

Master's thesis

PERCEPTION OF BASIC EMOTIONS IN CLINICAL
IMPROVISATIONS: AN EXPERIMENTAL STUDY

by

Sanna-Mari Kontoniemi

Master's Degree Programme in Music Therapy

August 2016

Department of Music
Faculty of Humanities
University of Jyväskylä
Finland

Tiedekunta – Faculty Faculty of Humanities	Laitos – Department Department of Music
Tekijä – Author Sanna-Mari Kontoniemi	
Työn nimi – Title Perception of basic emotions in clinical improvisations: an experimental study	
Oppiaine – Subject Music Therapy	Työn laji – Level Master's Thesis
Aika – Month and year August 2016	Sivumäärä – Number of pages 47
<p>Tiivistelmä – Abstract</p> <p>Recently the Finnish music therapy research has focused on therapy of clients with depression. In music psychology the global interest in felt and perceived emotions in music has been a clear trend for two to three decades. This experimental study shares the interests of both fields by examining perceived emotions in improvised music from music therapy sessions.</p> <p>In the experiment, participants (n=29), who were professional music therapists (n=14) and music therapy students (n=15), were asked to listen to 21 short excerpts from seven improvisations that clients with depression have played in their therapy. Meanwhile or after each excerpt, participants were asked to rate the strength of each basic emotion (joy, sorrow, anger, fear, tenderness) they heard in the excerpts. Some studies suggest perception of most basic emotions being possible in any (non-clinical) music, so it was assumed to be possible to identify basic emotions also in the clinical improvisations. Another hypothesis was that professionals may rate higher the emotions they heard in the excerpts, due to their longer experience in clinical work.</p> <p>The data was analysed mainly quantitatively using IBM SPSS Statistics –software. The results partly supported the set hypotheses: anger appeared to be the easiest emotion to recognize from the improvisations, whereas fear was the most difficult one. Fear was mistakenly rated to be tenderness, joy and sorrow. Also differences between students and professionals occurred, although they were not statistically significant.</p>	
Asiasanat – Keywords emotion, perception, music therapy, music listening, clinical improvisation, depression	
Säilytyspaikka – Depository	
Muita tietoja – Additional information	

Contents

Abstract

- 1 Introduction.....4
- 2 The key terms used in this thesis5
 - 2.1 Emotion and musical basic emotions 5
 - 2.2 Depression 9
 - 2.3 Music therapy 10
 - 2.4 Clinical improvisation..... 11
 - 2.5 Music listening 12
- 3 Previous studies on musical emotions.....14
 - 3.1 Research questions and hypotheses with studies supporting them 15
- 4 Research methods19
- 5 The listening experiment and data analysis20
- 6 Results24
 - 6.1 Results without group comparisons 24
 - 6.2 Group comparisons: music therapy students versus experienced professionals..... 28
- 7 Limitations and future research.....30
- 8 Discussion33
- 9 Conclusion.....38
- References39

Appendices

- APPENDIX 1: Answering form of the listening experiment
- APPENDIX 2: Additional instructions for the online listening experiment

1 Introduction

In music therapy, clinical improvisation is an essential tool for working with emotional and psychological problems. It means playing or singing together or either client or therapist alone, depending on the goals of the therapy. What does a clinical improvisation sound like if the player is suffering from depression? What emotions or emotion related experiences are present in those improvisations? Are they so clearly present that just anyone could hear them by only listening to the music and not seeing the performer? These questions I recall having been the most frequent ones in my mind when preparing this research. Little by little an idea of an experiment with a set of improvisations and a group of participants got clearer and clearer form and eventually became reality. As a novice music therapist myself, I was curious to make this topic as close to my situation as possible and chose to compare experienced music therapists to novice music therapists in their skills to listen to clinical improvisations, in other words, the improvisations made during a music therapy session.

In therapy session, therapist has a possibility to observe client's body language (posture, mimes, gestures), and together with audio information he or she can form a perception of an emotion. On one hand, I was curious to know which one is more important in emotion perception in music, visual or audio information. On the other hand, I was interested to see, how experience in clinical work shows in perception of musical emotions. Based on these interests I planned my study.

This study does not reveal anything really new from the field of music therapy or music psychology, but serves as a good base for something more complex by telling something about the nature of clinical improvisation.

2 The key terms used in this thesis

In this chapter I explain four key terms, which are essential to understand when reading further on this study. Some of the terms may have several meanings or definitions according to the context it is used, so it is important to know what these terms mean in this particular thesis.

2.1 Emotion and musical basic emotions

Emotion is a multi-faceted term. It seems as if there was no clear definition to it (Eerola 2011). Instead of defining it, I have chosen some features of this term to give what is needed to understand it when reading further on this thesis. According to Västfjäll's deep interpretation (2013), emotion conceives when a sound source is in relation to self. In a more general level, emotions are felt in individual's mind and body and then expressed to other people. Music is a powerful tool especially in inducing person's emotions. Music puts emotions into motion. This induction of emotion happens unconsciously. Juslin (2005, 87) has explained this unconscious process to be lineal and it seems to function only in one way. His model of emotion induction (figure 1) illustrates a traditional (classical music) concert situation, with a starting point (composer) and an end (listener in the audience).

If we leave out "composer's expressive intention" from the lineal model, we can reshape it into a circle which illustrates the situation in improvisation based music therapy session (figure 2), although music therapy session should never be understood as any kind of concert situation. The same way as an emotion "moves" in a concert situation from composer's and performer's intention to listener's perceptions and again experiences as a felt emotion, in music therapy the same emotion is first client's own intention and becomes then identifiable for a therapist (a listener) during improvisation act. What is different in music therapy situation, is the link between therapist's felt emotion (therapist's affective response) and client's intention (see

figure 2). Therapist transfers consciously the needed emotion (the same or different from what client has expressed) to a client by reacting to what client has expressed. In this transition client receives new musical and emotional motives, intentions, with which to react in the improvisation, and the wheel of emotions starts to spin until either client or therapist stops the improvisation. Unlike in Juslin’s linear one-way performance situation (2005, 87), in therapy situation emotions move in a circle. The reason why this process is important to understand when reading this thesis is that the music excerpts used in the experiment of this thesis are from improvisation based music therapy sessions. The intended emotions in music excerpts may originate from client or therapist or both, since sometimes the wheel of emotion spins rather fast during improvisation.

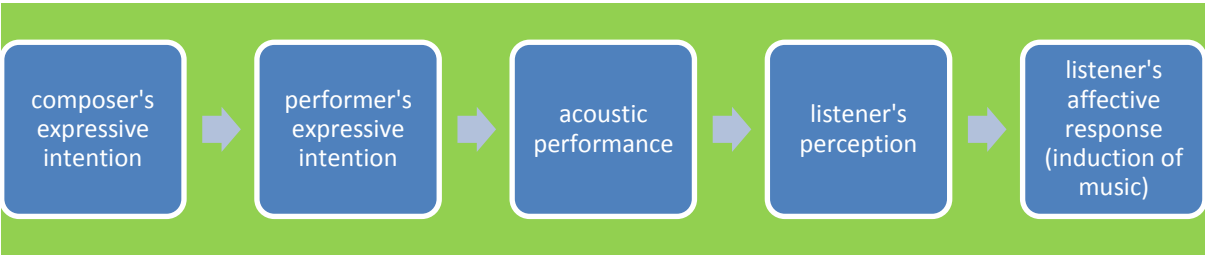


Figure 1. Juslin’s (2005, 87) model of emotion induction.

