# Western Norway University of Applied Sciences

# MASTER'S THESIS

Visual Representations in Music Listening Activities: Comparing sixth-graders' reception of a "rhythmic music" excerpt under three listening conditions

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# Sammendrag

Denne masteroppgaven er et forsøk på å undersøke sjetteklassingers (*n*=18) responser til et rytmisk musikkutdrag, i tre ulike lyttesituasjoner. Oppgaven undersøker hvorvidt tegning av musikk påvirker elevenes musikklytting. Den tar også sikte på å bidra til metodologiske forbedringer som kan være nyttige i fremtidige eksperimenter av et større omfang. Oppgaven er en «mixed methods»-undersøkelse med et kvasi-eksperimentelt design, men kan også beskrives som et «kvalitativt eksperiment.» Datamaterialet består av semistrukturerte en-til-en intervjuer med alle deltakerne, tegnede visuelle representasjoner av musikk og et selvutviklet Likert-type spørreskjema.

Analysen av kvalitative data avdekket ingen tydelige forskjeller i musikalske responser som kan knyttes til variasjoner i lyttesituasjoner, men funnene støtter i flere sammenhenger opp om tidligere forskning og korresponderer med de teoretiske perspektivene som ble brukt. Med utgangspunkt i den deduktive analysen av kvalitative data kan man stille spørsmål ved hvorvidt analytisk og emosjonell lytting bør forstås som en dikotomi (vanlig i tidligere forskning), ettersom disse konseptene ser ut til å stå i et mer dialektisk forhold. Resultatene ble tolket gjennom bruk av ulike «mikroteorier» som kan relateres til musikkoppfatning, -kognisjon, og -filosofi.

Analysen av kvantitative data avslørte reliabilitets- og validitetsutfordringer knyttet til selve spørreskjemadesignet. Samtidig dannet denne analyseprosessen et verdifullt grunnlag for å utvikle konkrete forslag til justeringer av metodologiske tilnærminger i fremtidig eksperimentell forskning i dette feltet.

# Abstract

This master's thesis is an attempt to explore sixth-graders' ($n=18$) responses to a "rhythmic music" excerpt under three different listening task conditions. It investigates the extent to which the participants' drawing to visually represent music may be determined to affect their music perception. An additional goal has been to develop refined tools for future experimental research in a large-scale study with a large sample of participants. This research can be described as a mixed methods study with a quasi-experimental design, or what has sometimes been called a "qualitative experiment." Collected data include semi-structured one-to-one interviews with all participants, freely drawn visual representations of music, and a self-developed Likert-type questionnaire.

Analysis of the qualitative data did not reveal any considerable music response differences that can be ascribed to variations in listening task conditions. However, it does on several occasions support previous research and corresponds with utilized theoretical perspectives. The deductive analysis of qualitative data demonstrated that understanding analytical and emotional listening as an essential dichotomy (as common in previous studies) should be challenged, since these concepts actually appear to have a dialectic relationship. Results were interpreted using various "microtheories" related to music perception, cognition and philosophy.

Analysis of questionnaire data revealed insufficient reliability and validity of the testing instrument. However, knowledge gained from the quantitative analysis provided valuable information used to develop specific recommendations for modification of approaches to future experimental research in this field.

# Preface

It is amazing to realize that my work with the thesis is nearing an end. It has been a meaningful, although sometimes challenging, year. I feel that I have gained a lot of new knowledge, as well as a better understanding of methodological approaches and limitations. In addition, writing in English for a year has certainly worked wonders on my second language skills. Even though I have learnt a lot, I do not feel that I am finished with music pedagogy, fully trained and filled up with knowledge. On the contrary, I have realized that this field of research is vast and that there are many things I still do not know. In short, working on the thesis has sparked a new and stronger curiosity. It has triggered a need to know more and I hope that I will get opportunities to explore matters of music pedagogy in the future.

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# 1 Introduction

## 1.1 Selection of research topic

This master's thesis can be described as having two key topics. It is related to visual representations of music, as well as music listening. The thesis details an attempt to examine if listening tasks, where children represent music visually, somehow affect their music perception.

When writing my bachelor's degree, I became fascinated with the psychological aspects of music and how this relates to music pedagogy. In hindsight, I believe that this interest guided me towards the topic of this thesis. However, the most important influence in my choice of research focus stems from teaching practice. During the first year of my master's program in music pedagogy, all students were participating in music teaching activities at schools in the Bergen area. In this period, I was involved in a project lasting three weeks, in which children developed their own notational system in cooperation with their teacher. Students suggested symbols and ways of organizing music notation, while the teacher provided feedback and tried to develop the notational system further. This experience resulted in a curiosity towards use of visual representations of music in music education and made me want to use my master's thesis to investigate this topic.

In order to narrow down the research topic, two approaches were used. The first approach involved considering the chosen topic in relation to the existing Norwegian primary school music curriculum. In this curriculum (Kunnskapsdepartementet, 2013), the music subject is divided into three main areas: music performance, composing, and listening. Visual representations of music may be considered relevant to all of these key topics, but due to the scope of this thesis it was considered necessary to specify whether visual representations should be examined in a performance, composing, or listening context. According to Espeland (2004), graphic notation may be a useful tool in *listening activities*. Children from an early age understand that one can draw to produce visual representations of music (p. 17), so study of listening activities offers an interesting perspective on how visual representations of music can be used in primary school music education.

The second approach used to sharpen the research topic focus, was to consider what kind of origins visual representations can have. It is reasonable to assume that visual representations

used in music listening activities may be a product of either composers, teachers or students. It is likely that content and processes in music listening activities can vary, depending on the origin of visual representations. This master's thesis focuses on visual representation by students. One rationale for this choice was the Norwegian school system's focus on student-centered pedagogy, found in both curriculum guidelines (Kunnskapsdepartementet, 2006) and the Education Act (Opplæringslova, 1998, § 1-1; 1-3).

## 1.2    Research question and hypothesis

As mentioned, this research project attempts to explore a particular intersection between music listening and visual representations, by investigating how children perceive music in different listening task situations. An additional goal is to develop refined tools for future use in a large-scale study with hundreds of participants. My *hypothesis* is that music listening, combined with tasks encouraging production of visual representations, can guide children's attention towards *musical* parameters inherent in the music to which they listen. In other words, I suspect that such a listening condition will result in more analytical than emotional responses to music.

The research question guiding this master's thesis is:

> "How do sixth-graders perceive a "rhythmic music" excerpt when tasked with representing the music visually, either during or after listening, and does their music perception somehow differ from that of sixth-graders who are simply asked to listen?"

As definitional issues, please note that visual representations consist of independent drawings with pen and paper. For a detailed description of drawing materials used in data collection, see Appendix A. "Rhythmic music" refers to genres such as pop, rock and jazz, and on p. 37 is a detailed description of the chosen music excerpt and rationale for its selection.

*Development of research question*

The research questions guiding this thesis have evolved over time. When the thesis proposal was submitted in May 2018, the research topic was graphic notation. There were two research questions in that proposal. The first one focused on how music listening tasks connected to notation could affect sixth-graders perception of formal elements in rhythmic music. The latter sought to investigate which aspects of rhythmic music would be perceived when they

were tasked with producing graphic notations, and how semiotic resources were used to create and record musical meaning. At that point, a comparison of free listening and listening combined with drawing was considered interesting but not included in the research questions. By the beginning of September 2018, the focus had shifted slightly due to knowledge gained from working with literature review and discussions with my supervisor. At this point, the main research question was "How may audio-graphic tasks encouraging production of invented notations alter sixth-graders' perceptions of musical parameters, such as rhythm, harmony, dynamics and form, in simple and complex rhythmic music?" This question was divided into three sub-questions. The first focused on what musical parameters students could describe when they were not tasked with creating notations, since this could serve as a baseline for comparison. The second sub-question asked what musical parameters students could describe if they were engaged in notational activities while listening. The last question was intended to examine if musical complexity affected students' music perception. In the end of November 2018, one of the sub-questions was removed to sharpen the focus. I decided that a comparison of differences between "simple" and "complex" rhythmic music, in addition to a comparison of differences between listening with or without notational activity, would be too wide-ranging. In order to narrow down the research question, comparison of music perception differences in "simple" and "complex" rhythmic music was eliminated.

In the beginning of February 2019, after spending approximately one month analyzing interviews, drawings and questionnaires, it became clear that another minor modification of the research question was necessary. Questionnaires (Appendix B) appeared to not generate reliable data on participants' perception of musical parameters and the accessible sample was insufficient for generalizable inferences. Due to the volume of data necessary for a reliable evaluation of each participant, we determined that it was unrealistic to pursue a generalizable study of students' music perception through the selected quantitative inquiry strategy without access to a research team and hundreds of hours for the study (which would be more appropriate for a PhD than a master's thesis). For this reason, the research focus shifted toward a more manageable goal: exploring the relationship between visual representations and music listening using a primarily qualitative approach. Such a design can offer detailed descriptions and exploratory comparisons, but robust measurements of effect sizes with ecological validity is an objective that must be saved for another study.

## 1.3   Research project rationale

It is likely that visual representations of music can be a useful tool in learning activities connected to all three topics of the Norwegian primary school music curriculum: performance, composing, and listening (Kunnskapsdepartementet, 2013). This can perhaps in itself be considered a rationale for conducting a music pedagogy research project aimed at children's use of visual representation, because such research may contribute to knowledge that ultimately might serve to improve music teaching practices.

It should be mentioned that primary school subjects are under reform in Norway. For the time being, the new music curriculum consists of four core elements: performance, production, experience, and cultural understanding (Utdanningsdirektoratet, 2018). Visual representations of music appear to be a learning tool that can be applied to many of the core elements, which makes this research project relevant to the renewed music subject. Scant Norwegian music pedagogy research specifically treats visual representations of music in a listening context. A search on the Norwegian words for "graphic notation", in the databases "Idunn" and "Norart," resulted in six hits. None of these results had any direct relevance to music pedagogy. The apparent need for research on this topic strengthens the rationale for this master thesis project.

Gaining insight into children's musical understanding may also be considered a valid reason for conducting research on invented notations. Children's visual representations, verbal explanations and kinesthetic responses to music can be regarded as externalized representations of cognitive schemes. These representations provide valuable cognitive and musical information (Kerchner, 2000, p. 32). Numerous studies recognize invented notations as a source of information about children's musical understanding (Blair, 2007; Carroll, 2017; Elkoshi, 2015; Gromko & Poorman, 1998a; Lee, 2013; McCusker, 2001; Pramling, 2009). This kind of knowledge about children's musical understanding can be seen as a relatively important contribution to the field of music pedagogy since it may be used to develop and improve the quality of music education.

# 2   Literature review

This chapter presents a review of literature considered relevant to the selected research question and hypothesis. It consists of two main sections, one treating previous research on music listening and one focusing on visual representations of music. Before presenting literature, the review method will be described.

*Literature review method*

This literature review can be described as a traditional *scoping review*. Such reviews are typically used to map out the general topic area and to identify gaps in knowledge (Jesson, Matheson, & Lacey, 2011, p. 76). One of the defining characteristics of this method is that it provides an overview of a wide-ranging topic (Peterson, Pearce, Ferguson, & Langford, 2017, p. 12). The approach used to produce this literature review was inspired by a three-stage process described by Jesson, Matheson and Lacey (2011, p. 86). It should be noted that scoping reviews do not have the same depth as systematic reviews but provides a broader conceptual range (Arksey & O'Malley, 2007, p. 20). Breadth was considered beneficial, because the research objectives are linked to both music pedagogy and music psychology.

The review has been carried out in a snowball-like fashion. Throughout the development of this thesis, literature has been added and the review gradually expanded. The process started with searches on the keyword "invented notation". Articles considered relevant were examined. This process involved summarizing important parts of each article, such as key concepts and theories, methodology, findings, and identifying relevant references. These references served as a point of departure for further searches (fig. 2.1, p. 6). Later, when a need for research on music listening emerged, the literature review process was repeated. This time, it started with searches on the keyword "music perception." It should be noted that the vast amount of existing research made it challenging to include all relevant studies in the review. Without time limitations, it could have been expanded considerably. However, the selection of research projects presented in the literature review, even though limited, still provide an overview of the topic area. While developing this review, I attempted to identify the studies that were most often cited. In order to ensure that important research was not left out, studies often cited were prioritized.

Content is organized thematically to display key areas of interest within each research topic. It should be mentioned that the themes are constructs that do not properly show the blurred borders between different research projects. By presenting research thematically, studies are placed in "boxes" that are not necessarily a perfect fit. This review does not capture every detail but attempts to highlight tendencies in research focus and methodological designs, as well as research findings. For short summaries of content in each reviewed study, see Appendix C.
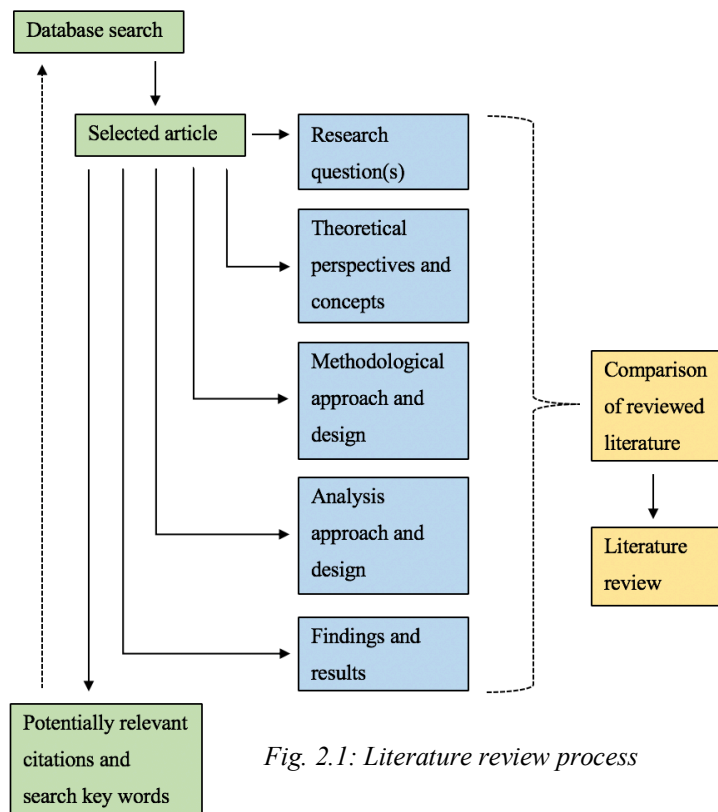
*Fig. 2.1: Literature review process*

## 2.1 Music listening

When examining previous research related to music listening, studies on music perception and cognition were considered particularly relevant. This type of research typically sheds light on different factors that affect responses to music. Researchers have for instance investigated how music perception is linked to emotions, personality traits, language processing, musical competence and gender. Several studies also provide ways to distinguish between different types of musical responses or listening styles.

Researchers who have made significant contributions to this field, include David J. Hargreaves, Joyce E. Gromko, and Stefan Koelsch. David J. Hargreaves is Professor of Education at Roehampton University. His research interests include developmental and social psychology, as well as arts education (University of Roehampton London, n.d.). In his research on music perception, he has used experimental approaches (Hargreaves & Colman, 1981). In addition, he has contributed to development of music perception theory (Hargreaves, 2012; Hargreaves, Hargreaves, & North, 2012).

Joyce E. Gromko has worked as Professor of Music Education at Bowling Green State. Her research interests are children's use of symbols in music and aural perception skill (Ward-Steinman, 2016). Her methodological approaches appear to be comparable with traditional experimental designs, relying on testing and quantitative measures. She has on several occasions made use of Gordon's Measure of Musical Audiation in her experimental designs (Gromko & Poorman, 1998a; Gromko & Russell, 2002) and also utilized IQ scoring (Gromko & Poorman, 1998b).

Stefan Koelsch is a Professor in Biological Psychology and Music Psychology at the University of Bergen. Some of his research interests are neurocognition of music, neural correlates of emotion and music therapy (Koelsch, 2013). Several of the research projects Koelsch has been involved in utilize EEG scanning to measure effects of musical stimuli (Jentschke, Koelsch, Sallat, & Friederici, 2008; Koelsch, Grossmann, Gunter, Hahne, Schröger & Friederici, 2003).

*Descriptions of musical responses*
Some research on music perception and cognition has focused on examining different types of perception. For instance, Hargreaves and Colman (1981) conducted an experiment with adults to investigate relationships between the ways that participants reacted to 18 varied pieces of music. They devised a content analysis scheme consisting of five music response categories: *categorical*, *objective-analytic*, *objective-global*, *affective* and *associative* (p. 16). Their findings suggested that musically naïve persons tend to react in a subjective/personal way, while musically trained persons are more likely to produce objective/technical reactions (p. 19).

Leipold and Loepthien (2015) examined *attentive-analytical* and *emotional listening,* finding that emotional listening increased with age in adolescence and adulthood. Attentive-analytical listening decreased between ages 12-18, before increasing between ages 18-23 (p. 123). Similar to the study by Hargreaves and Colman (1981), Leipold and Loepthien suggest that musical competence influences music perception (2015, p. 124). It should be noted that other studies also propose a connection between musical competence and perception (Gromko & Poorman, 1998a, p. 340; Magne, Schön, & Besson, 2006, p. 207). A third research project differentiating between different types of music perception, was conducted by Kreutz,

Schubert and Mitchell (2008), who applied a theory of two general cognitive styles to music perception and explored *music empathizing* and *music systemizing* through two surveys.

*Music perception in relation to personality traits and emotions*
Some research on music perception has examined emotional aspects. Kawakami and Katahira (2015) investigated how elementary school children's empathic abilities affected emotional responses to music, particularly focusing on links between empathy and preferences for sad music. This study found that some sub-components of trait empathy are connected to emotional responses and preferences for sad music. Perspective-taking abilities affected emotional responses to music and tendencies to fantasize directly explained preferences for sad music (p. 8). Multiple studies confirm that personality traits affect emotional responses to music (Liljeström, Juslin, & Västfjäll, 2012, p. 593; Vuoskoski & Eerola, 2011, p. 1104).

Another research project related to music perception and emotions, is the aforementioned study by Leipold and Loepthien (2015). They examined whether differences in emotional and cognitive music reception processes were related to different kinds of emotional regulation. Findings suggest that analytical listening, described as "attentive-analytical" listening in their study, results in listening processes that are similar to the mindset activated in accommodative coping processes. Their findings also suggest a similar link between emotional listening and rumination (p. 122). *Accommodative coping* processes involve focusing on alternative solutions and goals, while *rumination* is characterized by a focus on negative thoughts and discrepancies between one's current situation and goals (p. 114).

*Language effects on music perception*
Several studies point towards similarities in music and language processing and development. In a cross-cultural literature review, Stevens (2012) presents findings related to grouping and segmentation, sensitivity to melodic and tonal hierarchies, and different kinds of musical expectations. She notes that such findings "(…) points to effects of enculturation similar to perceptual reorganization observed in infants and children in the context of speech perception and production" (p. 659). Similar findings have come from neuroscience studies. An experiment utilizing EEG scanning found that children appear to process language and music more similarly than adults (Koelsch et al., 2003, p. 683). This suggests a common origin of language and music in the human brain (p. 688). Another neuroscientific experiment (Jentschke et al., 2008) investigated how young children with specific language impairment

processed musical regularities. This research found that children with difficulties processing language syntax had similar difficulties in the music domain (p. 1949). Other studies have also suggested connections between music and language processing (Magne et al., 2006, p. 207).

*Musical literacy*

Gromko and Poorman (1998a) examined possible relationships between children's aural perception and their use of symbols, finding that children's perception of musical sound affects their ability to make use of musical symbols in writing and reading tasks, and that the children's abilities followed a developmental progress (p. 20). In another research project conducted by Gromko and Russell (2002), investigating relationships among children's aural perception, listening conditions and precision in their reading of listening maps, they found that aural perception of musical patterns affected the children's reading accuracy (p. 340).

*Gender differences related to music perception*

Some studies of music perception have investigated gender differences. Robazza, Macaluso and D'Urso (1994) examined how emotional perceptions of music are related to age, gender and musical competence. Participants were asked to associate music pieces with an emotion and score the emotional intensity. No significant gender differences were identified (p. 942). However, more recent research reveals gender differences related to music perception and emotions. Kreutz, Schubert and Mitchell (2008), who examined music empathizing and systemizing, found differences in cognitive styles of music perception. Participating women leaned towards music empathizing, while male participants leaned towards music systemizing (p. 69). There are also neuroscientific studies related to auditory information processing that indicates gender differences (Koelsch et al., 2003, p. 683).

*Methodological approaches in research on music perception*

Most of the research on music perception appears to be based on experimental approaches. Several studies can be described as neuroscientific experiments (Jentschke et al., 2008; Koelsch et al., 2003; Magne et al., 2006). There are also a number of experiments that utilize different kinds of questionnaires or response sheets (Gromko & Poorman, 1998a; Gromko & Russell, 2002; Hargreaves & Colman, 1981; Kawakami & Katahira, 2015; Kreutz et al., 2008; Leipold & Loepthien, 2015; Robazza et al., 1994; Vuoskoski & Eerola, 2011). In addition, some experiments on music perception have utilized psychophysiological measurements, such

as skin conductance and heart rate (Liljeström et al., 2012). It should be noted that most of these research projects collected data individually from each participant.

Previous research on music perception is based on data collected from children and adults at different ages. Some studies focus on very young children, around three to five years old (Jentschke et al., 2008). Other studies have obtained data from young children, approximately six to nine years old (Gromko & Russell, 2002; Magne et al., 2006). There are also studies including both very young and young children (Koelsch et al., 2003), and research projects focusing on older children (Gromko & Poorman, 1998a; Kawakami & Katahira, 2015). In addition, several studies have collected data from adult participants (Hargreaves & Colman, 1981; Kreutz et al., 2008; Liljeström et al., 2012; Vuoskoski & Eerola, 2011) and some studies involve both children and adults (Leipold & Loepthien, 2015; Robazza et al., 1994).

Research on music perception has utilized different kinds of musical content. Some studies use music from a variety of genres (Hargreaves & Colman, 1981; Liljeström et al., 2012), while others use classical pieces (Kawakami & Katahira, 2015; Robazza et al., 1994) or film music (Vuoskoski & Eerola, 2011). There is also research using children's songs (Magne et al., 2006). Several experiments on music perception make use of musical fragments, such as short chord sequences or changes in pitch (Gromko & Poorman, 1998a; Gromko & Russell, 2002; Jentschke et al., 2008; Koelsch et al., 2003). It should also be noted that some research projects do not include any musical content (Kreutz et al., 2008; Leipold & Loepthien, 2015).

It appears that most of the research on music perception, involving presentation of musical material, contains listening tasks. Some tasks are focused toward noticing differences. For instance, participants have been asked to decide whether the ending of melodies sound natural or unnatural (Magne et al., 2006), to compare music excerpts (Hargreaves & Colman, 1981), or to judge similarities in pitch or rhythm (Gromko & Poorman, 1998a; Gromko & Russell, 2002). There are also tasks based on self-reporting of emotions (Kawakami & Katahira, 2015; Liljeström et al., 2012; Robazza et al., 1994; Vuoskoski & Eerola, 2011). However, it should be noted that some neuroscientific studies do not involve tasks but only exposure to music (Jentschke et al., 2008; Koelsch et al., 2003).

## 2.2 Visual representations of music

When investigating existing literature on visual representations of music, previous research on invented notation was considered particularly relevant. There is a significant body of research on children's invented notations. Sometimes referred to as "musical maps" or "phonographic drawings." Researchers who have made considerable contributions to this field include Jeanne Bamberger and Rivka Elkoshi. Jeanne Bamberger has been described as "(…) one of the seminal figures in the fields of music cognition and child development" (University of California, Berkely, 2015). Her research interests include musical development and learning, particularly related to aspects of representation. She is Adjunct Professor of Music at University of California, Berkeley, and Professor Emerita of Music and Urban Education at Massachusetts Institute of Technology (Massachusetts Institute of Technology, 2005). Bamberger has conducted experiments (Bamberger, 1991, p. 2) and also utilized case study designs (Bamberger, 2005). Rivka Elkoshi, affiliated with Levinsky College of Education (ReseachGate, n.d.), has also made several contributions to research on visual representations of music. She holds degrees in piano performance, music education and composition (McVicker, 2016, p. 175). In much of her work audio-graphic tasks play an important role in the methodological design (Elkoshi, 2002, 2004, 2007, 2015).

*Children's musical understanding*

Many of the previous studies on invented notations focus on children's musical understanding. Some of these studies have investigated what invented notations can tell us about children's music listening or musical perception. Elkoshi (2002) investigated if there is a connection between the perception of musical fragments and entire pieces. Children were asked to graphically describe a selected musical parameter, present in both a fragment and a piece. Six tasks of this nature were carried out, each one focusing on a different musical parameter (p. 201). She found no statistical correlation between children's visual responses to musical fragments and entire pieces (p. 199). According to her, the findings refute the widespread hypothesis of an existing connection between fragmental and contextual perception, where our understanding of musical fragments creates the basis for our understanding of musical pieces (p. 209).

In a study concerning children's visual representations of rhythm, Bamberger (1991) investigated differences between children. She found that participants "(…) focus on different but possible and legitimate features of the material – those that contribute to the coherence

that each student has made" (p. 19). Not only did participants structure musical events differently, but the perceived boundaries of parts in music also differed (p. 20).

Kerchner (2000) examined the cognitive processes children exhibited during music listening, through visual, verbal and kinesthetic responses (p. 31). She compared the responses of second- and fifth-graders and found that fifth-graders used more refined cognitive strategies to describe musical information. These students also seemed to have more affective responses to music than the second-graders. In addition to these findings, Kerchner writes that the audio-graphic responses of students in second grade were less detailed and differentiated than those of fifth-graders, and that the content of their notations varied according to grade level. The second-grade students tended to draw pictures, while students attending fifth grade used different kinds of markings and words to describe listening experiences (p. 32).

A study by Blair (2007), which was intended to examine how students make meaning during listening experiences (p. 4), compared the process of producing musical maps to that of narrative inquiry. She found several similarities between the two and considered them to be parallel processes (p. 13). According to her, invented notations are a form of narrative: "Like ink on a page, they tell the story of the creator's experience" (p. 14).

Some studies have examined children's invented notations using a social constructivist perspective on musical understanding. Carroll (2017) applied a Vygotskian perspective when she investigated the processes and products related to children's graphical notations of music. This approach resulted in several interesting findings. According to Carroll's study, the children's notations showed what they knew about music, as well as revealing extra-musical aspects such as aesthetic preferences (p. 532). She also found that the children's invented notations revealed something about their appropriation of cultural writing conventions (p. 533). Another finding from her study was that all the participating children used singing, speaking, gesturing, drawing materials and pointing in creative ways, when notating, singing the song back or describing their notation systems to peers (p. 534).

Another relevant study was conducted by Pramling (2009). He investigated children's invented notations using the Vygotskian concept *tools*, focusing particularly on external representations as a kind of tool (p. 274). According to Pramling, a child's musical

development "(…) can be perceived in terms of appropriating and being able to use various kinds of tools, such as external representations" (p. 275).

*Musical literacy*

Some research on children's invented notations has suggested that this kind of notational activity may have a positive impact on the development of literacy. According to Pramling (2009), it is "(…) reasonable to assume that realizing that sounds can be represented in other media (objects and visual shapes) is a key insight in learning music notation – leading to the discovery of principles and patterns (regularities and variations) of sounds and music – as well as literacy" (p. 288). A similar suggestion can be found in Elkoshi's (2002) study. She writes that through development of spontaneous notations children may at some point obtain the representational concepts needed to handle the shape relations of conventional music notation (p. 210). Carroll (2017) also mention this possible connection between invented notation and literacy. She claims that activities where children represent a song graphically, and then use their notations to perform it, can provide meaningful and playful experiences. These experiences may lead to an interest in learning conventional music notation and improvement of reading and writing skills (p. 535). This hypothesis of a link between invented notation and literacy, which also can be found in a case study by Upitis (1987, p. 4), seems to correspond with one of the findings in Lee's (2013) study. She found that children who exhibited advanced notational strategies tended to perform better in literacy skills (p. 403).

*Descriptions of children's invented notations*

Several former studies on children's invented notations presents categories to describe distinctive features of these notations. Lee (2013) conducted a longitudinal study investigating the systems children invent to document and recall pitch and rhythm (p. 395). She identified three systems that children use to visually represent pitch or rhythm: *quantitative size*, *graphic pattern* and *literal symbols* (p. 397). In short, children use sizing, patterns or symbols such as letters or numbers, to indicate changes in pitch or rhythm. Lee also identified two systems used by children to visually represent pitch and rhythm simultaneously: *system with indication* and *combination of two systems*. The first type is typically a system representing pitch, with added signs indicating rhythm. The latter refers to the use of two systems, one representing pitch and one representing rhythm (p. 400).

Barrett (2001) suggests that exploring attentive listening and substantive responses in children's notational meaning-making may enrich our understanding of children's musical understanding (p. 33). In this study, the invented notations of instrumental compositions were organized in six categories: *representation of instrument*, *symbolic representation*, *enactive*, *exploratory*, *representation of instrument with modification* and *adopted symbols*. The first category refers to notations containing a sketch or tracing of the instrument used. Symbolic representations include notations where symbols such as lines or dots represent specific sounds. The third category describes notations that are representations of gesture or function as a way of playing the sounds out on paper. The exploratory category refers to drawings where there is little evidence of a relationship between symbols and sounds. The fifth category is notations that include a sketch of an instrument, as well as modifications indicating a musical parameter. The last category includes notations using symbols from other domains, for example letters. Children's notations of vocal compositions were organized in two categories: *pictorial* and *text*. The first category is drawings referring to song lyrics or titles, while the latter is drawings in which children make use of letters (p. 36).

Elkoshi (2002) has investigated the connection between fragmental and contextual perception of music (p. 199), using five categories to classify children's phonographic responses: *zero*, *association*, *pictogram*, *formal response* and *growth*. The first category refers to drawings that are totally detached from the audio-graphic task. The second category includes drawings that represents associations. Drawings that describe any musical instrument are categorized as pictograms. The fourth category, called "formal response," refers to drawings indicating chronological order of sound events. The last category is for invented notations containing representations of groupings, separation and division of music into subsections (p. 202).

