprøvestørrelsen vægtet, og fordelingen undersøgt. For at opnå et konservativt resultat udelukkede positive ekstremværdier. Analysen viste at musikterapi har en middel til stor positiv effekt ($d = 0.61$) på klinisk relevante resultater. Dette var en statistisk meget stærk signifikans ($p < .001$) samt statistisk homogen. Effekten havde en tendens til at være større i forhold til adfærdsmæssige og udviklingsmæssige problemer end for emotionelle forstyrrelser; større for eklektiske, psykodynamiske og humanistiske metoder end for behavioristiske modeller; og større for adfærdsmæssige og udviklingsmæssige resultater end for sociale evner og selvopfattelse.

På grundlag af disse foreløbige resultater handlede forskningsspørgsmålene i denne undersøgelse om den kliniske effekt af individuel ambulans musikterapi for psykisk syge børn og unge, med formålet at undersøge hvordan denne effekt er influeret af karakteristika for patient og terapi. De første spørgsmål vedrørte statistisk signifikans og klinisk relevans af gennemsnitseffekten af musikterapi i klinisk praksis. De næste spørgsmål vedrørte indflydelsen af primær og sekundær diagnose samt alder og køn og, baseret på dette, særlig indikation eller kontraindikation for individuel musikterapi. Til sidst fulgte en tredje gruppe spørgsmål centreret omkring indflydelsen af særlige egenskaber ved musikterapi indbefattet "behandlingsdosis" samt brugen af bestemte musikterapeutiknikker, særlige omstændigheder for terapien og musikterapeutens personlige og faglige karakteristika.

Metode

De grundlæggende metodologiske karakteristika ved dette studie, omfattende et kontrolleret kvasi-eksperimentelt pre-test post-test design, en større og omfattende repræsentativ gruppe, ikke-manualiserede terapiprocedurer, samt mangfoldige muligheder for resultatvurdering, blev udviklet for bedst at kunne tilegnes undersøgelsens fokus på effekten af typiske kliniske behandlings procedurer med typiske patienter. Muligheden for gennemførelse blev testet i et pilotstudie (Gold, Wigram, & Berger, 2001). Deltagerne i undersøgelsen udgjorde 136 psykisk syge børn og unge, med en behandlingsgruppe på 75 deltagere som startede i musikterapi og en kontrolgruppe med 61 andre deltagere som enten var på venteliste eller som var blevet anbefalet terapi. Deltagerne var mellem 3½ og 19 år, og to tredjedele var af hankøn. Når

ingen kodet diagnose fandtes, blev beskrivende diagnoser kodet efter på forhånd definerede kategorier af to uafhængige personer. Der var 37 deltagere med en tilpasnings- og emotionel forstyrrelse (mest hyppige diagnose i denne gruppe: F43 tilpasningsforstyrrelse), 36 deltagere med en adfærdsmæssig forstyrrelse (hyppigste diagnose: F90 hyperkinetisk forstyrrelse) og 63 deltagere med en udviklingsmæssig forstyrrelse (hyppigste diagnose: F83 blandet udviklingsforstyrrelse af specifikke færdigheder). Sekundære diagnoser inkluderede medicinske forhold (Axis IV diagnoser) i 73 tilfælde og abnorme psykosociale situationer (Axis V diagnoser) hos 88 deltagere, hvor begge typer af forhold ses hyppigere i behandlingsgruppen end i kontrolgruppen.

Deltagerne i behandlingsgruppen modtog musikterapi med en ud af 15 kvalificerede musikterapeuter med varierende grader af erfaring og supplerende uddannelse. Musikterapeuterne beskrev deres professionelle baggrund som psykoterapeutisk og eklektisk, ofte baseret på psykoanalytisk og humanistisk teori, og beskrev at de almindeligvis bruger improvisation, sange, samtale, eller andre udtryksmidler eller aktiviteter (så som rollelege, spil samt tegning og maling) i deres arbejde med børn og unge. Indholdet af musikterapisessionerne med de aktuelle forløb blev beskrevet separat i en post-test.

De mest hyppigt beskrevne målsætninger for musikterapien i behandlingsgrupperne var at skabe mulighed for at opbygge og vedligeholde relationen, at forbedre selvværd og selvtillid, at øge potentialer for at udtrykke sig emotionelt og at øge social adfærd og interaktion med andre. Musikterapisessionerne blev typisk afholdt en gang om ugen i 45 minutter, med en stor forskel i den planlagte varighed af terapien fra ti sessioner til to år. Post-tests i behandlingsgruppen var bestemt til at skulle udføres efter 25 sessioner (eller ved terapiens afslutning alt efter hvad der kom først). Kontrolforanstaltningen var defineret som omstændigheder hvor deltagerne ikke modtog psykoterapeutisk behandling (inklusive musikterapi) mellem pre-test og post-test. Post-test i kontrolgruppen var fastsat til at skulle udføres efter 7 måneder (eller efter afslutning af venteperioden alt efter hvad der kom først).

En analyse af resultaterne inkluderede adskillige områder og adskillige observationsperspektiver, med brug af standardiserede tests med høj grad af pålidelighed. Graden af psykiatriske symptomer blev vurderet med brug af den samlede t-score af forældrenes version af Child Behavior Checklist (CBCL; Döpfner et al., 1994), som beskriver en bred vifte af adfærdsmæssige problemer og som har

fortræffelig reliabilitet. Et supplerende observationsperspektiv blev medtaget i behandlingsgruppen hvor terapeuterne evaluerede symptomforandringer i løbet af terapien samt i hverdagen med brug af Visual Analogue Scales (VAS). I det andet resultatområde blev generelle og sociale kompetencer og intra-personelle ressourcer vurderet med kompetence-tests ud fra forældrenes version af CBCL og terapeuternes vurdering af forandring med brug af VAS som nævnt ovenstående. Det tredje resultatområde, livskvalitet, blev vurderet med forældrenes version og selv-rapporterings skemaer med det standardiserede instrument KINDL (Ravens-Sieberer & Bullinger, 1998), som har en høj grad af reliabilitet og har påvist tydelig diskriminant validitet. Herudover evaluerede terapeuterne ændringer i livskvalitet med brug af VAS. I behandlingsgruppen vurderedes den familiemæssige og sociale arbejdsbyrde (med pre-test og post-test), og tilfredshed med behandlingen (med post-test) blev vurderet af forældrene ved ikke-standardiserede tests. Terapeuter og henvisende myndigheder gav yderligere en generel verbal bedømmelse af barnets udvikling. Forberedende statistiske analyser indeholdt en reliabilitetsanalyse af de to ikke-standardiserede tests, data screening, behandling af standardiserede forandringsvurderinger, og udregning af overensstemmelse mellem observatørernes svar. Den statistiske analyse af resultater indeholdt en analyse af covarians og deskriptiv analyse af relative frekvenser, effektstørrelser og forandringsvurdering.

Resultater

Behandlingsgruppen modtog gennemsnitligt 23 musikterapisessioner før post-testen, hvor musikterapiforløbet fortsatte efter post-testen i hvert andet tilfælde. Musikterapeuterne beskrev improvisation og andre udtryksformer som de mest anvendte og mest succesfulde teknikker. En analyse af covariance viste at brugen af sange, receptive teknikker, andre udtryksformer og samtale, samt fortsættelsen af musikterapien efter post-testen, afhang af deltagerens alder, køn, og Axis IV diagnose.

Omtrent to tredjedele af kontrolgruppen (59%), men kun en lille del af behandlingsgruppen (9%), modtog anden behandling af psykoterapeutisk eller pædagogisk karakter. Forældrerådgivning blev tilbudt som en medfølgende behandling i omkring to tredjedele af alle tilfælde. Mulighederne for forældrerådgivning, psykoterapi, funktionel terapi og medicinsk behandling afhang af alder, primær diagnose og Axis V diagnose. Frafaldsraten i hele gruppen var 13%.

Reliabiliteten af de to ikke-standardiserede tests var god (tilfredshed: $r_{tt} = .89$; arbejdsbyrde: $r_{tt} = .67$). Fordelingen af pre-tests og forandringsvurdering ved alle variabler var tæt på normalfordelingen, hvilket berettiger parametriske statistik. Vurderinger af de samme resultater af forskellige personer viste moderate korrelationer hvilket var indenfor det forventede område.

En analyse af afvigelse viste ingen signifikant effekt af musikterapi ved sammenligning med kontrolforanstaltningen, men signifikant forskel mellem grupperne, hvilket viser at behandlingsgruppen i starten havde en højere grad af forstyrrelse. Herimod viste den deskriptive analyse væsentlige effektstørrelser i forhold til livskvalitet (forældrevurdering: $d = 0.29$; egenvurdering: $d = 0.44$) og mindre effektstørrelser på symptomer ($d = 0.10$) og kompetencer ($d = 0.02$). Der fandtes signifikante fremskridt i løbet af en vis tid i behandlingsgruppen i forhold til symptomer ($p < .01$) og livskvalitet ($p < .01$) (forældrevurderinger), mens kontrolgruppen ikke viste lignende fremskridt. Retrospektive vurderinger af forandring på baggrund af terapeuternes vurdering viste fremskridt i symptomer, intra-personelle ressourcer og livskvalitet i behandlingsgruppen.

En analyse af covariance med henblik på påvirkningen af patientkarakteristika viste at effekten af musikterapi på symptomerne var stærkt influeret af tilstedeværelsen af somatisk sygdom (Axis IV diagnose) ($p < .01$). Musikterapi havde en middel positiv effekt for deltagere uden anden comorbiditet ($d = 0.44$), ingen eller lille effekt for dem med moderat somatisk sygdom ($d = 0.04$), og middel til stor negativ effekt for deltagere med svære somatiske symptomer ($d = -0.74$). Udviklingen af symptomer og arbejdsbyrde i behandlingsgruppen afhang tillige af klienternes alder og primære diagnose.

En anden analyse af covariance blev udført for at undersøge indflydelsen af forskellige former for terapi hvilket viste en stærk indflydelse af brugen af andre udtryksformer på udviklingen af symptomer ($p < .01$) og arbejdsbyrde ($p < .05$). Begge resultater forbedredes når andre udtryksformer var blandt de mest brugte teknikker (symptomer: $d = 0.54$ vs. $d = 0.18$; arbejdsbyrde: $d = 0.40$ vs. $d = 0.12$). Omvendt havde brugen af improvisation og samtale positiv indflydelse på symptomer og intra-personelle ressourcer. Yderligere signifikant indflydelse omfatter antallet af terapisesioner, graden af terapeutens erfaring og supplerende uddannelse, samt sammenhængen mellem terapeutens og klientens køn. Forældrenes tilfredshed med behandlingen hang signifikant sammen med antallet af sessioner og forbindelsen

mellem terapeutens og klientens køn. På grundlag af ovenstående blev påvirkningen af alvorlig somatisk sygdom som mulig kontraindikation til individuel musikterapi nærmere undersøgt. 20 deltagere led af alvorlig somatisk comorbiditet iberegnet hjerneskade ($n = 8$), motorisk dysfunktion ($n = 8$), høreskade ($n = 4$) og andre tilstande. Musikterapi med disse klienter var primært rettet mod at øge selvværd og relaterede mål. En undersøgelse af de otte symptom-undergrupper af CBCL viste den højeste vekselvirkning med undergruppen af kriminel adfærd uden at vise direkte sammenhæng med de specifikke problemer eller mål for terapien med disse klienter. Den mere generelle vurdering af symptomer i dagligdagen og almen succes og udvikling, som udførtes af terapeuter og henvisningsmyndigheder, antydede at effekten af musikterapi var svarende til eller bedre for disse klienter end for klienter uden lignende comorbiditet, hvilket er i modsætning til resultaterne beregnet på baggrund af forældrenes vurdering af symptomer.

Diskussion

Undersøgelsens resultater viser visse, men begrænsede, beviser på at individuel musikterapi, som den generelt tilbydes i ambulant behandling, er effektiv i reducere symptomer og forøgelse af livskvalitet. Comorbiditet med somatisk sygdom og brug af andre udtryksformer i musikterapi blev identificeret som to hovedfaktorer der reducerer effekten af musikterapi i gængs klinisk praksis. Resultater fra effektstudier er ikke nødvendigvis direkte generaliserbare i forhold til effekten af en metode i en aktuel klinisk setting. Resultaterne af meta-analysen gav overbevisende belæg for at musikterapi er en effektiv behandling for psykisk syge børn og unge, men resultaterne fra den foreliggende undersøgelse antyder at dens effekt i klinisk praksis ikke er lige så god som dens virkning. Dette er i overensstemmelse med tidligere resultater vedrørende effekt og virkning af psykoterapi med børn.

Comorbiditet udtrykt som somatisk sygdom er et hyppigt problem i klinisk praksis, og som viser sig hos over halvdelen af alle børnene i denne undersøgelse. Dog udelukkes ofte tilfælde med comorbiditet i virknings-(efficacy) undersøgelser (Aldridge, Gustorff, & Neugebauer, 1995). Denne undersøgelse viste en effekt af musikterapi hos børn uden comorbiditet, men kunne ikke påvise en positiv effekt hos de klienter der havde en comorbid somatisk sygdom.

Brugen af specifikke musikterapeutiske teknikker er et andet væsentligt træk som adskiller musikterapi i eksperimentelle undersøgelser (hvor musik og samtale

former hovedbestanddelene) fra musikterapi i klinisk praksis (hvor andre udtryksformer er blandt de mest typisk brugte teknikker). Undersøgelsen viste at musikterapi er lang mere effektiv når andre udtryksformer ikke bruges i så høj grad, som når de inddrages som en central teknik. Omvendt sås der visse beviser på at hyppig brug af improvisation og samtale hang positivt sammen med udfaldet af musikterapien. I den fortsatte diskussion om specifikke contra almindelige psykoterapeutiske faktorer fører disse resultater til konklusionen at der er en specifik effekt af musikterapi, f.eks. at den i højere grad er baseret på specifikke teknikker end udelukkende at være en konsekvens af terapeutens varme eller empati (cf. Haines, 1989; Montello & Coons, 1998).