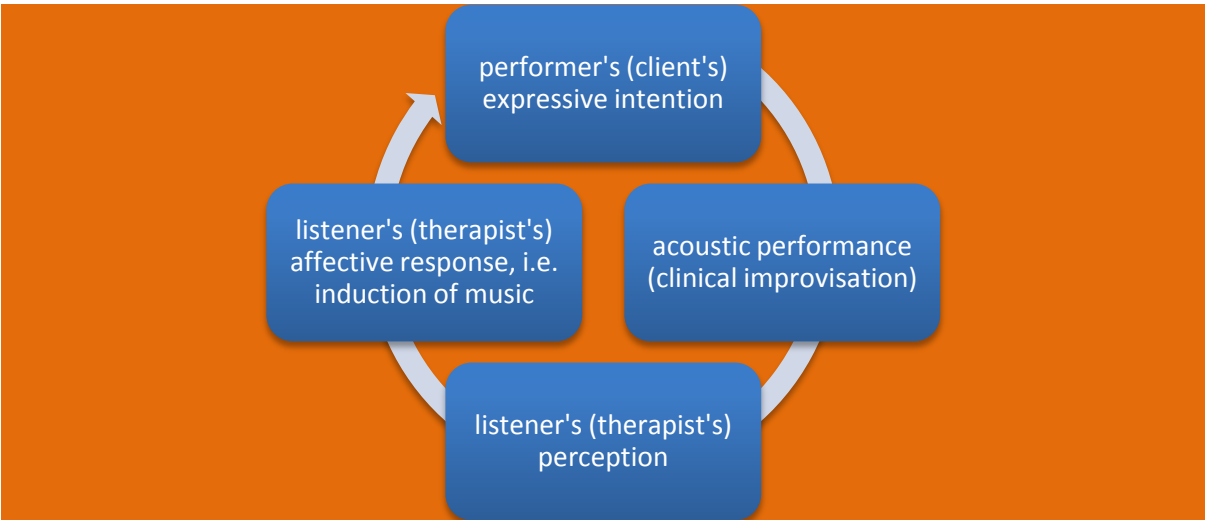


Figure 2. Juslin’s (2005, 87) model applied to illustrate emotion perception and induction in music therapy session.

As line and circle or wheel of emotion already introduce, we human beings have ability to perceive and identify other people's emotional expressions and even more discreet signs of emotion. These abilities were vital to human life and its evolution in the early phases of human kind. Anger and fear are good examples: in a (life-) threatening situation it was important to identify very rapidly another person's anger and also very rapidly react either by fighting back with anger or flee with fear. Those who had better emotional skills had a better chance to stay alive. (Gilboa et al. 2006, 199.) Emotions are still in our days very important, as it is possible to see in early development of a child. According to developmental psychologist John Bowlby's theory, emotional communication with an infant and being emotionally present is crucial to further healthy psychological development (Vilkko-Riihelä 2003, 200, 463; Smith et al. 2003, 91).

To perceive emotions we use eyes and ears. Facial expressions and the tone of one's voice offer information about the current emotional state or how a person reacts to a stimulus, for example a sudden sound, favourite music, traffic jam situation, spider on the floor, and a paper picture of a childhood home. Each reaction, i.e. emotion, happens in independent neural system and therefore it has been suggested that some kind of basic emotions could exist. There is not a clear consensus, though, about which emotions are the basic emotions in the field of study of emotions. Some researchers think there are six basic emotions – anger, fear, disgust, amazement, joy/love/happiness, and sadness – while others have come into a conclusion that only four emotions – anger, fear, sadness, and pleasure – can be regarded as basic emotions because they are universally identifiable. (Vilkko-Riihelä 2003, 478—479; Eerola & Saarikallio 2010, 262—263.)

Emotions can be perceived also in music. Spectrum of musical emotions is broad and it has been studied already rather extensively. Some researchers have created specific models for studying musical emotions, others regard the idea of basic emotions as best foundation for their research. Usually they exclude some emotions (e.g. disgust or amazement) and choose new ones instead (e.g. peacefulness) to

modify the set of basic emotions so that they represent better the music derived basic emotions. (Eerola & Saarikallio 2010, 263—264.)

In this thesis I chose the same five basic emotions, which have been used also in previous studies conducted in the University of Jyväskylä, in the department of music (e.g. Punkanen 2011, Erkkilä et al. 2011). The reason for choosing so is, that I utilized the same data that Punkanen (2011) and Erkkilä's researcher team (2011) produced. I wanted to continue with the same terminology for the sake of clarity. The chosen emotions are happiness/joy, sadness/sorrow, anger, fear and tenderness. Another reason for choosing them is that I think they represent in the best way the basic musical emotions. For example, I want tenderness to be included, because it is so often expressed through music and is rather clearly different from so called general happiness or joy.

The reason why tenderness is so often expressed through music can be either that there are so many love songs (usually a person in love tends to be tender to his/her loved one) or that people generally have the need to give and receive tenderness. Sometimes tenderness is not so easy to express directly to someone and then music makes it easier. Also there are times when tenderness is needed but no-one there to give it. In that situation listening to tender music may help.

Because terms joy and happiness mean almost the same – and in the similar fashion also sorrow and sadness – I decided to use joy and sorrow in this thesis. In this way translation into English becomes more exact, because joy and sorrow are closest to their most frequently used Finnish alternatives (joy – ilo; sorrow – suru).

2.2 Depression

In this thesis the music excerpts used in my listening experiment are from music therapy sessions of clients with depression, so it is important to understand what kind of deficit or disease depression is. Psychiatrist Matti Huttunen (2011) defines it as a syndrome of many symptoms of which depressive mood or state of mind is dominant. Other symptoms are “remarkable loss of weight or gaining a few kilograms extra weight, difficulties in sleeping (too much or too little sleep), being tired or feeling powerless almost daily, accelerated or retarded movements or thinking, feelings of worthlessness or exorbitant guilty, difficulties in thinking, focusing on, and making decisions, images of dying or thoughts of suicide”.

Finnish mental health care professionals use international ICD-10 classification system in diagnosing patients. According to ICD-10, there are four different depression categories. In addition to that, there are three other types of depression in which depressive state of mind comes only periodically: seasonal affective disorder, brief recurrent depression and manic-depressive disorder. Seasonal affective disorder symptoms appear usually in autumn and last until spring comes, whereas brief recurrent depression lasts only a few days but the symptoms return randomly many times a year and are not connected with any specific season. Depression may also overlap with for example schizophrenia and anxiety. (Tamminen 1998, 46—51.)

Depression affects person’s ability to perceive emotions or interpret other people’s facial emotion expressions. Punkanen (2011, 34—36) found out that also perception of emotions in music is different from non-depressed persons. In Punkanen’s research, people with depression perceived emotions in music as more negative than people without depression. With help of music therapy this negative bias was managed to get repaired. In my experiment I use the musical data that was produced in Punkanen’s research: my excerpts for listening task are extracted from improvisation sessions of the individual music therapy processes. When a person with depression expresses his or her emotions in music, what kind of emotions there

will be or will the emotions be too lightly expressed to be identified? This was the question in my mind when I started to plan my experiment and the whole thesis.

2.3 Music therapy

Music therapy has many definitions around the world (see Bruscia 1998, 265—277), because it is utilized in so many ways in different countries and for such a large spectrum of clients. The overall definition that I use in this thesis comes from Finnish Society for Music Therapy (2015). It defines music therapy as a form of rehabilitation and treatment or care, "in which different elements of music (rhythm, harmony, melody, timbre, dynamics etc.) are used as an essential tool for communication to meet the individually set goals." So music (making or listening) is always a tool in music therapy, not a goal (see also Bruscia 1998, 94). In this thesis I use data from improvisational psychodynamic music therapy (Erkkilä, Ala-Ruona, Punkanen, Fachner 2012, 414). The term means that the theoretical framework of the therapy is psychodynamic and the main method of utilising music in therapy is clinical improvisation. Other popular means to use music in therapy are "re-creating, composing and listening to music" (Bruscia 1998, 22).

As in improvisational psychodynamic music therapy, music can be utilised *in* therapy, as a medium for psychological growth and/or physical change. The goal of the therapy process is then, for example, to explore new ways to interact in a problematic and stressful social situation. Music is used indirectly "to enhance the effects of the therapist-client relationship or other treatment modalities." Music can also function as therapy, as direct medium for promoting client's health. Physioacoustic or vibroacoustic method of music therapy is a good example of this: music is listened to and at the same time sinusoidal sound from a specific chair or mattress resonates in a client's body harmonising the cells of it and thus promoting health. (Bruscia 1998, 38—40; Ala-Ruona et al. 2003, 141—279.) Music as therapy –perspective implements healing properties of music so that the *primal* influence is on physical level, almost in the same way as medical pill prescribed by a medical doctor. The

emphasis is on the word primal: Punkanen (2003, 214—248) explains that physioacoustic music therapy has enhanced effectively people with drug addiction in engaging in the therapy process. Healing properties of music in both perspectives, though, seem to be originated from music's ability to change neuron actions in the brain (e.g. Punkanen 2011, Fachner et al. 2013, Koelsch et al. 2008, Koelsch 2009, Blood & Zatorre 2001).