Elkoshi (2015) also studied how children conceptualize classical music and how age affects their graphical and verbal responses (p. 181), by distinguishing between *associative*, *formal* and *compound* responses. Associative responses refer to depictions of emotions, stories, atmosphere and events evoked by the music. Formal responses describe notations providing references to sound, sometimes through strict formal terminology. These responses also depict the temporal unfolding of musical dimensions, such as dynamics or instrumentation. The compound responses include both associative and formal responses (p. 183)

*The teacher's role in audio-graphic activities*

The majority of studies investigating children's invented notations seem to focus on children (Barrett, 2001; Blair, 2007; Carroll, 2017; Elkoshi, 2002, 2015; Lee, 2013; McCusker, 2001), but there are some studies that shed light on the teacher's role in activities involving audio-graphic tasks. In Pramling's (2009) discussion of findings from a study investigating children's representational knowledge, he describes what teachers in a preschool are doing when they try to develop children's musical knowledge. Interestingly, teachers challenged children to explain and clarify their understanding. This way of communicating about what and how one does something while doing it can contribute to the facilitation of learning. Pramling claims that talking about what signs mean is essential toward developing an understanding of the tools we use to think, speak about and perceive music (p. 287).

In a case study by Lau and Grieshaber (2010), examining how a kindergarten teacher stimulate a child's creativity, they found that the teacher scaffolded the attempts of a young boy to use musical notation (p. 127). According to Lau and Grieshaber, the teacher understood the significance of a well-planned creative environment. This, combined with the teachers use of scaffolding, provided many opportunities for children to develop their musical creativity (Lau & Greishaber, 2010, p. 137).

*Methodological approaches in research on children's invented notations*

Researchers have utilized different methodological approaches to gain insight into children's invented notations. There are several qualitative studies on the topic, some of which uses case study approaches (Barrett, 2001; Lau & Greishaber, 2010; Upitis, 1987). A research project by Blair (2007) is described as an ethnographic study. Elkoshi (2002) refers to her study as an experiment. Other research projects related to invented notation have used quantitative approaches (Gromko & Poorman, 1998a). There are also some mixed methods studies on invented notation (McCusker, 2001). The previous research on invented notation seems to be based on a wide range of data sources but some sources are prominent in many studies: audio-graphic tasks, interviews and video observations.

Previous research on invented notation has been based on data collected from children at different ages. Some studies have examined the invented notations of very young children, between three and five years old (Barrett, 2001; Lau & Greishaber, 2010; Pramling, 2009; Upitis, 1987). Other studies have investigated visual representations of music produced by

young children between six to nine years old (Elkoshi, 2002). Several studies on invented notation have collected data from both very young children and young children. (Carroll, 2017; Elkoshi, 2015; Lee, 2013; McCusker, 2001). There are also research on invented notation conducted with older children, aged ten to twelve years (Blair, 2007), and studies concerning both young children and older children (Kerchner, 2000).

Previous research on children's invented notations has utilized different kinds of musical content. Some studies have used western classical music as a part of their methodological design (Blair, 2007; Elkoshi, 2002, 2015; Kerchner, 2000). Others are concerned with original compositions produced by participating children (Lau & Greishaber, 2010; Upitis, 1987) or traditional 'canonic' songs (Carroll, 2017; McCusker, 2001). There are also studies combining different kinds of musical content, such as known songs and original compositions (Barrett, 2001).

Several studies involve a kind of audio-graphic task (Barrett, 2001; Blair, 2007; Carroll, 2017; Elkoshi, 2002, 2015; McCusker, 2001) where participating children are asked to invent notations representing recorded music, performed music or original compositions. Audio-graphic tasks have been worded in various ways. Some task formulations imply that the graphic representations of music have a communicative purpose. For instance, McCusker's (2001) task was formulated like this: "(…) use your paper and the crayons so that somebody else could come along, after class was over, and learn how the song or chant goes just by using your paper" (p. 66). Another example is: "Imagine [that] a girl or boy from another school or country who doesn't know the song could sing it just by looking at the marks on your paper" (Carroll, 2017, p. 525).  Other studies have used more open-ended task formulations, like: "Create in any way you like a drawing that you think represents the music" (Elkoshi, 2015, p. 183). Some research projects use tasks that include more than one sensory mode. For instance, Kerchner's (2000, p. 31) task included both verbal, visual and kinesthetic responses to music. It should also be mentioned that there are a few studies that do not seem to be based on a prepared notational task embedded in the research design (Lau & Greishaber, 2010; Pramling, 2009; Upitis, 1987). Most of these studies have relied on data collected in larger studies not specifically focusing on children's invented notations.

Some research projects have documented children's verbal explanations of their invented notations. Children's verbal explanations have been collected during notational tasks (Barrett,

2001; Elkoshi, 2002; Kerchner, 2000; McCusker, 2001; Upitis, 1987), using what may be described as a kind of active interviewing. Their explanations have also been recorded after notational tasks (Kerchner, 2000; Lee, 2013), using approaches similar to traditional qualitative interviews. Many studies on children's invented notations have collected data using video recordings. Often these studies combine video recordings with other types of documentation, such as interviews or invented notations created by participating children (Blair, 2007; Carroll, 2017; Elkoshi, 2015; Lau & Greishaber, 2010; McCusker, 2001). It should also be mentioned that one study concerning invented notation is entirely based on video observations (Pramling, 2009). Some research has tested children's musical aptitude or assessed their musical competence using information from parents and teachers, collected through questionnaires, interviews or other methods (Carroll, 2017; Gromko & Poorman, 1998a; Kerchner, 2000; Lau & Greishaber, 2010; McCusker, 2001; Upitis, 1987).

## 2.3    Gaps of knowledge in previous research

It should be noted that some aspects of music perception and visual representations do not appear to have been thoroughly investigated in previous research. In the reviewed research on music perception, findings appear to be based primarily on quantitative forms of data. There are few studies that have included qualitative inquiry strategies in their methodological designs. On the other hand, several studies on invented notations employ qualitative methods but the majority of these studies are not directly linked to music perception. In other words, there is a need for research on music perception that utilizes qualitative approaches. It is also evident that research on visual representations of music could benefit from new studies applying a more direct focus on music perception. As mentioned, previous research on music perception has often investigated different factors that can affect one's responses to music. However, it should be noted that this review has not identified any existing research that explores whether or not visual representations may affect music perception. Finally, much of the existing research, particularly in the field of invented notations, does not consider genres such as jazz, pop, and rock. Research on children's invented notations is often based on representational tasks connected to classical music, children's songs, or original compositions produced by the children participating in studies. There are some studies of music perception based on a variety of genres, but this review did not identify any previous research that specifically focuses on rhythmic music and children's invented notations.

## 2.4   Literature review summary

This literature review has examined previous research on music listening and visual representations of music, using a scoping review approach. Research on music perception and cognition has often investigated how different factors influence music perception, using experimental approaches. Some examples are neuroscientific experiments, self-report based psychological experiments, and experiments utilizing psychophysiological measurements. This type of research covers such topics as musical competence, gender, language processing, personality traits, and emotions. Some studies also explore different ways to categorize music perception. Research has been conducted with both children and adults. In addition, one can also find a significant variety in musical content. Many of these research projects include listening tasks that either relate to noticing musical differences or reporting emotions.

Previous research on invented notations appears to be concerned with how children visually represent music, and have investigated topics such as representational knowledge, musical understanding, perception and development. In addition, some studies have explored different ways to describe and categorize invented notations. There are several qualitative studies but also research projects that make use of experimental and mixed methods approaches. Research appears to primarily use child participants and have examined invented notations by both young and old children. Studies have used a variety of musical content and typically include an audio-graphic task.

The review also shed light on possible gaps in existing research. It appears that few studies on music perception have been based on qualitative inquiry. Research on invented notations does not seem to thoroughly cover the topic of music perception. There seems to be little research investigating how visual representations may affect music perception. Few studies, particularly on invented notation, have focused on rhythmic music. As a final note, it is important to again emphasize that this review do not include all existing research. Because of this, it is possible that some of the identified gaps in knowledge have been covered in previous studies.

# 3 Theory

Gromko and Russell have noted that "(…) our field has no macrotheory that explains the development of music literacy – the ability to read, write, and think in musical sound" (2002, p. 334). Although this thesis does not focus on music literacy, such a theory could possibly have been helpful for exploring the thesis' research question. After searching for a "grand theory" of this kind, it became clear that other avenues should be explored, resulting in a focus on various "microtheories." Some of the theories presented in this chapter are connected to music perception and cognition, while others are of a more philosophical nature. However, they all provide highly relevant and useful "lenses" for examining the research questions.

## 3.1 Analytical and emotional listening

According to Reitan (2013), listening is often described as either analytical or emotional. *Analytical listening* may involve a focus on musical structures or material, while *emotional listening* typically describes a more emotional or personal approach (p. 56). Espeland (2004) uses a similar dichotomy to describe listening. He distinguishes between formal and associative listening. *Formal listening* refers to a way of listening that focuses on the music's formal elements, such as rhythm and form. *Associative listening* is a term used to describe how people use their abilities to associate, fantasize or imagine while listening to music. This kind of listening entails a perception of music based on mood, action or situation (p. 22). Leipold and Loepthien (2015) use a similar distinction between two types of music reception: attentive-analytical listening and emotional listening. They describe *attentive-analytical listening* as a somewhat cognitive process, aiming towards capturing form and structure. This type of listening involves focusing on different components, such as dynamics, harmony or rhythm, and combining them to develop an understanding of the entire musical structure. *Emotional listening*, as Leipold and Loepthien define it, is characterized by activation of feelings. Music is connected to sentiment and often produce affective reactions (p. 112).

Swanwick (2002) also provides a useful perspective that can be related to analytical and emotional listening, grounded in both philosophical and cognitive theory. He understands logical and intuitive forms of knowledge as interwoven and interdependent, claiming that "(…) together they lead to understanding" (p. 28). Swanwick also notes that forms of knowledge can be organized in a hierarchical structure. He describes intuitive knowledge as the exercise of imagination and states that this process serves to bridge sensory information

and intellectual comprehension (p. 30). In addition to emphasizing a dialectic relationship between intuition and analysis, Swanwick also details the content of these two terms (2002, p. 41) in a way that can serve to inform our understanding of differences between analytical and emotional listening. The list below displays a selection of distinctions Swanwick make between intuition and analysis, considered particularly relevant for understanding emotional and analytical listening:

| Intuition | Analysis |
|---|---|
| Imagination | Intellect |
| Impressions | Conceptions |
| Individual things | Relationships |
| Subjective | Objective |
| Appearance | Underlying form |

Fig. 3.1: Distinctions between forms of musical knowledge

It is important to note that this excerpt from Swanwick's comparison of intuition and analysis do not display the dialectic relationship he mentions. As previously noted, he understands these forms of knowledge as interconnected. In addition, he argues that "The space *between* them is where it all happens, where durable, sustained and evolving knowledge is engendered and shared (…)" (2002, p. 42). However, the list above can be said to provide a meaningful perspective on emotional and analytical listening, by describing and contrasting characteristics of musical knowledge.

For simplicity, this thesis will mainly use Reitan's distinction between analytical and emotional listening (Reitan, 2013, p. 56). However, it is important to emphasize that these terms are understood as directly related to similar concepts. In some ways the distinction between analytical and emotional listening is a key component of this thesis, embedded in the hypothesis and influencing various stages of the research process. These two listening styles were considered to be particularly useful theoretical concepts for systematically examining the research question. The elegance of operating with two main listening categories was seen as beneficial, because it provided a clear direction for the work with this thesis.

## 3.2    Perceptual processes in music listening

In his book *Almen Musikdidaktik,* Nielsen (1998, p. 128) presents a theory about the relationship between musical phenomena perceived as aesthetical, and humans as aesthetically sensing beings. According to Nielsen, music does not achieve meaning before a kind of perceptual processing takes place. In this process of perceiving music, attention towards different musical aspects is constantly shifting. Nielsen claims that the musical object therefore constitutes a lifeworld of meaning and provides a wide range of opportunities for musical experiences. Nielsen organizes music's inherent meaning as six types of layers; acoustic layers, structural layers, kinetic-motoric or "bodily" layers, tension layers, emotional layers, and existential or "spiritual" layers. These layers correspond with layers of consciousness and perception inherent in the listener (1998, p. 136). In other words, Nielsen's theory shed light on the connection between music and listener and provides an interesting perspective on how this meeting generates musical meaning. Although this theory is not strictly concerned with listening styles, it can still be said to provide a valuable perspective on music perception. It is relevant to the thesis, because Nielsen's layers can be related to the distinction between analytical and emotional listening. In this way, his concepts serve to expand on emotional and analytical listening styles. For an illustration of how various theoretical perspectives are understood as interconnected, see figure 5.4 (p. 50).

It can be noted that Bamberger (1991) provides a perspective on music listening that appears to correspond well with Nielsen. She suggests that the mind is always engaged in organizing sensory material and that this is a type of generative process, where organizing happens in real time as auditory events occur. She writes that the process of organizing sound/time phenomena should not be understood as decoding something that is already structured. Instead, these phenomena hold potential for structuring, something that makes different hearings of a music piece possible (p. 9).

In *Music Matters: A New Philosophy of Music Education*, Elliott (1995) provides a perspective on music listening, understood as a cognitive and constructive process: music listening is "(…) essentially a *covert* form of thinking-in-action and knowing-in-action" (p. 80). Elliott claims that listeners are required to interpret and construct aural information according to their personal beliefs and understandings, and that auditory understanding depends on what listeners are able to capture in the music's temporal stream of information. In short, listening experiences are the result of numerous interpretation processes. According

to Elliott, listening involves construction, connection and comparison of musical patterns, as well as organizing such patterns into different kinds of textures (p. 81). While philosophical in approach, Elliott offers a perspective that sheds light on listening processes. In addition, it appears to support perspectives on perceptual processes provided by Nielsen and Bamberger.

### 3.3 Music listening responses

Elliott (1995) also lists different ways to talk about music. Within the context of Western music this can be done systematically, relatively, phenomenologically, descriptively or emotionally. When talking about music in a *systematic* way, terms such as fugue and dominant are used. Talking about music *relatively* involves comparing musical qualities, such as consonant-dissonant, short-long, and repeated-varied. The *phenomenological* approach is related to taking about music in terms of dark and bright sounds, thin and thick sounds, and so on. One can also talk about music *descriptively*. For instance, by describing sounds of marching, mourning, and "sounds-like-a-train." The last category presented by Elliott is the *emotional* way of talking about music, where music is described as expressions of feelings such as sadness or happiness (p. 97). These categories can be used to carefully examine data collected from interviews with participating sixth-graders. His list of different ways to talk about music is also understood as connected to analytical and emotional listening (fig. 5.4., p. 50).

In their chapter on music listening, Hargreaves, Hargreaves and North present the "Reciprocal feedback model of musical response" (2012, p. 158). This model suggests that there are three key factors affecting music listening responses: listener, listening situation, and music characteristics. It also shows that these determinants can influence each other and do so in a bi-directional manner. In other words, responses to music stems from interaction between listener, situation and the music itself (p. 157). This model implies that music responses contains three key components: physiological, cognitive, and affective responses. *Physiological* responses refer to the arousal of the autonomic nervous system, and listeners' level of engagement and control of listening situations are contributing factors. Listeners code new pieces according to stored mental representations of music that they have already heard. This can be described as *cognitive* responses and seen in relation to different phenomena, such as musical expectation, attention, memory and evaluation. The third component, *affective* responses, can be identified in listener's preferences and dislikes. It is also connected to the mood-inducing qualities of music (Hargreaves et al., 2012, p. 157).

# 4 Ethical considerations

When writing this thesis, it was important to ensure that the project was conducted in accordance with recognized norms of research ethics. Guidelines for research ethics provided by The National Committee for Research Ethics in the Social Sciences and the Humanities (NESH) (2016) provide a useful oversight of issues to consider, but are rather extensive. The committee writes that *research ethics* is a term that refers to "(…) a wide variety of values, norms, and institutional arrangements that help constitute and regulate scientific activities" (p. 5). This can be said to be reflected in their guidelines, which constitutes nearly 40 pages of suggestions and ethical aspects to consider. For this reason, it is challenging to address all guidelines without exceeding the formal page limitations of this thesis. However, some aspects of research ethics appear to be more important, and particularly relevant to the work with this thesis. The first paragraphs will provide a short presentation of my background, as a response to issues of experimenter expectancy, while the rest of this section is dedicated to key ethical considerations made during the process of writing this thesis.

## 4.1 The researcher's values and attitudes

Since different approaches and theoretical perspectives allow for different interpretations of the same data, it is important to examine how one's own attitudes and values affect selection of research topic, data sources, and understanding of collected data (NESH, 2016, p. 10). *Experimenter expectancy* can be considered one of the major bias effects in educational research. The biasing effect of researchers' beliefs can produce expected results in several different ways. For instance, a researcher's nonverbal communication with participants may indicate what kind of responses he or she wants. Researchers may also end up misinterpreting participants' responses in ways that favor their beliefs and expectations of results (Suter, 2012, p. 4). It is inevitable that this research project may be somewhat "colored" by my background and previous experiences. In order to be as transparent as possible with regards to data analysis and interpretation of findings, it is helpful to briefly describe my background and highlight experiences that are particularly related to this thesis.

I first got involved in music activities when I was approximately eight years old, taking piano lessons in my spare time. After having done this for a few years, I started to play in a band together with friends from school. This went on for quite some time and during secondary school it became an important part of my identity. It resulted in me applying to a high school

music program. During high school, I developed an interest in improvised music, particularly jazz, and spent most of my spare time on piano practice and band rehearsals. Afterwards, I studied music technology for one year, before starting my primary school teacher education. This resulted in a fascination for music pedagogy, which led to this master's degree. One might assume that my involvement with improvised music makes me somewhat critical to music notation. I would like to emphasize that I see benefits of working with both written and improvised music. In my view, both forms provide unique possibilities for musical development and should be considered of equal importance. However, I have personally experienced how challenging it can be to acquire skills needed to read sheet music, particularly through my years of piano training. For this reason, I hope that my research project might lead to findings that can aid children in bridging the gap between musical sounds and written notation. This wish can be considered "dangerous" because it might lead me to find what I want to find in collected data, rather than discovering what is actually there. During my teacher education practice, I have frequently used visual representations of music in my classes. I have experienced that developing notational systems in collaboration with students may be a useful activity. It appears to provide meaningful ways of working with music performance, composition and listening. My positive experiences with using visual representations may affect this research project negatively by preventing me from properly acknowledging issues in the collected data. In a worst-case-scenario I may end up promoting notational activities in music listening, without actually having supporting data.

## 4.2   Respecting individuals

The guidelines for research ethics, mentioned in the beginning of this chapter, include a section on respect for individuals (NESH, 2016, p. 12). Several sub-sections highlighting different aspects are to be considered, such as human dignity, privacy, data storage and duty to inform.

*Data storage*

The guidelines state that "Data related to identifiable individuals must be stored responsibly" (NESH, 2016, p. 18). When considering how to store collected data material, several decisions were made. The original drawings, questionnaires and audio recordings were stored in a code protected locker. Questionnaires and drawings were scanned and stored on the computer used in this research project, using participant codes as file names. Audio recordings were also imported to the computer and saved with codes as file names. The code

key, containing both participant names and corresponding codes, was kept on a separate USB-stick and never stored locally on the computer. As mentioned, a code key was used in order to anonymize collected data. Each participant had a number code indicating grouping and participant number. The first letter informed about group type, the first number specified which group, and the last number was used to identify participants. For instance, the code "T1-1" refers to participant number one in the first treatment group. Codes were written on questionnaires and drawing paper before this were handed out to participants. It should be noted that the anonymization of data corresponds with matters of confidentiality treated in the guidelines for research ethics (NESH, 2016, p. 17).

*Informed consent*

The guidelines for research ethics also emphasize that in projects dealing with personal data, researchers need to inform participants and obtain their consent (NESH, 2016, p. 15). In this thesis, the process of collecting informed consent was conducted according to guidelines provided by the Norwegian Centre for Research Data (NSD) (2019). Parents of participating children were given an information letter with a consent form at the end (Appendix D) a few weeks prior to data collection. Consent from parents or guardians is usually required when participants are children under the age of 15 (NESH, 2016, p. 21). Consent forms were collected at the day of data collection. It can also be noted that NSD were notified about this research project and approved collection of data (Appendix E).

*Researching children*

It is important to be aware that research on children differs somewhat from research on adults. The guidelines for research ethics clearly state that "Children and adolescents who take part in research are particularly entitled to protection" (NESH, 2016, p. 20). These guidelines also emphasize that research direction and methods must be adapted to children, and that participants should be provided with age-specific information about the research. When developing the methodological design in this thesis, considerations regarding how to balance child-friendly and traditional research approaches were made (p. 41). Even though the participating children's age triggers a need for parental consent, they also provided their own consent. Before starting the data collection procedure, all children were given an age-adapted information letter (Appendix F). This was read out loud to ensure that all participants received the information. Afterwards they provided their consent.

Another aspect to consider when researching children, is the impact that it might have on the society. The Convention on the Rights of the Child, adopted by the United Nations, states that a "(…) child who is capable of forming his or her own views [should be assured] the right to express those views freely in all matters affecting the child" (United Nations General Assembly, 1989, article 12). According to Melton (2005) this right is probably something that concerns any child with enough verbal skills to utter a preference (p. 920). In some ways educational research may affect different aspects of the educational system, thus research within the domain music pedagogy can possibly alter the music subject taught to children in schools. In other words, this kind of research may be considered a matter that might ultimately affect children. By using children as the main source of information, this thesis contributes to giving children opportunities to express their views.

# 5  Method

This chapter starts with a description of the overarching methodological approach and design. Afterwards, choices concerning selection and grouping of participants are explained. This is followed by a description of considerations made when selecting musical content. Later, the chosen data collection methods are presented and described in detail. This segment includes rationales for using selected methods, practical details concerning the actual data collection, and a presentation of method limitations and possible challenges. Afterwards, the chapter provides an overview of different data collection phases. The last section treats analysis methodology.

## 5.1  Research approach

*Description of research approach*

This research project can be described as a mixed methods study with a quasi-experimental design. The next paragraphs are intended to explain why this is a fitting label, by describing the role of qualitative and quantitative data (in what is sometimes called "qualitative experiments") and why its design is quasi-experimental rather than a true experiment. This thesis can be understood as a kind of qualitatively-driven mixed methods research. *Qualitative methods* explore and seek to understand the meaning that individuals or groups assign to a human or social problem (Creswell, 2014, p. 32). According to Taylor (2005), qualitative research aims at developing a deeper understanding and attempts to describe different realities and human perspectives (p. 101). Creswell and Clark (2011) write that qualitative researchers purposefully select individuals and sites that can provide the necessary information. In other words, participants are selected because they have experience with the central phenomenon or concept being examined (p. 173). This research project can be described as qualitatively driven because it seeks to understand how individuals ascribe meaning to music and intends to develop a deeper understanding of different realities and perspectives by examining how children perceive music differently. The thesis is also similar to qualitative research because participants have been purposefully selected.

According to Postholm (2010), qualitative research often involves exploring human processes or problems in a natural setting (p. 9). This research project differs from Postholm's description because the research setting itself is constructed. However, one reason for the somewhat unusual design of this project is that it is very challenging to collect in-depth

information about children's visual representations of music and music perception without actually giving them a task to generate this type of data. It should be noted that in the case of some studies in psychology and other fields, qualitative data collection can be emphasized in the context of a clinical study, or "intervention" design. Although the setting of this research project is constructed, it can be considered rather similar to some naturally occurring music listening situations. Drawing while listening appears to be a fairly common approach to music listening activities in primary school music education. It is suggested in several Norwegian books on music education methods (Espeland, 2004, p. 17; Solbu & Sæther, 2006, p. 90).

Although this thesis emphasizes qualitative data, it also contains some quantitative elements. According to Muijs (2004), *quantitative methods* are characterized by collection of numerical data and mathematically-based analysis procedures (p. 1). In this project, a self-developed questionnaire (Appendix B) was used to explore how the hypothesis could be tested in a true experiment setting. Haraldsen (1999, p. 13) writes that questionnaires often are used to collect statistics, which also is the case of the questionnaire in this master's thesis. This thesis can therefore be described as employing a mixed methods approach. Johnson, Onwuegbuzie and Turner (2007) write that "Mixed research is a synthesis that includes ideas from qualitative and quantitative research" (p. 113). According to Teddlie and Tashakkori (2010), one general characteristic of mixed methods research is *methodological eclecticism*. This refers to the selection and synergistical integration of the most appropriate qualitative, quantitative and mixed methods techniques to thoroughly study a phenomenon of interest. In other words, it indicates that methods are combined by choosing what is considered the best tools for answering the research question in focus (p. 8). These descriptions of mixed methods can be considered quite fitting for the approach taken in this research project.

Mixed methods research is "A term used for the process of research when researchers integrate quantitative methods of data collection and analysis and qualitative methods of data collection and analysis" (Clark & Ivankova, 2016, p. 56). However, this thesis can also be considered to utilize a mixed methods approach because data collection methods are organized in an experimental design. Creswell (2014, p. 278) describes this as *embedded mixed methods*. According to him, this type of mixed methods research is based on one or more forms of data within a larger design, such as a narrative study or an experiment.

Because of a relatively strong connection to qualitative research, this thesis can also be understood as a type of *qualitative experiment*. According to Kleining and Witt (2001), qualitative experiments are primarily used to explore a topic. By utilizing qualitative methods, this kind of experiment provides an explorative technique that can be applied to all types of data (p. 14). In a qualitative experiment conducted by Robinson and Mendelson (2012), they describe their approach as being a fusion of elements from experimental design and qualitative research strategies. It is a type of mixed methods research that uses the benefits of qualitative inquiry to better understand construction of meaning and produce a more holistic reading of differences between groups (p. 332). Qualitative experiments can be understood as qualitative data collection methods structured and organized in accordance with experimental designs, typically conducted with the intention of exploring a research topic. They can be based purely on qualitative data or combine quantitative and qualitative inquiry strategies. Some research projects in music education have utilized similar methodological designs. For instance, Edwards' dissertation "North American Indian Instruction: Influences upon attitudes, cultural perceptions and achievement" examined different experimental treatments by combining quantitative and qualitative strategies (Edwards, 1994). Another example is a study by Allen (2011), investigating if free improvisation can be used to reduce performance anxiety. He used an experimental design including both quantitative and qualitative methods.

True experiments typically involve a sufficiently large randomized sample to enable statistical inferences and "effect sizes" to be generalized to the target population (Lenth, 2012, p. 187). According to Byrne (2017, p. 3) randomized controlled trials are the essential type of experiments conducted in social sciences. The research design in this thesis differs from traditional experiments because it uses purposeful sampling instead of a randomized sample, as well as a relatively modest sample size. Creswell (2014) writes that "In quasi-experiments, the investigator uses control and experimental groups but does not randomly assign participants to groups" (p. 219). With this in mind, the design may be understood as a mixed methods (primarily qualitative) quasi-experimental study.

*Development of research approach*
Initially, I intended to use a quasi-experimental design to compare children's music perception in two different listening conditions: listening to music while drawing and drawing after listening to music. The initial idea was to examine whether audio-graphic listening tasks could cause changes in children's perception of musical parameters, by collecting and

analyzing both qualitative and quantitative data. After conducting the main data collection, it became clear that the quantitative data collected from a questionnaire utilizing Likert-type items (Appendix B) were not entirely reliable. The questionnaire was intended to be a tool for scoring accuracy in participants' perception of different musical parameters, such as dynamics, tempo, and form. In that way it would be possible to compare how different listening conditions affected participants' analytic music perception, and thus provide some answers to this thesis' research question.

When analyzing questionnaire data, it became evident that this would not be doable. For instance, one of the questionnaire items was "The music was slow" (Appendix B). This item was intended to measure if participants had perceived song tempo correctly. A key issue with this questionnaire item, and many others, is that it does not account for individuality in music perception. Participants can perceive a song tempo as slow or fast, but either way it will be hard to appropriately label their individual responses as being accurate or inaccurate. In other words, the questionnaire did not produce the kind of data needed to measure possible changes in analytical music perception caused by differences in listening conditions. This issue will be properly described later on, in the assessment of questionnaire validity (p. 86).

After discovering that the questionnaire could not be used as intended, it was necessary to consider which direction this research project should take. Either the methodological design could be adjusted, so it would be possible to conduct a more reliable experiment, or I could focus more on interviews and collected drawings. The latter option was chosen, because developing and conducting a more reliable experiment would make it quite challenging to finish the research project within the given time frame. However, questionnaire data was not entirely discarded. This attempt to approach the research question from a quantitative angle could potentially serve to inform future research efforts.

## 5.2    Methodological design

This thesis may be understood as a quasi-experimental mixed methods study, based on a posttest-only design with nonequivalent groups. This type of design contains a treatment group and a control group not subjected to intervention. Groups are selected in a way that make them as similar as possible and the design does not include any pretests measuring the outcome variable (Shadish, Cook, & Campbell, 2002, p. 115). The quasi-experimental design

in this thesis differs somewhat from a typical posttest-only design with nonequivalent groups, because it contains two treatment groups instead of only one (fig. 5.1).