Yderligere undersøgelsesresultater bekræfter vigtigheden af langsigtet terapiarbejde (cf. McQueen, 1975) og understreger værdien af tidlig intervention. Den faglige udvikling af musikterapeuter iberegnet erfaring og supplerende uddannelse, såvel som terapeutens køn i relation til klientens køn, ser ligeledes ud til at have en indflydelse på effekten af musikterapi (cf. Körlin & Wrangsjö, 2001). Endelig forudsættes det i resultaterne at forældrenes tilfredshed med musikterapien er afgørende for succes'en af musikterapi med psykisk syge børn og unge.

I undersøgelsen benyttedes et kvasi-eksperimentelt observations design og derfor kræver konklusioner på resultaterne en vis forsigtighed. Deltagerne blev ikke tilfældigt udvalgt til de to grupper hvorfor forskelle mellem de to kan grupper have påvirket resultaterne. Selvom lineær påvirkning blev statistisk afvejet i analyserne er det muligt at der var ikke-lineære påvirkninger samt påvirkning fra yderligere, ikke-observerede og endda ikke-observerbare variabler. Den højere andel af Axis IV og Axis V comorbiditet og pre-test score antyder at behandlingsgruppen var alvorligere forstyrret end kontrolgruppen. Endnu en påvirkning der ikke kunne kontrolleres i observationsundersøgelsesdesignet var tilbuddene om andre psykoterapeutiske og pædagogiske tiltag hos en stor del af kontrolgruppen. Endnu en begrænsning af undersøgelsen kunne findes i den begrænsede reliabilitet i nogle af testene samt deres begrænsede præcision i forhold til en bred vifte af kliniske betingelser. De fleste af disse begrænsninger så i højere grad ud til at reducer end at øge effekten.

Resultaterne taler for individuel musikterapi for børn og unge med en bred vifte af psykiske forstyrrelser, inklusiv tilpasnings-, emotionelle-, adfærdsmæssige og udviklingsmæssige forstyrrelser, som ikke lider af comorbid somatisk sygdom. Det anbefales at der i individuel musikterapi for psykisk syge børn og unge fokuseres på musik og samtale uden rutinemæssigt at medtage brugen af andre udtryksformer.

Selvom andre udtryksformer kan være nyttige i faser præget af modstand (cf. Fak & Schmidtmayr, 1997) er det vigtigt at føre patienten til den udtryksform som udgør essensen af musikterapi og som gør denne form for terapi mest effektiv.

På baggrund af denne undersøgelse omfatter retningslinier for videre forskning en replikation af resultaterne vedrørende indflydelsen af comorbiditet og specifikke terapeutiske teknikker med randomiserede kontrolundersøgelser. Undersøgelsen kan også fungere som en model for videre kliniskbaserede longitudinale undersøgelser med henblik på klinisk kontroreffekt og -kvalitet. Yderligere henleder undersøgelsen opmærksomheden på visse metodologiske spørgsmål vedrørende fremtidig forskning, indbefattet betydningen af større deltagergrupper, mangfoldige resultatområder og perspektiver samt effektstørrelser. Denne undersøgelse har dokumenteret effekten af musikterapi med psykisk syge børn og unge og har fremstillet forklaringer for hvordan og hvorfor effekten af denne terapi adskiller sig fra dens eksperimentelle virkning. Resultaterne fremstiller empirisk baserede hypoteser for forskning omkring forskellige former for terapi med denne klientgruppe og kan ligeledes direkte hjælpe terapeuter til at gøre deres kliniske arbejde mere effektivt.

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9 Appendices

9.1 Individual effect sizes of studies on music therapy with mentally ill children and adolescents

9.1.1 Aldridge, Gustorff, & Neugebauer (1995)

This study used a reversal design with comparisons between children who received music therapy and children who waited for therapy. Since all subjects received music therapy between pre-test and post-test, and data for the times between were not reported, this study was classified as a one-group pre-post study. Data for the eight children on the five subscales were read from the graphs and added up to a total score for each child. The total scores had the following values:

Pre-test $M = 45.92$ ($SD = 17.66$)

Post-test $M = 59.56$ ($SD = 18.87$)

The correlation between pre-test and post-test scores was $r = 0.93$.

The effect size was calculated as follows:

$$d = \frac{M_{post} - M_{pre}}{SD_{pre}} = 0.77$$

9.1.2 Clendenon-Wallen (1991)

This study used a one-group design. The outcome measure consisted of 34 items, 20 of which were indicators and 14 were contraindicators of self-confidence. Since the raw data were reported for each subject item by item, a total score could be computed for each subject. This was done by reversing the sign of the contraindicator items and summing up all items. The total scores were

Pre-test $M = 18$ ($SD = 6.36$)

Post-test $M = 21.36$ ($SD = 3.53$)

The correlation between pre-test and post-test scores was $r = 0.81$.

The effect size was calculated as follows:

$$d = \frac{M_{post} - M_{pre}}{SD_{pre}} = 0.53$$

9.1.3 Edgerton (1994)

This study used a one-group design. Although the outcome measure was taken in every session, only the first and the last value were used to obtain pre-test and post-test data. The values for each subject were read from the graphs. The values were

Pre-test $M = 15.73$ ($SD = 7.10$)

Post-test $M = 48.09$ ($SD = 16.65$)

The correlation between pre-test and post-test scores was $r = 0.39$.

The effect size was calculated as follows:

$$d = \frac{M_{post} - M_{pre}}{SD_{pre}} = 4.56$$

9.1.4 Eidson (1989)

This study compared six blocks (separate groups of clients). Four blocks received behavioural music therapy, one block received "general music therapy", and one block was a no-contact control group. For the meta-analysis, all five blocks where a form of music therapy was provided were summarised as the experimental group, which resulted in an experimental group of $n = 20$ and a control group of $n = 5$.

The group means were read from the graphs. SD s were not reported. However, since the groups were independent random samples from the same population, the SD between the group means at pre-test represented an estimate of the standard *error* of the samples. From this, an estimate of the pooled SD was obtained (see 9.1.12 for the formula).

The weighted means and standard deviations were

Treatment Pre-test $M = 67.40$

Treatment Post-test $M = 69.50$

Control Pre-test $M = 48.00$

Control Post-test $M = 53.00$

Pooled Pre-test $SD = 17.48$

Correlations between pre-test and post-test values were not known.

The effect size for the change in each group was calculated as follows:

$$\text{Treatment: } d_t = \frac{(M_{t,post} - M_{t,pre})}{SD_{pre}} = \frac{2.10}{17.48} = 0.12,$$

$$\text{Control: } d_c = \frac{(M_{c,post} - M_{c,pre})}{SD_{pre}} = \frac{5.00}{17.48} = 0.29$$

The effect size for the difference between the groups at post-test, corrected for the pre-test difference, was

$$d = \frac{(M_t^{post} - M_t^{pre}) - (M_c^{post} - M_c^{pre})}{SD_{pre}} = \frac{2.10 - 5.00}{17.48} = -0.17$$

9.1.5 Gregoire, Hughes, Robbins, & Voorneveld (1989)

This study used a one-group pre-test post-test design. Means and *SDs* were computed from the total score of each subject.

Pre-test $M = 51.73$ ($SD = 12.57$)

Post-test $M = 55.45$ ($SD = 12.93$)

The correlation between pre-test and post-test scores was $r = 0.93$.

The effect size was calculated as follows:

$$d = \frac{M_{post} - M_{pre}}{SD_{pre}} = 0.30$$

9.1.6 Haines (1989)

This study used a parallel group design. Means and *SDs* were reported.

Treatment Pre-test $M = 62.89$ ($SD = 17.81$)

Treatment Post-test $M = 64.44$ ($SD = 10.85$)

Control Pre-test $M = 60.00$ ($SD = 16.29$)

Control Post-test $M = 56.57$ ($SD = 13.05$)

Overall Pre-test $SD = 16.66$

Overall Post-test $SD = 12.13$

Correlations between pre-test and post-test values were not known.

The effect sizes were calculated as follows:

$$\text{Treatment: } d_t = \frac{(M_{t,post} - M_{t,pre})}{SD_{t,pre}} = \frac{1.55}{17.81} = 0.09$$

$$\text{Control: } d_c = \frac{(M_{c,post} - M_{c,pre})}{SD_{c,pre}} = \frac{-3.43}{16.29} = -0.21$$

$$\text{Between groups: } d = \frac{(M_{t,post} - M_{t,pre}) - (M_{c,post} - M_{c,pre})}{SD_{pre}} = \frac{1.55 - (-3.43)}{16.66} = 0.30$$

9.1.7 Johnson (1981)

This study used a parallel group design. The scores of the sub-scales were summed for a total score of each subject. From these scores, the following values were computed.

Treatment	Pre-test	$M = 64.08$	$(SD = 10.05)$
Treatment	Post-test	$M = 58.15$	$(SD = 8.12)$
Control	Pre-test	$M = 65.08$	$(SD = 7.39)$
Control	Post-test	$M = 66.08$	$(SD = 8.88)$
Pooled	Pre-test	$SD = 8.82$	
Pooled	Post-test	$SD = 8.51$	

The correlations between pre-test and post-test scores were

Treatment	$r = 0.42$
Control	$r = 0.60$

The effect sizes (with signs reversed) were calculated as follows:

$$\text{Treatment: } d_t = -\frac{(M_{t,post} - M_{t,pre})}{SD_{t,pre}} = -\frac{-5.93}{10.05} = 0.59$$

$$\text{Control: } d_c = -\frac{(M_{c,post} - M_{c,pre})}{SD_{c,pre}} = -\frac{1}{7.39} = -0.14$$

$$\text{Between groups: } d = -\frac{(M_{t,post} - M_{t,pre}) - (M_{c,post} - M_{c,pre})}{SD_{pooled,pre}} = -\frac{-5.93 - 1}{8.82} = 0.78$$

9.1.8 Laserer-Tschann (1992)

This study used a parallel group design.

9.1.8.1 Outcome 1: Intelligence

Group means of this outcome were reported completely. Data for computation of the standard deviations were only available for the control group, and therefore the control group SD was used as it was the best available estimate.

Treatment	Pre-test	$M = 96.7$	
Treatment	Post-test	$M = 106.3$	
Control	Pre-test	$M = 110.0$	$(SD = 12.18)$
Control	Post-test	$M = 112.1$	

The correlations between pre-test and post-test scores were not known.

The effect sizes were calculated as follows:

$$\text{Treatment: } d_t = \frac{(M_{t,post} - M_{t,pre})}{SD_{c,pre}} = \frac{9.6}{12.18} = 0.79$$

$$\text{Control: } d_c = \frac{(M_{c,post} - M_{c,pre})}{SD_{c,pre}} = \frac{2.1}{12.18} = 0.17$$

$$\text{Between groups: } d = \frac{(M_{t,post} - M_{t,pre}) - (M_{c,post} - M_{c,pre})}{SD_{c,pre}} = \frac{9.6 - 2.1}{12.18} = 0.62$$

9.1.8.2 Outcome 2: Behaviour problems

Percentiles were reported for this outcome, from which, under the assumption of a normal distribution, z values could be obtained.

		percentile	z
Treatment	Pre-test	86.5 %	1.10
Treatment	Post-test	77.0 %	0.74
Control	Pre-test	89.0 %	1.23
Control	Post-test	77.0 %	0.74

The correlations between pre-test and post-test scores were not known.

The effect sizes (with signs reversed) were calculated as follows:

$$\text{Treatment} \quad d_t = -(z_{t,post} - z_{t,pre}) = 0.36$$

$$\text{Control} \quad d_c = -(z_{c,post} - z_{c,pre}) = 0.49$$

$$\text{Between groups:} \quad d = d_t - d_c = -0.13$$

9.1.8.3 Overall outcome

The overall outcome was computed as the average of both outcomes.

$$\text{Treatment} \quad d_t = 0.58$$

$$\text{Control} \quad d_c = 0.33$$

$$\text{Between groups} \quad d = 0.25$$

9.1.9 McQueen (1975)

This study used a parallel group design. Means, SD s, and correlations were obtained from the scores of each subject.

$$\text{Treatment} \quad \text{Pre-test} \quad M = 56.00 \quad (SD = 22.86)$$

$$\text{Treatment} \quad \text{Post-test} \quad M = 72.22 \quad (SD = 19.13)$$

$$\text{Control} \quad \text{Pre-test} \quad M = 59.00 \quad (SD = 8.07)$$

Control Post-test $M = 58.00$ ($SD = 14.42$)

Overall Pre-test $SD = 20.05$

Overall Post-test $SD = 18.85$

The correlations between pre-test and post-test scores were:

Treatment $r = 0.82$

Control $r = 0.80$

The effect sizes were calculated as follows:

$$\text{Treatment: } d_t = \frac{(M_{t,post} - M_{t,pre})}{SD_{t,pre}} = \frac{16.22}{22.86} = 0.71$$

$$\text{Control: } d_c = \frac{(M_{c,post} - M_{c,pre})}{SD_{c,pre}} = \frac{-1}{8.08} = -0.12$$

$$\text{Between groups: } d = \frac{(M_{t,post} - M_{t,pre}) - (M_{c,post} - M_{c,pre})}{SD_{pooled,pre}} = \frac{16.22 - (-1)}{20.05} = 0.86$$

Separate effect sizes for each of the two intervention groups, as compared to the control group, each standardised by the overall pre-test SD , were as follows:

	Pre-test to post-test	Pre-test to follow-up
Short-term vs. control	0.53	0.66
Long-term vs. control	1.19	1.38

9.1.10 Michel & Martin (1970)

This study contained a controlled study ("phase 1") and a one-group pre-test post-test study ("phase 2"). Both studies were conducted with the same subjects and could therefore not be seen as independent. To avoid the problem of stochastically dependent effect sizes (cf. Cooper & Hedges, 1994), only the data from the controlled, parallel group study were used.

The same outcome, self-esteem, was measured in two different forms (a self-report and a teacher rating) and therefore first calculated as two different effect sizes which were then averaged.

For both forms, results were only reported as U values in a Mann-Whitney U test for independent samples, which was used for the dependent samples as well. The number of subjects per group and probability level of the test ($\alpha_{one-tailed} = 0.05$) was obtained indirectly from the critical U value that was reported. The text gave the information that the changes in the treatment group were in the positive direction, but

gave no clear information about the direction of the changes in the control group. For a conservative estimate, it was assumed that the control group also showed a positive change. An approximate formula for the calculation of the effect size was used (see 9.1.13).