Likewise other therapy forms, also music therapy can be offered individually or as a group therapy (for example Bruscia 1998). My data for the listening experiment is from individual music therapy.

2.4 Clinical improvisation

The music excerpts used in this study are extracted from clinical improvisations. Clinical improvisation means musical improvisation which is made during music therapy session. It is one of the most used music therapy methods. Tony Wigram presents a broader definition made by Association of Professional Music Therapists (UK): “the use of musical improvisation in an environment of trust and support established to meet the needs of clients.” This association defines musical improvisation as “any combination of sounds and sounds created within a framework of beginning and ending.” Thus important is only that the sounds have been made intentionally, being conscious of when to start and when to stop making them. Musical improvisation becomes clinical improvisation, when therapeutic methods are added in it. (Wigram 2004, 39.)

Skill requirements in clinical improvisation are different in comparison to “normal” musical improvisation. Usually improvising in non-clinical setting calls for some skills from an improviser to be able to create music: both improviser and listeners of the improvisation expect music to be certain kind of music with at least some stylistic conventions. In music therapy instead, music to be improvised is free from any stylistic conventions and skill requirements, but some rules and/or structure are

needed to make improvising safe and easy to join in. Therapist suggests some musical rule, for example that client would play only black keys of piano, or creates a thematic rule by asking the client to, let us say, imagine a problematic situation in his/her life and to explore and find new ways in which to react in the situation. (Wigram 2004, 41.)

Lehtonen (2008, 98—99) describes (clinical) improvisation to be "mutual psychological developing," a dialog that needs no words to be understood. He highlights the importance of mutual entrainment. It enables new expressions to come. After Bruscia (Lehtonen 1994, 6), the most important component of clinical improvisation is listening. Music therapist have to be "receptive, sensitive and modest" when improvising with a client or a group of clients.

In clinical improvisation, music functions as a sticky wall where client may project chaotic, fragmental feelings and formulate and organize them into an understandable form and order. Gradually chaos inside the client becomes cosmos with help of music. (Erkkilä 1995, 86.)

2.5 Music listening

Along with clinical improvisation, music listening is another frequently used music therapy method. Before going into details of what it encompasses in music therapy, it is wise to define first the concept of music. In music psychotherapy context "music is external, perceivable manifestation of humane psychological process." It originates from internal psychological and physical strains of a human being. (Lehtonen 1995, 15.) Bruscia (1998, 104) defines music in a broader music therapy context: "music is the human institution in which individuals create meaning and beauty through sound, using the arts of composition, improvisation, performance and listening." He notes, that music in clinical context is multisensory experience and "more than the pieces or sounds themselves; every music experience involves a person, a specific musical process, and a musical product of some kind" (Bruscia 1998, 94).

Music listening, although it is receptive method, can be seen as self-expression in music therapy. Client vicariously expresses himself or herself through the composer and performers of the piece listened to. He or she either identifies with them and experience the release of emotions as her own as well as theirs, or he or she can participate in their release without identifying the emotions as his or her own. (Bruscia 1998, 61—62.)

Therapist's task is to demonstrate empathy with music listening experience. In case that the therapist selects the music to be listened to, the therapist may empathise for example by entraining the client to music's pulse or expressing or reflecting client's conscious or unconscious feelings, thoughts and beliefs. (Bruscia 1998, 61.) The listening experiment of this study simulates a kind of opposite situation in which client improvises some music in order to tell something about his or her inner feelings or situation in life to therapist.

3 Previous studies on musical emotions

As already explained in the chapter 2.1, emotions can be both felt and perceived in music as well as in everyday life situations. When musical emotions are examined scientifically, researcher has to make a decision about which of these aspects of emotion will be examined, because it has an effect on what research methods to use and how to design the study. Both aspects have the same problem: it is very difficult to control that participants reliably focus on reporting *only* the aspect in question, *either* felt *or* perceived emotions. They are very difficult to separate and keep apart from one another (see for example Gabrielsson 2002, Kallinen & Ravaja 2006). I knew this before the first experiment session and decided to highlight the difference and inform participants as clearly as possible to which aspect of emotion I wanted them to concentrate on (see appendix 1).

Punukanen's doctoral dissertation (2011) deals with perceived emotions. It consists of three different studies made from the same data. The second of them investigated what kind of differences people with depression have in their perception of musical emotions when compared to people not having depression and how music therapy changes the differences. According to results, people with depression tended to perceive negative emotions (anger, fear, sadness) more easily and, likewise, perception of positive emotions was more difficult to them. They even sensed positive emotions to be negative ones in some cases: tenderness in music was interpreted to be sadness. Music therapy together with standard care helped clients to "fix" these negative biases better than standard care (verbal counselling sessions and medication) alone.

Depression affected perception of musical emotions according to Punukanen's (2011) research results. Vuoskoski and Eerola's (2013) study suggests that extramusical information can have an effect on emotional *experience* of music. Sadness in a piece of music was felt stronger when participants heard or read a sad story of the origin of the music. Listener interprets according to extramusical information what he or she

hears in music. That is why I did not tell in advance my participants what kind of people played in the clinical improvisation excerpts of my study. The study of Vuoskoski and Eerola is noteworthy, because it shows that many of our experiences and perceptions are actually products of our interpretations. We interpret visible world according to what we hear (for example in a motion picture, background music is crucial in creating the intended atmosphere), and we interpret sounds and music according to our cognitive information of their origin.

Vuoskoski (2012, 38—39, 42) has also studied whether music can make us genuinely sad. This study is actually a part of her doctoral dissertation. She noticed that music can really induce genuine sadness, even unfamiliar music. However, unfamiliar music induced sadness only in participants who had empathy as their measured personality trait. (Participants were tested with personality tests before the actual experiment.) Familiar music instead was not connected to any personality traits. The mechanism why familiar music induced emotions was the use of autobiographical memory: many of the participants reported that music brought some sad memories from their past and thus made them sad. This is actually what music therapists have known already decades from their experience in clinical practice. Now they eventually get some scientific base for their clinical work, something with which to justify their therapy methods (e.g. the use of music as emotion inducer in dealing with complex emotional disorders or problems).

3.1 Research questions and hypotheses with studies supporting them

In the studies introduced, the music in use was *pre-composed* music, composed by *healthy persons*, apparently without any mental health disorders. **Would it be possible to recognize musical emotions from *improvised* music made by a *person with depression*?** This is my first research question. People with depression tend to experience and express emotions with less intensity than healthy people (Punkanen et al 2011) as explained in chapter 2.2. Is it possible to identify emotions solely from the music that a client has made during music therapy session, without

seeing the client and his or her body language? This makes listener's task challenging: it is easier to a therapist to understand and identify client's musical emotions during music therapy session when the therapist can see the body language and facial expressions of the client. On the other hand, Syvänen (2005, 167) says this kind of situations occur sometimes when client (usually child client or adult with paranoid schizophrenia or related severe problems, author's addition) suddenly hides him-/herself in a therapy session and interacts with therapist only by creating sounds and music in his/her hiding place. From this perspective, the research setting is not actually as artificial as one might imagine.

I assumed that basic emotions can be heard in the clinical improvisations as well as in non-clinical music but only in a weaker strength. Musicology studies of perceiving basic emotions from pre-composed music gave me a reason to assume that my participants would be able to perceive at least some of the basic emotions if they were present in the improvisations. For example Fritz et al (2009) studied if emotions can be perceived from a totally foreign culture's music. They had two groups in their experiment: some people from a Cameroonian ethnic group named Mafa, and approximately the same amount of western people with approximately the same age range. The representatives of the Mafas and the group of westerners had not been introduced to the music or culture of the other group ever before. Both groups listened the music samples of western music and then evaluated whether the music sample expressed the given emotions (happy, sad scared/fearful) on their opinion. As their final result, Fritz et al suggest that at least the emotions they examined – happiness, sadness and fear – are universally recognizable. However, one has to keep in mind that all participants were males. This may have had some kind of an effect on the results.

Balkwill and Thompson (1999) have also been interested in universality of emotion recognition. They tested whether Western people (n=30) are able to recognise joy, anger, sadness and peace in specific Indian ragas. (Ragas are an essential part of Indian classical music.) They found out that western people were able to recognise at least joy, sadness and anger. Like Mafas and Western people had no experience on

culture or music of one another in the study of Fritz et al (2009), neither Balkwill and Thompson's participants knew anything about Indian classical music before the actual experiment. Balkwill and Thompson together with Matsunaga repeated the test with 147 Japanese participants and got similar results (Balkwill, Thompson, & Matsunaga, 2004).