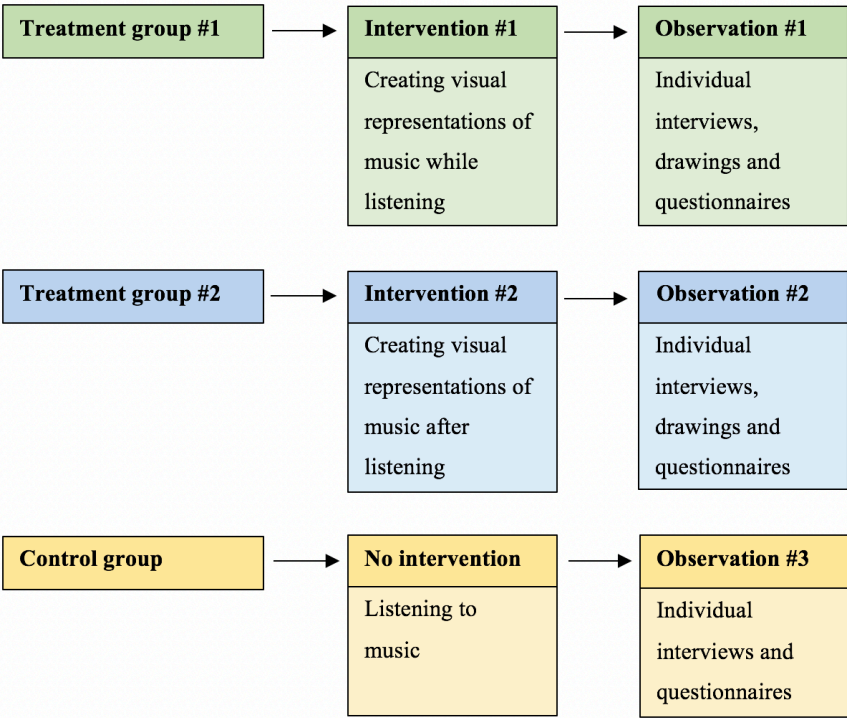| Treatment group #1 | → | Intervention #1 | → | Observation #1 |
|---|---|---|---|---|
| | | Creating visual representations of music while listening | | Individual interviews, drawings and questionnaires |
| Treatment group #2 | → | Intervention #2 | → | Observation #2 |
| | | Creating visual representations of music after listening | | Individual interviews, drawings and questionnaires |
| Control group | → | No intervention | → | Observation #3 |
| | | Listening to music | | Individual interviews and questionnaires |

*Fig. 5.1: Selected methodological design*

*Development of methodological design*

By the beginning of September 2018, the design consisted of four tasks and did not incorporate grouping of participants. At that point, the research question also included a comparison of "simple" and "complex" music (fig. 5.2).
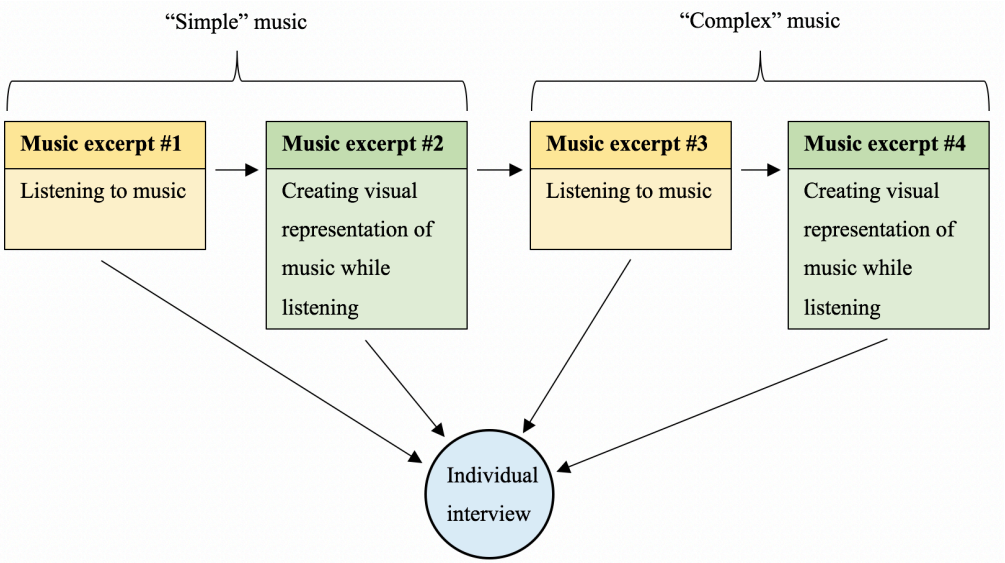


*Fig. 5.2: Early version of methodological design*

This design was used in the first pilot study, conducted 05.09.18 (for description of pilot study #1 see page 44). When analyzing pilot data, it became clear that there was a need for further adjustments of task formulations and how they were to be presented, since these were somewhat unclear to participants. One of the main reasons seemed to be that participants were exposed to several tasks and many instructions within a relatively short time-span. The methodological design was adjusted in two ways, to make sure that sixth-graders would understand what they were supposed to do. Treatment and control groups were included in the quasi-experimental design, so that participants only needed to receive instruction on how to perform one task. An exercise listening task was also added, as preparation for the main task. Before the second pilot study was conducted, the methodological design had been structured according to Shadish, Cook and Campbell's description of posttest-only design with nonequivalent groups (Shadish et al., 2002, p. 115). This design was relatively similar to the final methodological design described in the beginning of this section. It included a listening task, individual interviews with participants, and collection of drawings and questionnaires. At this point, comparison of "simple" and "complex" music was removed from the design in order to narrow down the research question.

The second pilot study was conducted 01.10.18 (for description of pilot study #2 see page 45). After examining data from this pilot, new adjustments were made. It revealed a need for changes in data collection schedule, room layout and musical content. The introduction phase lasted longer than planned and needed to be reduced somehow, because it made the entire data collection longer than what had been agreed with the participating school and teachers. The room layout (Appendix G) enabled participants to peek at each other's drawings, which could result in "polluted" visual representations of music. The selected music excerpt from "Just Kissed My Baby" by The Meters (Modeliste, Neville, Nocentelli, & Porter, 2004, track 3, 0:00-1:00) made it challenging to properly respond to questionnaire items, because it contained few clear variations in musical parameters. The timeline issue was solved by removing the exercise listening task. This was considered a reasonable way of keeping data collection within the given time frame, because adjustments in methodological design and task formulations had resulted in tasks that were considerably clearer and easier to understand. The second issue was addressed by changing the room layout (Appendix H), so that it would reduce the likelihood of participants looking at each other's drawings. The music selection was also replaced with a new music excerpt from Snarky Puppy's "Shofukan"

(League, 2014a, track 1, 0:26-1:59), containing significant variations in use of musical parameters. For a detailed description of this music excerpt, see page 38.

The main data collection was conducted 04.10.18. After having worked on the analysis for quite some time, it became clear that follow-up data collection could possibly enhance the project. In the main data collection, the treatment group was tasked with creating visual representations of music while listening. The control group was asked to listen to the excerpt and afterwards they were tasked with making visual representations. The rationale for having both groups create visual representations of music, was that control group participants also should be given the opportunity to express themselves both verbally and visually in interviews. The idea was that including verbal and visual modes in both groups would give participants an equal basis for describing their music perception, thus making collected data more comparable. However, this design can be criticized for resulting in too similar of groups. One could say that a visual representation intervention was introduced to both groups, resulting in no actual control group. In order to solve this issue, a follow-up data collection was conducted 21.01.19. This time participants were merely asked to listen to the music excerpt. Afterwards they were interviewed about their perceptions of the excerpt and filled out the questionnaire. The inclusion of follow-up data collection resulted in the three-group design that has been described in earlier in this chapter (fig. 5.1, p. 31).

## 5.3    Rationales for selected approach and methodological design

The key rationale for choosing a mixed methods (primarily qualitative) quasi-experimental research approach, was to utilize data collection methods and a methodological design that could provide some answers to the research question guiding this thesis. Qualitative inquiry strategies would make it possible to gain a deeper understanding of how sixth-graders perceive a rhythmic music excerpt, by examining how they ascribe meaning to their listening experiences. The selected quasi-experimental design opened up for comparisons of students' music perception across three different listening tasks. It should also be noted that this unusual but organic design enabled a qualitative assessment of questions commonly used in previous quantitative studies. Such a combination of qualitative and quantitative strategies enables this study to contribute to the previous body of knowledge, by offering qualitative insights that are grounded in the framework of previous quantitative studies. This also enables a critical reassessment, and ultimately refinement, of quantitative tools for future use.

In some ways the selected approach can be considered to embrace pluralism in music education research. Dorfman and Dansereau (2018) argue that pluralism is essential to production of nuanced and complex understandings of thinking, interactions, and behaviors that music learning and teaching involve (p. 4). In their introductory chapter, concerned with music education research in an American context, they write that this type of research relies heavily on other fields of knowledge to guide theoretical thinking and research designs. They claim that this should not be regarded as negative and that researchers should feel free to utilize the work of those outside of music, because music has psychological, social, kinesthetic and aesthetic connotations (p. 1). Torrance (2017) writes that experimentation is about "(…) interrupting the taken-for-granted, doing something different, trying something out to see what happens, creating the new" (p. 72). He argues that qualitative research should seek to expand the definitions of experimentalism and that qualitative researchers should start designing their own experiments (p. 74). Torrance's perspective on experimentation in qualitative research, combined with Dorman and Dansereau's arguments for pluralistic approaches (2018), can also be considered a rationale for conducting a qualitative quasi-experimental study examining sixth-graders' music perceptions in different listening tasks.

## 5.4   Selection of participants

*Rationales for selection of participants*

The participants in this study were children aged 10 to 11 (*n*=18), who attended sixth grade in a Norwegian primary school. One of the main reasons for choosing children this age group, was age and development. Children may be considered individuals in development. Age affects their ability to express themselves and reflect upon their own situation (Backe-Hansen & Frønes, 2012, p. 17). In other words, it is likely that students at this age are more able to express their experiences, beliefs and thoughts than younger children. Choosing participants at this age could strengthen the quality of collected data in this project, due to easier access to participants' thoughts and experiences. In addition to age and development, participants were also selected because of their previous experiences. All participants were part of the same student group at a school in the Bergen area. Therefore, it could be assumed that they had received a quite similar primary school music education. In addition, they had been made aware of how drawings could be used to represent music in previous music classes. In other words, all participants had some experience with activities involving visual representations of music. Similarity in students' previous experiences was considered important, because it could contribute to comparability of the three groups. It was also considered preferable to

select participants who already possessed some experience with visual representations of music, the research tasks would therefore be rather familiar.

*Participant grouping*

The 18 sixth-graders participating in this project, were divided into three groups. Each group consisted of six participants. It was anticipated that participants' previous musical experiences and skills could affect the data, so in order to enable meaningful comparisons between treatment and control groups, an even distribution of musical skill and experience was needed. Teachers' knowledge of their students was used as a basis for grouping participants with varying degree of previous musical experience and skills rather evenly between treatment and control groups. Using teacher knowledge for grouping of participants enabled a comfortable and safe research environment. Teachers were not only asked to distribute participants so that each group contained a good blend of musical skills, but also to consider social relations between students. The idea was that groups who functioned well socially would have a more pleasant experience in the research situation. This is fitting with ethical guidelines for research, emphasizing that children are particularly entitled to protection and that research methods must be adapted to age (NESH, 2016, p. 20).

*Development of participant grouping*

It should be mentioned that another approach to participant grouping, inspired by literature review findings (p. 17), was considered in the early stages of this research project. This approach included a music aptitude test. According to Gordon (2001), these tests measure the potential to learn music. *Music aptitude* is linked to music achievement, the music skills that one already possesses. Students with highly developed music skills do also have an increased potential for learning music, but students with low levels of music achievement may also have a good potential for learning music (p. 4). A parental questionnaire was also considered. This questionnaire would consist of questions providing information about the participating children's musical activity outside the school context. The idea was that combining questionnaires and music aptitude tests could provide a systematic way of grouping participants in treatment and control groups, reducing the risk of producing incomparable data when conducting data collection. For various reasons these alternative approaches were abandoned, since it would have required children to spend quite a lot of time participating in the project. In addition, parents would also become involved. In other words, including a music aptitude test and a parental questionnaire in the research design would make this

research project significantly more intrusive. It could potentially end up disrupting normal school activities to such an extent that it would be challenging to find a school willing to participate. It is also likely that the significant amount of time needed to implement such an approach would make it hard to conduct data collection early enough to properly analyze data and discuss findings, within the given time frame of this master's thesis.


## 5.5    Selection of musical content

This section presents different considerations regarding selection of musical content, describes the selected music excerpt, and provides rationales for using this particular excerpt.


*Considerations in selection of musical content*

One of the first considerations was whether music should be presented to participants in a "live" setting or as an audio recording. Musical differences occurring in live performances were thought to provide participants with an unequal basis for participation. Recorded music was chosen because it does not contain performance related variations, making it suitable for producing comparable data. Another aspect that was considered when selecting musical content, was whether it should be entire musical pieces or fragments. Elkoshi (2002) has examined if there is a connection between children's graphical responses to musical fragments and entire musical pieces. According to her study, there were no correlation between children's responses to fragments and full-length musical pieces (p. 199). With this in mind, the length of the musical content used to study visual representations of music may be considered an unnecessary methodological concern. At the same time, the length of the musical content used in this study had to be considered in relation to the time available for data collection. It was assumed that the use of full-length musical pieces would be more time consuming than short excerpts. In order to inflict as little disturbance of the participants' school days as possible, short excerpts were considered preferable.


Due to the considerable variations found in different genres and styles of music, it was also necessary to consider which type of music to use. According to Elkoshi further research is needed to investigate children's responses to diverse music selections through audio-graphic and verbal tasks (Elkoshi, 2015, p. 197). As it has been noted in the literature review, there seems to be little previous research on visual representations of music that focuses on "rhythmic music." This type of music, including genres such as pop, rock and jazz, was therefore chosen as a frame for selection of musical content. It is important to note that

*rhythmic music* is a term with a particular meaning in Scandinavian countries, that differs from how this term is understood other places in the world. One could assume that it is a label used to describe all kinds of music with pronounced rhythmical qualities. However, as Hauge (2012) writes, rhythmic music typically refers to specific traditions and musical styles, especially music with roots in Afro-American traditions. Hauge also notes that rhythmic music not only entails music played by Afro-Americans, but that this term also can be applied to genres such as jazz, rock, pop, salsa, hiphop, reggae and samba (p. 6). Tønsberg (2013) also highlights how rhythmic music is connected to Afro-American traditions. In addition, he describes the term as a particular Danish construct that often do not function properly outside of Scandinavia. He mentions several of the musical styles listed by Hauge but also includes styles such as world music and fusion (p. 21).

*Rationale for using selected music excerpt*

The music excerpt used in main and follow-up data collection was taken from Snarky Puppy's "Shofukan" (League, 2014a, track 1, 0:26-1:59). There were several reasons why this particular music excerpt was considered suitable. First of all, it is a piece of music that contains quite clear variations in use of musical parameters, such as dynamics, rhythm and form. This was seen as a preferable quality because it would give participants opportunities to focus on musical content and structure. In other words, it could enable analytical listening approaches. An excerpt containing clear variations in musical parameters was also considered to better match questionnaire items (Appendix B). The second reason for choosing to use "Shofukan," was that this piece blends musical complexity with simplicity. It contains pop-like characteristics, such as clear drum groves, simple riffs, and a somewhat commercial "sound." Snarky Puppy's music has been described as "(…) music for both brain and booty" (Jazz Night in America, 2016, 25. feb.). This quality was considered useful because it could serve to stimulate different kinds of both emotional and analytical perception. In other words, the excerpt appeared to provide listeners with a multitude of opportunities for interpretation. A third rationale for selecting "Shofukan", was access to sheet music. The original sheet music produced by Snarky Puppy (League, 2014b) could contribute to a more reliable analysis and understanding of the excerpt. This was an advantage when examining participant interviews, drawings and questionnaires, because it could serve to inform the data analysis.

*Description of selected music excerpt*

In order to properly understand structure and content of the selected music excerpt, I found it necessary to conduct a simple music analysis (Appendix I). This analysis was based on the original sheet music by Snarky Puppy (League, 2014b), shown below (fig. 5.3).

| Instruments | Part A | Part B | Part C | Part D | Part E |
|---|---|---|---|---|---|
| Trumpet solo | | | | | |
| Horns | | | | | |
| Guitar solo | | | | | |
| Guitars | | | | | |
| Keyboards | | | | | |
| Bass | | | | | |
| Percussion | | | | | |
| Drums | | | | | |
| **Dynamics** | | | | | |
| *f* | | | | | |
| *mf* | | | | | |
| *mp* | | | | | |
| *p* | | | | | |
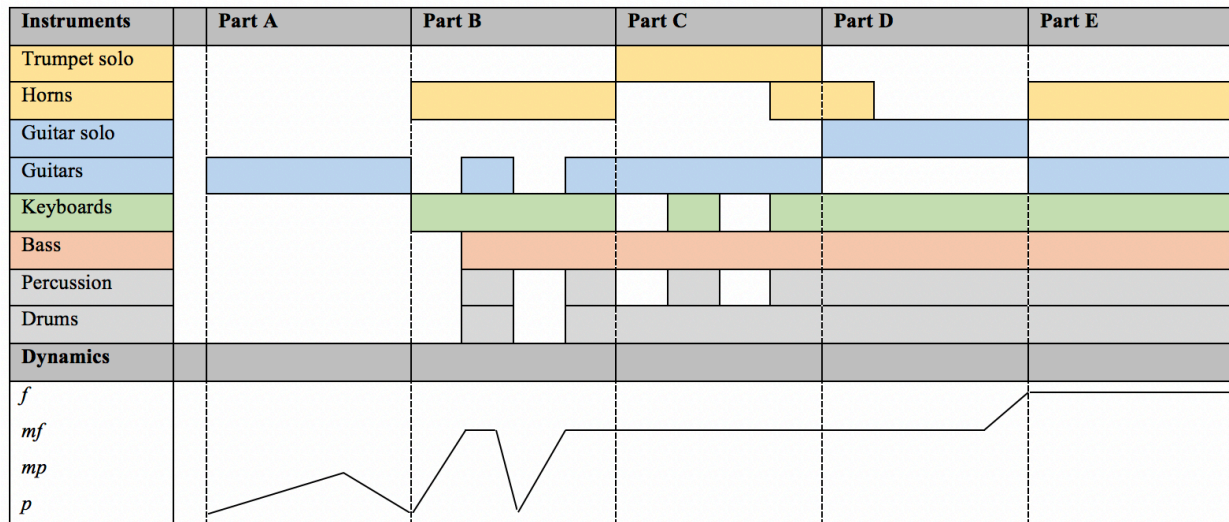
*Fig. 5.3: Visualization of music excerpt*

In short, the excerpt can be described as having a five-part structure. Part A, which can be perceived as a kind of introduction, consists of a rather minimalistic and soft guitar motive. Part B contains two distinct horn phrases played in unison, and a kind of "call and response" between the horns and the rest of the band. The third part of the excerpt (C) is characterized by a trumpet solo. Part D contains a guitar solo and resembles a kind of pre-chorus, building towards part E. The last part (E) seems to be more intense both dynamically and harmonically, containing relatively "heavy" riffs and use of all instruments.

## 5.6   Qualitative interview

One data collection method used in this research project, is the *qualitative interview*. According to Brinkmann and Kvale (2015), qualitative interviews aim at understanding the world from the perspectives of individuals and uncovering the meaning in their experiences (p. 3). Warren (2001) writes that the purpose of most qualitative interviewing is to develop interpretations, not laws or facts, from participant talk (p. 83). Brinkmann claims that most qualitative interviews tend to be semi-structured. Semi-structured interviews contain some kind of structure that are based on research interests, but at the same time they are open to participants' spontaneous descriptions and narratives (Brinkmann, 2014, p. 1008). My

interviews were intended to investigate participants' individual music perception and made use of semi-structured interview guides (Appendix J) to accomplish this.

By the end of August 2018, the interview design had developed into a video-stimulated recall interview, a two-part process where an activity is video recorded and then replayed for participants (Rowe, 2009, p. 426). The idea was to record how participants worked with listening tasks, identify interesting moments in video recordings, and use selected clips as a basis for interviews. There were two main reasons why this approach was abandoned. First of all, it would make the data collection more intrusive, because it required several visits to the participants' school. Secondly, it would require time to analyze video data between listening tasks and interviews. This was problematic, because the temporal proximity between activity and recall can have a negative effect on the usefulness of collected data (Gass, 2001, p. 221). In other words, the interview design moved from unstructured interview to stimulated recall interview, and then back again to unstructured interview. Video observation is mentioned in information letters (Appendix D; Appendix F), as well as in the NSD-receipt (Appendix E), but ultimately it was deemed unnecessary and not included in this thesis.

The first pilot study, conducted 05.09.18, revealed a need for further adjustments of interview design. In this pilot, participants were simply asked to describe what they heard in the music. They were also asked follow-up questions not planned beforehand. These questions produced some interesting data, but it became clear that many of the improvised follow-up questions did not function properly. In order to ensure that questions more consistently generated useful data, the design was changed into a semi-structured interview. This type of interview design was also considered a better approach because it would be easier to compare participant statements, since all participants were asked similar questions.

After the first pilot, the methodological design was adjusted in several ways. One significant adjustment was that data collection changed from being conducted entirely individually with each participant, to being carried out in control and treatment groups. Because of this change, it became necessary to consider whether the interview should be designed as a semi-structured group interview or as a semi-structured one-to-one interview. By the end of September 2018, I had developed two interview guides inspired by experiences and findings from the first pilot study. The first one, a group interview approach, contained questions examining participants' music perceptions by focusing on emotional and analytical listening.

It consisted of questions like: "How would you describe the music?" and "How did the music make you feel?" The second interview guide was a one-to-one approach that investigated participants' music perceptions by focusing on their visual representations of music. Some of the questions were: "What did you draw?" and "What does this symbol mean?"

In the end, the one-to-one approach was chosen. It was considered better to talk with every participant on their own, because of the individual nature of music perception. I assumed that a group approach could result in participants adjusting their responses according to peers. In addition, it could result in participants not answering all questions. The idea of using questions based on participants drawings appeared to be a good way of investigating their music perception, because it provided a clear link between listening tasks and interviews. This approach also made it possible to assume a kind of "naïve" role in the interview setting, and make participants come forward as experts on their own drawings.

When conducting the second pilot study, the interview guide (Appendix J) appeared to provide the kind of data that it was intended to produce. However, it was revised afterwards in order to further improve interview content and structure. When the follow-up study was planned, it became clear that this interview guide could not be used. The focus on participants' drawings simply did not match the listening task they were supposed to do, since this task did not involve any production of visual representations. The previously developed group interview guide was adapted to individual interviews and used in the follow-up study (Appendix J). The interview guide modifications between main and follow-up data collection introduces some reliability issues which are treated in the Discussion chapter (p. 89).

## 5.7 Document analysis

Gross (2018) defines document analysis as "(…) a form of qualitative research that uses a systematic procedure to analyze documentary evidence and answer specific research questions" (p. 544). The method can be used on its own or combined with other methods in qualitative and mixed methods research projects (Gross, 2018, p. 544). A document may include other types of text than verbal text. Some examples are pictures and graphs (Prior, 2003, p. 5). Hurworth (2011) writes that the definition of document is wide. She lists several examples, including maps, artifacts and different kinds of visual media (p. 119). It is in other words possible to consider visual representations of music as a type of document and treat it through a kind of document analysis. Documents can provide primary or secondary types of

data. Primary types of data deliver first-hand accounts, free from analysis or interpretation. The latter refers to documents that are based on interpretations and analysis of primary sources, intended to communicate interpretations to an audience (Gross, 2018, p. 545). Documents analyzed in this research project may be considered a primary data type, since children's visual representations of music can be understood as first-hand accounts of their experiences.

Visual representations may indicate how participants perceive music. According to Gromko and Poorman (1998a), "A growing body of research in music has shown that invented notations are measures of children's musical understanding" (p. 16). For this reason, visual representations of music are used as a data source. Such document analysis appears to be a reasonable way of gaining insight into how sixth-graders perceive a "rhythmic" music excerpt in different listening tasks. It should also be mentioned that documents can verify or contest, clarify or develop findings from other data sources (Gross, 2018, p. 544). For these reasons, the interviews conducted in this research project are compared with drawings whenever possible.

*Combining traditional and child-friendly approaches*

Due to development-related limitations, children must be studied with "child-friendly" methods that enables them to properly participate (Backe-Hansen & Frønes, 2012, p. 17). The listening tasks in this research project, both with and without drawing activity, may be considered a child-friendly approach. There are several reasons for using such approaches. In a literature review by Kirk (2007), treating methodological and ethical issues in conducting qualitative research with children, she presents three rationales for child-friendly research techniques. According to her, these kinds of methods can contribute to: sustaining interest and avoiding boredom, encourage expression, and reduce the imbalance in power between researcher and child (p. 1257). At the same time, these methods may result in a patronization of children. By using traditional research methods children can be treated like adults and given opportunities to display their competencies, thus reducing the risk of patronizing them (Punch, 2002, p. 330). Qualitative interviews, which can be described as a more traditional research method, contribute to reducing the risk of patronization.

## 5.8  Questionnaire

As previously mentioned, the questionnaire (Appendix B) did not function as intended. Still, it ultimately proved useful as a basis for suggesting refined quantitative tools that could inform future experimental research. For this reason, it is necessary to briefly describe questionnaire methodology and considerations that were made prior to data analysis. Questionnaires are typically used to collect statistics (Haraldsen, 1999, p. 13) and can be described as a social science data collection method (Boolsen, 2008, p. 7). This thesis implemented an experimental questionnaire to compare treatment and control groups (Fink, 1995, p. 22). There were several reasons for including a questionnaire in the research design. It would enable information retrieval from several participants simultaneously, thus contributing to keeping the entire experiment within the preferred time-frame of 30 minutes. Additionally, it provided quantifiable data that could be used to assess the effect of the experimental treatment and triangulate with findings from interviews and visual representations. According to Fowler (2009b), self-administered questionnaires are superior to interviews when collecting sensitive information, which tends thereby to be more accurately reported than in interviews (p. 74). Although data collected in this research project was not strictly sensitive information, it was still considered to be personal. Through the questionnaire, participating sixth-graders could report on their music perception without being affected by peer expectations.

My initial idea was to use a questionnaire developed in previous survey research on analytical and emotional listening, as this would probably contribute to reducing potential research bias and ensure good reliability. According to Golafshani (2003), *reliability* in quantitative research is linked to the idea of replicability. In other words, a research instrument can be considered reliable if study results can be reproduced (p. 598). However, it proved quite challenging to find an existing questionnaire that properly corresponded with this thesis' research aim. After several database searches with no relevant hits, the idea of using an existing questionnaire was abandoned. Instead, I developed a questionnaire designed for this specific research project. The next paragraphs describe the questionnaire development.

The design was inspired by Gehlbach's (2015) discussion of common survey mistakes and a chapter by Fowler (2009a) treating design of questions for measuring. In short, these texts shed light on concerns related to questionnaire design and present possible ways of enhancing reliability and validity. The questions were designed to measure participants' analytical

responses to music and were inspired by a summary of musical factors used in research on emotional expression in music, developed by Gabrielsson and Lindström (2010, p. 384). Although the thesis does not specifically focus on how musical factors may affect emotional expression in music, the summary still served as a useful tool when designing questions investigating analytical listening. Some of the musical factors presented in Gabrielsson and Lindström's summary (2010, p. 384) were considered unsuitable for generating relevant questions, mainly because they implied a focus on musical fragments instead of musical pieces. Thus, the following musical factors were excluded: amplitude envelope, intervals, pitch contour, pitch level, pitch variation and distribution of intervals in melodies. The musical factors used in development of questions concerning analytical listening were: articulation, harmony, loudness, loudness variation, melodic range, melodic direction, mode, pause/rest, rhythm, tempo, timbre, tonality, and musical form. The finished questionnaire (Appendix B) contained the following musical factors: loudness, loudness variation, tempo, tempo variation, rhythm, rhythm variation, mode, mode variation and form. These factors were selected because they were considered to be more easily described in a meaningful way with simple words instead of music terminology. Simple descriptions seemed important in order to ensure that all participants understood the questions they were asked.

## 5.9 Method limitations

*Quasi-experimental limitations*

Reichardt and Mark (2004) write that "The primary threat to internal validity in nonequivalent group designs is due to selection differences, which are differences between the treatment groups in the composition of participants" (p. 136). Although measures were taken to ensure similarity between groups, by considering participants age and previous musical experience, there are still some factors that reduces similarity between groups. For instance, gender was not considered. In hindsight it is clear that gender also could have been a grouping factor, because gender differences reduces similarity between groups.

*Interview limitations*

Ryen (2002, p. 135), lists several examples of internal critique against qualitative interviews. Some elements from Ryen's summary can be considered particularly relevant to the interviews conducted in this research project. Ryen mentions that qualitative interviews risk becoming intellectualistic, because they tend to favor rational over emotional aspects (p. 135). Questions used in this master's thesis (Appendix J) aimed at investigating both emotional and

rational dimensions of music perception, either by asking participants to explain their visual representations or to verbally describe what they felt, thought and noticed while listening. The interview guide used in the main data collection can be criticized for being intellectualistic, because questions appear to encourage participants to provide rational explanations of the content in their visual representations. However, it should be noted that when interviews were conducted, children's responses contained both rational and emotional dimensions.

According to Ryen (2002), qualitative interviews may also be criticized for being verbalizing. In other words, the focus on verbal aspects of communication may be considered a concern (p. 136). In the main data collection this does not appear to be a significant issue, because interviews (Appendix J) focused on the participating children's visual representations of music. This way, participants were able to express themselves through both verbal and visual modes. However, the interviews conducted in the follow-up study (Appendix J) did not include a focus on visual representations. This was because participants were tasked with only listening to music, and therefore did not produce any drawings of the music they listened to. However, this approach was essential to the design, fitting the research questions.

*Document analysis limitations*
One challenge that may arise during document analysis is collection of documents with insufficient detail (Gross, 2018, p. 547), a concern that seems particularly relevant for documents produced by children. It seems reasonable to assume that they may lack full awareness of the communicative purpose of documents and not consider how other readers understand them. The risk of ending up with visual representations of music that lack necessary detail was considered difficult to eliminate, but it was likely reduced through formulation of listening tasks.

## 5.10  Data collection process
In short, the data collection process consisted of four stages: pilot study #1, pilot study #2, main data collection, and follow-up data collection. Each stage will be described in the next paragraphs.

*Pilot study #1*
Silverman (2010) states that "It is often sensible to try out different styles of questioning prior to your main study. This kind of *piloting* is a feature of most kinds of good research – both

qualitative and quantitative" (p. 197). This idea of improving questions, was one of the reasons for doing the pilot studies. In addition, the pilots were intended to be a way of improving the methodological design as a whole, practicing interviewing, and rehearsing the task-based data collection procedure. The first pilot was conducted with two participants at slightly different ages, the youngest child was 9 years and the oldest was 12 years. This in September 2018, at the participants' home. Cognitive development among children at the same age can vary (Bjorklund & Causey, 2018, p. xii; Flavell, 1982, p. 3). One of the main reasons for using children at different ages in the pilot, was to gain some understanding of the possible visual and verbal responses to music by sixth-graders with varying degree of maturity. The first pilot study served as a means of examining whether the design functioned as intended and whether questions and task formulations were properly understood by participants. The pilot was also used to assess if data collection was doable within the preferred time-frame of 30 minutes.