9.1.10.1 Measure 1: Self-report

Treatment (pre to post):	$n = 14$	$U = 67.5$	$d_t = 0.55$	$r = ?$
Control (pre to post):	$n = 12$	$U = 71$	$d_c = 0.02$	$r = ?$
Between groups	$d = d_t - d_c = 0.53$			

The correlations between pre-test and post-test scores were not known.

9.1.10.2 Measure 2: Teacher rating

Treatment (pre to post):	$n = 14$	$U = 89$	$d_t = 0.16$	$r = ?$
Control (pre to post):	$n = 12$	$U = 69.5$	$d_c = 0.06$	$r = ?$
Between groups	$d = d_t - d_c = 0.10$			

9.1.10.3 Overall outcome

Treatment (pre to post):	$d_t = 0.36$
Control (pre to post):	$d_c = 0.04$
Between groups:	$d = 0.32$

9.1.11 Montello & Coons (1998)

This study used a parallel group design where each of the three groups received some form of music therapy. For the meta-analysis, it was therefore analysed as a one-group pre-test post-test study.

Since only group means were given, an estimate of the *SD* was obtained in a similar way as above (9.1.4; for the formula, see 9.1.12).

Pre-test $M = 3.32$ ($SD = 0.37$)

Post-test $M = 2.79$

The correlation between pre-test and post-test scores was not known.

The effect size (with signs reversed) was calculated as follows:

$$d = \frac{M_{post} - M_{pre}}{SD_{pre}} = 1.43$$

9.1.12 Calculation of SD from SE

The formula for SE is given by

$$SE = \sqrt{\frac{\sum_{i=1}^k (\bar{x}_{\cdot} - \bar{x}_i)^2}{k-1}}$$

(Bortz, 1999, formula 3.2), where \bar{x}_{\cdot} ... mean of all blocks, \bar{x}_i ... mean of block i , k ... number of blocks. The relationship between SD and SE is

$$SE = \frac{SD}{\sqrt{n}} \Leftrightarrow SD = SE\sqrt{n}$$

(Bortz, 1999, formula 3.1), where n ... number of subjects in each block. From this we obtain:

$$SD = SE\sqrt{n} = \sqrt{\frac{n \sum_{i=1}^k (\bar{x}_{\cdot} - \bar{x}_i)^2}{k-1}},$$

or, in case of unequal n :

$$SD = \sqrt{\frac{n \sum_{i=1}^k (\bar{x}_{\cdot} - \bar{x}_i)^2}{k-1}} = \sqrt{\frac{\sum_{i=1}^k n (\bar{x}_{\cdot} - \bar{x}_i)^2}{k-1}} = \sqrt{\frac{\sum_{i=1}^k n_i (\bar{x}_{\cdot} - \bar{x}_i)^2}{k-1}},$$

where \bar{x}_{\cdot} ... weighted mean of all blocks, n_i ... number of subjects in group i .

9.1.13 Calculation of d from U

Under the null hypothesis, the U values follow a normal distribution with

$$\mu = E(U) = \frac{n_1 n_2}{2}$$

and

$$\sigma = \sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}$$

(Bortz, 1999, formula 5.46 and 5.47). They can be transformed into a standard normally distributed value $z(U)$:

$$z(U) = \frac{U - \mu}{\sigma} = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}}$$

Test power of U test and t-test are related by their asymptotic relative efficiency (A.R.E.):

$$A.R.E.\left(\frac{U - test}{t - test}\right) = \frac{3}{\pi} \approx 0.955$$

(Lehmann, 1975). In larger samples the t-distribution is very close to the standard normal distribution, therefore

$$t \approx \frac{z(U)}{A.R.E.\left(\frac{U - test}{t - test}\right)} = \frac{\pi\left(U - \frac{n_1 n_2}{2}\right)}{3\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}}$$

In the case of a standardised difference, the formula of a independent samples t-test is reduced to

$$t = \frac{d}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \Leftrightarrow d = t \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

(cf. Bortz, formula 5.13 and 5.15). Therefore

$$d \approx \frac{\pi\left(U - \frac{n_1 n_2}{2}\right) \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}{3\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}}$$

In the case of $n = n_1 = n_2$, this can be simplified to

$$d \approx \frac{\sqrt{6}\pi(2U - n^2)}{3n^{3/2}\sqrt{2n+1}}$$

9.2 Variance of effect sizes for independent and related samples

The variance of an effect size estimate d is given by

$$v_i = \frac{1}{n_1} + \frac{1}{n_2} + \frac{d^2}{2(n_1 + n_2)}$$

(Cooper & Hedges, 1994) in the case of two independent samples with n_1 and n_2 subjects, respectively, and by

$$v_r = \frac{2(1-r)}{n}$$

(Becker, 1988) for two related samples with n subjects and correlation r between pre-test and post-test. The inverse variance is used for weighting effect sizes. If r is large, a one-group study will have a much smaller variance and will get a much larger weight than a controlled study of the same sample size. Therefore, it would not make much sense to use these two formulas together when combining effect sizes from both design types. However, if r is set to zero and $n = n_1 = n_2$, v_i is equal to v_r plus a correction term which is usually small:

$$v_i = \frac{1}{n} + \frac{1}{n} + \frac{d^2}{2(n+n)} = \frac{2 + \frac{1}{4}d^2}{n} \geq \frac{2(1-0)}{n} = v_r$$

Therefore, v_i can be applied for both design types, and the relation between sample size and weight is retained. As the most reasonable choice from both the clinical and the statistical perspective, v_i was used in all analyses where effect sizes from both design types were combined (all analyses except those in Table 7). In the analyses in Table 7, v_r was used because all effect sizes were from related samples. The sample size displayed is always the number of subjects (i.e., $n_1 + n_2$ in controlled studies, n in one-group studies).

9.3 Original questionnaires

9.3.1 Therapist variables

Therapeutenvariablen

TherapeutIn (Name, Alter):
Institution:
Datum:

<i>Ausbildung:</i> (musiktherapeutische und zusätzliche Ausbildungen; abgeschlossen? laufend?)
<i>Musiktherapeutischer Ansatz bzw. theoretischer Hintergrund:</i> (methodische und/oder philosophische Orientierung – z.B.: psychotherapeutisch, heilpädagogisch, anthroposophisch; analytisch, humanistisch, eklektisch, ... etc.)
<i>Vorwiegend verwendete Methoden beim untersuchten Klientel:</i> (z.B. freie/strukturierte Improvisation, Stimmimprovisation, Rezeptiv, Lieder, Spiel, Gespräch, ... etc.)
<i>Musiktherapeutische Berufserfahrung:</i> (in Jahren, ohne Praktika)
<i>Nehmen Sie derzeit Supervision in Anspruch?</i>

9.3.2 Referral criteria and treatment plan (intervention group, pre-test)

Zuweisungskriterien und Behandlungsplan (einmal je Patient: am Beginn der Therapie)

PatientIn (Name, Alter):
Datum:

Themenbereiche und Diagnosen
<i>Grund für die Zuweisung zur Musiktherapie:</i>
<i>Hauptdiagnose:</i> <i>(falls vorhanden bzw. bekannt, entsprechend ICD-10)</i>
<i>Sekundäre Probleme:</i> <i>(falls vorhanden bzw. bekannt)</i>
<i>Indikation und (vorläufige) Ziele der Musiktherapie:</i> <i>(soweit bisher bekannt)</i>

Setting und Rahmenbedingungen
<i>Geplante Frequenz und Dauer der einzelnen Einheiten:</i>
<i>Voraussichtliche Dauer der gesamten Therapie:</i> <i>(sofern abschätzbar)</i>
<i>Auf wessen Initiative hin wurde die Musiktherapie begonnen?</i> <i>(Freiwilligkeit des Kindes? der Eltern?)</i>

Evaluation

*Kann das Kind selbst einen Fragebogen beantworten?
(schriftlich? mündlich?)*

Wer füllt den Elternfragebogen aus?

*Wer käme außerdem für die Beurteilung des Kindes in Frage?
(andere Bezugspersonen, z.B. anderer Elternteil, Lehrer, Erzieher, Arzt, Psychologe, ... etc.)*

9.3.3 Therapeutic process (intervention group, post-test)

Therapeutischer Prozeß

(nach 25 Stunden bzw. bei kürzeren Verläufen am Ende der Therapie)

PatientIn (Name, Alter):
Datum:
Anzahl Therapiestunden bisher: (bis zum 2. Ausfüllen des Eltern-FB)

<i>Wurde das geplante Setting verändert? Wenn ja, wie?</i>
<i>Life Events seit Therapiebeginn: (bedeutsame Ereignisse im Leben des Kindes)</i>
<i>Hat das Kind seit Therapiebeginn eine klinische Diagnose erhalten? (Welche?)</i>
<i>Findet eine begleitende Beratung für die Eltern (Bezugspersonen) des Kindes statt? (Durch wen? In welchem Umfang?)</i>
<i>Wie schätzen Sie allgemein den bisherigen Erfolg der Therapie ein?</i>

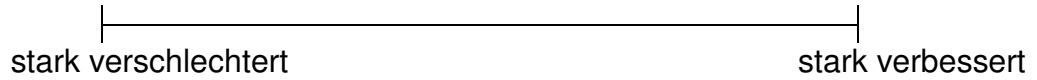
Bitte antworten Sie bei den folgenden Fragen jeweils in der Reihenfolge der Wichtigkeit bzw. Häufigkeit.

<i>Welche Veränderungen zeigte das Kind innerhalb der Musiktherapie (bezogen auf Ihre Ziele)?</i>
1. 2. 3.
<i>Falls bekannt: Welche Veränderungen zeigte das Kind im Alltag (bezogen auf Ihre Ziele)?</i>
1. 2. 3.
<i>Welche musiktherapeutischen Techniken wurden bei diesem Kind bisher am häufigsten verwendet?</i> <i>(z.B. freie/strukturierte Improvisation, Rezeptiv, Lieder, Spiel, Gespräch, ... etc.)</i>
1. 2. 3.
<i>Welche musiktherapeutischen Techniken waren bei diesem Kind bisher am erfolgreichsten?</i>
1. 2. 3.
<i>Welche weiteren Interventionen waren bei diesem Kind bisher am erfolgreichsten?</i> <i>(Falls beantwortbar)</i>

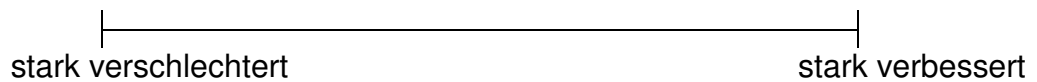
Bitte markieren Sie auf der Linie jeweils einen Punkt, der den Veränderungen des Kindes im bisherigen Verlauf der Therapie entspricht.

(bei elektronischem Ausfüllen in Word 97: mit der rechten Maustaste auf das Diagramm klicken, den Bleistift auswählen und mit der linken Maustaste einen senkrechten Strich ziehen)

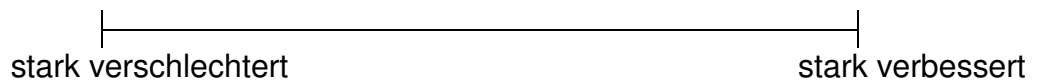
Innerhalb der MT ist die Symptomatik des Kindes



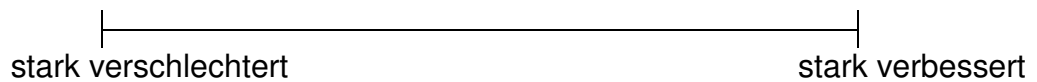
Innerhalb der MT sind die gesunden Ressourcen des Kindes



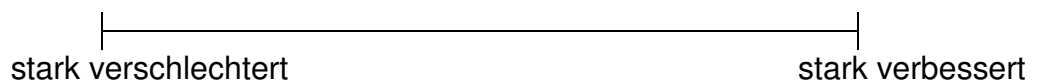
Falls bekannt: Im Alltag ist die Symptomatik des Kindes



Falls bekannt: Im Alltag sind die gesunden Ressourcen des Kindes



Falls bekannt: Im Alltag ist die Lebensqualität des Kindes



Falls zutreffend:

Weshalb wurde die Therapie beendet?

<i>Weshalb wurde die Therapie beendet?</i>
--

9.3.4 Questionnaire 1 for referrers (control group, pre-test)

Forschungsprojekt Christian Gold
Begleitbogen für Betreuer/Zuweiser
erster Zeitpunkt

Kind: _____

Ausfüllender: _____

Datum: _____

Bitte kreuzen Sie an, welche Probleme auf das von Ihnen betreute Kind zutreffen.

- Sozialer Rückzug
(z.B.: ist das Kind verschlossen, scheu, wenig aktiv, ...?)
- Körperliche Beschwerden
(z.B.: klagt das Kind häufig über Schmerzen, Übelkeit, ...?)
- Angst/Depressivität
(z.B.: fühlt sich das Kind einsam, ungeliebt, ist es ängstlich, weint es viel, ...?)
- Soziale Probleme
(z.B.: ist das Kind bei anderen nicht beliebt, wird von anderen gehänselt, ...?)
- Schizoid/zwanghaft
(z.B.: zeigt das Kind seltsame, bizarre, nicht nachvollziehbare Ideen oder Verhaltensweisen, ...?)
bitte beschreiben: _____
- Aufmerksamkeitsstörung
(z.B.: ist das Kind impulsiv oder unruhig, kann es sich schwer konzentrieren, ...?)
- Delinquentes Verhalten
(z.B.: lügt oder stiehlt das Kind, hat es Probleme mit Alkohol oder Drogen, ...?)
- Aggressives Verhalten
(z.B.: streitet, rauft oder schreit das Kind viel, ist es häufig ungehorsam, ...?)

Bitte beschreiben Sie kurz mit eigenen Worten die wichtigsten Probleme des Kindes:

Ist Ihnen eine Diagnose bekannt, die dem Kind gestellt wurde? Wenn ja, welche?

Wurde eine Therapie empfohlen? Welche? Grund? Findet diese statt?