Laukka et al (2013) examined universality, too, but in a slightly different manner. Four bowed-string musicians from different musical cultures (Swedish folk music, Hindustani classical music, Japanese traditional music, and Western classical music) were asked to perform short pieces of music to express eleven different emotions and related states through them. Then Swedish, Indian and Japanese participants were instructed to listen to the pieces and evaluate the emotional content of the pieces. Laukka et al. found out that the emotions musicians intended to convey through the pieces of music were identifiable, both within and across musical cultures, but identifying was more accurate when the listener and the piece of music were from the same culture.

Fritz et al. (2009) and Punkanen (2011) used Western (classical) and (African) folk music, Balkwill with her fellow researchers (1999, 2004) Eastern (art) music. Laukka et al utilized all of these music traditions in their study. My experiment brings listener to a different kind of music: it is western, but improvised music from a therapy session. Punkanen's researcher group tested people with depression by music made by (presumably) healthy composers and musicians, I tested (presumably) healthy persons by music made by people with depression.

My second research question is to compare **the differences between music therapy students' and qualified music therapists' perceptions of basic emotions**. I assumed that professionals would rate emotions higher than students because they are more experienced in perceiving and dealing with musical emotions compared to students and persons with only a few years of working experience as music therapist.

I derived the second hypothesis from studies made by Fredrickson (2000) on perception of musical tension and Gilboa, Bodner and Amir (2006) about communicability of emotions in improvised music. Gilboa et al compared music therapists and musically talented people in their ability to express and perceive musical emotions when the music in which to perceive and express emotions is improvised. They got a result that the music therapists perceived basic emotions more strongly than people who were not music therapists. Another important result was that “easy-to-express” emotions were also easier to perceive and, inversely, difficult-to-express emotions were slightly more difficult to perceive. The expressions “easy-to-express” and “difficult-to-express” refer to the experiment setting: 21 music therapists were asked to make two very short (15-75 seconds) improvisations expressing basic emotions which they think are easy to express, and two which are difficult to express in their opinion. After that music therapists joined in with “non-music therapists” (as Gilboa et al put it) to participate in listening task by listening to improvisations made by other music therapists and rating the emotional content of them from 0 to 9 on each given emotion.

4 Research methods

This study is actually both quantitative and qualitative research. I collected my data by conducting a comparative experiment, which many of research methodology books (for example Coolican 2009) classify as very traditional and often used quantitative method. The results of the experiment were analyzed both quantitatively and qualitatively. The main focus is on quantitative analysis, but I utilized qualitative data for getting explanatory information for the experiment results.

The study focuses on perceived emotions in improvised music from music therapy sessions. In Lehtonen's (1995, 31) classification, this study is situated on one hand in "applied research of clinical processes", because the focus is on a specific music therapy method, clinical improvisation, and on five musical emotions. On the other hand, this could also belong to "basic research", because emotions expressed and perceived in music, the essential subject of music psychology, are the core interest. I used only audio material, because I was interested in seeing how strongly emotions are audible only in audio material. In therapy session, therapist has a possibility to observe client's body language (posture, mimes, gestures), and together with audio information he or she can form a perception of emotion. In this experiment, a therapist had to rely only on audio material.

5 The listening experiment and data analysis

In my experiment I had two groups of participants (altogether n=29): graduated professional music therapists, who have approximately 10 years (ranging from 9 to 25 or even 30 years) of career in their profession (n=14), and undergraduate (or newly graduated) music therapy students (n=15). The participants were instructed to listen to 21 excerpts of improvisations, which a client with depression has played in his/her therapy process. Meanwhile or after each excerpt participants were asked to rate five basic emotions on a paper blanket according to how strongly they were present in the excerpt. If participant did not perceive some emotion or emotions to be rated, he/she was instructed to leave that emotion unrated in that excerpt. Later on, when analyzing the data, the unrated alternatives were marked with a number zero (0), to ensure that analysis calculations will be correct. The analysis program used was IBM SPSS Statistics 20.0.

I also was curious to compare whether either music therapy students or experienced music therapists perceived the basic emotions more strongly (hypothesis 2). To be prepared for the case that some differences occurred, I asked after each improvisation, consisting of three excerpts in a row, if participant had any specific thoughts about the improvisation (see appendix 1). The purpose of the question was that it would reveal to some extent how each participant listens to their client: to what kind of things and phenomena these participants usually pay attention while listening to a clinical improvisation. My working hypothesis was that the background information (see appendix 1) and answers to the open questions would have explained the possible differences between the results of the two groups. For example, if someone of the student participants would have rated remarkably lower all the emotions he or she perceived, that might have been due to remarkably different kind of earlier profession and different way of listening to client's improvisation process.

The excerpts that participants listened were selected from a database of all the therapy sessions of depression research. The database was made by Riitta Koski-Helfenstein, a Finnish music therapist (MA). She had created the database for her own Master's thesis (Koski-Helfenstein 2011) and I found it useful also for me. The database had lots of detailed and well organized information about each session and also about each individual improvisation. Koski-Helfenstein classified in her database for example if a therapy session had some kind of theme, if the client was active during the therapy session, or which instruments the client and therapist used in improvisations. I saw that every session contains at least one improvisation, so I chose to my study only first improvisation of each session. I got 580 improvisations. To choose seven improvisations from those of 580, I used following criteria:

1. five improvisations with therapist, two solo improvisations (to compare whether it is easier to perceive emotions from either of them)
2. the instrument that client (and therapist) used in improvisation had to be MalletKat with marimba sound (MalletKat is an electronic mallet instrument with many sound alternatives) to get also melody aspect to the improvisations. Melody instrument enables expressing broader spectrum of emotions, so it was vital to have it in this experiment setting.
3. there had to be one of the basic emotions marked as a theme for the whole therapy session to ensure that the improvisation has the same emotion as a theme.
4. only one of the basic emotions in one improvisation to get the clearest possible results. This encompasses five improvisations. There is one extra improvisation with sorrow and one extra with joy played by only a client for comparing whether the emotions are easier to perceive from a solo than a duo improvisation.
5. client's emotional working must have been active during the session and he/she must have been able to name his/her emotions during the session. (In this way I would be more certain that at least one of discussion themes in the session has been issues of emotions; and again, this helps comparing the ratings of audio clips and video material.)

Fourteen participants came to music therapy clinic in the University of Jyväskylä to take part in my experiment. For one participant I arranged the experiment in her home and for two at their working places. Two participants participated in another public place silent enough to concentrate on listening. Eleven persons chose to participate at their home virtually by using an Internet site built for this experiment. I created it for only storing the music samples of my experiment for participants to listen to them. I sent a link of the site and an answering blanket (appendix 1) via email to each participant who chose to participate in via Internet at his or her home.

When planning the web site for the experiment I wanted to find a free, cloud-based, easy-to-use site for it. Other criteria were that, firstly, it should offer a possibility to a password protection. Thus I made sure that only my participants can access it, not each and every Internet user. It was important, because the music clips are legally regarded as parts of patient documents and they need to be stored carefully and handled confidentially. For the same reason the site had to be “smart” enough to keep the music clips as built-in inside the site, preventing a possibility to a listener to either accidentally or intentionally download the material to their computer. Through trial and error I finally chose Yola (www.yola.com): it met all of my criteria.

As the experiment phase was over and data successfully gathered, I transferred all numeric answers into Microsoft Excel –matrix and after that again into the SPSS statistical analysis program. Before forming the actual descriptive statistics concerning the answers of the whole group of 29 participants I calculated a mean for each answering alternative (joy, sorrow, anger, fear, tenderness), deriving it from each three excerpts that had been extracted from the same improvisation. For example, a mean for the rating alternative joy in the first improvisation comes from the excerpts 1, 2, and 3. In this manner I got a clearer picture of the ratings, when there was only one alternative of each emotion for each improvisation. Since I knew the intended emotion of each improvisation, the intended emotion among each improvisation’s rating alternatives became a “target” emotion, to which compare other emotion alternatives of the same improvisation and other target emotions in order to see which emotion(s) was/were identified best and which emotions got mixed up

together. In addition to this, I still wanted to compare participant groups, students and professionals, according to my second hypothesis. I made it possible by making several analysis matrices about the data.