The data collection procedure was carried out in a one-to-one setting with each of the two participants Perception and understanding of music excerpts were investigated using four listening tasks. The participating children were interviewed after each task. The tasks were organized according to two listening conditions: listening including notational activity and listening not including notational activity. There were two tasks for each listening condition. One involving "simple" music and one based on "complex" music (fig. 5.2, p. 31). "Simple" music excerpts were: "The Hardest Button To Button" (White, 2003, track 9, 0:00-0:52) and "Around The World" (Bangalter & Homem-Christo, 1997, track 7, 3:02-3:58). The "complex" music excerpts used were: "What About Me?" (League, 2014c, track 2, 0:00-0:52) and "Donna Lee" (Parker, 2009, track 6, 0:00-0:52). For further details, see Appendix K.

*Pilot study #2*
The second pilot was carried out 01.10.18 with three music pedagogy master students. It proved quite challenging to find children available for participation in pilots, thus making it necessary to consider other ways of carrying out the pilot. Music pedagogy students were chosen because they were available at the time, but also because their knowledge of the research field could provide useful insight into methodological weaknesses. This pilot was intended check that adjustments made after the first pilot study did not result in data collection exceeding the decided time-frame of 30 minutes. It served as a way of investigating whether the questionnaire (Appendix B) produced useable data. In addition, this pilot

functioned as an exercise in data collection, carried out to ensure that task instructions, interviews and handling of technical equipment ran smoothly.

The data collection was carried out in a group setting, nearly identical to treatment group number one (fig. 5.1, p. 31). Perception and understanding of music excerpts were investigated using two tasks: a warm-up task and the main task. The music excerpt used in the warm-up task was "The Hardest Button To Button" (White, 2003, track 9, 0:00-0:52), and in the main task it was "Just Kissed My Baby" (Modeliste, Neville, Nocentelli, & Porter, 2004, track 3, 0:00-1:00). For further details, see Appendix L.

*Main data collection*

The main data collection was conducted with 12 sixth-graders at a primary school in the Bergen area, 04.10.18. It was carried out during the first half of the school day, according to the planned schedule (Appendix M). It should be mentioned that there were less participants than originally planned. Some of the students that were supposed to participate in the experiment were not at school. There was also one case where parental consent was not given. In total, four students that were supposed to be a part of the data collection did not participate. All participants appeared to concentrate during the listening task. There were surprisingly few disruptions and children seemed to take their participation seriously. At the same time participants also seemed quite relaxed with the data collection situation, and in a happy mood.

Before conducting the main data collection, I had written down anticipated results. In short, I anticipated that the group tasked with drawing whilst listening (the first treatment group) would provide more accurate and rich responses to the music excerpt than the other group. I assumed this, because the first treatment group had the closest connection between listening and drawing. These were the expected results: (1) treatment group two will provide more "uncertain" responses in the questionnaire than the first treatment group, (2) the first treatment group will provide more correct analytical responses than the second treatment group, (3) visual representations produced by the first treatment group will be richer in detail and more accurately represent the music excerpt, and (4) participants in treatment group one will explain their drawings more deeply, and in greater detail, than the other group. When I conducted the follow-up data collection, I had similar expectations. I assumed that participants that did not produce visual representations of the music would be more limited in their responses and statements, and that their reception of the excerpt would characterized by

a dominating amount of emotional responses. In addition, I also anticipated that they would produce the largest number of "uncertain" responses to the questionnaire. These expectations will be treated in the Discussion chapter (p. 81).

## 5.11 Qualitative analysis design

The data analysis in this research project can be described as consisting of two main parts, qualitative analysis and quantitative analysis. Due to the nature of this thesis' research question, the qualitative analysis approach may be described as a *nomothetic* approach. Gibbs (2007) writes that such an approach investigates general dimensions. From this perspective one can assume that there are some factors that affect human behavior. A nomothetic approach aims at explaining people, settings, and events through the features they have in common (p. 5). The qualitative analysis approach can also be described as *deductive*. In her chapter on document analysis, Gross (2018, p. 547) describes deductive analysis as an approach where predetermined codes and categories serve as the starting point. Reichertz (2014) connects deduction to the procedure of *subsumption*. It progresses from known features and aims at finding these features in the data, to gain knowledge about the specific case from which data is collected (p. 127). While inductive approaches seek to interpret "from below" through a search for the rules, deductive approaches aim at understanding the world "from above" by utilizing existing sets of rules (p. 130). One rationale for implementing deductive analysis in this study, was to make use of the considerable amount of existing literature related to music listening and visual representations of music. By analyzing collected data deductively, this thesis expands on the work of other researchers within the field.

*Qualitative analysis process*
According to Miles and Huberman (1994), qualitative analysis consists of "(…) three concurrent flows of activity: data reduction, data display, and conclusion drawing/verification" (p. 10). In this thesis, qualitative data was sorted, reviewed, coded, displayed, and compared using NVivo 12 software. The analysis process was inspired by Bazeley's (2013) suggestions. He breaks qualitative data analysis into different processes; read and reflect, explore and play, code and connect, and review and refine. The first process, read and reflect, aims at developing a holistic understanding of each data source and the project as a whole. The second process investigates what surrounds the data and emphasize the importance of looking at collected data with fresh eyes. Exploring and playing with

possibilities may stimulate the imagination and help reveal connections between data. The third analysis process, code and connect, involves coding collected data and connecting findings in different data sources. The last process described by Bazeley consists of reviewing and reflecting on what is being discovered (p. 15).

In order to develop an overview and general understanding of data content, the analysis process started with summarizing content in all transcripts. This was done by listening to audio recordings and reading written transcripts repeatedly, while developing a short summary of each interview. Several ideas and thoughts about data content, methodological design and research questions emerged during this process. A memo was created to keep track of such thoughts and ideas. Everything considered relevant to further analysis was written down in this memo and timestamped. This work can be seen as connected to Bazeley's "read and reflect" process. Interview transcripts were the first type of data to be coded. The first codes applied provided contextual information, such as participant grouping and gender. Afterwards, interviews were coded deductively utilizing selected theoretical concepts and categories (fig. 5.4, p. 50). This process can be described as consisting of several cycles. Each cycle involved investigating a potentially relevant theoretical concept, assessing whether or not it could be applied to collected data, and coding the interview transcripts accordingly. After having applied several layers of coding to the interviews, the same process was used to analyze participants' visual representations of music. When all qualitative data had been coded, summaries of coding applied to each participant were written. Afterwards, coding was compared between groups. The process involved examining similarities and differences between groups within each set of codes. This analysis process is based on Bazeley's "code and connect."

*Document analysis design*
The visual representations of music produced by participants were analyzed deductively using three categories developed by Elkoshi (2015): association, formal, and compound. These categories were considered particularly useful, because they focus on responses to music and can be linked to different types of music listening. *Association* refers to visual representations of emotions, atmospheres, events and stories evoked by the music. *Formal* is linked to drawings containing references to sound, and the *compound* category includes both formal and associative responses. Several existing concepts and categories stemming from research on children's invented notations were considered, when designing the deductive approach to

document analysis, specifically a system of codes by Carroll (2017, p. 533). However, these required substantial modifications in order to fit the purpose of the present, addressing differences in music perception.

*Interview analysis design*

The one-to-one interviews conducted with all participants were analyzed using different sets of theoretical concepts that could shed light on their music perception. The deductive analysis of interviews included Leipold and Loepthien's distinction between attentive-analytical and emotional listening (2015, p. 112), Nielsen's layers of musical meaning (1998), and a categorization of ways to talk about music by Elliott (1995, p. 97). Similar to the deductive analysis of participants' visual representations of music, not all theoretical concepts or categories considered were utilized. For instance, the distinction between music empathizing and music systemizing (Kreutz et al., 2008). When conducting the deductive interview analysis, it became clear that these concepts were too similar to analytical and emotional listening. In other words, they were considered superfluous. Another set of existing categories that were tested in the interview analysis was Elliot's different dimensions of musical information (1995, p. 92). These categories proved challenging to implement in the analysis, because they did not properly fit with participant statements.

*Considerations regarding interview transcription*

Analysis of interviews also involved other considerations, for instance, related to interview transcription. According to Gibbs (2007) transcriptions of interviews "(…) is a change of medium and that introduces issues of accuracy, fidelity and interpretation" (p. 11). Measures were taken to reduce the possibility of damaging data through the transcription process. Transcriptions did not contain corrections of grammatical errors or uncompleted sentences, in order to ensure that transcriptions closely matched participants' verbal accounts. However, rather than representing variations in dialect, words connected to a specific dialect were replaced with standardized written versions of such words. There were two main reasons for doing this: dialect variations are not important to the research project, and the use of standard written language made it easier to search and compare different transcripts. In addition to issues related to change of medium, language translation could also possibly result in a deterioration of collected data. Transcripts were written in Norwegian, the language used in interviews. Analyzing collected data in its original language was considered a reasonable way to reduce chances of losing meaning through the translation process. Presentation of interview

data also did not make use of direct quotations, which might perhaps be considered lack of transparency. However, one could also argue that it is misleading to use quotation marks when presenting translated statements. Chelsea Lee writes that "(…) because we can't codify how exact any given translation is, it would be inappropriate to put quotation marks around the translated words" (2014). In other words, a translation of another person's words is often best understood as a paraphrase rather than direct quotation.

*Tool used in deductive analysis of qualitative data*
In some ways, deductive codes can be understood as interconnected and related to analytical and emotional listening. The deductive coding tool utilized in analysis of qualitative data can be visualized as follows:

| Listening style | Emotional listening | | | Analytical listening | |
|---|---|---|---|---|---|
| Visual responses | Association | | Compound | | Formal |
| Ways to talk about music | Emotionally | Descriptively | Phenomenologically | Relatively | Systematic |
| Layers of musical meaning | Existential | Emotional | Tension | Kinetic-motoric | Acoustic | Structural |
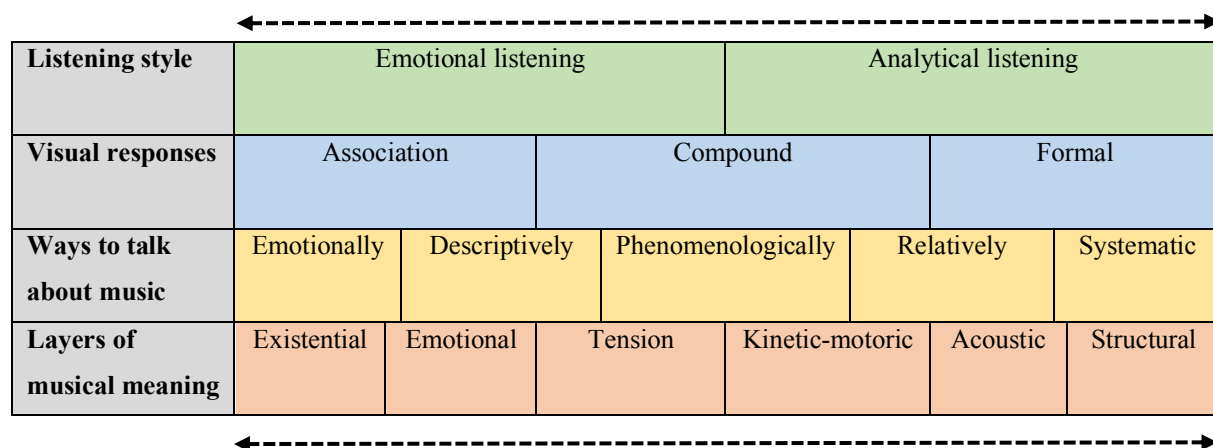
*Fig. 5.4: Visualization of analytical tool*

Knowledgeable readers might note that the analysis scheme developed by Hargreaves and Colman (1981, p. 16) is not included. This set of listening categories was not discovered until after the analysis stage of the thesis. However, their work is mentioned in the Discussion chapter as part of the interpretations, because of its relevance to the results (p. 84).

## 5.12 Quantitative analysis design

The original intent of the quantitative analysis was to examine if there were possible group differences related to accuracy in participants analytical listening. The questionnaire (Appendix B) was designed as a tool for investigating participants' perception of dynamics, tempo, rhythm, mode and form. Due to reliability and validity issues discovered in the piloting process, the focus shifted towards gaining corresponding qualitative insights that could be used to develop a refined instrument for future application in true experiments.

*Statistical procedures*

The data material in this analysis consists of Likert-type questionnaires collected from all sixth-graders (*n*=18) participating in the listening tasks. Analysis was conducted in Microsoft Excel. All questionnaire items were treated as ordinal measures with values from 0-4, 0 being "strongly agree" and 4 being "strongly disagree." For details, see Appendix N. According to Boone and Boone (2012), there is a difference between Likert-type items and Likert scales. If questions serve their own purpose in a stand-alone fashion, they should be analyzed as Likert-type items. Questions that are combined to measure a certain trait should be analyzed as a Likert scale (p. 3). Since questionnaire items in this research project did not measure a particular trait, it made sense to analyze the data as Likert-type items.

Boone and Boone have suggested that median or mode should be used to measure central tendencies, because Likert-type items express a "greater than" relationship without providing exact distances between scale intervals. They have also suggested frequencies as a measure of variability (2012, p. 3). Median and mode values were used in this analysis. Instead of frequencies, this analysis utilized range as a measure of variability. Range appeared to be more suitable for describing variations in participant responses, because it conveys information about response distribution in a somewhat simpler and more straightforward way. It is also a measurement of variability that does not involve calculations of means, making it similar to the statistical procedures suggested by Boone and Boone.

# 6 Qualitative results

The next subchapters provide summaries of content in participants' interviews and visual representations of music, as well as descriptions of coding applied to each participant. They are structured according to groups, first presenting data collected from control group participants, then treatment group #1, and at last treatment group #2. Please note that control group participants did not produce visual representations of music. This data source is only included in treatment groups. For details about codes, see Appendix O.

## 6.1 Control group participants' interviews

*Participant C1-1*

Participant C1-1 described the excerpt as fairytale-like and also connected it to summertime and flowers. When asked why she described the music this way, she stated that the trumpets reminded her of summer. She said that the music made her feel happy and "idyllic." In the interview, she also mentioned that she identified some instruments: trumpet and horns. She noted that she did not know the names of many instruments. Additionally, this participant appeared to detect a change in dynamics. She explained that the music was soft in the beginning but suddenly became loud. The associations to fairytales, summertime and flowers can be considered an emotional way of listening (L-E). Her description of the music as something that makes her feel happy and idyllic, can also be considered an indication of emotional listening. Additionally, this statement can be characterized as an emotional way of talking about music (L-E-E) and attention towards emotional layers (L-F-E). Participant C1-1 also provided statements that can be linked to analytical listening (L-AA). She identified some instruments, which indicates attention towards acoustic layers (L-F-A). She also appeared to detect changes in dynamics. This can be understood as a focus on structural layers (L-F-S) and a relative way of talking about music (L-E-R).

*Participant C1-2*

Participant C1-2 stated that the music reminded him of a forest, with small animals. He said that there were many instruments playing, and therefore many animals in the forest. He appeared to like the music and explained that this was because everyone (presumably the musicians) participated. He identified guitar and saxophone but stated that he did not know many instrument names. This participant also noted that the music switched between being

calm and fast. In addition, he also mentioned that different things were played all the time and that they kept the beat while at the same time being "off" the beat.

Participant C1-2 associated the music with a forest containing many small animals, which can be considered an indication of emotional listening (L-E). This participant also provided several statements that can be linked to analytical listening (L-AA). He identified some instruments, revealing an attention towards the music's acoustic layers (L-F-A). He also noted changes in musical form and described the excerpt as switching between calm and fast. It is unclear whether he meant a change in dynamics, tempo or both, but either way it can be considered an attention towards structural layers (L-F-S) and a relative way of talking about music (L-E-R). In addition, he mentioned that different things were played and that the music was somehow both on the beat and off the beat. These statements were understood as L-AA, L-F-S and L-E-R.

*Participant C1-3*
Participant C1-3 said that the music excerpt reminds him of small animals playing music. He explained that his little sister watches TV-programs where this happens, and that this is why he associated the music with animals. He stated that the music made him feel happy. This participant identified drums playing. He also described the music as being calm in the beginning and then becoming louder.

Because this participant associates the music with what may be understood as a previous experience and connects the excerpt to happiness, his music listening can be considered somewhat emotional (L-E). Participant C1-3 also provided statements leaning towards analytical listening (L-AA). He noticed that drums were playing. This can be understood as attention towards acoustic layers (L-F-A). In addition, he noted that the music progressed from calm to loud. In other words, he detected a change in dynamics. This can be seen as an attention towards structural layers (L-F-S). It can also be understood as a relative way of talking about music (L-E-R).

*Participant C1-4*
Participant C1-4 stated that the music made him think of parties, because it sounded like "party music." He also mentioned that the music sounded pleasant and made him feel in a good mood. He noted that trumpets and trombones were playing, as well as a kind of shaker

instrument. He described the music as changing between being calm and going fast. There were interludes where the music was fast, and more instruments were playing. He also noted that the music sounded somewhat classical.

Participant C1-4 provided some statements that can be understood as indications of emotional listening (L-E). For instance, he associated the music with partying. He also stated that the music made him feel in a good mood, which can be seen as a focus towards emotional layers (L-F-E). This participant also gave statements that can be considered indications of analytical listening (L-AA). He identified several instruments, revealing a focus towards acoustic layers (L-F-A) There were also statements indicating attention towards structural layers (L-F-S). For instance, he described the music as switching between calm and fast. He also appeared to note changes in instrumentation. This way of talking about music can be described as relative (L-E-R). In addition, he used the term "interlude" when mentioning changes in instrumentation, which can be understood as a systematic way of talking about music (L-E-S).

*Participant C1-5*
Participant C1-5 explained that the music made him feel a bit happier. He described the music as cool, because it was kind of "rocky." The excerpt also made him think about classical music, because it sounded somewhat old fashioned. He noted that the excerpt contained trumpets, drums, guitar, and shaker.

Because the participant stated that the music made him feel happier, he can be said to exhibit signs of emotional listening (L-E). This statement also reveals a focus towards emotional layers (L-F-E) and can be considered an emotional way to talk about music (L-E-E). There are also some statements indicating analytical listening (L-AA). When he describes the music as "rocky" and "classical" he talks about music in a descriptive way (L-E-D). However, it is somewhat unclear whether his description of the music as classical is an association or of a more analytical nature. The participant identified several instruments playing, which can be understood as an attention towards the music excerpt's acoustic layers (L-F-A).

*Participant C1-6*
Participant C1-6 thought of movies when he listened to the excerpt and stated that the music was like a movie progressing from start to end. He explained that he associated the music with movies because it was the type of music that could have been in a movie. He also said

that the music made him feel happy. He described the beginning of the excerpt as calm and sad. In the middle it was "livelier," with lot of things happening. He also noted that the music became calmer in the end, and that the ending was a bit weird.

Participant C1-6 does provide several statements indicating emotional listening (L-E). He appears to associate the excerpt with movies. In addition, he said that the music made him feel happy. Later in the interview, he described the beginning as somewhat sad. This can be understood as a focus on emotional layers (L-F-E) and an emotional way to talk about music (L-E-E). This participant also appeared to listen analytically (L-AA), because he described how the music switched between being calm and "lively." It can be seen as an indication of attention towards structural layers (L-F-S) and a relative way to talk about music (L-E-R). His description of the middle part as "lively" can perhaps be considered a phenomenological way to talk about music (L-E-P).

## 6.2 Treatment group #1 participants' interviews and visual representations of music

This section presents data and coding of participants in treatment group #1. The group was tasked with creating visual representations of music while simultaneously listening to the music excerpt (fig. 5.1, p. 31).

*Participant T1-1*
Participant T1-1 drew different instruments that he heard in the music (fig. 6.1): a drummer, people playing glockenspiel and saxophone, and a conductor. It seems like he has arranged the musicians according to how they are usually placed in the wind band he plays in. The participant started with the drawing of a glockenspiel because it was the first thing he heard. He explained that the instruments he chose to draw were the most important ones in the music excerpt.



*Fig. 6.1: Drawing by participant T1-1*

The focus on musical instruments that this participant exhibits indicates attentive-analytical listening (L-AA). He explained that the instruments he drew were the most important ones, the main instruments. Although there is no glockenspiel in the beginning of the music excerpt, it contains sounds similar to that of a glockenspiel. This makes it reasonable to assume that the participant is attentive towards the acoustic layers of the music (L-F-A). Because of the instruments included in the drawing, it can be labeled a formal response (V-E-F). The way he talks about the instruments he drew can be understood as a systematic way to talk about music (L-E-S). However, he also explains that the organization of musicians is similar to that of the wind band he plays in. This association to previous musical experiences can be seen as an indication of emotional listening (L-E) and makes it possible to describe the drawing as an associative phonographic response (V-E-A). In other words, the drawing can be characterized as a compound phonographic response (V-E-C).

*Participant T1-2*

Participant T1-2 said that the music reminded him of ancient Egypt. He stated that he had seen a movie about ancient Egypt where they used almost exactly the same music. He has drawn the construction of a pyramid. The drawing depicts a slave beaten by a master, people moving rocks and carrying bags (fig. 6.2). This participant's associations seem to indicate an emotional way of listening (L-E). He also appears to
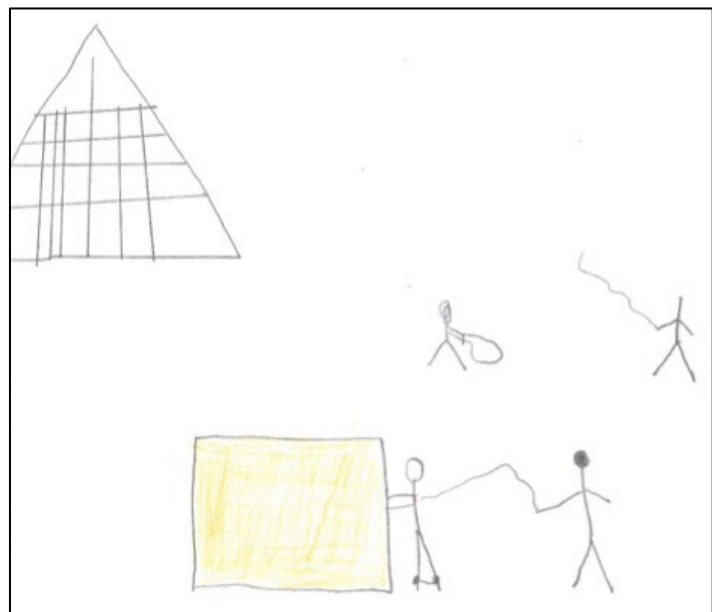


*Fig. 6.2: Drawing by participant T1-2*

talk about music in a descriptive way (L-E-D) and explains that the music excerpt sounded similar to music in a movie about Egypt. Because of the associations displayed in the drawing, it can be described as an associative phonographic response (V-E-A).

*Participant T1-3*

Participant T1-3 has drawn a castle (fig. 6.3). She
explained that all movies use music similar to the music
excerpt when people enter a castle. The participant has
used different colors in an attempt to show that the music
was "colorful." The drawing also contains people.
According to the participant, these people are the king,
queen, prince, and princess.

Because the participant associates (V-E-A) the music
excerpt with movie scenes of people entering castles, she
seems to listen emotionally (L-E). When relating the
music to a castle scene, she talks about music in a



*Fig. 6.3: Drawing by participant T1-3*

descriptive way (L-E-D). In the interview she also stated that the music sounded "colorful."
This statement can perhaps be understood as a phenomenological way of talking about music
(L-E-P). When asked to clarify what she meant by colorful music, she explained that it
sounded kind of happy. This may indicate attentiveness towards the music's emotional layers
(L-F-E) and can be characterized as an emotional way of talking about music (L-E-E).

*Participant T1-4*

Participant T1-4 has created a kind of story (fig.
6.4). It involves an elephant and a snake that
hear music in the distance. They start to walk
towards the music and end up watching people
perform. The participant explains that she drew
the elephant first, because it liked the kind of
music that the trumpet and saxophone made. The
snake enjoyed the music style. The music
performance takes place in some sort of castle.
Participant T1-4 described the music as varied
and mentioned that it sounded somewhat
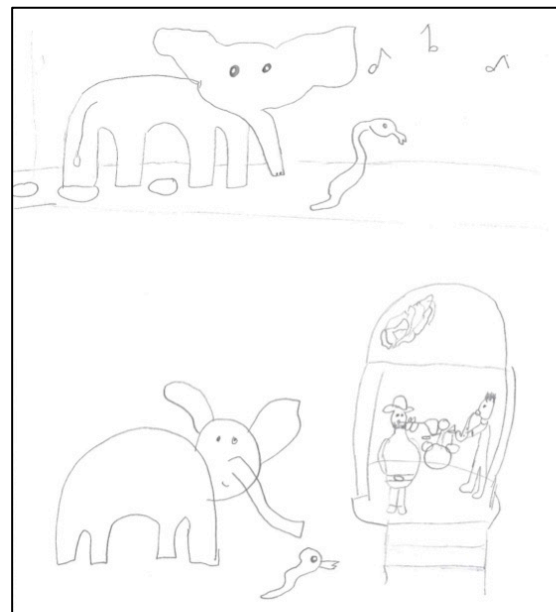"Mexican."



*Fig. 6.4: Drawing by participant T1-4*

The narrative and associations (V-E-A) displayed by this participant can be understood as an indication of emotional listening (L-E). There are also some elements in the drawing that point towards attentive-analytical listening (L-AA). The participant has identified saxophone trumpet and drums and included these instruments in her drawing. It indicates a focus on the music's acoustic layers (L-F-A). When she talks about music instruments in the interview, she is talking about music systematically (L-E-S). At the end of the interview she stated that the music sounded very "Mexican", which may be considered a descriptive way of talking about music (L-E-D). Because the drawing displays both associations and references to sound (V-E-F), it can be characterized as a compound phonographic response (V-E-C).

*Participant T1-5*

Participant T1-5 explained that he drew a "cool" wind band, playing flowing and beautiful music (fig. 6.5). He has drawn a saxophone and tried to draw music notes. He did also draw a cornet or trumpet and stated that he was not entirely sure which one it was. The participant explained that he drew instruments to show what kind of instruments the music excerpt contained. In addition, he also drew a bell, because there was a bell-like sound in the beginning of the piece. He explains that he started by drawing the bell, then the saxophone, the trumpet, and in the end the musicians.

This participant relates the music excerpt to a wind band. By doing so, he appears to identify a certain type of music instruments. In other words, he seems to focus on the acoustic layers of the music (L-F-A) and listen in an attentive-analytical way (L-AA). When mentioning instruments, such as saxophone and trumpet, he is talking about music systematically (L-E-S). Because of the instruments, the drawing may be labeled a formal phonographic response (V-E-F). The bell that he drew may also be considered an indication of



*Fig. 6.5: Drawing by participant T1-5*

attentive-analytical listening and focus on the music's acoustic layers, because the beginning of the excerpt contains sounds similar to that of a bell. In addition, this participant explained
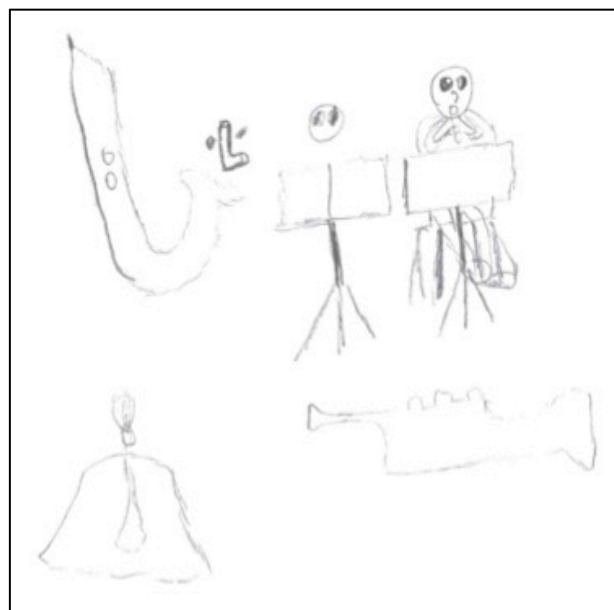
how the creation of the drawing followed changes in musical form. This implies a focus on the music's structural layers (L-F-S) and may be considered a relative way to talk about music (L-E-R). It should also be mentioned that the connection the participant makes between the music excerpt and a wind band can be understood as an association (V-E-A), which points towards a kind of emotional listening (L-E). Since the music excerpt contains both references to sound and association, it is characterized as a compound phonographic response (V-E-C).

*Participant T1-6*

Participant T1-6 (fig. 6.6) starts out stating that she had many different ideas. She drew a ballerina, because of the calm music in the beginning of the excerpt. In addition, she has drawn trumpet and drums. The participant says that this was because these instruments sounded louder than other instruments. She also drew a party, because the music was "catchy." Her drawing contains a wave-like pattern that represents how sounds and instruments change during the song. The participant drew the ballerina first, then drums and trumpet, and afterwards drew the party. In the end she drew the singer. She said that she did not hear singing in the music but imagined it, and that it would have sounded similar to opera.

There seems to be several statements that indicate attentive-analytical listening (L-AA). This participant identified trumpet and drums playing in the music excerpt. The drawing of these instruments suggests an attention towards the music's acoustic layers (L-F-A). It can also be described as a reference to sound (V-E-F). Her identification of instruments can be understood as a systematic way of talking about music (L-E-S). She also explained that the music was calm in the beginning, before trumpet and drums joined in. Her drawing also contains a wave-shaped pattern representing how different sounds appear and



*Fig. 6.6: Drawing by participant T1-6*

disappear in the piece. The wave pattern also serves as a division between the music excerpt's introduction and main parts. In other words, the drawing is structured according to the temporal unfolding of sound events. This comparison of musical qualities can be

characterized as talking about music relatively (L-E-R). The focus on musical form also indicates that she is perceiving some of the music's structural layers (L-F-S).

Her drawing and verbal explanations also suggest emotional listening (L-E). For instance, she seems to have associated (V-E-A) the beginning of the music excerpt with calmness and a ballerina. In addition to mentioning calmness, she also describes the music as catchy. This is indicative of attention towards emotional layers in the music (L-F-E). She imagined the calm start of the piece being combined with an opera-like voice and associated parts of the music with partying, which also suggests emotional listening. Since the drawing contains both associative and formal responses, it is characterized as a compound phonographic response (V-E-C).

### 6.3 Treatment group #2 participants' interviews and visual representations of music

This section presents data and coding of participants in treatment group #2. This group listened to the music excerpt and created visual representations afterwards.