9.3.5 Questionnaire 2 for referrers (control group, post-test)

Forschungsprojekt Christian Gold
Begleitbogen für Betreuer/Zuweiser
zweiter Zeitpunkt

Kind: _____

Ausfüllender: _____

Datum: _____

In den folgenden Fragen bitten wir Sie um Ihre Einschätzung der Veränderungen, die sich seit dem ersten Ausfüllen des Fragebogens ergeben haben.

<i>Wie schätzen Sie die Entwicklung des Kindes ein? (z.B. deutlich verbessert/verschlechtert, ...)</i>
<i>Haben sich beim Kind neue Probleme entwickelt? (Welche?)</i>
<i>Hat das Kind eine neue klinische Diagnose erhalten? (Welche?)</i>
<i>Gab oder gibt es eine regelmäßige Beratung oder Zusatzbetreuung für das Kind, seine besonderen Probleme betreffend? (Art? Umfang?)</i>
<i>Gab oder gibt es eine regelmäßige Beratung für die Eltern (Bezugspersonen), die besonderen Probleme des Kindes betreffend? (Art? Umfang?)</i>
<i>Gab es neue Life Events (bedeutsame Ereignisse im Leben des Kindes)? (Welche? – z.B. Wohnortwechsel, Geburt eines Geschwisters, Trennung der Eltern, Todesfall, ...)</i>

9.3.6 Burdens and treatment satisfaction

Elternfragebogen zur Behandlungszufriedenheit

in Anlehnung an den Hertlingshausener Zufriedenheitsfragebogen

Familie

Wie groß ist die Beeinträchtigung des familiären Alltags durch das Verhalten Ihres Kindes?

0	1	2	3	4	5	6	7	8	9	10
(0=nicht bedeutsam)					(10=sehr groß)					

Wie häufig kommt es zu familiären Konflikten wegen des Verhaltens Ihres Kindes?

0	1	2	3	4	5	6	7	8	9	10
(0=nie)					(10=täglich mehrmals)					

Wie stark ist die Einschränkung einzelner Familienmitglieder in ihren persönlichen Bedürfnissen durch Ihr Kind?

0	1	2	3	4	5	6	7	8	9	10
(0=keine Einschränkung)					(10=sehr starke Einschränkung)					

Wie groß ist die Dominanz Ihres Kindes aufgrund seiner Erkrankung/Behinderung innerhalb der Familie?

0	1	2	3	4	5	6	7	8	9	10
(0=keine Dominanz)					(10=sehr große Dominanz)					

Wie groß ist die Selbständigkeit Ihres Kindes im familiären Alltag?

0	1	2	3	4	5	6	7	8	9	10
(0=keine Selbständigkeit)					(10=völlige Selbständigkeit)					

Schule/Kindergarten/Beruf

Wie hoch bewerten Sie die Überwindungskraft, die Ihr Kind aufbringen muß, um in die Schule/in den Kindergarten/zur Arbeit zu gehen?

0	1	2	3	4	5	6	7	8	9	10
(0=keine Überwindung)					(10=sehr große Überwindung)					

Wie bedeutungsvoll schätzen Sie für Ihr Kind Freundschaften in Schule/Kindergarten/Beruf ein?

0	1	2	3	4	5	6	7	8	9	10
(0=keine Bedeutung)					(10=sehr große Bedeutung)					

Wie hoch ist Ihrer Meinung nach die Integration Ihres Kindes in seine Bezugsgruppe in der Schule/im Kindergarten/am Arbeitsplatz?

0	1	2	3	4	5	6	7	8	9	10
(0=keine Integration)						(10=sehr hohe Integration)				

Wie groß ist nach Ihrer Meinung die Auswirkung der Krankheit oder Behinderung Ihres Kindes auf die alltäglichen Probleme in Schule/Kindergarten/Beruf?

0	1	2	3	4	5	6	7	8	9	10
(0=keine Auswirkung)						(10=sehr große Auswirkungen)				

Wie groß schätzen Sie die Vorteile ein, die Ihr Kind aufgrund seiner Krankheit oder Behinderung in der Schule/im Kindergarten/am Arbeitsplatz hat?

0	1	2	3	4	5	6	7	8	9	10
(0=keine Vorteile)						(10=sehr große Vorteile)				

Welche sonstigen therapeutischen Maßnahmen laufen parallel zur Musiktherapie für Ihr Kind bzw. sind seit dem letzten Ausfüllen des Fragebogens zeitweise gelaufen? (Bitte zutreffendes ankreuzen)

- | | |
|---|---|
| <input type="checkbox"/> Psychotherapie | <input type="checkbox"/> Physiotherapie |
| <input type="checkbox"/> Familientherapie | <input type="checkbox"/> Logopädie |
| <input type="checkbox"/> Spieltherapie | <input type="checkbox"/> Ergotherapie |
| <input type="checkbox"/> Reittherapie | |
| <input type="checkbox"/> sonstige: | |

Welche Medikamente nimmt Ihr Kind regelmäßig ein?

.....

Die nun folgenden Fragen müssen **erst ab dem zweiten Ausfüllen des Fragebogens** beantwortet werden. Wenn Sie den Fragebogen zum ersten Mal ausfüllen (bei Therapiebeginn), sind Sie jetzt fertig! Wir danken Ihnen vielmals für Ihre Mitarbeit.

Musiktherapeutische Behandlung

Wie gerne geht nach Ihrem Eindruck Ihr Kind in die Musiktherapie?

0	1	2	3	4	5	6	7	8	9	10
(0=sehr ungern)					(10=sehr gerne)					

Wie stark sind nach Ihrer Meinung die Auswirkungen der Musiktherapie im Alltag Ihres Kindes zu spüren?

0	1	2	3	4	5	6	7	8	9	10
(0=überhaupt nicht)					(10=sehr stark)					

Sind diese Auswirkungen wünschenswert?

0	1	2	3	4	5	6	7	8	9	10
(0=Auswirkungen sind störend)					(10=Auswirkungen sind sehr erwünscht)					

Können Sie bei Ihrem Kind Verhaltensänderungen feststellen, die Sie direkt auf die Musiktherapie zurückführen?

0	1	2	3	4	5	6	7	8	9	10
(0=überhaupt nicht)					(10=sehr stark)					

Wie bewerten Sie die Veränderungen Ihres Kindes seit Beginn der Musiktherapie in Bezug auf die Familie?

0	1	2	3	4	5	6	7	8	9	10
(0=sehr negativ)					(10=sehr positiv)					

Wie bewerten Sie die feststellbaren Veränderungen Ihres Kindes seit Beginn der Musiktherapie in Bezug auf Schule/Kindergarten/Arbeitsplatz?

0	1	2	3	4	5	6	7	8	9	10
(0=sehr negativ)					(10=sehr positiv)					

Wie verständlich und nachvollziehbar sind für Sie die Rahmenbedingungen, Strukturen und (soweit bekannt) Inhalte der Musiktherapie Ihres Kindes?

0	1	2	3	4	5	6	7	8	9	10
(0=überhaupt nicht)					(10=sehr gut verständlich/nachvollziehbar)					

Wie zufrieden sind Sie mit dem Verlauf der Musiktherapie Ihres Kindes?

0	1	2	3	4	5	6	7	8	9	10
(0=überhaupt nicht zufrieden)						(10=sehr zufrieden)				

Wie häufig haben Sie schon überlegt, ob eine andere Therapiemethode als die laufende Musiktherapie für Ihr Kind ertragreicher sein könnte?

0	1	2	3	4	5	6	7	8	9	10
(0=noch nie)						(10=sehr oft)				

Wie gut entspricht Ihrem Eindruck nach die laufende Musiktherapie den Bedürfnissen Ihres Kindes?

0	1	2	3	4	5	6	7	8	9	10
(0=entspricht überhaupt nicht)						(10=entspricht sehr gut)				

Wie stark sind die Veränderungen, die Sie unmittelbar nach der Therapiestunde bei Ihrem Kind feststellen können?

0	1	2	3	4	5	6	7	8	9	10
(0=keine Veränderungen)						(10=sehr starke Veränderungen)				

Wie beurteilen Sie diese?

0	1	2	3	4	5	6	7	8	9	10
(0=sehr negativ)						(10=sehr positiv)				

Falls die Therapie bereits zu Ende ist:
Aus welchem Grund wird die Therapie beendet?

Herzlichen Dank für Ihre Mitarbeit!

9.4 Form for coding of diagnoses

a) Excerpt

Proband	Hauptdg. (Gruppe) 1...8 oder 0	Sicherheit H / M / N	Achse 5: psychosozial 0...2	Sicherheit H / M / N	Achse 4: körperlich 0...2	Sicherheit H / M / N	genaue Hauptdg. nur falls möglich bzw. bekannt	Kommentar
507							F	
537							F	
18							F	
40							F	
551							F	

b) Explanations

Spalte 1: Hauptdiagnose (Gruppe)

0. Keine psychische Störung

1. Affektive Störungen und Belastungsstörungen

- F30 – F39 Affektive Störungen
- F43.0 Akute Belastungsreaktion
- F43.1 Posttraumatische Belastungsstörung
- F43.2 Anpassungsstörungen

2. Angststörungen und emotionale Störungen mit Beginn in der Kindheit und Jugend

- F40 Phobische Störungen
- F41 Andere Angststörungen
- F42 Zwangsstörungen
- F93 Emotionale Störungen des Kindesalters

3. Dissoziative und somatoforme Störungen und andere neurotische Störungen

- F44 Dissoziative Störungen (Konversionsstörungen)
- F45 Somatoforme Störungen
- F48 Neurasthenie und andere neurotische Störungen

4. Eßstörungen und andere Verhaltensauffälligkeiten mit körperlichen Störungen

- F50 Eßstörungen
- F51 Nichtorganische Schlafstörungen
- F52 Nichtorganische sexuelle Funktionsstörungen
- F54 Psychologische oder Verhaltensfaktoren bei andernorts klassifizierten Krankheiten

5. Verhaltensstörungen mit Beginn in der Kindheit und Jugend und Tic-Störungen

- F90 Hyperkinetische Störungen

F91 Störungen des Sozialverhaltens
F92 Kombinierte Störungen des Sozialverhaltens und der Emotionen
F94 Störungen sozialer Funktionen mit Beginn in der Kindheit und Jugend
F95 Tic-Störungen
F98 Andere Verhaltens- oder emotionale Störungen mit Beginn in der Kindheit und Jugend

6. Autismus und andere tiefgreifende Entwicklungsstörungen

F84 Tiefgreifende Entwicklungsstörungen

7. Persönlichkeits- und Verhaltensstörungen, Mißbrauch und Abhängigkeit von Substanzen, Schizophrenie und wahnhaftige Störungen

F10 – F19 Psychische und Verhaltensstörungen durch psychotrope Substanzen
F20 – F29 Schizophrenie, schizotype und wahnhaftige Störungen
F55 Mißbrauch von nichtabhängigkeitserzeugenden Substanzen
F60 – F69 Persönlichkeits- und Verhaltensstörungen

8. Intelligenzminderung, organische psychische Störungen und Entwicklungsstörungen

F00 – F09 Organische, einschließlich symptomatische, psychische Störungen
F70 – F79 Intelligenzminderung
F80 – F83 Umschriebene Entwicklungsstörungen
F88 Andere Entwicklungsstörungen
F89 Nicht näher bezeichnete Entwicklungsstörungen

Spalte 2: mit wie großer Sicherheit (Wahrscheinlichkeit) trifft diese zu?

H: hohe Sicherheit (fast ganz sicher: 90% und darüber)
M: mittlere Sicherheit (relativ sicher)
N: niedrige Sicherheit (unsicher, unklar)

Spalte 3: Vorliegen von Achse 5-Diagnosen (aktuelle abnorme psychosozialen Umständen)

0: keine abnormen psychosozialen Umstände bekannt
1: mäßige (leichte bis mittelgradige) abnorme psychosozialen Umstände (d.h. solche, die nicht alleine eine psychische Krankheit erklären können, aber bei Gefährdung zusätzliche Risikofaktoren darstellen)
2: schwere bis schwerste abnorme psychosozialen Umstände (d.h. solche, die u.U. alleine eine psychische Krankheit erklären können: z.B. Mißbrauch, Verwahrlosung)

Spalte 4: Sicherheit

wie Spalte 2

Spalte 5: Vorliegen von Achse 4-Diagnosen (körperliche Symptomatik)

0: keine körperliche Symptomatik bekannt
1: leichte bis mittelgradige körperliche Symptomatik (d.h. mit eher geringer Beeinträchtigung von Alltag oder Sozialleben)
2: schwere bis schwerste körperliche Symptomatik (d.h. mit gravierender Beeinträchtigung von Alltag oder Sozialleben)

Spalte 6: Sicherheit

wie Spalte 2

Spalte 7: genaue Hauptdiagnose

nur bei Fällen, in denen eine genauere Klassifizierung als in Spalte 1 zuverlässig möglich ist

Spalte 8: Kommentar

- besondere Probleme?
- alternative Diagnosemöglichkeiten?
- sonstiges

Allgemein

- Bei vorliegender Diagnose keine Umklassifizierung vornehmen, außer in begründeten Ausnahmen (wenn angegebene Diagnose eindeutig falsch ist). Im Zweifelsfall die angegebene Diagnose übernehmen.
- Achse 5 und Achse 4: wenn nichts entsprechendes berichtet ist, "0" und "H" eintragen.