6 Results

Before reporting any of my results, it is good to note, that when telling about improvisations in this chapter, I mean a cluster of three excerpts, each taken from the same original clinical improvisation. For instance, a mean of improvisation anger has been calculated from the ratings of the three excerpts of anger expressing improvisation. First I will present the results according to my first research question. After that, there will be comparisons between the two participant groups as an answer to the second research question.

6.1 Results without group comparisons

These results without group comparisons give answers to my first research question: is it possible to recognize musical emotions from improvised music made by a person with depression? When analyzing my data, I got results that partly support the set hypotheses: overall, without taking into account the differences between participant groups, some emotions were possible to perceive in the improvisations. By comparing each mean of each improvisation's intended emotion to the answering alternatives of each improvisation, I noticed that anger was the easiest emotion to perceive in the clinical improvisations used in this study. 28 out of 29 participants answered that they heard anger in the improvisation, which was intended to be a musical expression of anger. "The anger's" evaluation alternative anger got the highest mean of all alternatives and improvisations: 2,92 with standard deviation being 1,10 (see table 1). Participants' ratings differed, though, from 1 to 5 in this improvisation, only in the first excerpt of the improvisation the maximum rating was 4 (see tables 1 and 2).

Tenderness, joy and sorrow seemed to get mixed together when trying to detect them from a clinical improvisation. Also anger and fear seemed to get mixed together

in music, but only when the intended musical emotion was anger. Fear got a higher mean (2,96 blue row) than anger (2,39 red row) and a bigger amount of participants (23) perceived it in the improvisation of anger, in the first excerpt of it (see table 2), but not vice versa (see table 3). These findings are in line with the findings of Gilboa et al. (2006). They got exactly the same kind of interpretation bias in anger. On the other hand, in my results the bias did not exist anymore on second and third excerpt.

Fear was undisputedly the most difficult emotion to detect. Only 8 participants perceived it with the mean strength of only 2,0 (SD=0,8), as the table 1 demonstrates. When looking at each particular excerpt, which all are from the same improvisation of fear, it can be seen that participants have thought the improvisation to be sad and tender (both marked with green in the table 3) rather than filled with fear (orange lines in the table 3).

Table 1. Statistical information about how strongly (scale 1-5, 1=weakly/unclearly, 5=strongly/clearly) intended emotions were perceived among all participants, without group comparisons.

intended emotion	N	Minimum	Maximum	Mean	Std. Deviation	Variance
anger	28	1,00	4,67	2,92	1,10	1,20
tenderness	24	1,00	4,00	2,57	0,88	0,78
joy	21	1,00	4,00	2,23	0,88	0,78
joy (solo)	21	1,00	3,33	1,94	0,77	0,59
sorrow	21	1,00	3,50	1,99	0,83	0,69
sorrow (solo)	18	0,00	4,33	1,94	1,00	0,99
fear	8	1,00	3,00	2,00	0,80	0,64

Table 2. Descriptive statistics about the improvisation expressing anger. Each excerpt represented.

	N	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
1st excerpt: joy	6	1	2	10	1,67	0,52	0,27
1st : sorrow	7	1	3	11	1,57	0,79	0,62
1st : fear	23	1	4	68	2,96	0,98	0,95
1st : anger	18	1	4	43	2,39	0,85	0,72
1st : tenderness	1	1	1	1	1,00	.	.
2nd excerpt: joy	8	1	4	21	2,63	1,19	1,41
2nd : sorrow	9	1	3	16	1,78	0,83	0,69
2nd : fear	18	1	5	53	2,94	1,21	1,47
2nd : anger	23	1	5	74	3,22	1,24	1,54
2nd : tenderness	1	1	1	1	1,00	.	.
3rd excerpt: joy	7	1	3	16	2,29	0,95	0,91
3rd : sorrow	6	1	2	11	1,83	0,41	0,17
3rd : fear	13	1	4	36	2,77	1,01	1,03
3rd : anger	28	1	5	93	3,32	1,34	1,78
3rd : tenderness	0						

Table 3. Fear expressing improvisation's ratings displayed excerpt by excerpt. Noteworthy results have been highlighted with bright green and orange.

the excerpts with their rating alternatives	N	Minimum	Maximum	Mean	Std. Deviation	Variance
1st excerpt: joy	3	1	1	1,0	0	0
1 st exc.: sorrow	23	1	5	2,65	1,15	1,33
1 st exc.: fear	6	1	3	2,17	0,75	0,57
1 st exc.: anger	0					
1 st exc.: tenderness	14	1	4	2,21	0,98	0,95
2 nd exc.: joy	5	1	2	1,2	0,45	0,2
2 nd exc.: sorrow	26	1	4	3,08	0,94	0,87
2 nd exc.: fear	4	1	3	1,75	0,96	0,92
2 nd exc.: anger	0					
2 nd exc.: tenderness	14	1	5	2,21	1,37	1,87
3 rd exc.: joy	11	1	3	2,0	0,89	0,8
3 rd exc.: sorrow	21	1	5	2,43	1,08	1,16
3 rd exc.: fear	0					
3 rd exc.: anger	0					
3 rd exc.: tenderness	23	1	4	2,61	0,78	0,61

Qualitative analysis about “free comments” –part¹ gave some hints why this kind of results appeared. Some participants’ answers refer to that instrument’s sound and mild dynamics made it difficult to distinguish emotions. Also bad sound quality may have had an impact on it. One of the participants wrote there was so much background noise in the excerpts that it made listening difficult. The music participants listened to have been extracted from video clips of the music therapy sessions, not only from audio files created by musical instruments in use. Audio files created by musical instruments (MIDI-instruments connected to computers) would have given clearer sounds, but the soundscape would not have been as rich and

¹ After rating all three excerpts of one improvisation, the answering sheet has a few empty lines for the participant to fill in with any possible thoughts about the listened excerpts (see appendix 1). The idea was to collect information on *how* participants think when listening to clinical improvisations and what issues they pay attention to.

authentic as it was in the final excerpts. For example the intensity of playing in the improvisation of anger would have experienced a remarkable loss.

I also wanted to investigate if working experience (the amount of years as clinician) correlated with perception of musical emotions. I used Pearson's correlation coefficient, but could not find any correlations between working experience and perceived musical emotions.

6.2 Group comparisons: music therapy students versus experienced professionals

When comparing the ratings between groups, according to hypothesis 2, independent samples T-test results refer to the group of music therapy students being somewhat more talented in distinguishing emotions from the excerpts than the group of professionals. For example, on the improvisation of anger, the mean of the students' ratings was 3,2 and the same of the professionals was 2,6. There can be seen an interesting trend: music therapy students are also more unanimous in most of their ratings than professionals, when looking at the target emotion ratings. In the improvisation of anger the standard deviation is 1,29 among professionals and only 0,84 in the group of students. In this question, Free comments –part of the questionnaire gave no hints why this kind of trend occurred. Moreover, this was not a statistically significant result (One-Sample Kolmogorov-Smirnov Test result: 0,665).

Another interesting finding was discovered when comparing solo and duo improvisations on each others. As I already told in the chapter 4, I chose altogether seven improvisations for my experiment, each of them expressing one of the five basic emotions. Two of the five emotions were represented twice, in solo and duo improvisations. The “doubled” emotions were joy and sorrow. When comparing them to duo improvisations and looking at the two participant groups' ratings I recognised that on sad improvisations both professionals and students were more unanimous in their ratings when it was played duo, but on happy improvisations students seemed

to only get confused about playing duo (SD=1,04 on duo improvisation, SD=0,75 on solo improvisation).

To summarise this whole report of results, musical emotions were partly possible to hear from clinical improvisations made by persons suffering from depression, without seeing the client's body language. In addition to that, there were some differences between professionals and students, but they were not statistically significant.

7 Limitations and future research

One very obvious limitation of the current study is the lack of randomization. Already when designing this experimental study I considered carefully whether or not I should randomize the excerpts of clinical improvisations. I knew that without randomizing the excerpts the first sample contaminates to some extent the second one and the second will contaminate the third one and so on, because the emotional atmosphere of the previous sample may change the mood of a participant so that he or she listens to the next sample in a slightly different mood and may interpret the samples differently compared to the situation where there is no mood changing stimulus before each sample. Thus, now that all 29 participants listened the music samples in the same order, this order effect (Coolican 2009, 69—70) on mood of the participants may have contaminated the results.