*Participant T2-1*

The interview with participant T2-1 mainly revolved around the Egyptian vibe of the music. He explained that he had drawn a pyramid, a swimming pool and some sun beds. He also began to draw a man playing trumpet, because he heard a trumpet in the music excerpt (fig. 6.7).
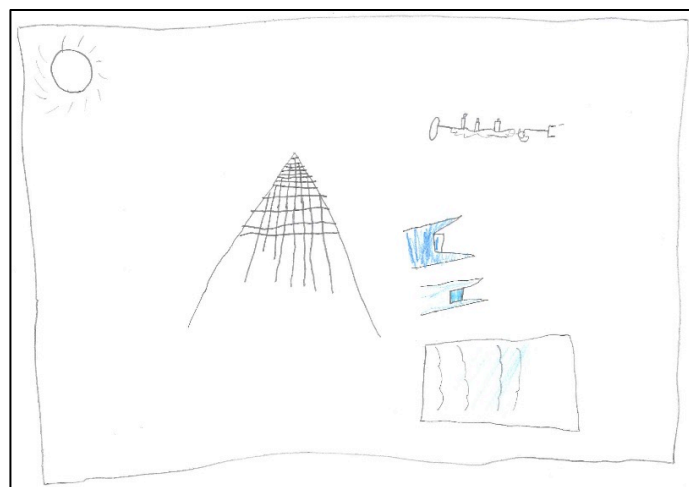


*Fig. 6.7: Drawing by participant T2-1*

Associations (V-E-A) seems to be relatively significant to this participant's perception of the music excerpt. He appears to associate the music with Egypt and summer. In other words, his drawing can be understood as indicating emotional listening (L-E). When he explains his associations in the interview, he talks about music in a descriptive way (L-E-D). Although associations seem to be the key component in his perception, the drawing also displays a kind of attentive-analytical listening (L-AA). He has drawn a trumpet, which may be understood as attention towards the music's acoustic layers (L-F-A). When mentioning trumpet in the

interview, the participant's statement can be seen as a systematic way of talking about music (L-E-S). Because this participant's drawing contains both associations and a reference to sound (V-E-F), it can be described as a compound phonographic response (V-E-C).

*Participant T2-2*
Participant T2-2 (fig. 6.8) described how the drawing represented song structure and emotions connected to these changes in musical form. She used different colors on smileys to show different amounts of happiness. The participant explained how the music changed from being happy to happier, before ending up sad. She used



*Fig. 6.8: Drawing by participant T2-2*

arrows to represent changes in musical arrangement and emotions, and to show how the music was organized in a cyclic fashion.

Because this participant relates the music excerpt to different emotions, her music perception seems to involve emotional listening (L-E). It can also be understood as an attention towards the music's emotional layers (L-F-E) and an emotional way to talk about music (L-E-E). Her drawing depicts different emotions, or an associative phonographic response (V-E-A). At the same time, her drawing and verbal statements also indicate attentive-analytical listening (L-AA). She describes how the music starts with one instrument before developing into a group and explains that it moves through a kind of cycle. This focus on changes in musical form can be seen as attentiveness towards structural layers in the music (L-F-S). When comparing different parts of the music excerpt, she is talking about music relatively (L-E-R). According to the participant, the instrument playing in the beginning of the piece is a piano. Although her music instrument identification is incorrect, it reveals a focus on sound and the music's acoustic layers (L-F-A). The drawing's references to sound may also be considered a formal response (V-E-F). In other words, this drawing seems to be a compound response (V-E-C).

*Participant T2-3*

The participant explains how the drawing represent a "good" side and a "dark" side (fig. 6.9). The stickmen he drew are warriors. Blue is used to represent the good side, while red represents the dark side. The participant says that his drawing can be understood as a kind of comic strip. In the end, all warriors end up on the good side.
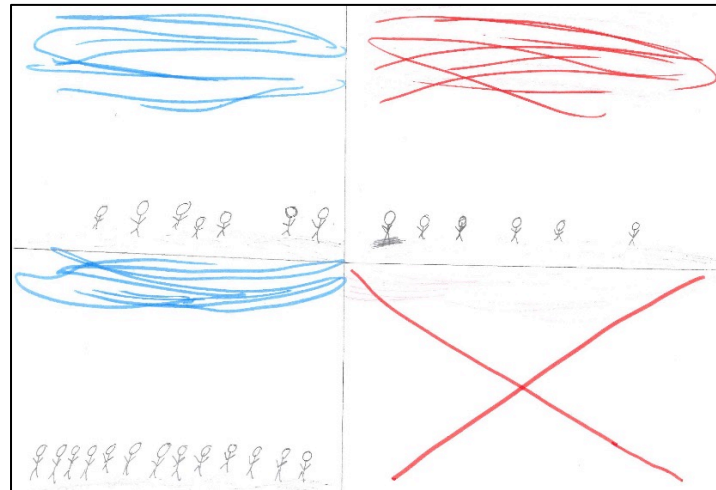


Fig. 6.9: Drawing by participant T2-3

The drawing and verbal accounts provided by this participant reveals how she created a narrative based on the music excerpt. In other words, her phonographic response to the music excerpt can be described as an associative response (V-E-A) and as indicating emotional listening (L-E).

*Participant T2-4*

The drawing produced by participant T2-4 (fig. 6.10) contains clocks, because the start of the music excerpt reminded her of clocks. She also drew two girls and explained that they were partying. In addition, she drew a trumpet. This participant also noted



Fig. 6.10: Drawing by participant T2-4

some changes in dynamics, which she tried to visualize by drawing a curved line.

The way this participant associated (V-E-A) parts of the music excerpt with clocks can be understood as indicating emotional listening (L-E), and a descriptive way of talking about music (L-E-D). In addition, the girls partying can also be labeled as an associative and emotional response. However, the clocks she drew and the related verbal explanations she provided also point toward an attentive-analytical way of listening (L-AA). Clocks produce a sound that is somewhat similar to the sounds produced in the beginning of the music excerpt.

In other words, this participant seems attentive towards the music's acoustic layers (L-F-A) and provides a visual reference to sound (V-E-F). In addition, she distinguishes between the introduction, containing clocks, and the rest of the song. By doing so, she talks about music relatively (L-E-R) and demonstrates a focus on structural layers (L-F-S) in the music excerpt. There are also other elements that indicate attentive-analytical listening. The participant identified a trumpet in the piece, which points toward a focus on acoustic layers and a systematic way of talking about music (L-E-S). She also explained that the curved line in her drawing depicts how the music excerpt changes between soft and loud. Because the drawing contains both associative and formal phonographic responses, it can be described as a compound response (V-E-C).

*Participant T2-5*

Participant T2-5 (fig. 6.11) created a story. It starts with a man waking up and being sad. When he listens to music on the phone he becomes happy. After becoming happy, the man goes for a walk. He meets many people who are sad and makes them happy. A sad person that became happy then continues walking and meets another person who is sad. The participant



*Fig. 6.11: Drawing by participant T2-5*

said that happiness is contagious and relates this to the music excerpt gradually becoming more and more happy. She has drawn arrows to show how the story develops.

The narrative created by this participant may be understood as a sign of emotional listening (L-E) and considered an associative phonographic response (V-E-A). The story visualized in the drawing appears to be connected to changing emotions. In other words, the participant seems to focus on the music's emotional layers (L-F-E) and talks about music in an emotional way (L-E-E). Although emotional listening seems to dominate this participant's music perception, there are also traces of attentive-analytical listening (L-AA). She explains how the emotions change in a cyclic fashion, suggesting attention towards changes in musical form.

*Participant T2-6*

Participant T2-6 (fig. 6.12) drew a puddle to represent the beginning of the song. Then, she explained, it became a choir, because many instruments joined in. This "choir" contains guitar and flute. The participant explained that she drew these instruments because of previous music experiences. She also drew a smiley to show that the music was happy. In addition, her drawing contains a rollercoaster, because she felt that the music was related to that.

Because this participant associates (V-E-A) the beginning of the music excerpt with a puddle, she appears to listen emotionally (L-E). By relating the music to a puddle, this participant is talking about music in a descriptive way (L-E-D). At the same time, it may also be understood as a focus on the music's acoustic layers (L-F-A) and an attentive-analytical way of listening. The participant explains how the music changes from a puddle to some sort of choir. By doing so, she is comparing changes in musical form and talking about music relatively (L-E-R). In addition, she has drawn two instruments. This could be understood as attentive-analytical



*Fig. 6.12: Drawing by participant T2-6*

listening but also appears to be connected to association. The interview revealed that these instruments were associated with previous musical experiences. She also states that she perceives the music as happy (L-E-E), indicating attention towards emotional layers in the music (L-F-E). The participant explains that the rollercoaster included in the drawing is supposed to represent happiness and people having fun, which may also be characterized as an emotional response. Since her drawing contains both associations and references to sound (V-E-F), it can be described as a compound phonographic response (V-E-C).

### 6.4 Summary of participant coding

This table summarizes distribution of codes across all participants. For descriptions of codes, see code book (Appendix O).

| Group | Participant | Context | Listening | Visual representation |
|---|---|---|---|---|
| Control | C1-1 | C-GE-F, C-GR-C | L-AA, L-E, L-E-D, L-E-E, L-E-R, L-F-A, L-F-E, L-F-S | |
| | C1-2 | C-GE-M, C-GR-C | L-AA, L-E, L-E-R, L-F-A, L-F-S | |
| | C1-3 | C-GE-M, C-GR-C | L-AA, L-E, L-E-E, L-E-R, L-F-A, L-F-S | |
| | C1-4 | C-GE-M, C-GR-C | L-AA, L-E, L-E-R, L-E-S, L-F-A, L-F-E, L-F-S | |
| | C1-5 | C-GE-M, C-GR-C | L-E, L-E-D, L-E-E, L-F-A, L-F-E | |
| | C1-6 | C-GE-M, C-GR-C | L-AA, L-E, L-E-E, L-E-R, L-E-P, L-F-E, L-F-S | |
| Treatment #1 | T1-1 | C-GE-M, C-GR-T1 | L-AA, L-E, L-E-S, L-F-A | V-E-A, V-E-C, V-E-F |
| | T1-2 | C-GE-M, C-GR-T1 | L-E, L-E-D | V-E-A |
| | T1-3 | C-GE-F, C-GR-T1 | L-E, L-E-D, L-E-E, L-E-P, L-F-E | V-E-A |
| | T1-4 | C-GE-F, C-GR-T1 | L-AA, L-E, L-E-D, L-E-S, L-F-A | V-E-A, V-E-C, V-E-F |
| | T1-5 | C-GE-M, C-GR-T1 | L-AA, L-E, L-E-D, L-E-R, L-E-S, L-F-A, L-F-S | V-E-A, V-E-C, V-E-F |
| | T1-6 | C-GE-F, C-GR-T1 | L-AA, L-E, L-E-D, L-E-R, L-E-S, L-F-A, L-F-E, L-F-S | V-E-A, V-E-C, V-E-F |
| Treatment #2 | T2-1 | C-GE-M, C-GR-T2 | L-AA, L-E, L-E-D, L-E-S, L-F-A | V-E-A, V-E-C, V-E-F |
| | T2-2 | C-GE-F, C-GR-T2 | L-AA, L-E, L-E-E, L-E-R, L-F-A, L-F-E, L-F-S | V-E-A, V-E-C, V-E-F |
| | T2-3 | C-GE-F, C-GR-T2 | L-E | V-E-A |
| | T2-4 | C-GE-F, C-GR-T2 | L-AA, L-E, L-E-D, L-E-R, L-E-S, L-F-A, L-F-E, L-F-S | V-E-A, V-E-C, V-E-F |
| | T2-5 | C-GE-F, C-GR-T2 | L-AA, L-E, L-E-E, L-F-E | V-E-A |
| | T2-6 | C-GE-F, C-GR-T2 | L-AA, L-E, L-E-D, L-E-E, L-E-R, L-F-A, L-F-E, L-F-S | V-E-A, V-E-C, V-E-F |

*Fig. 6.13: Distribution of participant coding*

## 6.5 Group comparison of analytical and emotional listening

This table (fig. 6.14) shows the number of participants coded to each type of music perception. The next paragraphs describe why qualitative data was coded in this way.

| Group | Analytical listening | Emotional listening |
|---|---|---|
| Control | 5 | 6 |
| Treatment #1 | 4 | 6 |
| Treatment #2 | 5 | 6 |

Fig. 6.14: Distribution of codes for attentive-analytical and emotional listening

*Emotional listening*

All control group participants provided statements that were coded as indications of emotional listening. Participant C1-1 thought of the music as fairytale-like and associated it with summertime and flowers. She also described the music as happy and "idyllic." Participant C1-2 imagined a forest with small animals. Participant C1-3 associated the music with TV-programs where animals start playing music and noted that the excerpt made him feel happy. Participant C1-4 associated the music with partying and said that it made him feel in a good mood. Participant C1-5 stated that the music made him feel a bit happier. Participant C1-6 thought of movies and imagined the music excerpt being a movie progressing from beginning to end. He also described the music as happy, while at the same time noting that the beginning of the excerpt sounded a bit sad.

All children participating in treatment group #1 had some statements suggesting emotional listening. Participant T1-1 seemed to associate the music with the wind band he plays in. Participant T1-2 associated the music with a scene from ancient Egypt. In his drawing slaves are building a pyramid. He explained that he had seen a movie about Egypt which used music similar to the excerpt. Participant T1-3 drew a castle. She stated that all movies use music similar to the excerpt when people are entering a castle. In addition, she thought of the music as colorful and happy. Participant T1-4 created a story about an elephant and a snake. They heard music playing in the distance and start walking towards the music. When they arrived, a band was playing in a castle. She also noted that the music sounded very "Mexican." Participant T1-5 provided some statements that may be understood as indications of emotional listening. He explained that there was a bell sound in the beginning of the piece. It is possible to think that he associated the beginning of the music excerpt with the sound of bells, but it is also possible that this is analytical. The participant stated that the music

reminded him of a "cool" wind band. Participant T1-6 drew a ballerina because the beginning of the piece was calm. Her drawing also includes a party. She explained that she drew the party because the music was very "catchy". In addition, she imagined someone singing with a voice quality similar to opera in the beginning of the excerpt, although she heard no singing.

All participants in treatment group #2 seemed to listen emotionally, with references to the codes for emotional listening. Participant T2-1 imagined a kind of desert scene, consisting of a pyramid and a swimming pool. Participant T2-2 seemed to focus on emotions. She explains that the music sounded happy and evolved to being even happier but got sad in the end. Participant T2-3 created a story involving a "good" side and a "dark" side. Warriors were battling until the good side won and all dark warriors joined the good side. Participant T2-4 seemed to associate the music with partying. Participant T2-5 also created a story. A man wakes up in the morning. He is sad but after hearing the music he becomes happy. He goes for a walk where he meets other people that are sad. He makes them happy and they move on to making other people happy. Participant T2-6 drew a smiley face because the music sounded happy. She also drew a rollercoaster to represent the happiness. In addition, she associated the music with instruments that either she or her dad had played. All children participating, either in control or treatment groups, exhibited signs of emotional listening. Some participants focused on emotions, others created narratives or scenes, and some associated the music excerpt with movies or other previous experiences. There seems to be no clear differences in emotional listening between treatment and control groups.

*Analytical listening*

Nearly all control group participants (*n*=5) exhibited signs of analytical listening. Participant C1-1 stated that trumpets were playing and noted a change in dynamics. Participant C1-2 identified two instruments in the excerpt, guitar and saxophone, and stated that different things were played all the time. He also described the music as changing between calm and fast, and noted that musicians appeared to keep the beat while at the same time being off the beat. Participant C1-3 heard drums and noted a change in dynamics. Participant C1-4 noted that trumpets, trombones and a shaker-like instrument were playing. He also described changes in instrumentation and tempo. Participant C1-6 noted a change in dynamics and instrumentation, with shifts between calm and "lively."

The majority of participants in treatment group #1 (*n*=4) had some statements that fell into the analytical listening category. It is interesting to see that all participants exhibiting analytical listening focused on identification of instruments. Participant T1-1 identified several instruments. He drew musicians playing drums, glockenspiel and saxophone. He explained that these instruments seemed to be the main instruments in the piece. Participant T1-4 also drew instruments: saxophone, drums, and trumpet. Participant T1-5 drew instruments as well: saxophone, cornet or trumpet, and a bell. The participant explained that there was a bell-like sound in the beginning of the piece and seems to have drawn instruments according to changes in musical form. Participant T1-6 drew the instruments that seemed to be the loudest ones: trumpet, and drums. In addition, she mentioned that the beginning of the piece was calm. She also drew a wave that represented how the instrumentation changed during the excerpt and stated that the trumpet did not always play. This participant appeared to note a difference between the song's introduction and main parts.

Nearly all participants in treatment group #2 (*n*=5) seemed to listen analytically. All interviews, except participant T2-3, have references to the code for attentive-analytical listening. Participant T2-1 identified a trumpet in the music excerpt. Participant T2-2 seems to have noted a development in the music's form. She explains that it started with some kind of piano, before moving on to be a larger group. This participant used arrows to represent a form cycle in the piece. Participant T2-4 also identified a trumpet. In addition, she drew clocks to represent a clock-like sound in the beginning of the music excerpt. She noticed changes in dynamics and explained that one of the lines she drew were meant to depict how the music varied between soft and loud. Participant T2-5 described a change between happiness and sadness. It could be discussed if this can be considered attentive-analytical listening or not, but it seems to indicate a perception of musical form. Participant T2-6 also noted changes in the music's form. She explained that the music at first reminded her of a water puddle, before developing into a kind of choir. This is somewhat similar to participant T2-5 in that it is challenging to label the statement as strictly attentive-analytical listening.

The majority of participants (*n*=14) in both control and treatment groups seemed to listen in an analytical way. Many participants identified different instruments playing in the music excerpt, for instance trumpet, saxophone, guitar, and drums. Some participants appeared to note changes in instrumentation or dynamics. It should be mentioned that treatment group #1 displayed less variation in analytical responses than other groups, with participants mainly

focusing on identification of instruments. In essence, the majority of participants seemed to listen both emotionally and attentive-analytically. Differences in listening conditions did not appear to have any noticable impact on how participating children perceived the music excerpt.

## 6.6    Group comparison of layers of musical meaning

This table (fig. 6.15) shows the number of participants coded to each layer type. The next paragraphs describe why qualitative data were coded in this way.

| Group | Acoustic | Emotional | Existential | Kinetic-motoric | Structural | Tension |
|-------|----------|-----------|-------------|-----------------|------------|---------|
| Control | 5 | 4 | 0 | 0 | 5 | 0 |
| Treatment #1 | 4 | 2 | 0 | 0 | 2 | 0 |
| Treatment #2 | 4 | 4 | 0 | 0 | 3 | 0 |

*Fig. 6.15: Distribution of codes for layers of musical meaning*

*Acoustic layers of meaning*

Nearly all control group participants (*n*=5) provided statements indicating attention toward the music excerpt's acoustic layers. Participant C1-1 noted that trumpets and other horns were playing. Participant C1-2 stated that he heard guitar and saxophone. Participant C1-3 mentioned that the music excerpt contained drums. Participant C1-4 identified trumpets, trombones and a shaker-like instrument. Participant C1-5 heard trumpets, drums, guitar and something similar to a shaker.

Four participants in treatment group #1 seemed to exhibit attention towards acoustic layers. Participant T1-1 drew different musicians, a drummer, a person playing glockenspiel and a saxophonist. He explained that these instruments seemed to be the most important ones. Participant T1-4 also identified several instruments: saxophone, drums and trumpet. Participant T1-5 mentioned saxophone and trumpet but stated that it was hard to determine whether it was a trumpet or a cornet. This participant also drew a bell, because the beginning of the piece contained a bell-like sound. Participant T1-6 also identified several instruments: trumpet, and drums. She explained that these instruments sounded louder than the others and noted that the instruments were used differently during the song.

Four participants in treatment group #2 provided statements indicating attention towards the music's acoustic layers. Participant T2-1 identified a trumpet in the music excerpt. Participant

T2-2 associated the sounds in the beginning of the music excerpt with piano. Participant T2-4 stated that the introduction contained clock-like sounds and appeared to identify a trumpet in the music. Participant T2-6 thought that the beginning of the excerpt sounded like a puddle. She explained that the music developed into a choir, consisting of many instruments.

The majority of treatment and control group participants (*n*=13) seemed to display attention towards the music excerpt's acoustic layers of meaning. All of these participants identified instruments or certain timbres in the music. There were only minor differences between control and treatment groups. The control group had five participants indicating attention towards acoustic layers, while both treatment groups had four. In other words, this perspective on children's listening does not reveal any noteworthy differences between treatment and control groups. However, it should be mentioned that control group statements appear to be less differentiated than statements from treatment groups. In both treatment groups, some participants seemed to describe acoustic qualities in other ways than merely naming instruments. In the control group participants consequently named instruments and did not appear to focus on other acoustic aspects.

*Emotional layers of meaning*
A small majority of the control group participants (*n*=4) provided statements linked to emotional layers. Participant C1-1 described the music as happy and "idyllic." Participant C1-4 stated that the music made him feel in a good mood. Participant C1-5 also noted that the music made him feel happier. Participant C1-6 described the music as happy but noted that the beginning sounded somewhat sad.

Two participants in treatment group #1 seemed to focus on the music's emotional layers. Participant T1-3 described the music as colorful and explained that it sounded kind of happy. Participant T1-6 associated the music with partying.

Four participants in treatment group #2 provided statements suggesting attention towards the emotional layers of the music excerpt. Participant T2-2 stated that the music became sad at the end. It began happy, then became happier, and ended up being sad. This participant seemed to think that these mood changes occurred in a cyclic fashion. Participant T2-4 associated the music with a party. Although this is not strictly an emotional response it can be interpreted this way, since "party" typically refers to a state of happiness. Participant T2-5

created a narrative based on emotional changes. A man wakes up being sad. He listens to music that makes him happy. He goes for a walk and meets other sad people and makes them happy. This participant also seemed to think that the mood changes followed a kind of cycle. Participant T2-6 thought that the music was very happy. She drew a smiley face and a rollercoaster to represent happiness and fun.

There seems to be a difference between the two treatment groups with regards to emotional layers of musical meaning. While four participants in treatment group #2 provided statements indicating attention towards emotional layers, only two participants in treatment group #1 did the same. In addition, they provided more vague statements with weaker connections to emotional layers. The control group was similar to treatment group #2, because both groups had an equal number of participants indicating attention towards emotional layers. However, the statements provided by participants in treatment group #2 appeared to be somewhat more varied and complex. Two of these participants noted mood changes progressing through a kind of cycle. This was not the case in the control group, where participants merely described the music as being happy or sad.

*Structural layers of meaning*

Nearly all control group participants (*n*=5) provided statements indicating attention towards structural layers. Participant C1-1 appeared to note a change in dynamics, stating that the excerpt began calm and suddenly became very loud. Participant C1-2 seemed to focus on tempo changes. He described the music as switching between calm and fast. He also noted that musicians appeared to keep the beat, while at the same time being off the beat. Participant C1-3 described the music as changing from calm to loud and noisy. Participant C1-4 noted that the music switched between being calm and fast, which may be understood as a focus on tempo changes. Participant C1-6 appeared to note changes in both dynamics and instrumentation. He described the music as switching between calm and "lively." This participant also revealed a focus on musical form when stating that the end was a bit weird. Two participants in treatment group #1 provided statements that may be understood as a focus on structural layers. Participant T1-5 seemed to notice changes in arrangement and structured his drawing accordingly. He stated that the music excerpt began with a bell. Afterwards instruments changed between playing. Participant T1-6 also noted that all instruments did not play at the same time and drew a wave to represent changes in instrumentation.

Three participants in treatment group #2 provided statements that indicated a focus on structural layers of musical meaning. Participant T2-2 described how the music began with one instrument, piano, before developing into a larger group. This participant also seemed to note a kind of cyclic music structure. Participant T2-4 also appeared to notice a difference between the intro and other parts of the music excerpt. She stated that the beginning contained bell-like sounds. Later in the interview, she explained that the group of people she drew came later in the song. This participant also seemed to note changes in dynamics. Similar to the other control group participants, participant T2-6 noted a difference in the number of instruments used. This participant associated the sounds in the beginning of the piece with a puddle and explained that the music evolved into a choir containing many instruments. There seems to be some kind of group difference related to focus on structural layers, especially between the control group and treatment group #1. In the control group, five participants provided statements indicating attention towards the music's structural layers. Only two participants in treatment group #1 did the same.

### 6.7  Group comparison of ways to talk about music

This table (fig. 6.16) shows the number of participants coded to each music talking category. The next paragraphs describe why qualitative data were coded in this way.

| Group | Descriptive | Emotional | Phenomenological | Relative | Systematic |
|---|---|---|---|---|---|
| Control | 2 | 4 | 0 | 5 | |
| Treatment #1 | 5 | 1 | 1 | 2 | 4 |
| Treatment #2 | 3 | 3 | 0 | 3 | 2 |

*Fig. 6.16: Distribution of codes for ways to talk about music*

*Descriptive ways to talk about music*

Two control group participants appeared to talk about the music in a descriptive way. Participant C1-1 compared the excerpt to summertime. Participant C1-5 described the music as "rocky." The majority of participants in treatment group #1 (*n*=5) talked about music in a descriptive way. Participant T1-2 connected the excerpt to music in a movie about Egypt. Participant T1-3 described the piece as similar to music in movie scenes where people are entering castles. Participant T1-4 stated that the music sounded "Mexican." Participant T1-5 described the sounds in the beginning of the piece as clock-like sounds. Participant T1-6 compared the beginning of the excerpt with a ballerina and the other parts with a party.

Three participants in treatment group #2 talked about music in a descriptive way. Participant T2-1 related the music to Egypt and described it as desert music. Participant T2-4 stated that the beginning of the music excerpt had clock-like sounds and connected other parts of the music to partying. Participant T2-6 explained that the beginning of the piece sounded like a puddle. In addition, she stated that the music reminded her of a rollercoaster.

The use of descriptive ways to talk about music seems to differ between control and treatment groups. The control group had only two participants talking about music descriptively, while five participants in treatment group #1 did the same. Treatment group #2 landed somewhere in between, with three participants talking about music in a descriptive way. In other words, the task that was most directly linked to drawing yielded a considerable amount of descriptive talking. The task not involving production of visual representations resulted in fewer instances where participants talked about the music descriptively.

*Emotional ways to talk about music*

Many control group participants ($n$=4) appeared to talk about music in an emotional way. Participant C1-1 used words such as happy, "idyllic" and fairytale-like to describe the music. Participant C1-3 also connected the music excerpt to happiness. Participant C1-5 did the same, stating that the music made him feel happier. Participant C1-6 also connected the excerpt to happiness but noted that the beginning sounded a bit sad. One treatment group participant seemed to talk about music in an emotional way. Participant T1-3 described the music as colorful and explained that she thought the music sounded happy. Three control group participants provided statements that can be understood as emotional ways to talk about music. Participant T2-2 explained that the music excerpt's different parts contained different emotions. According to her, the music was happy in the beginning. Afterwards it became even happier. The last part of the excerpt sounded sad. Participant T2-5 also focused on emotions. She created a narrative involving a man waking up in the morning being sad. When he listened to music he became happy. This happiness affected other sad people that he met. She explained that the music excerpt gradually became happier. Participant T2-6 described the music as very happy.

There appears to be a difference between control and treatment groups related to emotional ways to talk about music. While four control group participants seemed to talk about music emotionally, only one participant in treatment group #1 did the same. Treatment group #2 was

closer to the control group, with three participants talking about music in an emotional way. In other words, the group with no drawing activity had the largest number of references to emotional ways to talk about music, while the group most directly connected to drawing had the smallest.

*Relative ways to talk about music*

Nearly all control group participants (*n*=5) appeared to talk about music in a "relative" way (Elliott, 1995, p. 97). Participant C1-1 compared differences in dynamics, stating that the excerpt was calm in the beginning and suddenly became loud. Participant C1-2 noted a change in tempo. According to him, beginning and end was calm while the middle was fast. He also made a comparison between musicians keeping the beat and being of the beat. Participant C1-3 noted a change in dynamics, progressing from calm to loud. Participant C1-4 heard a change in tempo stated that the music switched between calm and fast. He also noted a change in instrumentation, saying that more musicians were playing in the middle section. Participant C1-6 also perceived a change in dynamics, where he perceived the middle of the excerpt as louder than beginning and ending.

Two participants in treatment group #1 seemed to talk about music in a relative way. Participant T1-5 explained that the music started with a bell-like sound. She also stated that instruments appeared to take turns playing. Participant T1-6 seemed to focus on the same aspects of the music. She explained that the instruments did not play all the time and used the trumpet as an example. She stated that the trumpet only played occasionally. She also noted a difference between the beginning of the music excerpt and its main parts.

Three participants in treatment group #2 appeared to talk about music relatively. Participant T2-2 stated that the music started with one instrument, piano, before developing into a group. Participant T2-4 also focused on a contrast in sound. She explained that the excerpt started with a bell-like sound. Afterwards, a trumpet appeared. She also seemed to note changes in dynamics and stated that the music varied between being loud and soft. Similar to the other participants in this group, T2-6 noted a difference between the beginning of the piece and the main parts. She explained that the music at first sounded like a puddle, before turning into a choir. A slight difference was noticed in the number of participants talking about music "relatively" in treatment and control groups. Nearly all control group participants (*n*=5) provided statements that can be related to this way of talking, while two participants in

treatment group #1 did the same. The second treatment group landed somewhere in between, with three participants talking about music in a relative way.

*Systematic ways to talk about music*

Five control group participants seemed to talk about music in a systematic way. Participant C1-1 noted that trumpets and other horns were playing. Participant C1-2 identified guitar and saxophone. Participant C1-3 heard drums playing. Participant C1-4 mentioned a shaker-like instrument, trumpets and trombones. He also noted that the music excerpt contained an interlude. Participant C1-5 heard trumpets, drums, guitar and a shaker-like instrument in the music excerpt. Four participants in treatment group #1 appeared to talk about music systematically. Participant T1-1 identified several instruments: drums, glockenspiel, and saxophone. He explained that these instruments seemed to be the most important ones. Participant T1-4 also mentioned instruments playing in the music excerpt. She heard a saxophone, drums, and a trumpet. Participant T1-5 noted that there was a saxophone and a trumpet or cornet. Participant T1-6 stated that she heard trumpet and drums.