9.5 Sensitivity analyses

9.5.1 Overall effects

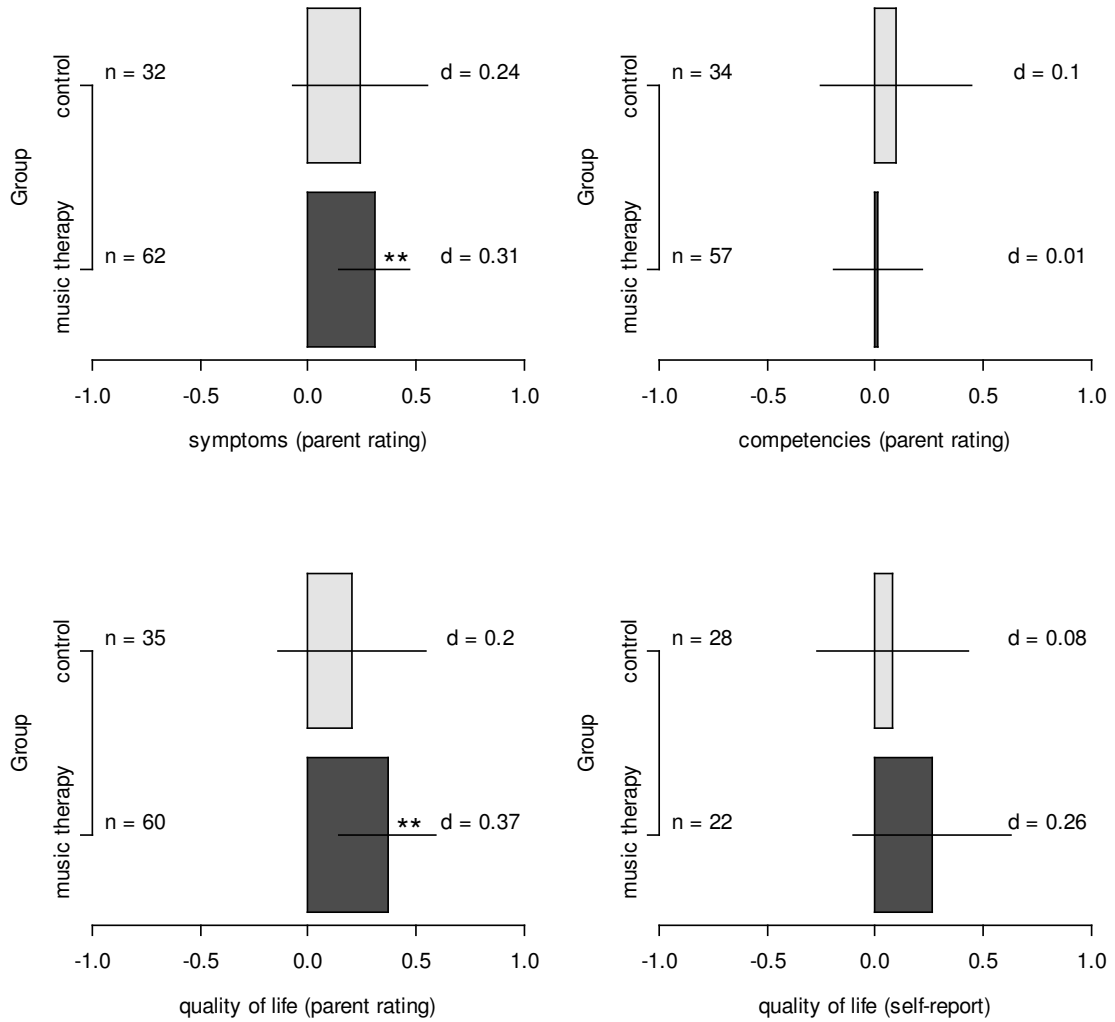
9.5.1.1 Exclusion of subjects who received other psychotherapy

Table 49. Overall effects of music therapy (other psychotherapy excluded)

Effect		<i>F</i>	<i>df</i>	<i>p</i>	η^2
<i>Symptoms</i>					
between subjects	intercept	3008.356	1, 92	.000 **	.970
	group ^a	3.849	1, 92	.053 (*)	.040
within subjects	time ^b	11.953	1, 92	.001 **	.115
	time x group	0.184	1, 92	.669	.002
<i>Competencies</i>					
between subjects	intercept	3364.311	1, 89	.000 **	.974
	group ^a	7.824	1, 89	.006 **	.081
within subjects	time ^b	0.345	1, 89	.558	.004
	time x group	.205	1, 89	.652	.002
<i>Quality of Life (parent)</i>					
between subjects	intercept	7048.899	1, 93	.000 **	.987
	group ^a	4.843	1, 93	.030 *	.049
within subjects	time ^b	8.573	1, 93	.004 **	.084
	time x group	0.706	1, 93	.403	.008
<i>Quality of Life (child)</i>					
between subjects	intercept	4288.692	1, 48	.000 **	.989
	group ^a	1.833	1, 48	.182	.037
within subjects	time ^b	1.939	1, 48	.170	.039
	time x group	0.542	1, 48	.465	.011

Note. The table shows the results of four independent univariate repeated measures analyses of variance. Participants who received psychotherapy were excluded. Missing values were excluded for each analysis separately. *df* - displayed as: numerator *df*, denominator *df*. ^a Intervention group vs. control group. ^b pre-test vs. post-test.

Figure 32. Overall effect sizes (other psychotherapy excluded)



Note. The figure displays effect sizes (standardised change scores) with 95% confidence intervals. Positive effect sizes indicate improvement.

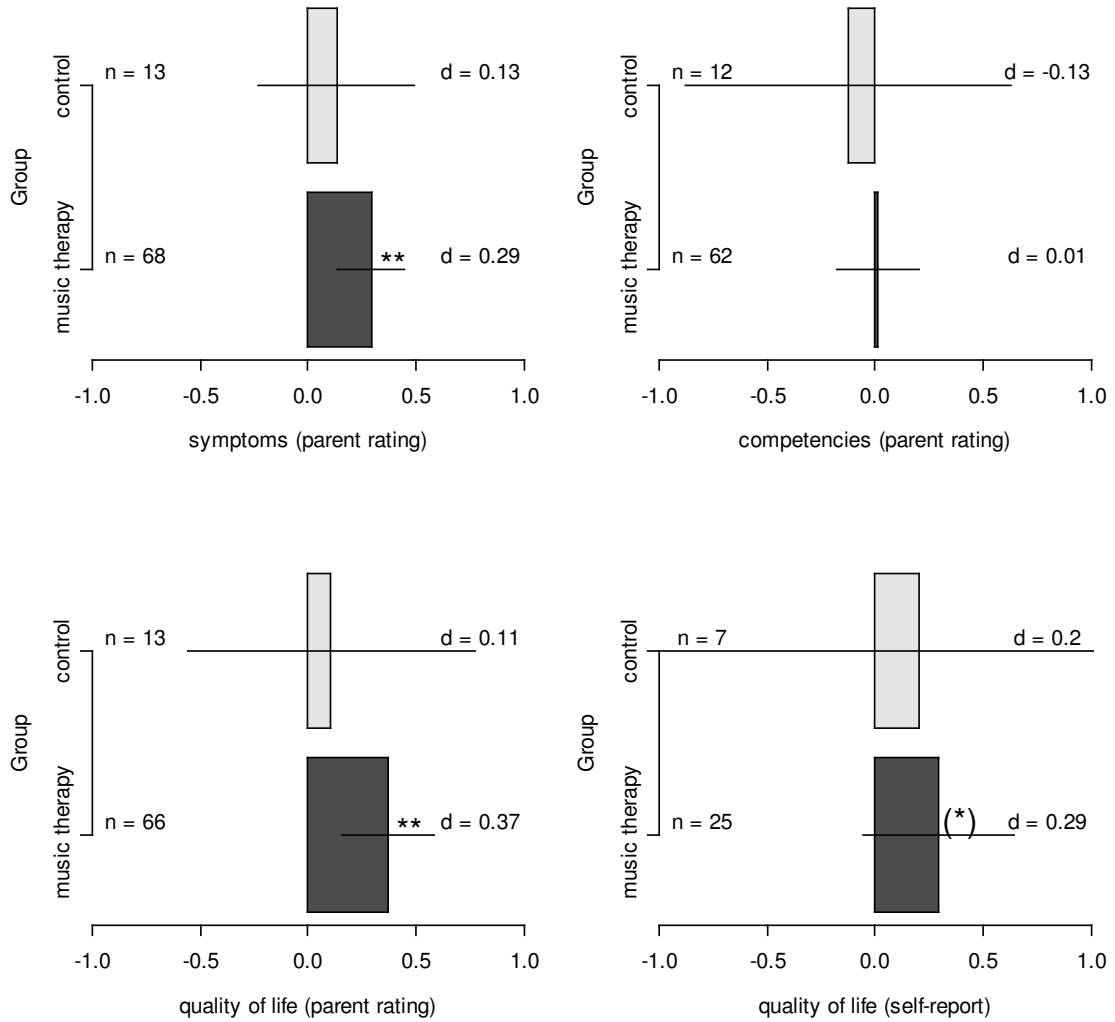
9.5.1.2 Exclusion of subjects who were not referred for music therapy

Table 50. Overall effects of music therapy (non-referred subjects excluded)

Effect		<i>F</i>	<i>df</i>	<i>p</i>	η^2
<i>Symptoms</i>					
between subjects	intercept	1475.446	1, 79	.000 **	.949
	group ^a	0.638	1, 79	.427	.008
within subjects	time ^b	4.890	1, 79	.030 *	.058
	time x group	0.699	1, 79	.406	.009
<i>Competencies</i>					
between subjects	intercept	1775.698	1, 72	.000 **	.961
	group ^a	765.167	1, 72	.002 **	.131
within subjects	time ^b	0.183	1, 72	.670	.003
	time x group	0.285	1, 72	.595	.004
<i>Quality of Life (parent)</i>					
between subjects	intercept	3065.452	1, 77	.000 **	.975
	group ^a	1.030	1, 77	.313	.013
within subjects	time ^b	3.073	1, 77	.084 (*)	.038
	time x group	0.935	1, 77	.337	.012
<i>Quality of Life (child)</i>					
between subjects	intercept	2181.186	1, 30	.000 **	.986
	group ^a	0.877	1, 30	.357	.028
within subjects	time ^b	1.046	1, 30	.315	.034
	time x group	0.037	1, 30	.849	.001

Note. The table shows the results of four independent univariate repeated measures analyses of variance. Participants who received psychotherapy were excluded. Missing values were excluded for each analysis separately. *df* - displayed as: numerator *df*, denominator *df*. ^a Intervention group vs. control group. ^b pre-test vs. post-test.

Figure 33. Overall effect sizes (non-referred subjects excluded)



Note. The figure displays effect sizes (standardised change scores) with 95% confidence intervals. Positive effect sizes indicate improvement.

9.5.1.3 Controlling for other treatments

Table 51. Overall effects of music therapy, controlling for other treatments

a) Dependent Variable: Symptoms change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	8	1.058	0.398	0.075
Intercept	1	3.208	0.076	0.030
symptoms pre-test (parent)	1	6.271	0.014 *	0.056
psychotherapy	1	1.656	0.201	0.016
functional therapy	1	0.020	0.887	0.000
medical treatment	1	0.441	0.508	0.004
educational interventions	1	0.191	0.663	0.002
parent counselling	1	0.845	0.360	0.008
MT/waiting/non-referred	2	0.153	0.858	0.003
Error	105			
Total	114			
Corrected Total	113			

b) Dependent Variable: Competencies change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	8	4.639	0.000 **	0.271
Intercept	1	22.353	0.000 **	0.183
competencies pre-test (parent)	1	24.444	0.000 **	0.196
psychotherapy	1	0.555	0.458	0.006
functional therapy	1	0.079	0.779	0.001
medical treatment	1	0.688	0.409	0.007
educational interventions	1	2.750	0.100	0.027
parent counselling	1	1.325	0.252	0.013
MT/waiting/non-referred	2	0.232	0.794	0.005
Error	100			
Total	109			
Corrected Total	108			

c) Dependent Variable: Quality of life change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	8	3.411	0.002 **	0.205
Intercept	1	15.839	0.000 **	0.130
quality of life pre-test (parent)	1	16.653	0.000 **	0.136
psychotherapy	1	3.959	0.049 *	0.036
functional therapy	1	1.061	0.305	0.010
medical treatment	1	0.130	0.719	0.001
educational interventions	1	0.058	0.811	0.001
parent counselling	1	5.026	0.027 *	0.045
MT/waiting/non-referred	2	0.299	0.742	0.006
Error	106			
Total	115			
Corrected Total	114			

d) Dependent Variable: Quality of life change (self)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	8	3.806	0.001 **	0.365
Intercept	1	14.656	0.000 **	0.217
quality of life pre-test (self)	1	13.789	0.000 **	0.206
psychotherapy	1	1.690	0.199	0.031
functional therapy	1	0.552	0.461	0.010
medical treatment	1	2.836	0.098	0.051
educational interventions	1	1.314	0.257	0.024
parent counselling	1	0.003	0.958	0.000
MT/waiting/non-referred	2	0.060	0.942	0.002
Error	53			
Total	62			
Corrected Total	61			

9.5.2 Effects for specific groups of clients

9.5.2.1 Music therapy versus control condition

Table 52. Effects of music therapy by patient characteristics, using original categories

a) Dependent Variable: Symptoms change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	24	1.521	0.083	0.298
Intercept	1	3.313	0.072	0.037
symptoms pre-test (parent)	1	5.254	0.024 *	0.058
group	1	0.038	0.847	0.000
age (factor)	3	2.130	0.102	0.069
gender	1	1.737	0.191	0.020
diagnosis (original category)	3	1.553	0.207	0.051
axis 4 (factor)	2	0.517	0.598	0.012
axis 5 (factor)	2	0.660	0.519	0.015
group * age (factor)	3	0.331	0.803	0.011
group * gender	1	0.454	0.502	0.005
group * diagnosis (original category)	3	1.040	0.379	0.035
group * axis 4 (factor)	2	5.152	0.008 **	0.107
group * axis 5 (factor)	2	0.291	0.749	0.007
Error	86			
Total	111			
Corrected Total	110			

b) Dependent Variable: Competencies change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	24	2.291	0.003 **	0.401
Intercept	1	24.248	0.000 **	0.228
competencies pre-test (parent)	1	28.105	0.000 **	0.255
group	1	0.442	0.508	0.005
age (factor)	3	1.283	0.286	0.045
gender	1	2.218	0.140	0.026
diagnosis (original category)	3	1.224	0.306	0.043
axis 4 (factor)	2	1.151	0.321	0.027
axis 5 (factor)	2	0.188	0.829	0.005
group * age (factor)	3	2.193	0.095	0.074
group * gender	1	1.598	0.210	0.019
group * diagnosis (original category)	3	0.656	0.581	0.023
group * axis 4 (factor)	2	1.482	0.233	0.035
group * axis 5 (factor)	2	0.683	0.508	0.016
Error	82			
Total	107			
Corrected Total	106			

c) Dependent Variable: Quality of life change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	24	1.625	0.054	0.310
Intercept	1	16.626	0.000 **	0.160
quality of life pre-test (parent)	1	13.020	0.001 **	0.130
group	1	0.690	0.408	0.008
age (factor)	3	0.857	0.467	0.029
gender	1	0.094	0.760	0.001
diagnosis (original category)	3	0.353	0.787	0.012
axis 4 (factor)	2	1.954	0.148	0.043
axis 5 (factor)	2	0.574	0.566	0.013
group * age (factor)	3	0.536	0.659	0.018
group * gender	1	0.125	0.724	0.001
group * diagnosis (original category)	3	1.790	0.155	0.058
group * axis 4 (factor)	2	2.163	0.121	0.047
group * axis 5 (factor)	2	2.610	0.079	0.057
Error	87			
Total	112			
Corrected Total	111			

d) Dependent Variable: Quality of life change (self)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	24	1.022	0.467	0.399
Intercept	1	11.786	0.001 **	0.242
quality of life pre-test (self)	1	11.922	0.001 **	0.244
group	1	0.418	0.522	0.011
age (factor)	3	0.443	0.724	0.035
gender	1	0.170	0.682	0.005
diagnosis (original category)	3	0.431	0.732	0.034
axis 4 (factor)	2	0.190	0.828	0.010
axis 5 (factor)	2	0.160	0.853	0.009
group * age (factor)	3	0.287	0.835	0.023
group * gender	1	1.400	0.244	0.036
group * diagnosis (original category)	3	0.021	0.996	0.002
group * axis 4 (factor)	2	0.760	0.475	0.039
group * axis 5 (factor)	2	0.822	0.447	0.043
Error	37			
Total	62			
Corrected Total	61			