I weighed advantages and disadvantages of both possible choices. An advantage (it seemed to be the only in this case) in randomizing the music excerpts was that I could get more reliable results from my experiment: randomly picked excerpts would break the order effect, because the order of the excerpts would be unique each time for each listener or listener group (and then possible mood changes would fall randomly on any excerpt). I estimated, though, the contamination effect to be so small in this experiment that it would not have had almost any impact on such a small amount of data as my experiment produced. Only in studies with hundreds of people it would have some significance. Thus I chose non-randomized music samples in this study.

First and most remarkable disadvantage in randomizing, in this case, was that I could not have used any internet site to enable more people to participate in my experiment from their home couch. Instead, I should have used only university's own specific computers, one or two that have a randomizing program installed in them, and should have made reservations in advance. I also knew that 15 professional music

therapists from all over Finland would not travel to Jyväskylä only for attending my experiment. Finding the best possible time slot for each participant would have been another problem.

Along with the choice of non-randomization, the small amount of participants is another limitation of this study. With hundreds of participants it could be possible to see clearer trends in ratings of musical emotions. Also statistically significant test results could arise in a bigger sample of participants. Now the reliability of the results suffers from a (too) small sample. Thus all results should be read and discussed with caution. Hundreds of participants might also give more information in so called free comments –part of the questionnaire (see appendix 1) about how music therapists listen to clinical improvisations, in other words, to what they pay their attention when listening to client's playing or singing.

By expanding the amount of participants could be one improvement worth trying. Another would be to change the whole research setting towards qualitative study by forgetting about the plain auditive testing and replacing audio material by audiovisual videos from real music therapy sessions and encouraging music therapists, beginners and professionals again, to tell what basic emotions they think the client and therapist are playing and to what observations they base their answer. In this manner the differences between beginners and professionals could possibly arise clearer. Then the setting would also be nearer to a real situation in therapy room, as some participants of current study implicitly seemed to wish.

If audio information alone was not enough in the experiment, how about visual information then? The third direction in which to develop this research would be to investigate how effectively only gestures, mimes of the face and bodily postures can convey emotions from a client to a therapist. Participants would watch muted videos from therapy situations and tell after each improvisation clip how many emotions they "saw" and how strong the emotions seemed to be. Perhaps this approach could define better the role of music and auditory information in therapy settings.

Perhaps. Perhaps not. Syvänen (2005, 165) suggests in his doctoral dissertation, that emotion recognition, experiencing and understanding them would be easier in musical interaction. Musical emotions expressed in clinical improvisations seem to arise mostly from therapeutic interaction. Because of that, in future research, I suggest clinical improvisations and therapy sessions being presented as audiovisual entities to maximise reliability of results.

8 Discussion

The main result of this study is that emotions expressed by people with depression were difficult but not impossible to perceive. Only anger was easy to recognize in its outstanding difference in expression compared to other emotions in other improvisations. Other emotions got mistaken or were poorly recognized. Why so? When thinking of (musical) emotions overall, Juslin's (2013) insight is that "we may not always 'detect' discrete emotions in everyday life situations or in musical expressions, simply because milder versions of basic emotions involve more subtle differences." Most probably music therapy clients used these milder versions of basic emotions in their clinical improvisations, because their expressions of emotions overall tend to be milder due to depression (for example Punkanen 2011, 23). Also because their perceptions of musical emotions are negatively biased (Punkanen 2011, 39—40, 82) – negative emotions are perceived as stronger and positive emotions are thought to be negative ones – it is logical to assume that their improvisations are just as biased. The confusion created by this bias is conveyed to the listeners of the improvisations causing misinterpretations between joy, sorrow and tenderness. Those improvisations had little variation in their expression, such as in dynamics and tempo. If emotions are lame in music, it is more difficult to identify them.

Fear and anger are a whole different issue. I believe the reason why anger is misinterpreted as fear (both in present study and in many previous studies), is that most probably listener accidentally switches to *experience*, to *react*, the emotion instead of only perceiving it. The listener accidentally allows music to influence him or her emotionally, even though advised to stay as an observer of emotions in music. This seems to be an endogenous, "built-in" phenomenon, as there are so many studies (e.g. Terwogt & Van Grinsven 1991, Stachó et al. 2013) with findings that children usually mix up anger with fear, but adults have performed well in distinguishing them. Some people are able to develop in their childhood and youth in

distinguishing anger and fear from each other, others are not. I think evolutionary perspective provides an understandable explanation why not. As already told in chapter 2.1, anger has been a (life-) threatening emotion by the time when homo sapiens lived as a hunter-gatherer (Gilboa et al 2006, 199). In those times better ability to identify fast another person's anger and aggression meant better chance to stay alive or at least to be safe (Gilboa et al 2006, 199). In a threatening situation like that, it is not relevant whether a person perceives the anger or reacts by fearing the threatening person. More important is to solve the situation as fast as possible: to fight or flee. Because evolution has made this reaction so automatic it is difficult to stay as an objective observer in a test situation.

Gilboa et al. (2006) discovered anger to be difficult to express and Stachó et al. (2013, 507—508) noticed the difficulty to perceive it in music. Interestingly though, this was not the case in my experiment. Client and therapist seemed to play the anger out rather easily, and the anger turned out to be also the easiest emotion to perceive in the experiment. Gilboa et al. suggest that difficulty to express anger would exist because we naturally try to avoid expressing it, whereas Stachó et al. consider anger to be hard to perceive in music because it is so seldom expressed in music and thus easily misunderstood. I disagree with Stachó's team: punk and rock music are not seldom expressing anger. These are the music genres that, for some people, serve primarily as socially acceptable channel for aggression release. The interpretation of Gilboa's group instead is sensible. Considering that Gilboa et al. did their experiment to healthy participants, the explanation is understandable. Actually that viewpoint explains the status of anger in my experiment as easiest to perceive emotion: when we are mentally healthy, we tend to avoid strong negative emotion expressions for social reasons (just as in Gilboa's study), but when we have avoided them too long, we become mentally ill. When being mentally ill, the packed negative emotion pressure needs to be released and is easy to release in music then.

Eerola and Saarikallio (2010, 270) introduce Juslin's matrix, in which basic emotions are listed with their musical characteristics or cues. I can realize by looking at it and by listening through analytically the excerpts played to the participants, that most of

the intended musical emotions are indeed biased. For example, all improvisations have been played in very slow tempo, except anger improvisation. This may be due to depression since it tends to make a person's overall functioning slower (Huttunen 2011, see chapter 2.2). Alternatively the tempo is slow because every improvisation chosen for this study is the first improvisation of the session: client has just arrived in therapy session and may be still so tied to this slow-functioning symptom that it shows in the improvisations. Possibly on the second improvisation they would have been more relaxed and focused on therapy setting and hence might have performed better.

Another reason why emotion perception was partly so challenging for my participants could be that we human beings have been built to live with all our five senses: sight, sound, smell, taste, and touch. When one or more of these senses are suddenly temporally not possible to use, the situation impairs us. Music therapist needs especially sight and sound (hearing) to make reliable conclusions about his/her clients. In the light of current findings, the lack of visual information about client seems to mislead therapist to mix together joy, sorrow and tenderness when listening to clinical improvisation. One of the participants already mentioned in the free comments -part the difficulty of observing emotions only by ears.

One of the results was that music therapy students performed slightly better and were more unanimous when rating basic emotions of clinical improvisations. Surprisingly, this might be due to sheer natural ageing. Lima and Castro (2011) have found out that people in their middle age, and older than that, tend to perceive less negative emotions, like sad and scary, in the music. Positive emotions remained the same across the adult life span. Lima and Castro explain this phenomenon to be "motivational changes" of ageing: people tend to forget more of their negative experiences and actively recall positive experiences. This could be the case in my experiment: the students and novice music therapists were mostly in their 20's and 30's, i.e. not yet middle-aged, and experienced music therapists were middle-aged and older.

This sounds scary when thinking of the future of a professional music therapist: what is the use of studying and gathering more and more knowledge about new phenomena, if the most important skill, emotion recognition in music, will only deteriorate day by day after middle age? Is there a risk that a client soon does not get all of his or her negative emotions heard and discussed? Perhaps, but perhaps the other aspect of this effect is that client's positive emotions and positive emotional reactions may get much more attention from a therapist and therefore the client gets more positive feedback, for example about progressive steps in therapy process, from a therapist who is middle-aged or older.