Two participants in treatment group #2 talked about music in what can be regarded as a systematic way. Participant T2-1 identified a trumpet in the music excerpt, participant T2-4 did the same. There seems to be some sort of group difference related to systematic ways to talk about music. Nearly all control group participants ($n$=5) talked about music in such a way, while only two participants in treatment group #1 did the same. The second treatment group, who created drawings after listening, had four participants talking about music systematically. In other words, the group with no drawing activity talked significantly more about music in a systematic way than the group that drew whilst listening.

## 6.8   Summary of group comparisons

To summarize, deductive analysis of qualitative data shows that most participants listen both emotionally and analytically. Other theoretical concepts suggest some differences between groups, but there are no clear indications of any correlation between listening task conditions and group differences. In other words, findings from this analysis do not appear to support the hypothesis of a connection between visual representation and music perception, where drawing activity affect music perception. For further details, see Appendix P.

# 7 Quantitative results

This section presents measures of central tendency in the questionnaire data, as well as interpretations of these numbers. High values (3-4) suggest disagreement, while low values (0-1) suggest agreement. Graphs only display calculation of single modes. Where several modes exist, these are presented in the text.

## 7.1 Group comparison of central tendency

*Questionnaire item #1*

The statement used in the first questionnaire item (fig. 7.1) was "The musicians played softly." Median scores suggest that participants were uncertain of whether the musicians played softly or not. There were no noteworthy differences in control and treatment group scores. However, modes indicate that the control group tended to disagree with the statement, while treatment group #2 tended to agree.
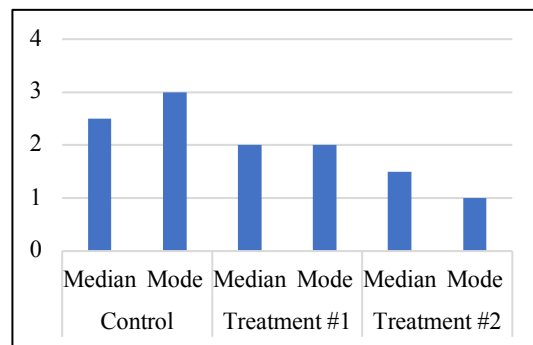


*Fig. 7.1: Central tendencies – item #1*

*Questionnaire item #2*

The second questionnaire item (fig. 7.2) contained the following statement: "The musicians changed between playing soft and loud." The median scores suggest that participants perceived the music as changing between soft and loud. There were no substantial differences between control and



*Fig. 7.2: Central tendencies – item #2*

treatment groups, but it should be noted that treatment groups appear to agree more strongly with the item statement than the control group. Treatment group #1 had two modes, 0 and 1, which might suggest somewhat weaker agreement than in treatment group #2.

## Questionnaire item #3

The third statement (fig. 7.3) in this questionnaire was "The music was slow." The median scores of item #3 suggest that participants disagreed slightly with the statement. There were no considerable group differences. However, modes indicate that both treatment group #1 and the control group leaned



Fig. 7.3: Central tendencies – item #3

towards disagreeing with the statement. Treatment group #2 had two modes, 3 and 2. This can be understood as supporting the median value, which suggests that participants were somewhere in between being uncertain and disagreeing.

## Questionnaire item #4

The fourth questionnaire item (fig. 7.4) contained the statement: "The music changed between going slow and fast." The median values suggest that participants to some degree perceived the music as changing between slow and fast. There were some differences between groups. Treatment group #1 appeared to



Fig. 7.4: Central tendencies – item #4

strongly agree with the statement, while treatment group #2 landed somewhere in between agreeing and being uncertain. The latter also had two modes, 1 and 2, which supports this interpretation. The control group appeared to agree with the statement, but not as strongly as treatment group #1.

## Questionnaire item #5

The fifth questionnaire item (fig. 7.5) was "The music was floating." Median scores suggest that treatment groups leaned towards agreeing with the statement, while the control group leaned towards disagreeing. The control group mode also suggests disagreement. Treatment group #1 appeared to most strongly agree with the statement, having both median and mode
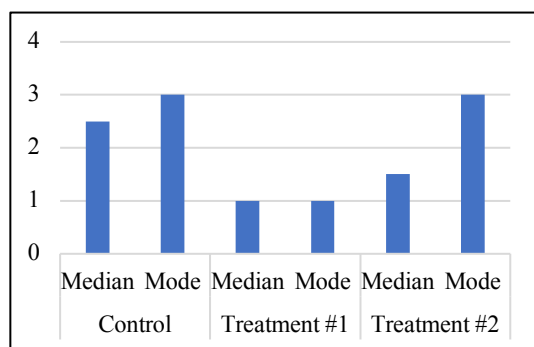


Fig. 7.5: Central tendencies – item #5

indicating agreement. The second treatment group had two entirely different modes, 3 and 0. When taking both median and modes into account, this group appears to be rather uncertain.

*Questionnaire item #6*

Questionnaire item number six (fig. 7.6) contained the following statement: "The music changed between being floating and jagged." Both treatment groups appeared to be uncertain. Treatment group #1 had three different modes, 1, 2 and 3. This may be interpreted as an indication of uncertainty. Treatment group #2



*Fig. 7.6: Central tendencies – item #6*

had identical mode and median value, indicating uncertainty. On the other hand, the control group median suggests disagreement. The mode of this group indicates the same.

*Questionnaire item #7*

The statement used in item number seven (fig. 7.7) was "The music sounded happy." Median values and modes suggest that all groups agreed quite strongly with this statement. There were no clear differences between groups, but treatment group #2 appeared to not agree quite as strongly as the other groups. This group also had two modes, 0 and 1.
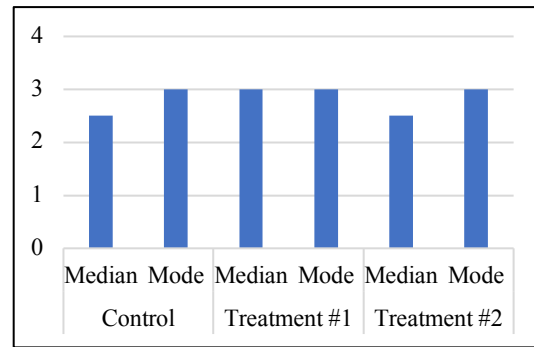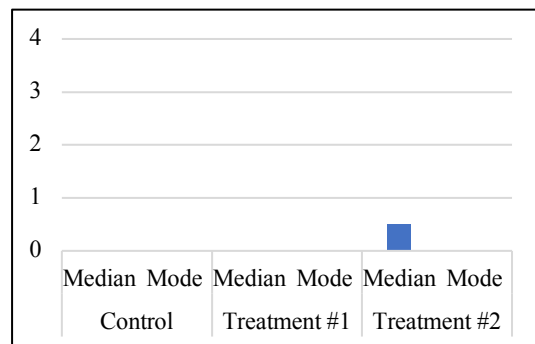


*Fig. 7.7: Central tendencies – item #7*

*Questionnaire item #8*

The eighth questionnaire item (fig. 7.8) contained the statement: "The music changed between sounding happy and sad." Median values suggest that both treatment group #1 and the control group tended to disagree. However, both groups had multiple modes. Control group modes were 3, 4 and 1, while modes in treatment group #1 were 4 and 2. In other words, both groups appear to land somewhere between
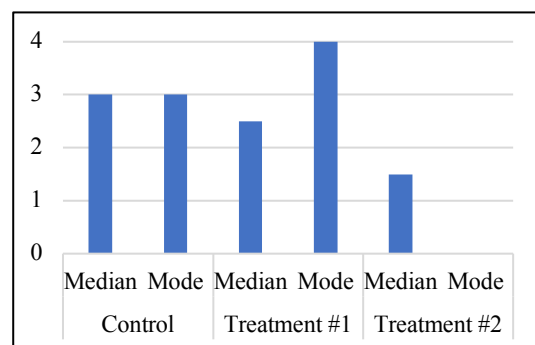


*Fig. 7.8: Central tendencies – item #8*

uncertainty and disagreement. Treatment group #2 appeared to agree with the statement, having a median value of 1.5. The mode, 0, also indicates agreement.

*Questionnaire item #9*

The ninth questionnaire item (fig. 7.9) was "All instruments played all the time." Median values suggest that all groups disagreed with this statement. The control group appeared to disagree most strongly, with both median and mode being 4. Treatment group #2 had the weakest kind of disagreement, while treatment group #1 landed somewhere in between disagreeing and strongly disagreeing.
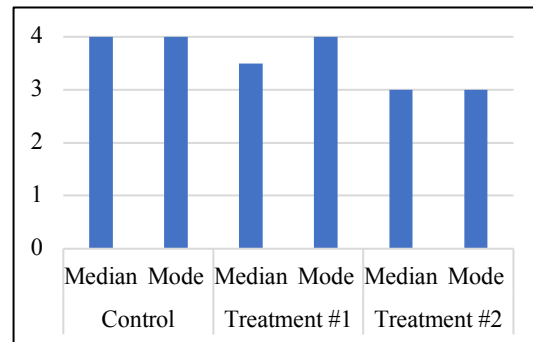


*Fig. 7.9: Central tendencies – item #9*

*Questionnaire item #10*

The last questionnaire item (fig. 7.10) contained the following statement: "The musicians played the same thing all the time." Median values suggest that treatment group #2 and the control group strongly disagreed with the statement, while treatment group #1 remained uncertain. Modes tell a similar story but indicates that treatment group #2 did not disagree quite as strongly as the control group.
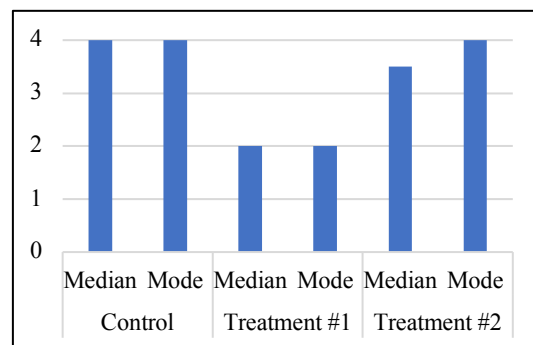


*Fig. 7.10: Central tendencies – item #10*

Measures of central tendencies did not reveal any clear differences between control and treatment groups. In other words, collected data did not show any group differences that can be ascribed to variations in music listening conditions.

## 7.2    Response distribution

There is a considerable distribution of responses within each group. A measure indicating this is range (fig. 7.11). It should be noted that the lowest possible range is 0, while the highest possible range is 4. The table below (fig. 7.11) shows that groups typically used many different response options when responding to items. In other words, individual participants

appear to have responded differently to the same questionnaire items. This may also explain why no substantial group differences were found.

| Group | Item | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | #1 | #2 | #3 | #4 | #5 | #6 | #7 | #8 | #9 | #10 |
| Control | 2 | 2 | 2 | 3 | 4 | 3 | 1 | 3 | 1 | 2 |
| Treatment #1 | 3 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 |
| Treatment #2 | 2 | 1 | 3 | 3 | 3 | 4 | 1 | 4 | 2 | 3 |

*Fig. 7.11: Measures of range*

The high ranges attained from most questionnaire items suggest insufficient validity. When comparing questionnaire statements with music excerpt content, the weak validity becomes even clearer. A critical assessment of questionnaire validity is included in the Discussion chapter (p. 86), where it is used as basis for suggesting improvements of quantitative tools that can be applied in future experimental research investigating the hypothesis.

# 8   Discussion

This chapter will begin with a short summary of results, followed by explanations of these findings, using a variety of theoretical perspectives. The next section compares the qualitative results with findings of previous research, which is followed by a validity assessment of the quantitative and qualitative data. The remainder of the chapter is devoted to refinement of tools for a future large-scale true experiment on the research question, building on knowledge gained through the analysis in this thesis. Recall that this study examined how sixth-graders perceive a rhythmic music excerpt when they are tasked with representing it visually. Their perception of the selected music excerpt was examined using three different task conditions: drawing whilst listening, drawing after listening, and only listening. Deductive analysis of qualitative data did not reveal any considerable differences between participant groups. No clear listening tendencies could be ascribed to differences in task conditions. However, the analysis showed that participants typically listened in *both* emotional and analytical ways. It also revealed that participants focused on different kinds of musical layers and talked about their listening experiences in different ways. These results suggest that participating sixth-graders' music perception was rather rich in detail and implies a quite high level of perception complexity. This affirms the argument that children's music perception capabilities should not be underestimated. Analysis of questionnaire data yielded inconclusive results, due to validity and reliability issues. However, the questionnaire data remained valuable, because considered in light of qualitative data the integrated analysis provides knowledge about how one can best proceed with robust quantitative inquiries in the future.

## 8.1   Interpretation of qualitative findings

In the Method chapter, I listed several expected results prior to data collection (p. 46). In short, I anticipated that participants drawing whilst listening (the first treatment group) would produce the most accurate and detailed responses to the music excerpt, while the control group would display a "weaker" type of analytical listening containing more uncertainty. Qualitative results did not correspond with my expectations, because the analysis did not reveal any noteworthy group differences. Additionally, I made assumptions based on differences in questionnaire responses. As already mentioned, the questionnaire produced inconclusive results. For this reason, I cannot confidently compare quantitative results with my expectations. However, it is very useful to explore why results did not align with

expectations. This section attempts to view qualitative results from different theoretical perspectives, in order to interpret these results.

It is interesting to see that a large majority of participating sixth-graders (*n*=14) appeared to listen both analytically and emotionally, when previous research has treated this as an essential dichotomy (Espeland, 2004; Kreutz et al., 2008; Leipold & Loepthien, 2015; Reitan, 2013). This raises a question about whether analytical and emotional listening should be understood as a kind of continuum, two poles in a scale, rather than a dichotomy. Viewing analytical and emotional listening as a continuum, where listeners continually slide between the two poles during hearings, would in some ways help explain why participants displayed a "blended" listening approach. In addition, such a perspective can be said to correspond well with what Swanwick describes as a dialectic relationship between intuitive and analytic knowledge (2002, p. 42).

Nielsen (1998) writes that production of musical meaning involves perceptual processing of received sensory information. In this music perception process, there is both a background and a foreground. The foreground constitutes musical aspects or elements that grabs our attention, while the background contains everything else. Nielsen claims that there is a constant foreground-background fluctuation. Something in the music grabs the listener's attention for a while before retreating to the background, when another musical aspect moves to the foreground and becomes the center of attention (p. 133). Nielsen's perspective might explain why participants displayed signs of both emotional and analytical listening. The analysis results suggest a foreground-background fluctuation whereby participants' focus of attention constantly shifted between different layers of musical meaning, sometimes being attentive towards emotional layers and other times towards acoustic or structural layers.

Bamberger (1991) also provides a perspective that can help explain why participants appeared to listen both analytically and emotionally. She argues that multiple hearings of a musical piece are possible, because music does not come as a pre-organized and encoded package that listeners simply decode. Instead, it holds the potential for being structured by listeners, making multiple hearings possible (p. 9). Although Bamberger's focus seems to be guided more towards cognitive aspects of musical understanding than Nielsen, they share some similarities. Both suggest that music itself is insufficient for producing musical meaning and the listener plays a role in the meaning creation process. In some ways, Bamberger's

description of multiple hearings can be understood as corresponding with Nielsen's perspective and possibly explain why participants listened both analytically and emotionally.

A perspective on analytical and emotional listening that treats these concepts as a continuum rather than a dichotomy in some ways explains the results. However, there might be other reasons why participants appeared to listen both analytically and emotionally. For instance, one might ask if this tendency is linked to the selected excerpts' musical characteristics. According to the reciprocal feedback model of musical response (Hargreaves et al., 2012, p. 158), musical characteristics can affect listening responses. When describing selection of musical content in the Method chapter (p. 37), it was noted that Snarky Puppy's music has been characterized as "music for both brain and booty" (Jazz Night in America, 2016, 25. feb.). Such characteristics could potentially open doors to both analytical and emotional listening responses. For this reason, one can reasonably suspect that the music excerpt itself may have contributed to participants listening both emotionally and analytically.

No clear connection was found in this study between music perception and participant groups. One might ask if music perception is of such an individual nature that group differences cannot be detected. Bamberger (1991) describes music listening as a generative process. She suggests that the mind is engaged in a constant process of organizing sensory material. This process happens in real time as sound events occur. As previously mentioned, Bamberger claims that listeners do not simply decode musical structures. Instead, musical sound holds the potential for being structured, making different hearings possible (p. 9). The fact that no evident group differences were found, may suggest that different hearings occurred. This can perhaps be said to demonstrate the individual nature of music listening, because participants appeared to have relatively different hearings of the same music excerpt.

Nielsen's perspective may also support the assumption that individuality in music listening can be the reason why no considerable group differences were found. Similar to Bamberger, he suggests that the listener actively contributes to the production of musical meaning. According to him, there is an interaction between the musical layers and the listener's layers of attention. In other words, musical meaning occurs via interaction between the musical material and the listener (1998, p. 137). If participants' perception of the musical excerpt is a result of such interactions, it makes sense that their responses are of an individual nature.

The individual nature of music listening has been suggested as a possible reason why there were no considerable group differences. The reciprocal feedback model of musical response (Hargreaves et al., 2012, p. 158) can also be said to support such an explanation. This model suggests that musical characteristics, listener and listening situation affect musical responses. The "listener" factor in the reciprocal feedback model indicates that sub-components such as gender, age and nationality play a role in musical responses. The data collection conducted in his thesis did not account for gender differences. Because the analysis focused on group differences and did not involve investigation of gender differences, it is challenging to properly determine how this affected analysis results. However, based on the feedback model, as well as previous research (Koelsch et al., 2003, p. 683), one can assume that gender differences contributed to variations in responses and might partly explain why no clear group differences were found. It should be noted that another aspect of the "listener" factor is musical knowledge, containing sub-components such as training and experience (Hargreaves et al., 2012, p. 158). Although musical competence was considered in grouping participants, the procedure could have been more systematic. It is reasonable to assume that variations in musical competence partly explains why no group differences were found.

## 8.2  Similarities and differences between results and previous research

*Music listening*

As already mentioned, a considerable majority of participants appeared to listen both analytically and emotionally. In some ways this result appears to correspond with previous research. Hargreaves and Colman (1981) found that adults who were musically naïve tended to react in subjective and personal ways, while adults with considerable musical experience often had more technical and objective responses (p. 19). Even though the sixth-graders participating in this study appeared to listen both emotionally and analytically, their analytical responses were seldom clearly objective and technical. Instead, they can perhaps be described as "subjective-analytical." In their own subjective ways, participants identified different characteristics of the music excerpt. In some ways this seems to be similar to Bamberger's study, where she found that participants focused on different features of the musical material. According to her, they were attentive towards features that contributed their individually constructed musical coherence (Bamberger, 1991, p. 19). This subjectivity also resembles what Hargreaves and Colman found when examining musically naïve adults.

The results do also appear to contradict some previous research. For instance, Leipold and Loepthien (2015) found a relationship between age and music reception. In a graph displaying this relationship, analytical listening appears somewhat more dominant than emotional listening in children around the age of twelve (p. 122). In this thesis, analyses did not reveal any clear differences between emotional and analytical listening. Still, the total number of analytical and emotional responses identified in the analysis might actually be considered an indication of emotional listening being slightly dominating. All sixth-graders (*n*=18) had emotional responses and fourteen appeared to listen analytically. Although this thesis had a small sample size and cannot strongly contradict Leipold and Loepthien's results, it is interesting to see that its findings do not appear correspond with their description of age-related differences in music reception.

*Visual representations of music*

Some of the findings related to participants' visual representations of music correspond with previous research. For instance, Blair (2007) noted similarities between children's drawings and processes of narrative inquiry. She argued that children's invented notations told the story of their experiences (p. 14). This perspective also appears valid in the case of this thesis, where a considerable number of the participants seemed to draw their musical experiences, for instance by depicting associations. Although the thesis did not primarily focus on describing children's visual representations of music, it should be noted that there are similarities between characteristics of collected drawings and findings in previous research. One of the things that Carroll found in her study was that children's invented notations revealed something about their appropriation of cultural writing conventions (Carroll, 2017). The visual representations of music collected in this thesis can be considered to partly support this finding. Several of the drawings, particularly the ones depicting a story, started at the top left corner (fig. 6.4, p. 57; fig. 6.8, p. 61; fig. 6.10, p. 62; fig. 6.12, p. 64) or somewhere at the top of the paper (fig. 6.6, p. 59; fig. 6.9, p. 62). This can be interpreted as indicating awareness of writing conventions, because texts typically are read from left to right and start at the top of a page.

In some ways the characteristics of collected participant drawings also differ from findings in previous research. When comparing drawings by second- and fifth-graders, Kerchner found that students attending fifth grade made use of different markings and words to describe their listening experiences (Kerchner, 2000, p. 32). In the case of the present study, only one of the

drawings produced by participating sixth graders contained words (fig. 6.6, p. 59). However, some of the drawings made use of symbols such as lines, arrows, and musical notes. One could have expected that most of the sixth-graders would produce visual representations of music that were similar to those described by Kerchner. This does not appear to be the case, because many of the collected drawings had more in common with pictures.

## 8.3    Assessment of validity

So far, the discussion chapter has offered possible explanations of results and examined how various qualitative analysis results relate to previous research on music listening and visual representations of music. However, it is also necessary to properly investigate the validity of collected data, as this provides knowledge needed to assess if results are actually trustworthy. The following paragraphs provide a two-part assessment of validity. The first part focuses on quantitative data, while the second part treats qualitative data. It should be noted that this assessment may come across as excessively self-critical. This does not mean that the data collection was a failure. However, when trying to modify data collection methods for future experimental research, the flaws and errors are particularly useful. For this reason, this section focuses on the cons rather than the pros.

*Questionnaire validity*

In the Quantitative results chapter (p. 79), it became clear that participants often used a wide range of different response options on each item statement, when filling out the questionnaire. Dick writes that "(…) in quantitative research, a valid measure is one that accurately measures what it purports to measure" (2014, p. 803). These results can be considered an indication of insufficient questionnaire validity, because they suggest that participants might have had rather different understandings of how to correctly respond to item statements. The next paragraphs are a comparison of particularly relevant questionnaire items (Appendix B), related range values (fig. 7.11, p. 80), and music excerpt content (Appendix I), used to critically assess whether or not the questionnaire adequately measured what it was designed to measure.

The first questionnaire item was "The musicians played softly." Considering the qualities of the music excerpt, it is understandable that participant responses were varied. In part A (fig. 5.3, p. 38) the music is quite soft, but in other parts of the excerpt dynamics change significantly. In one way, agreeing with the statement "The musicians played softly" can be

considered an accurate response, because this is true for parts of the music excerpt. However, disagreeing with this statement also appears to be an appropriate response, because some parts of the excerpt are quite loud and intense. In other words, this questionnaire item does not appear to be suitable for assessing accurateness of analytical listening related to dynamics.

The third questionnaire item was "The music was slow." The music excerpt had a tempo of 168 beats per minute (Appendix I), which in itself can be considered a rather fast tempo. Range values (fig. 7.11, p. 80) indicate that participants responded quite differently to this statement, which may suggest poor validity. One possible explanation for these results is that the music excerpt contains certain qualities, particularly related to use of percussion, that might have affected participants' perception of tempo. In part A (fig. 5.3, p. 38), there are no percussion instruments keeping the beat and guitars play quite softly. In parts B and C percussion and drums alternate between playing and not playing, which may have created an impression of tempo changes and may explain the considerable variability in responses.

Measures of range seem to indicate a substantial variation in participants' responses to the sixth questionnaire item (fig. 7.11, p. 80), which was "The music changed between being floating and jagged." One possible explanation of these results may be found in the item statement itself. In some ways, rhythm is a challenging concept to describe without using music terminology. To make sure that participants responded to statements they could understand, everyday words were used instead of musical terminology. These "translations" may however have not fully solved the issue. It is possible that participants were uncertain of what was meant with "floating" and "jagged," resulting in high range values indicating poor validity.

The seventh item statement was "The music sounded happy." Even though several of the groups have range scores that could suggest strong validity (fig. 7.11, p. 80), there are still considerable validity concerns. Together with item #8, which had high range values (fig. 7.11, p. 80), it was intended to measure participants' perception of major/minor modes. This item statement, along with item #8, appears to actually inform about emotional responses rather than perception of musical modes. In other words, these items do not measure what they were intended to measure.

As these examples have shown, there are some indications of insufficient questionnaire validity. For instance, there are items where both agreement and disagreement can be considered appropriate responses. There are also items where participants may lack the music listening experience needed to properly respond. In other words, item statements do not necessarily mean the same thing to all participants. However, this assessment of questionnaire validity can be considered useful in development of new ways to measure music perception. It shows how the individual nature of music listening makes it difficult to properly measure music perception using quantitative procedures. The assessment suggests that questionnaires relying on a Likert-type design may not be an ideal approach for generating data suited to test the hypothesis.

*Interview validity*

The questionnaire has limitations, but it is also important to critically assess interview data, as this might also contribute to understanding whether or not selected data collection methods served their intended purposes. In treatment groups, the interviews were focused on the drawings that participants produced while carrying out their music listening tasks (Appendix J). When comparing qualitative data sources, interviews appear to have sufficient validity. Interview statements clearly match the content in participants drawings. This correspondence between verbal and visual ways of expressing music listening experience in itself suggests good validity. However, there are other issues to consider when assessing interview validity.

Validity can be considered a matter of accuracy (Maul, 2018, p. 1771). Even though comparison of interviews and drawings indicate accuracy in collected data, it is important to question whether or not interview questions accurately correspond with the research question. The short answer is that interview questions both do and do not correspond properly with the research question. The interview guide used in the main data collection (Appendix J) can be criticized for not directly asking participants about their perception. From this perspective, questions concerning participants' visual representations of music, where they are asked to describe their drawings, can be described as being "off target." However, these questions produced a significant amount of interesting statements that shed light on participants' music perception. By explaining their drawings, they provided information about how they in different ways had listened to the music excerpt. In this way, the interview questions resulted in statements that corresponded well with the aim of this thesis. As mentioned in the Method chapter (p. 40), the follow-up study required interview guide adjustments. Because there were

no drawings that could form the basis of interviews, other questions were needed. These questions (Appendix J) can be considered to more accurately correspond with the overarching research question of this thesis, because they apply a more direct focus on music perception.

*Interview reliability*

It is important to note that the use of two different interview guides in itself may pose a threat to data reliability, because control and treatment groups were not asked exactly the same questions. Leung (2015) argues that the notion of replicability, which typically characterizes definitions of reliability in quantitative research, cannot easily be applied to qualitative research. She notes that qualitative reliability is essentially a matter of consistency (p. 3). Changes in the interview guide, made between main and follow-up data collection, can be said to reduce the consistency; however, it should be mentioned that both interview guides, although containing different questions, provided similar information about participants' listening experiences. For this reason, the results should not be considered unreliable.

## 8.4    Refinement of tools for future experimental research

This section of the Discussion chapter attempts to examine how knowledge gained through this thesis contributes to refined methodologies for application in future studies. It seeks to map out an improved approach for investigating possible links between visual representations and music perception, based on the overarching hypothesis (p. 2). This might be useful for other researchers interested in investigating the hypothesis, who have sufficient time and resources for a large-scale study. The first paragraphs examine how the research questions and hypothesis may be improved and adapted to a true experiment setting. Qualitative and quantitative results are compared to identify which components provide particularly rich data. Afterward, a suggested response sheet design is proposed. Additionally, this section provides an estimate of needed sample size, as well as suggestions for how to randomize the sample.

*Research question and modifications to the hypothesis*

One matter that needs to be addressed in future experimental research testing this hypothesis, is the precision of research question focus. Throughout the work on this thesis it has become clear that the research question (p. 2) is not sufficiently focused to be applied in a true experiment setting. It can be said to contain too many music perception variables, making it hard to identify differences in perception caused by representational tasks. It can be

considered crucial to improve research question precision, because it in some ways causes ripple effects impacting nearly all other research project components.

The insufficient precision of the research question can be illustrated through the reciprocal feedback model of musical response (Hargreaves et al., 2012, p. 157), which suggests that a number of different variables affect our responses to music. When reflecting on research question wording and content, it becomes clear that several important aspects were not properly considered. This concern may be particularly related to the "listener" component in the reciprocal feedback model, suggesting individual differences such as gender, age, and musical competence. Even though the research question in this thesis is relatively specific with regards to age, differences in gender and musical competence are not accounted for. It should be noted that the research question seems to more adequately correspond with the other main variables in the mentioned model, "music" and "situations and context." The thesis research question specifies "rhythmic" music as a focus. It also details the listening situations that are to be investigated (fig. 5.1, p. 31).

The concern related to individual differences can be considered less problematic in a true experiment setting, where it can be solved through proper sampling procedures. In other words, sufficient sample size and appropriate participant randomization can make up for individual differences. Because this concern can be understood as a matter of adjustments in methodological design rather than adjustments in research question wording, it will be treated in a later section presenting sample considerations.

When dissecting the research question, another concern emerges. The word "perceive" can perhaps in itself be considered problematic, because the research question does not specify what kind of perception is to be investigated. This might have resulted in an attempt to "cover all the bases," where a variety of different music perception concepts were included in the methodological design. As already suggested, an insufficiently focused research question may have caused ripple effects leading to somewhat imprecise data collection procedures. It seems reasonable to assume that a focus on one particular type of music perception makes it easier to collect accurate data.

After reflecting on the content of the hypothesis guiding this thesis (p. 2), it has become clear that it essentially emphasizes analytical listening. It focuses on musical parameters and

suggests an increase in use of analytical listening caused by an experimental intervention. Because of this, it makes sense to emphasize analytical listening when modifying the research question. Even though such a focus will contribute to a sharpened research question, it can be criticized for still containing a too loosely defined type of music perception. In order to make an informed suggestion about how analytical listening may be specified in a future experiment, it is necessary to properly consider what sub-components that appear suitable for such a study. The next paragraphs compare quantitative and qualitative results, in order to identify sub-components of analytical listening that appear particularly suitable for future research.