9.5.2.2 *Development over time in the intervention group*

Table 53. Development over time by patient characteristics, using original categories

a) Dependent Variable: Burdens change (parent)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	12	3.601	0.001 **	0.490
Intercept	1	7.551	0.009 **	0.144
burdens pre-test (parent)	1	14.693	0.000 **	0.246
age (factor)	3	4.663	0.006 **	0.237
gender	1	0.882	0.353	0.019
diagnosis (original category)	3	2.679	0.058	0.152
axis 4 (factor)	2	1.817	0.174	0.075
axis 5 (factor)	2	0.680	0.512	0.029
Error	45			
Total	58			
Corrected Total	57			

b) Dependent Variable: Symptoms change in MT (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	11	1.173	0.325	0.177
Intercept	1	17.844	0.000 **	0.229
age (factor)	3	2.246	0.092	0.101
gender	1	0.908	0.344	0.015
diagnosis (original category)	3	0.347	0.791	0.017
axis 4 (factor)	2	2.271	0.112	0.070
axis 5 (factor)	2	0.647	0.527	0.021
Error	60			
Total	72			
Corrected Total	71			

c) Dependent Variable: Symptoms change daily life (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	11	1.074	0.398	0.172
Intercept	1	9.804	0.003 **	0.147
age (factor)	3	2.037	0.119	0.097
gender	1	0.707	0.404	0.012
diagnosis (original category)	3	1.283	0.289	0.063
axis 4 (factor)	2	0.018	0.982	0.001
axis 5 (factor)	2	0.185	0.831	0.006
Error	57			
Total	69			
Corrected Total	68			

d) Dependent Variable: Resources change in MT (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	11	0.855	0.588	0.137
Intercept	1	44.226	0.000 **	0.428
age (factor)	3	0.673	0.572	0.033
gender	1	2.183	0.145	0.036
diagnosis (original category)	3	0.095	0.963	0.005
axis 4 (factor)	2	1.573	0.216	0.051
axis 5 (factor)	2	0.389	0.679	0.013
Error	59			
Total	71			
Corrected Total	70			

e) Dependent Variable: Resources change daily life (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	11	0.837	0.604	0.139
Intercept	1	19.628	0.000 **	0.256
age (factor)	3	1.585	0.203	0.077
gender	1	0.424	0.518	0.007
diagnosis (original category)	3	0.915	0.440	0.046
axis 4 (factor)	2	0.295	0.746	0.010
axis 5 (factor)	2	0.333	0.718	0.012
Error	57			
Total	69			
Corrected Total	68			

f) Dependent Variable: Quality of life (therapist)

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	11	0.581	0.836	0.106
Intercept	1	13.081	0.001 **	0.195
age (factor)	3	1.406	0.251	0.072
gender	1	0.273	0.603	0.005
diagnosis (original category)	3	0.239	0.869	0.013
axis 4 (factor)	2	0.077	0.926	0.003
axis 5 (factor)	2	0.314	0.732	0.011
Error	54			
Total	66			
Corrected Total	65			

9.6 Computational procedures

9.6.1 Syntax used in SPSS

9.6.1.1 Predictors of therapy characteristics

```
GLM sessions frequ ongoing improv songs recept nonmus verbal  
counsel th_psy th_funk th_med th_paed BY dggroup sex WITH alter axis4  
axis5 /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ  
/CRITERIA = ALPHA(.05) /DESIGN .
```

9.6.1.2 Reliability analysis

```
RELIABILITY /VARIABLES=mt01 mt02 mt03 mt04 mt05 mt06 mt07 mt08  
mt09r mt10 mt11 mt12  
/FORMAT=NOLABELS /SCALE(ALPHA)=ALL/MODEL=ALPHA  
/STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL .
```

```
RELIABILITY /VARIABLES= f1p1 f1p2 f1p3 f1p4 f1p5r j1p1 j1p2r  
j1p3r j1p4 j1p5  
/FORMAT=NOLABELS /SCALE(ALPHA)=ALL/MODEL=ALPHA  
/STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS .
```

```
RELIABILITY /VARIABLES= f2p1 f2p2 f2p3 f2p4 f2p5r j2p1 j2p2r  
j2p3r j2p4 j2p5  
/FORMAT=NOLABELS /SCALE(ALPHA)=ALL/MODEL=ALPHA  
/STATISTICS=DESCRIPTIVE SCALE CORR /SUMMARY=TOTAL MEANS .
```

9.6.1.3 Inter-observer agreement

```
CORRELATIONS/VARIABLES=estot sym_mt sym_all /MISSING=PAIRWISE .  
CORRELATIONS/VARIABLES=esres res_mt res_all /MISSING=PAIRWISE .  
CORRELATIONS/VARIABLES=esptot esktot qol_all /MISSING=PAIRWISE .
```

9.6.1.4 Overall effects: ANOVA

```
GLM ttot1 ttot2 BY group /WSFACTOR = time 2 Polynomial  
/MEASURE = Symptome /METHOD = SSTYPE(3)  
/print = etasq /CRITERIA = ALPHA(.05)  
/WSDESIGN = time /DESIGN = group .
```

```
GLM resourc1 resourc2 BY group /WSFACTOR = time 2 Polynomial  
/MEASURE = Ressourcen /METHOD = SSTYPE(3)  
/print = etasq /CRITERIA = ALPHA(.05)  
/WSDESIGN = time /DESIGN = group .
```

```
GLM ptot1p ptot2p BY group /WSFACTOR = time 2 Polynomial  
/MEASURE = LQEltern /METHOD = SSTYPE(3)  
/print = etasq /CRITERIA = ALPHA(.05)  
/WSDESIGN = time /DESIGN = group .
```

```
GLM ktot1p ktot2p BY group /WSFACTOR = time 2 Polynomial  
/MEASURE = LQKind /METHOD = SSTYPE(3)  
/print = etasq /CRITERIA = ALPHA(.05)  
/WSDESIGN = time /DESIGN = group .
```

9.6.1.5 Overall effects: Sensitivity analysis 1 and 2

```
USE ALL .  
COMPUTE filter_$=(th_psy=0).
```

```

FILTER BY filter_$.
EXECUTE .

* repeat as above

USE ALL .
COMPUTE filter_$(warte=1 | subject<=75).
FILTER BY filter_$.
EXECUTE .

* repeat as above

```

9.6.1.6 Overall effects: Sensitivity analysis 3

```

COMPUTE groupn = sum(group, warte) .
EXECUTE .
GLM estot BY groupn WITH ttot1 th_psy th_funk th_med th_paed
counsel /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ
/CRITERIA = ALPHA(.05) /DESIGN .
GLM esres BY groupn WITH resourc1 th_psy th_funk th_med th_paed
counsel /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ
/CRITERIA = ALPHA(.05) /DESIGN .
GLM esptot BY groupn WITH ptot1p th_psy th_funk th_med th_paed
counsel /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ
/CRITERIA = ALPHA(.05) /DESIGN .
GLM esktot BY groupn WITH ktot1p th_psy th_funk th_med th_paed
counsel /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ
/CRITERIA = ALPHA(.05) /DESIGN .

```

9.6.1.7 Factors

```

STRING agef (A8) .
RECODE alter (Lowest thru 6.999='3-6') (7 thru 10.999='7-10')
(11 thru 14.999='11-14') (15 thru Highest='15-19') INTO agef .
STRING axis4f (A8) .
RECODE axis4 (0='none') (0.5 thru 1.0='moderate') (1.5 thru
2.0='severe') INTO axis4f .
STRING axis5f (A8) .
RECODE axis5 (0='none') (0.5 thru 1.0='moderate') (1.5 thru
2.0='severe') INTO axis5f .
EXECUTE .

```

9.6.1.8 Effects by patient characteristics

```

* main outcome variables (intervention and control group)

GLM estot BY group agef sex dggroup axis4f axis5f WITH ttot1
/METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = ttot1 group agef sex dggroup axis4f axis5f
group*agef group*sex group*dggroup group*axis4f group*axis5f .
GLM esres BY group agef sex dggroup axis4f axis5f WITH resourc1
/METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = resourc1 group agef sex dggroup axis4f axis5f
group*agef group*sex group*dggroup group*axis4f group*axis5f .
GLM esptot BY group agef sex dggroup axis4f axis5f WITH ptot1p
/METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = ptot1p group agef sex dggroup axis4f axis5f
group*agef group*sex group*dggroup group*axis4f group*axis5f .
GLM esktot BY group agef sex dggroup axis4f axis5f WITH ktot1p
/METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = ktot1p group agef sex dggroup axis4f axis5f
group*agef group*sex group*dggroup group*axis4f group*axis5f .

```

```

* other outcome variables (intervention group only)

GLM esburd BY agef sex dggroup axis4f axis5f WITH burd1p
/METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = burd1p agef sex dggroup axis4f axis5f .
GLM sym_mt BY agef sex dggroup axis4f axis5f /METHOD =
SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = agef sex dggroup axis4f axis5f .
GLM sym_all BY agef sex dggroup axis4f axis5f /METHOD =
SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = agef sex dggroup axis4f axis5f .
GLM res_mt BY agef sex dggroup axis4f axis5f /METHOD =
SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = agef sex dggroup axis4f axis5f .
GLM res_all BY agef sex dggroup axis4f axis5f /METHOD =
SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = agef sex dggroup axis4f axis5f .
GLM qol_all BY agef sex dggroup axis4f axis5f /METHOD =
SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = agef sex dggroup axis4f axis5f .

```

9.6.1.9 Effects by patient characteristics: Sensitivity analysis

```

* main outcome variables (intervention and control group)

USE ALL.
COMPUTE filter_$(= (dgkat = 1 | dgkat = 2 | dgkat = 5 | dgkat =
8) .
FILTER BY filter_$.
EXECUTE .

GLM estot BY group agef sex dgkat axis4f axis5f WITH ttot1
/METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = ttot1 group agef sex dgkat axis4f axis5f
group*agef group*sex group*dgkat group*axis4f group*axis5f .
GLM esres BY group agef sex dgkat axis4f axis5f WITH resourc1
/METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = resourc1 group agef sex dgkat axis4f axis5f
group*agef group*sex group*dgkat group*axis4f group*axis5f .
GLM esptot BY group agef sex dgkat axis4f axis5f WITH ptot1p
/METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = ptot1p group agef sex dgkat axis4f axis5f
group*agef group*sex group*dgkat group*axis4f group*axis5f .
GLM esktot BY group agef sex dgkat axis4f axis5f WITH ktot1p
/METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = ktot1p group agef sex dgkat axis4f axis5f
group*agef group*sex group*dgkat group*axis4f group*axis5f .

* other outcome variables (intervention group only)

GLM esburd BY agef sex dgkat axis4f axis5f WITH burd1p /METHOD
= SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = burd1p agef sex dgkat axis4f axis5f .
GLM sym_mt BY agef sex dgkat axis4f axis5f /METHOD = SSTYPE(3)
/INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA = ALPHA(.05) /DESIGN =
agef sex dgkat axis4f axis5f .
GLM sym_all BY agef sex dgkat axis4f axis5f /METHOD = SSTYPE(3)
/INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA = ALPHA(.05) /DESIGN =
agef sex dgkat axis4f axis5f .
GLM res_mt BY agef sex dgkat axis4f axis5f /METHOD = SSTYPE(3)
/INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA = ALPHA(.05) /DESIGN =
agef sex dgkat axis4f axis5f .

```

```

GLM res_all BY agef sex dgkat axis4f axis5f /METHOD = SSTYPE(3)
/INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA = ALPHA(.05) /DESIGN =
agef sex dgkat axis4f axis5f .

```

```

GLM qol_all BY agef sex dgkat axis4f axis5f /METHOD = SSTYPE(3)
/INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA = ALPHA(.05) /DESIGN =
agef sex dgkat axis4f axis5f .

```

```

FILTER OFF.
USE ALL.
EXECUTE .

```

9.6.1.10 *Effects by therapy characteristics*

```

GLM estot BY dggroup sex th.sex WITH ttot1 alter axis4 axis5
sessions frequ ongoing improv songs recept nonmus verbal counsel
th.exp th.sv th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT =
ETASQ /CRITERIA = ALPHA(.05)

```

```

/DESIGN = ttot1 alter sex dggroup axis4 axis5 sessions frequ
ongoing improv songs recept nonmus verbal counsel th.sex th.exp th.sv
th.pt sex*th.sex .