It is still good to bear in mind the limitations discussed in chapter 7 when thinking of these interpretations. The weaknesses in planning the experiment setting may have caused that the results are not reliable and then also interpretations lose (at least some of) their validity.

One explanation why the results are so confusing and not too unanimous is that possibly emotions in clinical improvisations cannot be investigated from the viewpoint of basic emotions. As phenomena, music-based basic emotions and emotions of clinical improvisations may be too far from each others: the concept of music-based basic emotion has its roots in western classical art music, and emotional expression and experience in clinical improvisation belong to therapy setting (Erkkilä 2016).

According to Erkkilä (1997, 57—58), the emotional expressions and experiences in music are three-dimensional: emotions can be shared and experienced in music therapy as vital affects, in a psychodynamic dimension and in cognitive dimension. The level of vital affects is something that will develop in the first months after birth. The two other levels or dimensions develop later in life. If person is healthy and has reached adult level in psychological development, he or she expresses and feels emotions in music on any of these dimensions, sometimes in some of them even at the same time (Erkkilä 1997, 57—58). In music therapy, clients may have got stuck in certain phase in psychological development and therefore their emotional functioning also may be restricted only on, for example, vital affect dimension. Emotions in that

dimension are not as clear as basic emotions, which could be situated in Erkkilä's three-dimension model on cognitive dimension. This may be the core reason why basic emotions were not so easy to perceive in my experiment and why different kind of research setting should be considered.

My suggestion on how to change the current research setting into more useful direction is borrowed from Syvänen (2005). By expanding the participant group sizes, and instead of hunting musical basic emotions, it could be more useful to ask participants to report – in the manner of qualitative research – all kinds of emotions they hear and see in the clinical improvisations. In this kind of setting the answers could possibly be better comparable between groups and by comparing all the answers to therapist's memo scriptures would give some information how "correctly" participants identified emotions from the clinical improvisations. It is still good to remember that even with these improvements the client's depression symptoms may affect the results in the fashion already discussed in the beginning of this chapter.

9 Conclusion

The aim and purpose of this study was to give some information about how big (or small) a role audio material actually plays in our perception of emotions. The results surprisingly reveal it having relatively small or equal role compared to other senses, concerning perception of emotions in music. It seems to be highly dependent on information from other senses, especially sight. We seem to interpret emotions in music incorrectly when we rely only on hearing. Of course this is the case of only people who have no impairment in their senses. For example, people with visual impairments use their other senses more effectively to compensate the absence or restrictions of visual sensations, so for them the role of audio information might be more important. On the other hand, the current results and earlier studies refer to that only clinical improvisation requires multisensory observing, and when listening to so called “normal” musical improvisation, the listener is less dependent on other senses.

All in all, even though this is only a Master’s thesis, this is a good addition to studies in music psychology and music therapy. For the former field of study this thesis provides partly new understanding about musical emotions as they exist in clinical improvisations. This also continues the ongoing discussion in the field about the universal existence of musical basic emotions: now, in the light of this thesis, I would suggest that, since only one of the five basic emotions was recognizable, the basic emotions cannot be said to be totally universal. They may be universal in pre-composed music, but not in clinical improvisation. Music therapy as a field of study benefits from this thesis, because this supports earlier research results about the nature of clinical improvisation and emotion expressions in it.

References

- Ala-Ruona, E., Erkkilä, J., Jukkola, R. & Lehtonen, K. (eds.) 2003. *Muistoissa – Petri Lehikoinen 1940—2001. (In memories – Petri Lehikoinen 1940—2001.)* Jyväskylä: Suomen musiikkiterapiayhdistys ry.
- Balkwill, L.-L. & Thompson, W. F. (1999). A cross-cultural investigation of the perception of emotion in music: psychophysical and cultural cues. *Music Perception*, 17(1), p. 43—64.
- Balkwill, L.-L., Thompson, W. F. & Matsunaga R. (2004). Recognition of emotion in Japanese, Western and Hindustani music by Japanese listeners. *Japanese Psychological Research*, 46(4), p. 337—349.
- Blood, A. J. & Zatorre, R. J. (2001). Intensely pleasurable responses to music correlate with activity in brain regions implicated in reward and emotion. *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 98, no 20, p. 11818—11823.
- Bruscia, K. E. (1998). *Defining music therapy*. Second edition. Gilsum, NH: Barcelona Publishers.
- Coolican, H. (2009). *Research Methods and Statistics in Psychology*. New York, USA: Routledge.
- Eerola, T. (2011). *Lecture 6: Music and emotions*. Lecture from course “Music Psychology 1” in University of Jyväskylä on spring semester 2011.
- Eerola, T. & Saarikallio, S. (2010). Musiikki ja tunteet. (Music and emotions.) In: J. Louhivuori & S. Saarikallio (eds.) *Musiikkipsykologia (Music psychology)*. Jyväskylä: WS Bookwell, p. 259—278.
- Eerola, T. & Vuoskoski, J. (2013). *Does extramusical information contribute to emotions induced by music?* Paper session in International Conference on Music and Emotion, in University of Jyväskylä, on June 11th-15th 2013.
- Erkkilä, J. (1995). Musiikkipohjaiset tunteet ja musiikkiterapia. (Music-based emotions and music therapy.) In: J. Erkkilä & Y. Heinonen (eds.). *Avaa mielesi musiikille! Kohti tutkimuspohjaista musiikkiterapiaa. (Open your mind for music!*

- Towards research-based music therapy.*) Jyväskylä: Jyväskylän yliopistopaino, p. 75—136.
- Erkkilä, J. (1997). *Musiikin merkitystasot musiikkiterapian teorian ja kliinisen käytännön näkökulmista* (The musical meaning levels from the perspectives of music therapy theory and clinical practice). University of Jyväskylä. Jyväskylä and Lievestuore: Jyväskylän yliopistopaino and ER-paino Ky. Doctoral dissertation.
- Erkkilä, J., Punkanen, M., Fachner, J., Ala-Ruona, E., Pönttiö, I., Tervaniemi, M., Vanhala, M. & Gold C. (2011). Individual music therapy for depression: randomised controlled trial. In: M. Punkanen. *Improvisational music therapy and perception of emotions in music by people with depression*. University of Jyväskylä. Jyväskylä studies in humanities 153. Doctoral dissertation, p. 63—71.
- Erkkilä, J., Ala-Ruona, E., Punkanen, M. & Fachner, J. (2012). Creativity in improvisational, psychodynamic music therapy. In: D. Hargreaves, D. Miell, & R. MacDonald (eds.). *Musical Imaginations. Multidisciplinary perspectives on creativity, performance, and perception*, p. 414—428.
- Erkkilä, J. (2016). Phone call consultation and e-mail discussion with the author in Jun 14th and 15th 2016.
- Fachner, J., Gold, C. & Erkkilä, J. (2013). Music therapy modulates fronto-temporal activity in rest-EEG in depressed clients. *Brain topography*, Apr 2013, Vol. 26, (2), p. 338—354.
- Finnish Society for Music Therapy. (2015). *Mitä musiikkiterapia on? (What is Music Therapy?)* Last retrieved on Nov—Dec 2015 from:
<http://www.musiikkiterapia.net/index.php/mita-musiikkiterapia-on>
- Fredrickson, W. E. (2000). Perception of tension in music: musicians versus non-musicians. *Journal of Music Therapy*, 37 (1), p. 40—50.
- Fritz, T., Jentschke, S., Gosselin, N., Sammler, D., Peretz, I., Turner, R., Friederici, A. D. & Koelsch, S. (2009). *Universal recognition of three basic emotions in music*. Retrieved from: http://www.stefan-koelsch.de/papers/Fritz_2009_CurrBiol.pdf