One sub-component of analytical listening that perhaps can be considered a particularly useful approach is *timbre*, more specifically in the form of music instrumentation. The group comparison of analytical listening (p. 68) suggested that many participants identified different instruments playing in the excerpt. When comparing with questionnaire item #9 (Appendix B) it is interesting to see that this was one of the statements where all groups displayed a rather high level of confidence. According to median and mode values all groups appeared to disagree with the item statement (fig. 7.9, p. 79). Because of the range in response variation, one cannot draw any hard conclusions. However, in the case of instrumentation, qualitative and quantitative results appear to somehow correspond. For this reason, *instrumentation* appears to be a sub-component of analytical listening that might be fitting for quantitative experiments. It should be noted that other codes applied to interview transcripts can be said to support such an approach. Among all the layers of musical meaning, acoustic layers were the code applied to the largest number of interviews (fig. 6.15, p. 69).

Another sub-component of analytical listening that appears suitable for quantitative inquiries, is *dynamics*. The utilized questionnaire contained two statements linked to dynamics, item #1 and item #2 (Appendix B). The second item appears to suggest high-confidence responses from participants, since all groups had median and mode values indicating agreement (fig. 7.2, p. 76). It should be noted that the first questionnaire item does not indicate high-confidence responses. However, as the questionnaire validity assessment suggested (p. 86), this can be explained by the statement formulation itself. Based on the quantitative results, changes in dynamics appear to be a suitable aspect to examine in future experimental research. It should also be noted that the second questionnaire item had rather small ranges in response variation (fig. 7.11, p. 80), which can be understood as supporting the interpretation

of item #2 resulting in rather high-confidence responses. In addition, results from analysis of interviews appear to support this. The group comparison of structural layers (p. 71) revealed that several participants noted changes in dynamics. Attention towards dynamics was also evident in the group comparison of relative ways to talk about music (p. 74).

When examining how quantitative and qualitative results fit together, an interesting pattern emerges. Participants' questionnaire responses appear to display a higher level of confidence when questionnaire items are linked to *changes in sound events*. Both item #2 and #9 (Appendix B), which have been interpreted as items showing a higher confidence level than other questionnaire items, can be said to contain the element of *change*. The second item suggests that *changes in dynamics* occur, while the ninth item states that there are no *changes in instrumentation* whatsoever. Even though item #9 essentially suggests an absence of change, participants are required to note changes in instrumentation to properly respond to this item statement. What makes this tendency particularly interesting, is that it seems to correspond well with previous research on music perception. In the literature review section treating methodological approaches in research on music perception (p. 10), two types of listening tasks were identified. One of the task types present in several studies, was related to identification of musical differences. With this in mind, it seems that listening tasks focusing on musical changes are particularly useful for experimental research on music perception.

*Recommendations for future experimental research on the hypothesis*
The comparison of quantitative and qualitative results in this thesis suggests two sub-components of analytical listening as useful approaches in future experimental research: *instrumentation* and *dynamics*. Further examination of questionnaire items has indicated that tasks linked to *musical change* are particularly suitable. A research question that could possibly guide such a study, is "Do sixth-graders tasked with visually representing "rhythmic" music whilst listening more accurately notice changes in instrumentation and dynamics than those who are only asked to listen?" This research question can be considered more efficient for several reasons. It specifies a type of music and implies a focus on particular sub-components of analytical listening. It describes what kind of music perception will be investigated in a way that corresponds better with the hypothesis. Additionally, it contributes to more elegant methodological design, consisting of two groups instead of three.

In order to properly examine the overarching hypothesis and revised research question, an experiment-specific hypothesis is needed. The hypothesis that is to be tested also needs to be considered in relation to a null hypothesis. A *null hypothesis* ($H_0$) can be considered opposite to the alternative hypothesis ($H_1$) and often suggests a no-effect-scenario (Loftus, 2010, p. 939). In an experiment based on the revised research question above, an alternative hypothesis can be "I suspect that music listening, when combined with a task encouraging production of visual representations, will increase accurateness in *perception of changes in (a) instrumentation and (b) dynamics*." In this case, an appropriate null hypothesis can be "No significant differences will be found in scores on *perception of changes in (a) instrumentation and (b) dynamics* between the treatment group tasked with production of visual representations while listening, and the listening-only control group."

*Data collection adjustments*

The assessment of questionnaire validity (p. 86) illustrated weaknesses that made it unsuitable for answering this thesis' research question. Because of information obtained by comparing qualitative and quantitative results, as well as corresponding adjustments in research question and hypothesis, it is now possible to propose a more focused response sheet. One approach that appears particularly useful, is to have participants simply report the number of instruments they heard whilst listening and score the loudness of the music (fig. 8.1).

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How many different music instruments did you hear in the first part of the excerpt? \_\_\_\_\_

How many different music instruments did you hear in the last part of the excerpt? \_\_\_\_\_

|                                                         | Soft | Medium | Loud |
| ------------------------------------------------------- | ---- | ------ | ---- |
| How loud was the music in the first part of the excerpt? |      |        |      |
| How loud was the music in the last part of the excerpt?  |      |        |      |

---

*Fig. 8.1: Suggested response sheet*

One of the advantages with this response sheet, compared to the Likert-type questionnaire (Appendix B), is that it does not attempt to inform about a large number of different types of analytical listening. Instead, it focuses solely on accurateness in perception of changes in instrumentation and dynamics. Such a simple design can probably make it easier to measure participants' perception accuracy, because the process mainly consists of scoring response

sheets by matching participant responses with the music's actual instrumentation and dynamics.

Another benefit of using such a design, is that it accounts for music instrument familiarity. Participants may note differences in timbre without being able to connect it with a specific instrument. Some of the conducted interviews appear to indicate that this is a valid concern. Participant C1-1 and C1-2 stated that they did not know the names of many instruments (p. 52). Another indication of lacking instrument familiarity can be found in treatment group interviews. For instance, participant T1-1 perceived the electric guitar in the beginning of the excerpt as a glockenspiel (p. 55). One can assume that this mismatch is caused by similarities in timbre between the two instruments. The ability to identify instruments can be understood as connected with familiarity to different instruments and the kind of timbre that each of them can produce. The suggested response sheet design circumvents this issue, by not relying on participants abilities to name instruments. Instead, it merely requires that participants report how many different sound sources they heard, and to consider whether or not the number of sound sources changed during the music excerpt. Although the suggested response sheet is based on knowledge gained through the work with this thesis, it is important to emphasize that this is an idea that still will need adjustments to function as intended. First and foremost, it should be piloted and refined accordingly before an actual experiment takes place.

In contrast to the methodological design utilized in this thesis, the proposed design relies on a "pool" of predetermined music excerpts. As previously noted (p. 83), the musical characteristics of "Shofukan" might in itself have affected participants' music perception. In order to circumvent this type of issue in the future, it appears useful to use several excerpts. If a tendency in music perception can be identified across several music excerpts, results can be considered more trustworthy. It is important to emphasize that music excerpts should be carefully selected to properly correspond with the response sheet. It is essential that excerpts contain instruments that can easily be distinguished from each other. For instance, music containing multiple guitars, or a large horn section, will not be suitable. In such cases it would be challenging, even for experienced listeners, to accurately report the number of instruments playing. Presumably, a jazz piano trio, a small pop-band, or similar groups with clearly distinguishable instruments are preferable.

Another aspect to consider is, as Bamberger (1991) notes, that children appear to structure musical events differently from one another. In other words, children can have different understandings of where one musical part ends and another one begins (p. 20). In order to counteract this tendency, so that results can be compared in a reliable way, excerpts should be rather short. There are other reasons why short musical excerpts appear to be an ideal approach. Sloboda (1985) argues that "(…) unless the material to be recalled is very short we are in danger of seriously underestimating the amount of musically related mental activity that has taken place" (p. 151). One can assume that excerpts of 10-15 seconds in length, containing one obvious change in instrumentation or dynamics, would yield more precise results than long excerpts containing several changes. However, when testing children's accuracy in perception of instrumentation and dynamics, it would be interesting to also include some excerpts that do not contain any changes whatsoever as a baseline. In order to reliably select excerpts that suit the needs of the proposed approach to future experimental investigation, consultation with both musicians and non-musicians can be beneficial. In this way, selection of excerpts does not solely rely on the researcher's understanding of musical qualities.

Although using several music excerpts appears to be better than relying on one excerpt, each participant should not be subjected to several excerpts. If each participant listens to several music excerpts, filling out the suggested response sheet after each excerpt, the precise intent of the experiment could be revealed. In other words, a *Hawthorne effect* (Suter, 2012, p. 7). Participants can become aware of what they should focus their listening towards and the data collection procedure can in itself produce changes in participants' music perception. The issue is possible to solve by randomizing music excerpts in a way that makes it possible to trace participants' responses to the specific excerpts they heard.

*Adjustments in methodological design*
So far, the discussion concerning revisions of research approach have discussed issues related to the thesis research question, and proposed adjustments that can contribute to production of more focused knowledge. These adjustments can create opportunities for experimental studies to generate data that refute or support the hypothesis in a more reliable way. It is however important to emphasize that the proposed response sheet (fig. 81, p. 93) should be piloted because unforeseen issues may arise. The next paragraphs discuss how the data collection approach itself may be refined. As mentioned in the Method chapter, true experiments are

typically based on large and randomized sample sizes, making it possible to produce statistical inferences that can be generalized to the target population (Lenth, 2012, p. 187). In other words, purposeful sampling and small sample sizes will not suffice in a true experiment. Two key components related to sampling should be considered, sample size and randomization. It is important to determine a sample size that will produce reliable results. According to Lenth (2012, p. 187), one of the most popular ways of determining sample size is to examine the power of a test of the hypothesis. However, the power test procedure suggested by Lenth, based on a two-sample t test (p. 188), appears to rely on measures of standard distribution in previous studies that are similar to a planned experiment. Since it has been challenging to find previous studies that have investigated similar research questions using quantitative approaches, other ways of determining sample size needs to be considered.

One possible way of determining sample size, is to use a simplified formula by Yamane that only requires population size and level of precision (Israel, 1992, p. 4). In the case of this experiment, the Norwegian population at age 10 can be considered the population size. Even though many children become 11 years during sixth-grade, it would be inaccurate to include both age groups in the population estimate because this would result in a kind of doubling of target population. According to Statistics Norway (2019), the total Norwegian population at age 10 is 65609. One can assume that some children at this age are not attending school and that the population size estimate could be reduced. However, this number can be considered suitable for generating a conservative sample size estimate. With a confidence level of 95 percent, the sample size should be 398 participants, which would probably require a research team in a study across multiple years. It can be noted that there are several other ways of determining sample size that needs to be carefully considered.

Alferes (2012) writes that randomization procedures differ according to experiment design. He lists two main categories: between-subjects designs, and within-subjects designs. *Between-subjects designs* imply that each participant group is exposed to only one experimental condition (p. 1). This description can be considered to fit with the quasi-experimental design used in this thesis (fig. 5.1, p. 31). For this reason, it can serve as a starting point for examining possible ways to randomize participants in future research. *Randomized block design* appears to be one approach connected to between-subject designs that might be particularly useful. When done properly, such a procedure can reduce variability caused by heterogeneity in experimental units (Alferes, 2012, p. 30).

One can suspect that gender and musical competency causes variations that will make it harder to see the expected relationship between visual representations and accurateness in perception of instrumentation. These two sources of variation can be used as blocking variables. In essence, blocking involves organizing participants in homogenous groups (blocks) based on measures of blocking variables. In other words, participants should be placed in homogenous groups based on gender and musical competency prior to the actual randomization procedure. It should be noted that there are a number of randomized block design types, each utilizing different procedures for blocking and randomizing participants. These should be considered carefully before selecting randomization procedure.

Even though it should be fairly simple to organize homogenous groups according to gender, creating such blocks based on musical competency appears to require some kind of testing. When looking back at considerations made during development of this thesis' methodology, discarded ideas offers a possible solution. In the section treating development of participant grouping (p. 35), music aptitude testing and parental questionnaires are mentioned. It is likely that a combination of both approaches would systematically produce homogenous groups.

*Summary of proposed adjustments*

In this section, providing suggestions about how future experimental research on the hypothesis can be carried out, several avenues have been explored. An examination of the utilized research question revealed a need for refinement, in order to support large-scale true experiments. It was suggested that a focused research questions and corresponding experiment-specific hypotheses, focusing on particular sub-components of analytical listening, can produce knowledge needed to support or refute the overarching hypothesis. A comparison of qualitative and quantitative data collected in this thesis suggested that instrumentation and dynamics appear to be sub-components of analytical listening particularly suitable for future quantitative inquiries. In addition, tasks related to musical change are preferable. This section has also suggested how a response sheet may be designed, as well as procedures for selection of music excerpts. The simple and rather conservative estimate of sample size indicates that nearly 400 participants are needed. By using a randomized block design, future research can account for individual differences corresponding to gender and musical competency. The suggested experiment design is summarized below (fig. 8.2).
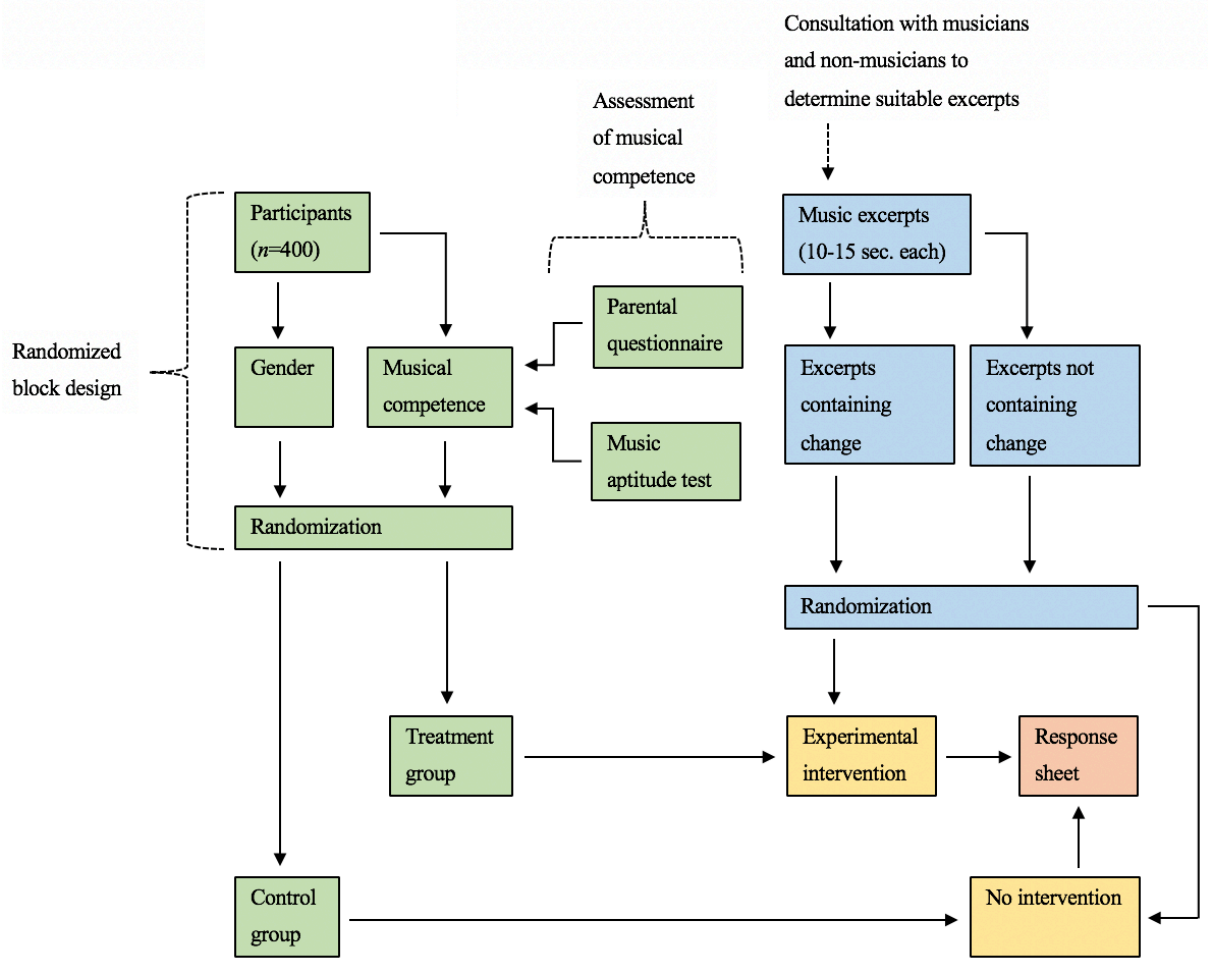
*Fig. 8.2: Suggested experiment design*

# 9   Conclusion

To briefly summarize, this thesis examined how sixth-graders (*n*=18) perceive a rhythmic music excerpt under three listening task conditions: drawing whilst listening, drawing after listening, and only listening. The aim was to explore the extent to which listening tasks encouraging production of visual representations would guide children's attention towards musical parameters, and thus yield more analytical responses. This study utilized a mixed methods (primarily qualitative) quasi-experimental design. Although not unheard of in music education research, it can be described as a rather novel methodological approach. The data collection process consisted of four stages: pilot study #1, pilot study #2, main data collection, and follow-up data collection. Interviews and visual representations of music were analyzed deductively, while quantitative data was examined by applying statistical procedures considered suitable for a Likert-type questionnaire.

While this thesis cannot definitively assert whether creation of visual representations affects sixth-graders' music perception in a way that guides their attention towards musical parameters, its qualitative results suggest that students this age utilize both emotional and analytical listening styles. The usefulness of understanding analytical and emotional listening as an essential dichotomy (as common in previous studies) can be questioned, because these concepts appear to have a dialectic relationship. In addition, the results reveal that participants' music perceptions are relatively diverse, complex and nuanced. For this reason, one should not underestimate sixth-graders' abilities to perceive music in ways that gives them rich and meaningful listening experiences.

These findings correspond well with the applied theoretical perspectives. They highlight the individual nature of music listening, as well as how interaction between music and listener is essential for producing musical meaning. Additionally, they suggest that gender and musical competence may have affected the participants' responses to music. Findings in this thesis often correspond with previous research on music perception and children's invented notations; for instance, studies that highlight subjectivity in music listening responses or describe the function of visual representations. However, in some instances, the findings contradict previous studies that describe age-related changes in balance between emotional and analytical listening, or age-related differences in characteristics of invented notations.

Although quantitative measures may not independently provide reliable and valid data in this thesis, in combination with the qualitative data they suggest that certain musical elements may provide a particularly useful focus in future experimental research on the hypothesis. Questionnaire items related to changes in instrumentation and dynamics suggest a rather high level of confidence in participants' responses and appear to also correspond well with interview data. One unique advantage of the design of this study has been that the combination of qualitative and quantitative data enables a reevaluation of instruments commonly used in experimental studies. Consequently, this study has also been able to make a modest contribution to improvement of methodologies for further research on the topic.

As a final remark, I would like to emphasize that research of this kind can be important to music education. In essence, this thesis can be understood as a step towards improved teaching practices. My hope is that future research may be able to identify certain listening activities as beneficial for promoting analytic listening approaches. Such knowledge can be useful when planning and conducting learning activities related to music listening, which is a key topic in the curriculum. One might ask if analytical listening is a necessary competence, something that children should learn. My response to such a critique is that in our modern society we are surrounded by music and noise most of the time, either intentionally or unintentionally. By taking some time to listen analytically, we get opportunities to remove ourselves from the distracting stream auditory information present in our daily lives to center our attention towards the "inner workings" of music. Such a focused listening approach can provide new ways of appreciating music. Rich and meaningful listening experiences may result in an enduring passion for music, that in multiple ways can enrich our lives. If we, as music educators, can spark a strong interest in music among young students, we have in many ways succeeded. Giving children opportunities to develop their analytical listening can be one way to get there.

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## Appendix A: Data collection inventory

### Audio-graphic tasks

| | |
|---|---|
| Color pencils | Faber-Castell 10 Jumbo Buntstifte (beige, black, blue, brown, green, light blue, orange, purple, red, and yellow) |
| Drawing paper | A4 |
| Markers | Staples colouring pens (black, brown, dark blue, dark pink, green, light blue, light pink, orange, purple, red, turquoise, and yellow) |
| Pen | Paper Mate Write Bros. (black) |
| Pencil | Staples wooden pencil |
| Ruler | Staples linjal (15 cm) |

### Interviews

| | |
|---|---|
| Sound recorder | Zoom H6 |

### Presentation of music excerpt

| | |
|---|---|
| Computer | Apple MacBook Pro (2016) |
| Sound interface | Focusrite Clarett 2pre |
| Speakers | Yamaha HS7 |

## Appendix B: Questionnaire

(Translated from Norwegian to English)


Do these statements match with the music we just heard?

Check of the box that most accurately correspond with what you heard.

| | Strongly agree | Agree | Uncertain | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| The musicians played soft. | | | | | |
| The musicians changed between playing soft and loud. | 1 | 2 | 3 | 4 | 5 |
| The music was slow. | 1 | 2 | 3 | 4 | 5 |
| The music changed between going slow and fast. | 1 | 2 | 3 | 4 | 5 |
| The music was floating. | 1 | 2 | 3 | 4 | 5 |
| The music changed between being floating and jagged. | 1 | 2 | 3 | 4 | 5 |
| The music sounded happy. | 1 | 2 | 3 | 4 | 5 |
| The music changed between sounding happy and sad. | 1 | 2 | 3 | 4 | 5 |
| All instruments played all the time. | 1 | 2 | 3 | 4 | 5 |
| The musicians played the same thing all the time | 1 | 2 | 3 | 4 | 5 |


Great work! Make a nice drawing on the back of the paper.

## Appendix C: Review comparison table

| Research on visual representations of music | | | | | | |
|---|---|---|---|---|---|---|
| **Title** | **Author/ Year** | **Research question(s)** | **Theoretical perspectives and concepts** | **Methodological approach and design** | **Analysis approach and design** | **Findings and results** |
| A Child's Development of Music Notation through Composition | Upitis (1987) | How one child develops music reading and writing. Describes the first eight months of a longer study. | No apparent theoretical perspectives applied. | Inspired by a longitudinal case study on language development. Observation of musical activity and collection of compositions. Participant 5 years old. | No clearly defined analysis method. Presentation of observational data combined with researcher comments. | The participant used a number of different standard or invented ways to indicate number of events, pitch, tempo, mood, duration, and register. Throughout the study, the participant's ability to write music exceeded his ability to read notation. |
| An Investigation into Children's Responses through Drawing, to Short Musical Fragments and Complete Compositions | Elkoshi (2002) | Test the hypothesis of a connection between fragmental and contextual perception of music. | Self-developed categories: zero, association, pictogram, formal response, and growth. | Experimental approach. Audio-graphic task. Collection of verbal explanations and drawings. Participants 7-8 years old. | Procedure consisting of three phases: material analysis, structural analysis, and conceptual analysis. | Findings refute the hypothesis of a connection between fragmental and contextual perception, where understanding of musical fragments is the basis for comprehension of larger, complex compositions. |
| Children's Drawings of Simple Rhythms | Bamberger (1991) | Investigate why participants group rhythms differently in their visual representations. | No apparent theoretical perspective in this chapter but refers to Gestalt psychologists. | A series of studies on rhythm. Data collected from an experimental music program. Collection of verbal explanations and drawings. Participants 8-9 years old (*n*=25). | Organizes children's notations in two categories: "figural" and "formal." | Participants: "(…) focus on different but possible and legitimate features of the material – those that contribute to the coherence that each student has made (p. 19)." Children structure and organize flow of events differently. Boundaries between musical parts are blurred, similar to adults. |
| Children's invented notations: Extending knowledge of their intuitive musical understandings using a Vygotskyan social constructivist view. | Carroll (2017) | Investigate the features of notational systems that children in different age groups use. Examine how children use available resources to complete notational task. | Uses a Vygotskyan perspective. "Metarepresentational competence." "Zone of proximal development." | Audio-graphic task. Audio and video recordings of task, as well as audio recorded conversations with parents, teacher and school principal. Participants 5-9 years old. | The study drew on "portraiture." A combination of "phenotypic" and "genotypic" analysis. Notations coded according to categories developed in previous research on invented notation. | Children's notations became increasingly song-specific. Notations showed what they knew about music, as well as extra musical aspects (e.g. aesthetic preferences). Use of drawing tools appeared to be connected with "schooling." All children used singing, gesturing, pointing, speaking and drawing materials in creative ways. Older children used their singing to reflect on and verify what they were doing. |

| | | | | | |
|---|---|---|---|---|---|
| Children's invented notations and verbal responses to a piano work by Claude Debussy | Elkoshi (2015) | Investigate how participants conceptualize classical music intended for children. Examine how age affects children's verbal and visual responses to the music. | Self-developed categories: associative, formal, and compound responses. | Tape recorded verbalizations, video recorded meetings and collection of notations. | Procedure consisting of three phases: material analysis, structural analysis, and conceptual analysis. | Participants used different graphical codes to represent metaphors and/or formal aspects of the music. Associative responses were dominating. Gradual decline in associative responses corresponding with increasing age. Formal responses inconsistent across all age groups. |
| Children's Verbal, Visual, and Kinesthetic Responses: Insight into Their Music Listening Experience | Kerchner (2000) | Investigate cognitive processes as they appear during listening to a music excerpt. Compare perceptual and affective responses by grade level. | Appears to be based on cognitive perspectives by Gardner and others. | Verbal, visual and kinesthetic tasks. Task related interviews and questionnaire concerning musical competence. Second- and fifth-graders. | No clearly defined analysis method. Development of categories: perceptual responses, affective responses, use of musical terms, style of thinking, and degree of differentiation. | Older children used more sophisticated thinking strategies, to provide more differentiated descriptions of musical information. They also had more affective responses. All children connected music excerpt with previous musical experiences. Second-graders had less differentiated visual responses. They tended to draw pictures, while fifth-graders also used words and combinations of markings. |
| Constructing a View of Children's Meaning-Making as Notators: A Case-Study of a Five-Year-Old's Descriptions and Explanations of Invented Notation | Barrett (2001) | Examine notational strategies used by pre-literate, "musically naïve" kindergarten children. | No apparent theoretical perspectives applied. | Case study based on an exploratory investigation. Collection of notations and observational data. Audio recorded sessions. Five-year-old participant. Two-month data collection. | No clearly defined analysis method. Presentation of conversations with key informants, supplemented with pictures of their notations. | Six notation categories: representation of instrument, symbolic representation, enactive, exploratory, representation of instrument with modification, and adopted symbols. |
| Emerging Musical Literacy: Investigating Young Children's Music Cognition and Musical Problem-Solving through Invented Notations | McCusker (2001) | Investigate what children's musical representations reveal about musical problem-solving and emerging musical literacy. | "Emerging musical literacy." "Reflection-in-action." | Mixed methods study. Video recorded classroom observations, notations, parent questionnaire, and music audiation test. Participants 5-7 years old. Ten-week data collection. | No clearly defined analysis method. Presentation of notations supplied with comments by the researcher. Data were coded to develop categories. | A hierarchy in the invented notations: pictoral (a), pictoral-iconic (b), and iconic (c). Rhythm depicted more often than melody. Musical thinking not dependent on age only (also language literacy and musical competence). Five categories of musical behaviors: moving, chanting, singing, playing, and graphic representations. |

| | | | | | | |
|---|---|---|---|---|---|---|
| External representation and the architecture of music: Children inventing and speaking about notations | Pramling (2009) | How children represent music. How teachers and children talk about representations. | Vygotskyan perspective, particularly the concept of "tools." "External representations." | Data drawn from a larger three-year study. Video recording of a preschool activity. | No clearly defined analysis method. Video analysis where empirical excerpts are presented in a temporal and thematic way. | Children use onomatopoeia to mimic sounding qualities. Children develop a database of representational strategies, and interaction with teacher appears to aid the development. |
| Musical Maps as Narrative Inquiry | Blair (2007) | How children make meaning during listening experiences in classroom. | "Reflection-in-action." "Conversation" between music and listener. | Qualitative ethnographic study. Observations and video recordings. Fifth-graders. Seven-month data collection. | Reflexive analysis with repeated searching and reading of literature. | Gestures became more sophisticated. Singing became more accurate. Visual representations were edited or given more detail. |
| Musical free play: A case for invented musical notation in a Hong Kong kindergarten | Lau, & Grieshaber (2010) | Examine beliefs and practices about music education among kindergarten teachers. Investigate how beliefs and practices support children's creativity. | "Scaffolding." "Creativity." | Case study based on video recordings, field notes, and a stimulated recall interview. Twelve-week data collection. | No clearly defined analysis method. Data systematically grouped in categories. Interviews analyzed for word usage. | A well-planned and well-arranged creative environment affects interaction between children and teacher. There were opportunities for children to interact, explore and express themselves. Children's musical creativity could flourish. |
| Self-invented notation systems created by young children | Lee (2013) | Understand the systems children develop to recall pitches and rhythms. | Some cognitive theories are mentioned (Piaget, Bruner, and Gardner). "Thinking-in-action." | Notations and interviews collected throughout the school year. One-year data collection Participants 4-6 years old. | No clearly defined analysis method. Analysis focuses on participants' invented notations, with interviews as auxiliary material. | Systems used to recall pitch or rhythm: quantitative size, graphic pattern, and literal symbols. Systems used to recall pitch and rhythm simultaneously: system with indication and combination of two systems. Evidence of emergent literacy when learning music. Children's notations gradually became more precise. Children with advanced notational strategies tended to perform better in literacy skills. |

| Research on music listening | | | | | | |
|---|---|---|---|---|---|---|
| **Title** | **Author/ Year** | **Research question(s)** | **Theoretical perspectives and concepts** | **Methodological approach and design** | **Analysis approach and design** | **Findings and results** |
| Children Processing Music: Electric Brain Responses Reveal Musical Competence and Gender Differences | Koelsch, Grossmann, Gunter, & Hahne (2003) | Investigate music-syntactic processing in children and comparing different age groups. | No apparent theoretical perspective applied. | Experimental approach. EEG measurements. Participants were 5 and 9 years old ($n$=28). | Statistical analysis procedures. | Results suggest a gender difference in children's music processing. Results suggest that children process language and music more similarly than adults, indicating a common origin of language and music in the human brain. The study shows that children as young as five years old process music according to cognitive representations of musical syntax. |
| Children with Specific Language Impairment Also Show Impairment of Music-syntactic Processing | Jentschke, Koelsch, Sallat, & Friederici (2008) | Investigate music-syntactic processing in children by comparing children with and without specific language impairment. | No apparent theoretical perspective applied. | Experimental approach. Language development test, nonverbal intelligence test, self-authored test of musical skills, and EEG measurements. Participants 4-6 years old. | Statistical analysis procedures. | Results indicate a strong relationship between syntax processing in language and music. Children with difficulties processing language syntax had similar difficulties in the music domain. |
| Cognitive Styles of Music Listening | Kreutz, Schubert, & Mitchell (2008) | Develop psychometric scales for music empathizing and systemizing and use these to explore differences related to sex and musical competence. | Baron-Cohen's E-S theory. | Questionnaire study. 4-point Likert scale. Participants 12-87 years old ($n$=442). | Statistical analysis procedures. | Results suggest that music empathizing and music systemizing support and extend the general E-S theory. The surveys showed that females tended to be positive music empathizers, while males tended to be positive systemizers. Findings suggest that high levels of music performance experience can be associated with music systemizing. |
| Emotional reactions to music by gender, age, and expertise | Robazza, Macaluso, & D'Urso (1994) | How age, gender and musical competence relates to emotional music perception. | No apparent theoretical perspective applied but Gardner is mentioned. | Listening task involving identification of emotion and emotional intensity. Questionnaires for self-reports of emotional perception. Participants were 9-10 and 19-29 years old ($n$=80). | Statistical analysis procedures. | Findings suggest no significant gender differences in emotional responses. Musically competent and naïve listeners both ascribed similar emotions to music excerpts. Children did more often than adults perceive happiness. |