```

```

GLM esres BY dggroup sex th.sex WITH resourc1 alter axis4 axis5
sessions frequ ongoing improv songs recept nonmus verbal counsel
th.exp th.sv th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT =
ETASQ /CRITERIA = ALPHA(.05)

```

```

/DESIGN = resourc1 alter sex dggroup axis4 axis5 sessions
frequ ongoing improv songs recept nonmus verbal counsel th.sex th.exp
th.sv th.pt sex*th.sex .

```

```

GLM esptot BY dggroup sex th.sex WITH ptot1p alter axis4 axis5
sessions frequ ongoing improv songs recept nonmus verbal counsel
th.exp th.sv th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT =
ETASQ /CRITERIA = ALPHA(.05)

```

```

/DESIGN = ptot1p alter sex dggroup axis4 axis5 sessions frequ
ongoing improv songs recept nonmus verbal counsel th.sex th.exp th.sv
th.pt sex*th.sex .

```

```

GLM esktot BY dggroup sex th.sex WITH ktot1p alter axis4 axis5
sessions frequ ongoing improv songs recept nonmus verbal counsel
th.exp th.sv th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT =
ETASQ /CRITERIA = ALPHA(.05)

```

```

/DESIGN = ktot1p alter sex dggroup axis4 axis5 sessions frequ
ongoing improv songs recept nonmus verbal counsel th.sex th.exp th.sv
th.pt sex*th.sex .

```

```

GLM esburd BY dggroup sex th.sex WITH burd1p alter axis4 axis5
sessions frequ ongoing improv songs recept nonmus verbal counsel
th.exp th.sv th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT =
ETASQ /CRITERIA = ALPHA(.05)

```

```

/DESIGN = burd1p alter sex dggroup axis4 axis5 sessions frequ
ongoing improv songs recept nonmus verbal counsel th.sex th.exp th.sv
th.pt sex*th.sex .

```

```

GLM sym_mt BY dggroup sex th.sex WITH alter axis4 axis5
sessions frequ ongoing improv songs recept nonmus verbal counsel
th.exp th.sv th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT =
ETASQ /CRITERIA = ALPHA(.05)

```

```

/DESIGN = alter sex dggroup axis4 axis5 sessions frequ ongoing
improv songs recept nonmus verbal counsel th.sex th.exp th.sv th.pt
sex*th.sex .

```

```

GLM sym_all BY dggroup sex th.sex WITH alter axis4 axis5
sessions frequ ongoing improv songs recept nonmus verbal counsel

```



```
th.exp th.sv th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT =
ETASQ /CRITERIA = ALPHA(.05)
/DESIGN = alter sex dggroup axis4 axis5 sessions frequ ongoing
improv songs recept nonmus verbal counsel th.sex th.exp th.sv th.pt
sex*th.sex .
```

```
GLM res_mt BY dggroup sex th.sex WITH alter axis4 axis5
sessions frequ ongoing improv songs recept nonmus verbal counsel
th.exp th.sv th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT =
ETASQ /CRITERIA = ALPHA(.05)
/DESIGN = alter sex dggroup axis4 axis5 sessions frequ ongoing
improv songs recept nonmus verbal counsel th.sex th.exp th.sv th.pt
sex*th.sex .
```

```
GLM res_all BY dggroup sex th.sex WITH alter axis4 axis5
sessions frequ ongoing improv songs recept nonmus verbal counsel
th.exp th.sv th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT =
ETASQ /CRITERIA = ALPHA(.05)
/DESIGN = alter sex dggroup axis4 axis5 sessions frequ ongoing
improv songs recept nonmus verbal counsel th.sex th.exp th.sv th.pt
sex*th.sex .
```

```
GLM qol_all BY dggroup sex th.sex WITH alter axis4 axis5
sessions frequ ongoing improv songs recept nonmus verbal counsel
th.exp th.sv th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT =
ETASQ /CRITERIA = ALPHA(.05)
/DESIGN = alter sex dggroup axis4 axis5 sessions frequ ongoing
improv songs recept nonmus verbal counsel th.sex th.exp th.sv th.pt
sex*th.sex .
```

9.6.1.11 Treatment satisfaction

```
GLM mtsat BY agef sex dggroup axis4f axis5f /METHOD = SSTYPE(3)
/INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA = ALPHA(.05) /DESIGN =
agef sex dggroup axis4f axis5f .
```

```
GLM mtsat BY dggroup sex th.sex WITH alter axis4 axis5 sessions
frequ ongoing improv songs recept nonmus verbal counsel th.exp th.sv
th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ
/CRITERIA = ALPHA(.05)
/DESIGN = alter sex dggroup axis4 axis5 sessions frequ ongoing
improv songs recept nonmus verbal counsel th.sex th.exp th.sv th.pt
sex*th.sex .
```

```
CORRELATIONS /VARIABLES=mtsat estot esres esptot esktot esburd
sym_mt sym_all res_mt res_all qol_all
/PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE .
```

9.6.1.12 General rating of success and development

```
GLM gen.succ BY group agef sex dggroup axis4f axis5f /METHOD =
SSTYPE(3) /INTERCEPT = INCLUDE /PRINT = ETASQ /CRITERIA =
ALPHA(.05) /DESIGN = group agef sex dggroup axis4f axis5f group*agef
group*sex group*dggroup group*axis4f group*axis5f .
```

```
GLM gen.succ BY dggroup sex th.sex WITH alter axis4 axis5
sessions frequ ongoing improv songs recept nonmus verbal counsel
th.exp th.sv th.pt /METHOD = SSTYPE(3) /INTERCEPT = INCLUDE /PRINT =
ETASQ /CRITERIA = ALPHA(.05)
/DESIGN = alter sex dggroup axis4 axis5 sessions frequ ongoing
improv songs recept nonmus verbal counsel th.sex th.exp th.sv th.pt
sex*th.sex .
```

9.6.2 Syntax used in R

9.6.2.1 Figure 1

```
# example: Haines' data
balken2<-function(a,b,c,d){mp<-barplot(a[,1],ylab=b,xlab=c,
horiz=T,xlim=c(-1,1),main=d);box();segments(a[,2],mp,a[,3],mp)}
betw<-rep(NA,6);dim(betw)<-c(2,3);rownames(betw)<-c("Pre-
test","Post-test")
betw[1,1]<-(62.89-60)/16.66;betw[2,1]<-(64.44-56.57)/12.13
ci<-qt(.975,df=14)*sqrt(1/9+1/7)
betw[,2]<-betw[,1]-ci;betw[,3]<-betw[,1]+ci
within<-rep(NA,6);dim(within)<-c(2,3);rownames(within)<-
c("Verbal therapy","Music therapy")
within[1,1]<-(56.57-60)/16.66;within[2,1]<-(64.44-62.89)/16.66
ci.c<-qt(.975,df=6)*sqrt(2*1/7);ci.i<-qt(.975,df=8)*
sqrt(2*1/9);ci<-c(ci.c,ci.i)
within[,2]<-within[,1]-ci;within[,3]<-within[,1]+ci
par(mfrow=c(2,2))
balken2(betw,"Time","Self-esteem","a) between groups")
balken2(within,"Group","Self-esteem","b) within groups")
```

9.6.2.2 Figure 2

```
plot(c(0,150),c(0,1),col="white",xlab="Sample size",
ylab="Test power")
title("")
n<-seq(5,150,1)
a<-0.05
za<-qt(1-a/2,n)
d1<-0.8
p1<-pnorm(d1*(n-1)*sqrt(2*n)/(2*(n-1)+1.21*(za-1.06))-za)
par(lty="solid")
lines(n,p1,type="l")
d2<-0.5
p2<-pnorm(d2*(n-1)*sqrt(2*n)/(2*(n-1)+1.21*(za-1.06))-za)
lines(n,p2,type="l")
d3<-0.2
p3<-pnorm(d3*(n-1)*sqrt(2*n)/(2*(n-1)+1.21*(za-1.06))-za)
lines(n,p3,type="l")
n2<-seq(-10,160,5)
p80<-0*n2+.8
par(lty="dotdash")
lines(n2,p80,type="l")
text(55,.93,"large effect")
text(63,.7,"medium effect")
text(78,.19,"small effect")
```

9.6.2.3 Preparation of variables

```
sex<-SEX;sex[sex==1]<-"boys";sex[sex==2]<-"girls"
age<-ALTER;age[ALTER<7]<-"3-6";age[ALTER>=7 & ALTER<11]<-"7-
10";age[ALTER>=11&ALTER<15]<-"11-14";age[ALTER>=15]<-"15-19"
diag<-c("Mood and adjustment disorders","Anxiety and emotional
disorders","Dissociative and somatoform disorders","Behavioural
disorders","Pervasive developmental disorders","Developmental
disorders")
diag2<-c("Adjustment and emotional disorders","Behavioural
disorders","Developmental disorders")
diag3<-c("Adjustment","Behaviour","Development")
```

```

    group<-GROUP; group[group==1]<-" music therapy";
group[group==2]<-"control"
    axis4<-AXIS4; axis4[AXIS4==0]<-" none"; axis4[AXIS4>0 & AXIS4
<=1]<-"moderate"; axis4[AXIS4>1]<-"severe"
    axis5<-AXIS5; axis5[AXIS5==0]<-" none"; axis5[AXIS5>0 & AXIS5
<=1]<-"moderate"; axis5[AXIS5>1]<-"severe"
    axis5f2<-AXIS5; axis5f2[AXIS5>0]<-1
    dg<-dg.group; for (i in 1:3) dg[dg==i]<-c("Adj.", "Beh.",
"Dev.")[i]
    nonmus<-NONMUS; nonmus[NONMUS==0]<-"no"; nonmus[NONMUS==1]<-
"yes"
    improv<-IMPROV; improv[IMPROV==0]<-"no"; improv[IMPROV==1]<-
"yes"
    verbal<-VERBAL; verbal[VERBAL==0]<-"no"; verbal[VERBAL==1]<-
"yes"
    sessions<-SESSIONS; sessions[SESSIONS<=10]<-" 1 to 10";
sessions[SESSIONS >10 & SESSIONS<25]<-" 11 to 24";
sessions[SESSIONS>=25]<-"25 or more"
    plansess<-PLANSESS; plansess[PLANSESS<=10]<-" 1 to 10";
plansess[PLANSESS >10 & PLANSESS<25]<-" 11 to 24";
plansess[PLANSESS>=25]<-"25 or more"
    th.pt2<-th.pt; th.pt2[th.pt==0]<-"no"; th.pt2[th.pt==1]<-"yes"
    th.exp2<-th.exp; th.exp2[th.exp<=1]<-" 0-1"; th.exp2[th.exp>1]<-
"> 1"; th.exp2[th.exp>5]<-"> 5"; th.exp2[th.exp>10]<-">10";
th.exp2[th.exp>15]<-">15"
    matchsex<-th.sex;matchsex[th.sex==1&SEX==1]<-"m/m";
matchsex[th.sex==1&SEX==2]<-"m/f"; matchsex[th.sex==2&SEX==1]<-"f/m";
matchsex[th.sex==2&SEX==2]<-"f/f"

```

9.6.2.4 Patient characteristics

```

# age and gender
barplot(table(group, age),legend=T, xlab="Age", ylab="number of
subjects"); box()
barplot(table(group, sex), legend=T, xlab="Gender", ylab="number
of subjects"); box()

# primary diagnoses
a<-table(group, DGKAT); colnames(a)<-diag
barplot(t(a), xlab="Group", ylab="number of subjects", beside=T)
legend(7.2,34.5, names(a[1,]), fill=heat.colors(6), cex=.9)

a<-table(group, dg.group); colnames(a)<-diag2
barplot(t(a),legend=T, xlab="Group", ylab="number of subjects",
beside=T)

# axis 4 and 5 diagnoses
barplot(table(axis4, group),legend=T, xlab="Group", ylab="number
of subjects", beside=T)
barplot(table(axis5, group),legend=T, xlab="Group", ylab="number
of subjects", beside=T)

```

9.6.2.5 Other treatments and parent counselling

```

# other treatments
a<-cbind(table(group,th.psy)[,2], table(group,th.funk)[,2],
table(group,th.med)[,2], table(group,th.paed)[,2])
colnames(a)<-c("psychotherapeutic","functional", "medical",
"educational")
a[1,]<-a[1,]/75; a[2,]<-a[2,]/61
barplot(a, xlab="Concurrent treatment", ylab="percentage of
cases (%)", beside=T)
legend(7,0.32,names(table(group)),fill=c("red","yellow"))

```

```

# parent counselling
a<-table(COUNSEL, group); rownames(a)<-c("none", "occasional
meetings", "regular sessions")
barplot(a, legend=T, xlab="Group", ylab="number of cases",
beside=T)

```

9.6.2.6 Predictors of therapy characteristics

```

# function
histo<-function(x,y,z1,z2) {
  a<-table(x,y); b<-round(a[,2]/(a[,1]+a[,2]),2)*100
  mp<-barplot(b, xlab=z1, ylab=paste(z2,"%"), ylim=c(0,100))
  c<-b+5;c[c>90]<-90
  text(mp,c+5, paste("(",a[,2],"/",a[,1]+a[,2],")",sep=""))
}

# music therapy techniques
par(mfrow=c(3,3))
histo(age, SONGS, "age", "songs")
histo(age, NONMUS, "age", "other media")
histo(age, VERBAL, "age", "verbal discourse")
histo(sex, ONGOING, "", "continued after post-test")
histo(sex, SONGS, "", "songs")
histo(sex, VERBAL, "", "verbal discourse")
histo(axis5, RECEPT, "axis 5", "receptive techniques")

# parent counselling and other treatments
par(mfrow=c(3,3))
histo(age[GROUP==1], COUNSEL[GROUP==1], "age", "parent
counselling")
histo(dg[GROUP==1], COUNSEL[GROUP==1], "diagnosis", "parent
counselling")
histo(age[GROUP==1], th.funk[GROUP==1], "age", "functional
therapy")
histo(age[GROUP==1], th.med[GROUP==1], "age", "medical
treatment")
histo(axis5[GROUP==1], th.psy[GROUP==1], "axis 5",
"psychotherapy")