- Gabrielsson, A. (2002). Emotion perceived and emotion felt: same or different? *Musicae Scientiae*, Special issue 2001-2002, p. 123—147.
- Gilboa, A., Bodner, E. & Amir, D. (2006). Emotional communicability in improvised music: the case of music therapists. *Journal of Music Therapy*, Fall 2006, 43 (3), p. 198—225.
- Huttunen, M. (2011). *Masennus* (Depression). Duodecim, electronic version. Retrieved on December 2011 from: http://www.terveyskirjasto.fi/terveyskirjasto/tk.koti?p_artikkeli=dlk00389&p_artikkeli=dlk00389&p_haku=Masennus
- Juslin, P. N. (2005). From mimesis to catharsis: expression, perception, and induction of emotion in music. In D. Miell, R. MacDonald & D.J. Hargreaves. *Musical communication*. New York, US: Oxford University Press, p. 85—115.
- Juslin, P.N. (2013). What does music express? Basic emotions and beyond. *Frontiers in Psychology*, 4: 596. Retrieved from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3764399/#B72>
- Kallinen, K. & Ravaja, N. (2006). Emotion perceived and emotion felt: same and different. *Musicae Scientiae* 10 (2), p. 191—213.
- Koelsch, S., Fritz, T. & Schlaug G. (2008). Amygdala activity can be modulated by unexpected chord functions during music listening. *NeuroReport*, Volume 19, issue 18, p. 1815—1819, Brain Imaging.
- Koelsch, S. (2009). A neuroscientific perspective on music therapy. *Annals of the New York Academy of Sciences*, volume 1169, The Neurosciences and Music III: Disorders and Plasticity, p. 374—384.
- Koski-Helfenstein, R. (2011). Kliinisen improvisaation käynnistämä emotionaalinen prosessointi musiikkiterapiassa masennuksen hoidossa. (Emotional processing activated by clinical improvisation in music therapy in the treatment of depression.) MA thesis. University of Jyväskylä. Retrieved from: <https://jyx.jyu.fi/dspace/bitstream/handle/123456789/36537/URN:NBN:fi:jyu-2011081011216.pdf>
- Laukka, P., Eerola, T., Thingujam, N. S., Yamasaki, T. & Beller, G. (2013). Universal and culture-specific factors in the recognition and performance of musical affect expressions. *Emotion* June 2013; 13 (3): 434—449.

- Lehtonen, K. (1994). Musiikkiterapian professori Kenneth Bruscia päätoimittajan haastattelussa (Kenneth Bruscia, professor of music therapy, in interview with editor-in-chief). *Musiikkiterapia* (Music therapy) 1/1994, p. 3—8.
- Lehtonen, K. (1995). Mietteitä musiikkiterapian tutkimuksesta. (Thoughts about music therapy research.) In: J. Erkkilä & Y. Heinonen (eds.). *Avaa mielesi musiikille! Kohti tutkimuspohjaista musiikkiterapiaa*. (Open your mind for music! Towards research-based music therapy.) Jyväskylä: Jyväskylä University Printing House, p. 13—32.
- Lehtonen, K. (2008). Johdatus musiikkipsykoterapiaan (Introduction to music psychotherapy). *Psykoterapia* (Psychotherapy) 2/2008, 27 (2), p. 97—113.
- Lima C. F. & Castro S. L. (2011). Emotion recognition in music changes across the adult life span. *Cognition & Emotion*, June, 25 (4), p. 585—598.
- Punkanen, M. (2003). Matkalla mieleen ja tunteisiin – FA-menetelmä ja musiikkiterapia huume kuntoutuksessa. (On a journey to mind and emotions – FA method and music therapy in drug rehabilitation.) In: E. Ala-Ruona, J. Erkkilä, R. Jukkola, K. Lehtonen (eds.). *Muistoissa – Petri Lehikoinen 1940—2001*. (In memories – Petri Lehikoinen 1940—2001.) Jyväskylä: Suomen musiikkiterapiayhdistys ry, p. 214—248.
- Punkanen, M. (2011). *Improvisational music therapy and perception of emotions in music by people with depression*. University of Jyväskylä. Jyväskylä studies in humanities 153. Doctoral dissertation.
- Smith, E. E., Nolen-Hoeksema, S., Fredrickson, B. L., Loftus, G. R., Bem, D. J. & Maren, S. M. (2003). *Atkinson & Hilgard's introduction to psychology*. 14th edition. Belmont, CA: Wadsworth/Thomson Learning.
- Stachó, L., Saarikallio, S., Van Zijl, A., Huotilainen, M. & Toiviainen, P. (2013). Perception of emotional content in musical performances by 3—7-year-old children. *Musicae Scientiae* 17 (4), p. 495—512.
- Syvänen, K. (2005). *Vastatunteiden dynamiikka musiikkiterapiassa* (The dynamics of countertransference in music therapy). University of Jyväskylä. Jyväskylä Studies in Humanities 35. Doctoral dissertation.

- Tamminen, T. (1998). Masennustilat ja niiden hoito (States of depression and cure of them). In K. Achté & T. Tamminen. *Psykiatrian käsikirja* (A Handbook of psychiatry). Jyväskylä: Gummerus Kirjapaino Oy, p. 43—68.
- Terwogt, M. M. & Van Grinsven, F. (1991). Musical expression of mood states. *Psychology of Music*, 19, p. 99—109.
- Vilkko-Riihelä, A. (2003). *Psyyke. Psykologian käsikirja* (Psyche. A Handbook of psychology). Porvoo: WSOY.
- Vuoskoski, J. (2012). Can sad music really make you sad? Indirect measures of affective states induced by music and autobiographical memories. In: J. Vuoskoski. *Emotions Represented and Induced by Music. The Role of Individual Differences*. University of Jyväskylä. Jyväskylä Studies in Humanities 174. Doctoral dissertation, p. 129—138.
- Wigram, T. (2004). *Improvisation. Methods and techniques for music therapy clinicians, educators and students*. London and Philadelphia: Jessica Kingsley Publishers.

APPENDIX 1: Answering form of the listening experiment

Background information

male/ _____ female *Participant nr.* _____ a/b

Work experience as clinician _____ years **OR** therapeutic use of music in some other profession _____ years

Educational background:

The listening experiment

You will hear 21 short music excerpts altogether. They have been selected from seven clinical improvisations, three excerpts from each: one from the beginning, one somewhere approximately from the middle, and one from the final notes. You will hear both client—therapist duets and solo improvisations (client only). Listen to music excerpt and, after that, **mark down which emotions you heard** or perceived and **how strong you consider them** in the excerpt. **If you think some emotions are not included in the listened excerpt at all, do not mark anything in its slot.** Express **the strength of the perceived emotions with numbers from 1 to 5**, where 1 means "hardly perceivable" and 5 means "very clearly perceivable". You will hear three excerpts in a row, after which there is a longer pause. During that pause you may freely answer on your own words to a question (marked A-G) about special features of the three excerpts.

- 1. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____
- 2. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____
- 3. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____

A) Was there something in these three excerpts that especially caught your attention? If there was, I kindly ask you to tell about it/them here.

- 4. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____
- 5. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____
- 6. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____

B) Was there something in these three excerpts that especially caught your attention? If there was, I kindly ask you to tell about it/them here.

7. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____
8. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____
9. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____

C) Was there something in these three excerpts that especially caught your attention? If there was, I kindly ask you to tell about it/them here.

10. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____
11. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____
12. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____

D) Was there something in these three excerpts that especially caught your attention? If there was, I kindly ask you to tell about it/them here.

13. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____
14. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____
15. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____

E) Was there something in these three excerpts that especially caught your attention? If there was, I kindly ask you to tell about it/them here.

16. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____

17. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____

18. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____

F) Was there something in these three excerpts that especially caught your attention? If there was, I kindly ask you to tell about it/them here.

19. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____

20. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____

21. joy/happiness _____ sorrow _____ fear _____ anger _____
tenderness _____

G) Was there something in these three excerpts that especially caught your attention? If there was, I kindly ask you to tell about it/them here.

Thank you for your help!

Appendix 2: Additional instructions for the online listening experiment.

Welcome to the listening experiment!

At this site you can listen to the music excerpts of my listening experiment. Please find a calm place where there is the least amount of disturbing factors.

A few guiding words before you start

1. Listen to each excerpt, one after another, and write your emotion evaluation to the blanket, which you received in your email, immediately after each excerpt.
2. Listen to the excerpts in the numerical order and also answer to the blanket in the same order (excerpt 1 – answer into the slot 1 and so on). In this way it is possible to avoid mixing singular answers together.
3. All the other guidance needed will be found on your blanket.

And now, simply go and do the thing! (From the link 'Music excerpts', above the welcoming text.)

Sanna-Mari Kontoniemi articulates her deepest thanks!