```

9.6.2.7 Computation of change scores

```

### function pooled.sd
pooled.sd<-function(x,y)
{xx<-x[!is.na(x)]; yy<-y[!is.na(y)]
a<-c(var(xx),var(yy)); b<-c(length(xx), length(yy))
sqrt(weighted.mean(a, b))}

### standardised change scores
sd.ttot<-pooled.sd(TTOT1[GROUP==1], TTOT1[GROUP==2])
sd.tint<-pooled.sd(TINT1[GROUP==1], TINT1[GROUP==2])
sd.text<-pooled.sd(TEXT1[GROUP==1], TEXT1[GROUP==2])
sd.ptot<-pooled.sd(PTOT1P[GROUP==1], PTOT1P[GROUP==2])
sd.ktot<-pooled.sd(KTOT1P[GROUP==1], KTOT1P[GROUP==2])
sd.res<-pooled.sd(RESOURC1[GROUP==1], RESOURC1[GROUP==2])
sd.burd<-sqrt(var(BURD1P[!is.na(BURD1P)]))
es.tot<- -(TTOT2-TTOT1)/sd.ttot
es.int<- -(TINT2-TINT1)/sd.tint
es.ext<- -(TEXT2-TEXT1)/sd.text
es.res<- (RESOURC2-RESOURC1)/sd.res
es.ptot<- (PTOT2P-PTOT1P)/sd.ptot
es.ktot<- (KTOT2P-KTOT1P)/sd.ktot
es.burd<- -(BURD2P-BURD1P)/sd.burd

```

9.6.2.8 QQ-Plots

```
q<-function(x,y){qqnorm(x, main=y);qqline(x)}

par(mfrow=c(2,3))
q(TTOT1, "Symptoms (parent rating)")
q(TCOMP1, "Competencies (parent rating)")
q(PTOT1P, "Quality of life (parent rating)")
q(KTOT1P, "Quality of life (self-report)")
q(BURD1P, "Burdens (parent rating)")

par(mfrow=c(2,3))
q(es.tot, "symptom change (p)")
q(SYM.MT, "symptom change within MT (t)")
q(SYM.ALL, "symptom change in daily life (t)")
q(es.res, "competencies change (p)")
q(RES.MT, "resources change within MT (t)")
q(RES.ALL, "resources change in daily life (t)")

q(es.ptot, "quality of life change (p)")
q(es.ktot, "quality of life change (s)")
q(QOL.ALL, "quality of life change in daily life (t)")
q(MTSAT, "treatment satisfaction (p)")
q(es.burd, "burdens change (p)")
```

9.6.2.9 Functions for descriptive analyses

```
### multiple barplots with error bars

# arguments for barplots
arg<-function(x1,x2){ # x1: Factor, x2: Outcome
  t1<-table(x1); nam<-names(t1); l<-length(t1)
  a<-rep(NA, 10*1); dim(a)<-c(1,10)
  rownames(a)<-nam
  for (i in 1:l) {tt<-unlist(t.test(x2[x1==nam[i]])); a[i,]<-tt}
  colnames(a)<-names(tt); a<-a[,1:7]; mode(a)<-"numeric"
  a}

# function barplot for effect sizes
balken<-function(a,b,c){ # a: arg(Factor, Outcome); b: Name of
factor; c: Name of outcome-Name
  mp<-barplot(a[,6],ylab=b,xlab=c, horiz=T, xlim=c(-1,1))
  segments(a[,4],mp,a[,5],mp)
  sig<-a[,3]; sig[a[,3]>=.1]<-""; sig[a[,3]<.1]<-"(*)";
sig[a[,3]<.05]<-"*"; sig[a[,3]<.01]<- "***"
  text(a[,6]+.1, mp-.1, sig, cex=1.5)
  text(.8, mp+.1, paste("d =",round(a[,6],2)))
  text(-.8, mp+.1,paste("n =",a[,2]+1))}

# function barplot for VAS
balken2<-function(a,b,c){ # a: arg(Factor, Outcome); b: Name of
factor; c: Name of outcome-Name
  mp<-barplot(a[,6],ylab=b,xlab=c, horiz=T, xlim=c(-50,50))
  segments(a[,4],mp,a[,5],mp)
  sig<-a[,3]; sig[a[,3]>=.1]<-""; sig[a[,3]<.1]<-"(*)";
sig[a[,3]<.05]<-"*"; sig[a[,3]<.01]<- "***"
  text(a[,6]+5, mp-.1, sig, cex=1.5)
  text(40, mp+.1, paste("M =",round(a[,6],2)))
  text(-40, mp+.1,paste("n =",a[,2]+1))}

# function barplot for treatment satisfaction
balken3<-function(a,b,c){ # a: arg(Factor, Outcome); b: Name of
factor; c: Name of outcome-Name
```

```

mp<-barplot(a[,6],ylab=b,xlab=c, horiz=T, xlim=c(0,10))
segments(a[,4],mp,a[,5],mp)
text(9, mp+.2, paste("M =",round(a[,6],2)))
text(9, mp-.2,paste("n =",a[,2]+1))

# function barplot for general rating of success
balken4<-function(a,b,c){ # a: arg(Factor, Outcome); b: Name of
factor; c: Name of outcome-Name
mp<-barplot(a[,6],ylab=b,xlab=c, horiz=T, xlim=c(-1,3))
segments(a[,4],mp,a[,5],mp)
sig<-a[,3]; sig[a[,3]>=.1]<-" "; sig[a[,3]<.1]<- "("*)";
sig[a[,3]<.05]<-"*"; sig[a[,3]<.01]<- "***"
text(a[,6]+.2, mp-.1, sig, cex=1.5)
text(2.5, mp+.1, paste("M =",round(a[,6],2)))
text(-0.5, mp+.1,paste("n =",a[,2]+1))}

```

9.6.2.10 Overall results

```

# overall results: parent ratings & self reports
grp<-group; grp[grp==" music therapy"]<-" MT"
par(mfcol=c(4,1))
balken(arg(grp, es.tot), "group", "symptoms (parent rating)")
balken(arg(grp, es.res), "group", "competencies (parent rating)")
balken(arg(grp, es.ptot), "group", "quality of life (parent
rating) ")
balken(arg(grp, es.ktot), "group", "quality of life (self-
report) ")

# overall results: therapist ratings
par(mfrow=c(1,1))
a<-c(SYM.MT, SYM.ALL, RES.MT, RES.ALL, QOL.ALL)
b<-c(rep("symp. MT",136), rep("symp. DL",136), rep("res.
MT",136), rep("res. DL",136), rep("quality of life", 136))
balken2(arg(b, a), "outcome", "change rating")

```

9.6.2.11 Overall results: Sensitivity analysis 1

```

# overall results: parent ratings & self reports
par(mfrow=c(2,2))
balken(arg(group[th.psy==0],
es.tot[th.psy==0]), "Group", "symptoms (parent rating)")
balken(arg(group[th.psy==0],
es.res[th.psy==0]), "Group", "competencies (parent rating)")
balken(arg(group[th.psy==0],
es.ptot[th.psy==0]), "Group", "quality of life (parent rating)")
balken(arg(group[th.psy==0],
es.ktot[th.psy==0]), "Group", "quality of life (self-report)")

```

9.6.2.12 Overall results: Sensitivity analysis 2

```

# overall results: parent ratings & self reports
par(mfrow=c(2,2))
balken(arg(group[WARTE==1|GROUP==1],
es.tot[WARTE==1|SUBJECT<=75]), "Group", "symptoms (parent rating)")
balken(arg(group[WARTE==1|GROUP==1],
es.res[WARTE==1|GROUP==1]), "Group", "competencies (parent rating)")
balken(arg(group[WARTE==1|GROUP==1],
es.ptot[WARTE==1|GROUP==1]), "Group", "quality of life (parent rating)")
balken(arg(group[WARTE==1|GROUP==1],
es.ktot[WARTE==1|GROUP==1]), "Group", "quality of life (self-report)")

```

9.6.2.13 *The influence of patient characteristics*

```
# group x axis 4 -> symptoms (parent rating)
par(mfrow=c(2,2))
balken(arg(axis4[group==" music therapy"], es.tot[group==" music
therapy"]), "axis 4 diagnosis", "symptom change (parent rating)")
title(main="Intervention group")
balken(arg(axis4[group=="control"], es.tot[group=="control"]),
"axis 4 diagnosis", "symptom change (parent rating)")
title(main="Control group")

# development over time in the intervention group by patient
variables
par(mfrow=c(2,2))
balken2(arg(age, SYM.MT), "age", "symptoms (in MT)")
balken2(arg(age, SYM.ALL), "age", "symptoms (daily life)")
balken(arg(age, es.burd), "age", "burdens on family and
society")
balken(arg(dg, es.burd), "diagnosis", "burdens on family and
society")
```

9.6.2.14 *The influence of therapy characteristics*

```
# music therapy techniques
par(mfrow=c(2,2))
balken(arg(nonmus, es.tot), "other media", "symptoms (parent
rating)")
balken(arg(nonmus, es.burd), "other media", "burdens on family
and society")
balken2(arg(verbal, SYM.MT), "verbal discourse", "symptoms (in
MT) ")
balken2(arg(verbal, RES.MT), "verbal discourse", "resources (in
MT) ")

par(mfrow=c(2,2))
balken2(arg(improv, SYM.ALL), "improvisation", "symptoms (daily
life) ")

# dosage of therapy
par(mfrow=c(2,2))
balken2(arg(sessions, SYM.MT), "number of sessions", "symptoms
(in MT) ")
balken2(arg(sessions, RES.MT), "number of sessions", "resources
(in MT) ")

# therapist variables
par(mfrow=c(2,2))
balken2(arg(th.pt2, SYM.MT), "additional psychotherapy
training", "symptoms (in MT) ")
balken2(arg(th.pt2, RES.MT), "additional psychotherapy
training", "resources (in MT) ")
balken2(arg(th.exp2, SYM.MT), "experience (years)", "symptoms
(in MT) ")
a<-names(table(th.exp)); b<-rep(NA,length(a))
for (i in 1:11) b[i]<-mean(SYM.MT[th.exp==a[i]], na.rm=T)
plot(a,b, xlab="experience (years)", ylab="change of symptoms
(in MT) "); lines(a,b)

par(mfrow=c(2,2))
balken2(arg(matchsex, SYM.MT), "gender therapist/client",
"symptoms (in MT) ")
```

9.6.2.15 Treatment satisfaction

```
par(mfrow=c(2,2))
balken3(arg(sessions, MTSAT), "number of sessions", "treatment
satisfaction")
balken3(arg(matchsex, MTSAT), "gender therapist/client",
"treatment satisfaction")
```

9.6.2.16 General rating of success and development

```
par(mfrow=c(2,2))
balken4(arg(group, GEN.SUCC), "group", "general success and
development")
```

```
par(mfrow=c(2,2))
balken4(arg(sessions, GEN.SUCC), "number of sessions", "general
success and development")
```

9.6.2.17 Examination of possible contraindications

```
es.wit<- -(TWIT2-TWIT1)/pooled.sd(TWIT1[GROUP==1],
TWIT1[GROUP==2])
es.som<- -(TSOM2-TSOM1)/pooled.sd(TSOM1[GROUP==1],
TSOM1[GROUP==2])
es.anx<- -(TANX2-TANX1)/pooled.sd(TANX1[GROUP==1],
TANX1[GROUP==2])
es.soc<- -(TSOC2-TSOC1)/pooled.sd(TSOC1[GROUP==1],
TSOC1[GROUP==2])
es.tho<- -(TTHO2-TTHO1)/pooled.sd(TTHO1[GROUP==1],
TTHO1[GROUP==2])
es.att<- -(TATT2-TATT1)/pooled.sd(TATT1[GROUP==1],
TATT1[GROUP==2])
es.del<- -(TDEL2-TDEL1)/pooled.sd(TDEL1[GROUP==1],
TDEL1[GROUP==2])
es.agg<- -(TAGG2-TAGG1)/pooled.sd(TAGG1[GROUP==1],
TAGG1[GROUP==2])

# mt
par(mfrow=c(3,3))
balken(arg(axis4[GROUP==1], es.wit[GROUP==1]), "axis 4",
"withdrawn")
balken(arg(axis4[GROUP==1], es.som[GROUP==1]), "axis 4",
"somatic")
balken(arg(axis4[GROUP==1], es.anx[GROUP==1]), "axis 4",
"anxious/depressed")
balken(arg(axis4[GROUP==1], es.soc[GROUP==1]), "axis 4", "social
problems")
balken(arg(axis4[GROUP==1], es.tho[GROUP==1]), "axis 4",
"thought problems")
balken(arg(axis4[GROUP==1], es.att[GROUP==1]), "axis 4",
"attention problems")
balken(arg(axis4[GROUP==1], es.del[GROUP==1]), "axis 4",
"delinquent")
balken(arg(axis4[GROUP==1], es.agg[GROUP==1]), "axis 4",
"aggressive")

# control
par(mfrow=c(3,3))
balken(arg(axis4[GROUP==2], es.wit[GROUP==2]), "axis 4",
"withdrawn")
balken(arg(axis4[GROUP==2], es.som[GROUP==2]), "axis 4",
"somatic")
```



```

    balcken(arg(axis4[GROUP==2], es.anx[GROUP==2]), "axis 4",
"anxious/depressed")
    balcken(arg(axis4[GROUP==2], es.soc[GROUP==2]), "axis 4", "social
problems")
    balcken(arg(axis4[GROUP==2], es.tho[GROUP==2]), "axis 4",
"thought problems")
    balcken(arg(axis4[GROUP==2], es.att[GROUP==2]), "axis 4",
"attention problems")
    balcken(arg(axis4[GROUP==2], es.del[GROUP==2]), "axis 4",
"delinquent")
    balcken(arg(axis4[GROUP==2], es.agg[GROUP==2]), "axis 4",
"aggressive")

    # therapist
    par(mfrow=c(2,2))
    balcken2(arg(axis4[GROUP==1], SYM.MT[GROUP==1]), "axis 4",
"symptoms (within MT)")
    balcken2(arg(axis4[GROUP==1], SYM.ALL[GROUP==1]), "axis 4",
"symptoms (daily life)")

    # general success
    par(mfrow=c(2,2))
    balcken4(arg(axis4[GROUP==1], GEN.SUCC[GROUP==1]), "axis 4",
"general success and development")
    title(main="Intervention")
    balcken4(arg(axis4[GROUP==2], GEN.SUCC[GROUP==2]), "axis 4",
"general success and development")
    title(main="Control")

```