| | | | | | | |
|---|---|---|---|---|---|---|
| Experimental evidence of the roles of music choice, social context, and listener personality in emotional reactions to music | Liljeström, Juslin, & Västfjäll (2012) | Investigate a selection of individual, situational, and musical factors in emotional reactions to music. | No apparent theoretical perspective applied. | Experimental approach. Self-report of emotional responses and intensity. Measures of psychophysiological responses and personality traits. Participants 20-43 years old (*n*= 50). | Statistical analysis procedures. | Self-selected music lead to more intense emotional arousal than randomly sampled music. Self-selection also resulted in more positive emotions. Listening with a close friend also produced more intense emotions. The personality trait "openness to experience" correlated with the emotional intensity experienced by participants. Another trait, "neuroticism" was connected to more negative emotions. |
| Influence of trait empathy on the emotion evoked by sad music and on the preference for it | Kawakami, & Katahira (2015) | How children's empathic abilities affect emotional responses to music. Focus on link between trait empathy and preferences for sad music. | "Perceived" and "felt" emotions. "Trait empathy." | Experimental approach IRI scale used to measure trait empathy and self-reporting of experienced emotions. Participants 12 years old (*n*=84). | Statistical analysis procedures. | Some sub-components of trait empathy can be connected to emotional responses and preferences for sad music. Perspective-taking abilities affected the emotional responses to sad music. Sweet emotions contributed to preferences for sad music. Tendency to fantasize directly explained preferences for sad music. |
| Music reception and emotional regulation in adolescence and adulthood | Leipold, & Loepthien (2015) | Examine whether attentive-analytical and emotional listening is connected to accommodative coping and rumination. | "Attentive-analytical" and "emotional" listening. "Accommodative coping" and "rumination." | Questionnaire-based study. Participants in study #1 18-86 years old (*n*=521). Participants in study #2 12-17 years old (*n*=152). | Statistical analysis procedures. | Findings indicate that emotional listening increases with age (in adolescence and adulthood). Attentive-analytical listening decreases between ages 12-18 and starts to increase from 18-23. Musical competence appears to influence music perception. Findings also suggest similarities between attentive-analytical listening and accommodative coping, and emotional listening and rumination. |
| Musician Children Detect Pitch Violations in Both Music and Language Better than Nonmusician Children: Behavioral and Electrophysiological Approaches | Magne, Schön, & Besson (2006) | Test the hypothesis that musical training aids pitch processing in both music and language. | No apparent theoretical perspective applied. | EEG measurements. Participants 7 to 9 years old (*n*=26). | Statistical analysis procedures. | Findings suggest that children with musical competence are better at pitch detection, in both music and language, than musically naïve children. Results indicate a common pitch processing mechanism in both language and music perception. |

| | | | | | | |
|---|---|---|---|---|---|---|
| The Dimensions of Aesthetic Reactions to Music | Hargreaves, & Colman (1981) | Investigate and compare how adults react to different music pieces. | No apparent theoretical perspective applied. | Experimental approach. Collection of self-reported listening responses based on a specially-designed response sheet. Adult participants. | Content analysis based on five response categories: categorical, objective-analytic, objective-global, affective, and associative | Those who produce affective constructs are less likely to produce other kinds of responses and are likely to have little musical experience. In other words, musically naïve persons are likely to respond in a subjective way, while musically experienced persons are likely to provide objective or technical reactions. |
| The role of mood and personality in the perception of emotions represented by music | Vuoskoski, & Eerola (2011) | Explore how participants' personality and mood affects evaluations of emotions in music. | Refers to behavioral theory and personality theory. | Experimental approach. Collection of self-reported perceived and felt emotions. | Statistical analysis procedures. | Participants' moods appeared to bias their evaluations of emotions in music. However, extraversion seemed to moderate this effect. Personality traits were connected to music preference. |

## Appendix D: Information letter to parents

(Norwegian)

# Ønsker du at barnet ditt skal delta i forskningsprosjektet «Bruk av grafisk notasjon i musikkrelaterte lytteaktiviteter»?

Dette er en forespørsel om samtykke til ditt barns deltakelse i et forskningsprosjekt. Prosjektet undersøker hvordan tegning av musikk påvirker barns lytting. I dette skrivet vil jeg informere deg (barnets forelder/verge) om målene for prosjektet, og hva deltakelse innebærer.

**Formål**
Prosjektet mitt undersøker hvordan eldre barn i grunnskolen lytter, når de tegner ned musikk på papir. Spørsmålene jeg prøver å besvare omhandler rytmisk musikk (pop, rock, jazz og lignende), og fokuserer på hvilke deler av musikken barn oppfatter. Prosjektet er en masteroppgave i musikkpedagogikk. Den har et relativt begrenset omfang, og vil involvere rundt 20 elever.

**Hvem er ansvarlig for forskningsprosjektet?**
Høgskulen på Vestlandet er ansvarlig for prosjektet.

**Hvorfor får barnet ditt spørsmål om å delta?**
Det er flere grunner til at barnet ditt blir spurt om å delta i dette prosjektet.
- Barnet kjenner meg litt fra før, gjennom tidligere praksisbesøk på skolen.
- Barnet er i en alder hvor man fint kan si noe om egne meninger og tanker.

**Hva innebærer det for barnet å delta?**
Deltakerne i undersøkelsen skal gjennomføre en kort lytteoppgave som involverer tegning av musikk. Lytteoppgaven gjennomføres i små grupper, bestående av 3-4 elever. Det blir gjort videoopptak av aktiviteten. Etter lytteoppgaven svarer deltakerne på noen spørsmål om lytting. Det blir gjort lydopptak av samtalen. Elevenes tegninger samles inn når alle aktivitetene er gjennomført. Totalt vil aktivitetene vare i ca. 30 minutter.

**Det er frivillig å delta**
Det er frivillig å delta i prosjektet. Du kan når som helst trekke ditt samtykke, uten å oppgi noen grunn. Alle opplysninger om barnet vil da bli slettet. Dersom du velger at barnet ditt ikke skal delta, vil dette ikke ha noen negative konsekvenser for deg eller ditt barn. Det samme gjelder dersom du på et senere tidspunkt velger å avbryte deltakelsen.

**Barnets personvern – hvordan vi oppbevarer og bruker opplysninger om barnet**
Jeg vil bare bruke opplysningene om barnet til formålene jeg har fortalt om i dette skrivet. Jeg behandler opplysningene konfidensielt og i samsvar med personvernregelverket.
- Det er kun jeg og min veileder som vil ha tilgang til innsamlede opplysninger.
- Lyd- og videoopptak vil oppbevares i et låst skap.
- Datamaskinen som brukes i prosjektet er passordbeskyttet, og vil oppbevares i et låst rom.
- Navn eller andre personentydige kjennetegn blir erstattet med en nummerkode i datamaterialet. Listen med oversikt over koder og navn blir oppbevart separat fra selve datamaterialet.

Masteroppgaven vil kun vise til anonymiserte utsagn, aktivitetsbeskrivelser og tegninger. Dermed vil det ikke være mulig å gjenkjenne deltakerne i den publiserte teksten.

**Hva skjer med opplysningene om barnet når vi avslutter forskningsprosjektet?**
Prosjektet skal etter planen avsluttes 15.05.19. Ved prosjektslutt vil datamaterialet slettes.

**Dine rettigheter**
Så lenge barnet ditt kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om barnet,
- å få rettet personopplysninger om barnet,
- få slettet personopplysninger om barnet,
- få utlevert en kopi av barnets personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av barnets personopplysninger.

**Hva gir meg rett til å behandle personopplysninger om barnet?**
Jeg behandler opplysninger om barnet, basert på ditt samtykke.

På oppdrag fra Høgskulen på Vestlandet har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

**Hvor kan jeg finne ut mer?**
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

*Høgskulen på Vestlandet*
Torkel Toft (student)
Epost: 145066@stud.hvl.no
Telefon: 405 11 006

David G. Hebert (veileder)
Epost: David.Gabriel.Hebert@hvl.no
Telefon: 55 58 57 64

*Vårt personvernombud*
NSD – Norsk senter for forskningsdata AS
Epost: personvernombudet@nsd.no
Telefon: 55 58 21 17

Med vennlig hilsen,

Torkel Toft (student)                                David G. Hebert (veileder)

_____        _____

# Samtykkeerklæring

Jeg har mottatt og forstått informasjonen om prosjektet «Bruk av grafisk notasjon i musikkrelaterte lytteaktiviteter», og har fått anledning til å stille spørsmål. Jeg samtykker til:

deltakelse i lytteoppgave og spørsmål om lytting.


Jeg samtykker til at opplysninger om _____ (barnets navn) behandles frem til prosjektet er avsluttet, ca. 15.05.19.


_____

(Signert av forelder/verge, dato)

**Appendix E: NSD receipt**

(Norwegian)

David Gabriel Hebert

5063 BERGEN

Vår dato: 16.07.2018          Vår ref: 61267 / 3 / BGH          Deres dato:          Deres ref:

# Vurdering fra NSD Personvernombudet for forskning § 31

Personvernombudet for forskning viser til meldeskjema mottatt 24.06.2018 for prosjektet:

| 61267 | *Bruk av grafisk notasjon i musikkrelaterte lytteaktiviteter: En kvalitativ undersøkelse av sjetteklassingers egenproduserte grafiske notasjoner, relatert til elevenes musikklytting* |
| Behandlingsansvarlig | *Høgskulen på Vestlandet, ved institusjonens øverste leder* |
| Daglig ansvarlig | *David Gabriel Hebert* |
| Student | *Torkel Toft* |

## Vurdering
Etter gjennomgang av opplysningene i meldeskjemaet og øvrig dokumentasjon finner vi at prosjektet er meldepliktig og at personopplysningene som blir samlet inn i dette prosjektet er regulert av personopplysningsloven § 31. På den neste siden er vår vurdering av prosjektopplegget slik det er meldt til oss. Du kan nå gå i gang med å behandle personopplysninger.

## Vilkår for vår anbefaling
Vår anbefaling forutsetter at du gjennomfører prosjektet i tråd med:
• opplysningene gitt i meldeskjemaet og øvrig dokumentasjon
• vår prosjektvurdering, se side 2
• eventuell korrespondanse med oss

Vi forutsetter at du ikke innhenter sensitive personopplysninger.

## Meld fra hvis du gjør vesentlige endringer i prosjektet
Dersom prosjektet endrer seg, kan det være nødvendig å sende inn endringsmelding. På våre nettsider finner du svar på hvilke endringer du må melde, samt endringsskjema.

## Opplysninger om prosjektet blir lagt ut på våre nettsider og i Meldingsarkivet
Vi har lagt ut opplysninger om prosjektet på nettsidene våre. Alle våre institusjoner har også tilgang til egne prosjekter i Meldingsarkivet.

## Vi tar kontakt om status for behandling av personopplysninger ved prosjektslutt

*Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.*

Ved prosjektslutt 15.05.2019 vil vi ta kontakt for å avklare status for behandlingen av personopplysninger.

Se våre nettsider eller ta kontakt dersom du har spørsmål. Vi ønsker lykke til med prosjektet!

Katrine Utaaker Segadal

Belinda Gloppen Helle

Kontaktperson: Belinda Gloppen Helle tlf: 55 58 28 74 / belinda.helle@nsd.no

Vedlegg: Prosjektvurdering
Kopi: Torkel Toft, 145066@stud.hvl.no

**Personvernombudet for forskning**

Prosjektvurdering - Kommentar

INFORMASJON OG SAMTYKKE

Du har opplyst i meldeskjema at utvalget vil motta skriftlig og muntlig informasjon om prosjektet, og samtykke skriftlig til å delta. Vår vurdering er at både informasjonsskrivet til barna og foreldrene er godt utformet.

OBSERVASJON I KLASSEROMMET

Det er viktig at det bare er elever som har samtykket til deltakelse som blir filmet/tatt lydopptak av i forbindelse med observasjonen i klasserommet. Når videoobservasjon i klasserommet også innebærer lydopptak er det ikke tilstrekkelig å plassere kamera slik at elever ikke filmes. Elevene som ikke deltar i forskningen må få være i annet rom (f.eks. hos parallellklassen), slik at de kan delta muntlig i undervisningen uten at deres stemmer registreres.

Elevene må informeres om det alternative opplegget på forhånd, slik at deltagelse i forskningen oppleves reelt frivillig.

INFORMASJONSSIKKERHET

Personvernombudet forutsetter at du behandler alle data i tråd med Høgskulen på Vestlandet sine retningslinjer for datahåndtering og informasjonssikkerhet. Vi legger til grunn at bruk av mobil lagringsenhet er i samsvar med institusjonens retningslinjer.

PROSJEKTSLUTT OG ANONYMISERING AV DATAMATERIALET

Prosjektslutt er oppgitt til 15.05.2019. Det fremgår av meldeskjema og informasjonsskrivet at du vil anonymisere datamaterialet ved prosjektslutt.

Anonymisering innebærer vanligvis å:
- slette direkte identifiserbare opplysninger som navn, fødselsnummer, koblingsnøkkel
- slette eller omskrive/gruppere indirekte identifiserbare opplysninger som bosted/arbeidssted, alder, kjønn
- slette lydopptak
- slette eller sladde bilde- og videoopptak

For en utdypende beskrivelse av anonymisering av personopplysninger, se Datatilsynets veileder:
https://www.datatilsynet.no/globalassets/global/regelverk-skjema/veiledere/anonymisering-veileder-041115.pdf

VURDERING AV PROSJEKTET ETTER NY PERSONOPPLYSNINGSLOV (GDPR)

20. juli 2018 blir en ny lov om behandling av personopplysninger innført i Norge. Dette prosjektet er vurdert etter gjeldende lovverk, ikke det nye lovverket. Informasjonsskrivet vedlagt meldeskjemaet er imidlertid i tråd med det nye lovverket, og vi finner derfor at prosjektet kan hjemles i artikkel 6. nr. 1 bokstav a) i ny personopplysningslov.

## Appendix F: Information letter to participants

(Norwegian)

**Har du lyst å være med i prosjektet mitt?**

Jeg skal forske på tegning av musikk.

Jeg prøver å finne ut om det gjør noe med hvordan vi lytter.

Jeg ønsker å ha deg med fordi:

- Vi kjenner hverandre litt fra før.
- Du kan komme med spennende tanker og meninger.

Hvis du velger å bli med skal du gjøre en liten lytteoppgave.

I oppgaven skal du tegne det du hører i musikken.

Jeg filmer arbeidet med tegningen.

Vi skal også snakke litt om hvordan du lytter til musikk.

Jeg gjør opptak av det vi snakker om.

Det er frivillig å delta.

Det betyr at du selv bestemmer om du har lyst til å være med.

Det går helt fint om du ikke vil delta.

Jeg kommer til holde navnet ditt hemmelig.

Ingen som leser om prosjektet skal kunne finne ut at du har vært med.

Hilsen Torkel Toft.

Vil du være med?

☐ Ja, jeg vil være med.

☐ Nei, jeg vil ikke være med.

--------------------------------------------------------------------------------------------------------

(Skriv navnet ditt på linjen)

**Appendix G: Pilot study #2 room plot**
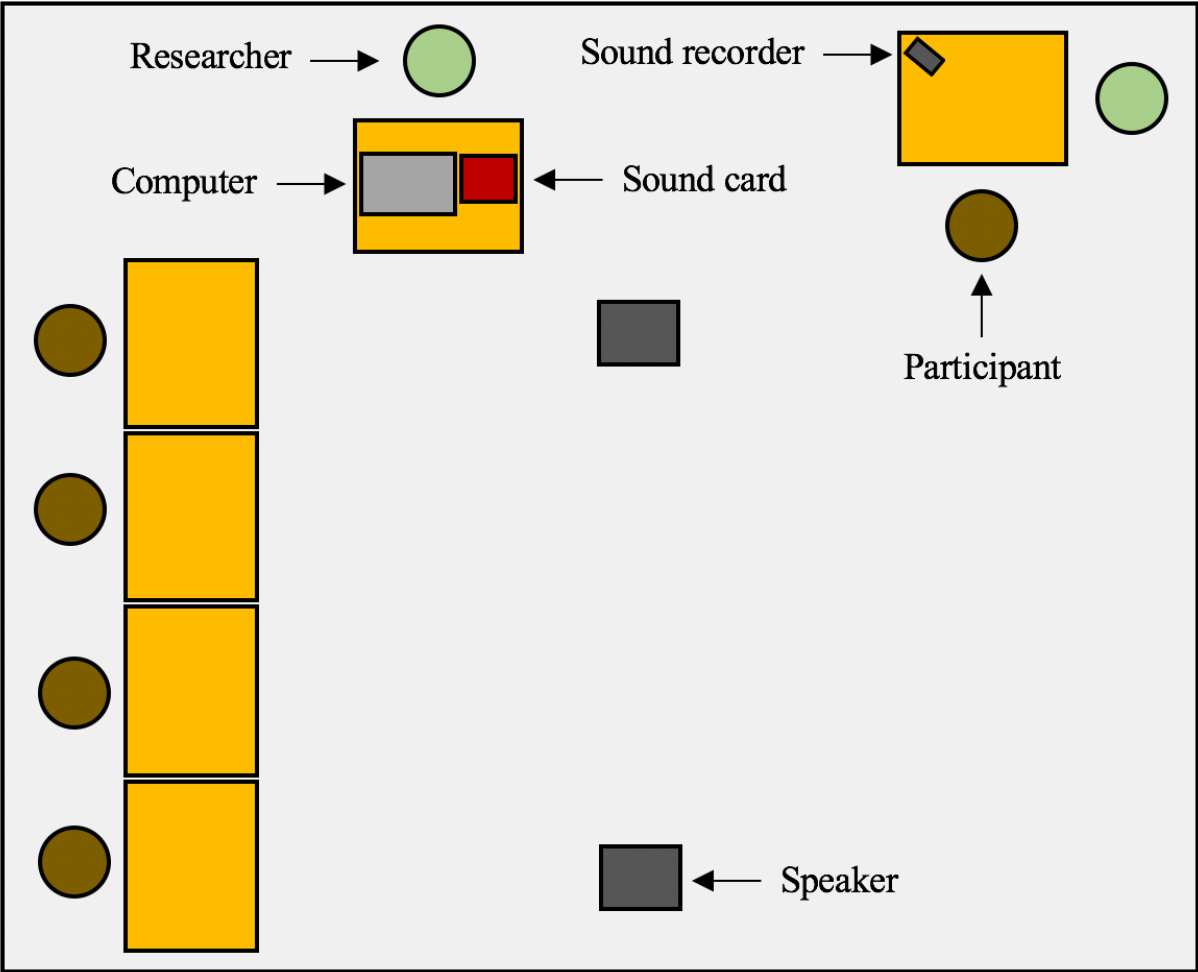
**Appendix H: Main and follow-up study room plot**
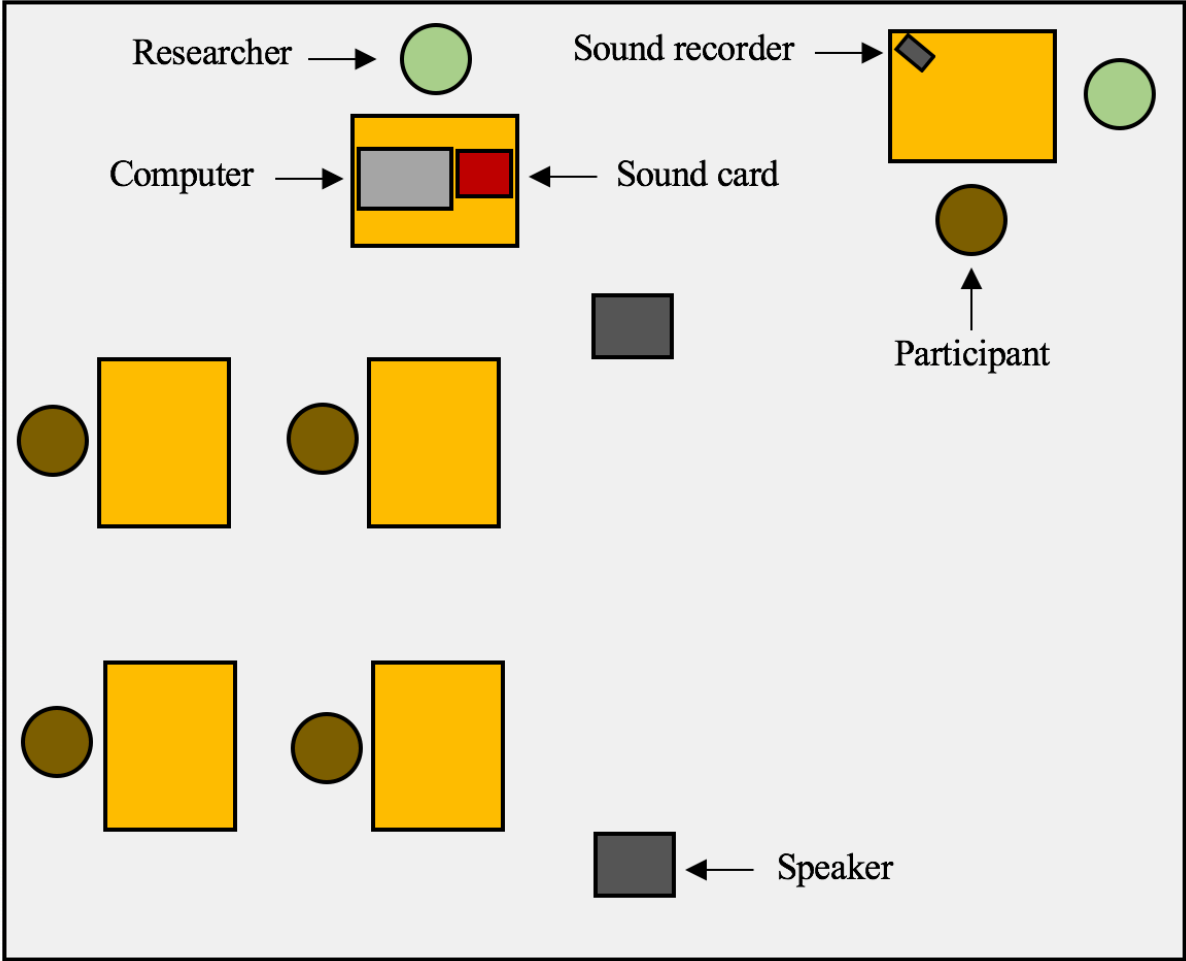
## Appendix I: Music excerpt analysis

Excerpt from Snarky Puppy's "Shofukan"

Song tempo:   168 bpm

Key:           Bm

*Introduction*

The excerpt begins at bar 19. In the beginning, only electric guitars are playing. They play a motive consisting of quarter notes alternating between b1 and b2. This motive is played quite softly. It starts piano but contains a slight crescendo-decrescendo developing across eight bars. In other words, the beginning of the excerpt can be described as a relatively minimalistic and soft guitar motive.

*Rehearsal mark A*

After the eight-bar guitar motive, the instrumentation changes. Guitars stop playing and are swapped out with horns and keyboards. Keyboards play a soft and relatively simple chord progression, moving from B major to A minor, and back to B$^5$. Keyboards appear to follow the rhythmic pattern in the melodic phrase played by horns.

The horns play a unison seven-bar melodic phrase. One interesting harmonic characteristic of this phrase is that it appears to be structured around minor second intervals, while at the same time keeping all notes within the chord scales. Even though the song tempo is 168 beats per minute, a rather high tempo, this melodic phrase could be described as "slow". It mainly consists of half notes and whole notes. In addition, it does not contain any note values smaller than quarter notes. The melodic phrase is played quite legato, which also could be said to contribute to "slowness." Dynamically, the phrase appears to serve as a kind of build-up. It starts piano but after two bars there is a crescendo to mezzo-forte, introducing a noticeable change in dynamics as the horn phrase reaches its last note.

After the first four bars of the melodic phrase (bar 31), when it reaches the last note, more instruments are added. Electric guitars start playing an ostinato, and a bass guitar is introduced together with drums and percussion. The guitar ostinato consists of the root, perfect fifth and minor seventh in a D minor scale. The bass guitar plays four-bar phrase, also

consisting of notes within the D minor scale. It should be mentioned that there is an interesting similarity between the previously mentioned horn phrase and this bass phrase. The bass phrase does also appear to be structured around minor seconds within the chord scale. Drums and percussion provide a rhythmic pattern containing a quite clear eighth note feel.

After chord instruments and rhythm section have played four bars in mezzo-forte, horns start a second phrase (bar 35). This phrase is similar to the first one in many ways. It starts piano and increase in loudness until the last note and it appears to be based on minor second intervals. It should be noted that while the previous phrase contained a downward melodic motion, this one moves upwards. In other words, it can be perceived as a kind of response to the first phrase.

When the horns start playing the second phrase guitars, drums and percussion stop playing. Keyboards and bass continue to provide a harmonic foundation but goes back to playing quite softly. Harmonically, it is quite similar to the chord progression played during the horns' first phrase, but some new chords are added. When horns end their second melodic phrase, guitars, drums and percussion join in. From this point (bar 39), the whole band plays mezzo-forte. These changes in instrumentation and dynamics can be said to generate a kind of "call and response" between the horns and the rest of the band. Each time the horns start playing a melody line, the band plays softly and with few instruments. Each time the horns finish their phrases, the band plays louder and with more instruments.

*Rehearsal mark B*
After the first part, containing a kind of "call and response" between the horns and the rest of the band, a trumpet plays a mezzo-forte solo melody (bar 43). This melody consists of two phrases, both containing the notes of a B minor scale. The trumpet appears to have a less airy and more focused timbre than earlier. In addition, the solo melody can be perceived as being faster than the previous horn phrases because it mainly consists of smaller note values. The second phrase in the trumpet solo (bar 51) is similar to the first one, because it contains some of the same rhythmic figures. For this reason, it can be perceived as a variation of the first phrase.

While the trumpet is soloing, the guitars play two different motives. The first motive is played during the first four bars of trumpet phrases, while the last one is played during the last four

bars of trumpet phrases. The first guitar motive provides $Bm^{11}$ and $Am^{11}$ harmonies and generates a somewhat "oriental" vibe. A significant use of grace notes can be considered one of the reasons why it ends up sounding oriental. The last motive mainly consists of eighth notes within the chord scales of E minor and G major. In the final bar of this part (bar 58), all horns join together in a block harmonized phrase leading towards rehearsal mark C. This phrase also prepares a modulation from B minor to Bb major.

*Rehearsal mark C*

In bar 59, the electric guitar starts soloing. The solo lasts eight bars and appears to be structured around a two-bar motive in the key of Bb major. After having presented the motive, a variation of the motive is played. Afterwards, the original motive is played one again. The two last bars consist of half notes leading towards the next part in the piece.

During the guitar solo, horns stop playing. Keyboards, bass, and electric guitars not soloing provide a harmonic foundation. Drums provide a beat emphasizing quarter notes, although sometimes subdividing hi-hat patterns. It should be noted that drums appear to produce a rhythmic variation in the two first bars (bar 59-60), by following a bass motive. The whole band does a crescendo to forte whilst playing the two last bars (bar 65-66).

*Rehearsal mark D*

The last part of the excerpt starts at rehearsal mark D (bar 67). The band plays forte and guitars make use of a more distorted sound. In addition, the horns play a block harmonized melody. All of these things make this part sound somewhat more intense than previous parts. It can also be noted that the music returns to the original key of B minor. Another interesting aspect to mention, is that this part also contains a "call and response" between horns and electric guitars. When horns end their phrase, the guitar provides a short motive before horns repeat their phrase. In some ways this part can be described as somewhat repetitive. The horns play the same phrase four times and the guitar consequently provides a "response" to the phrase.

## Appendix J: Interview guides

(Translated from Norwegian to English)

### Pilot study #2 interview guide

| Questions | Follow-up questions | Comments |
|---|---|---|
| (Name of participant), what did you draw? | Can you tell me more? | Questions examining content in participants' invented notations. |
| | Why did you draw it? | |
| | How did you draw it? | |
| What does this mean (point and describe symbols or areas of drawing)? | Can you tell me more? | Questions examining systems in participants' invented notations. |
| | Why did you place it/them like that? | |
| | Do the colors mean anything? | |

### Main study interview guide

| Questions | Follow-up questions | Comments |
|---|---|---|
| (Name of participant), what did you draw? | Why did you draw it? | Questions examining content in participants' invented notations. |
| | What were you thinking about while you were drawing? | |
| What does this mean (point and describe symbols or areas of drawing)? | Why did you place it/them like that? | Questions examining systems in participants' invented notations. |
| | Do the patterns mean anything? | |
| | Do the symbols mean anything? | |
| | Do the colors mean anything? | |
| You are saying that (summarize what the participant have said so far). Is that right? | Is there something else you can tell me about your drawing? | |

### Follow-up study interview guide

| Main questions | Follow-up questions | Comment |
|---|---|---|
| What did you think about when the music was playing? | Why did you think about that/ why did you not think about anything? | Question examining emotional/affective listening. |
| | How did the music make you feel? | |
| What did you hear? | How would you describe the music? | Questions examining analytical listening. |
| | What happened in the music? | |
| You say that (summarize the participant's statements). Is that correct? | Is there something else that you can tell me about how you listened? | |

## Appendix K: Pilot study #1 schedule

| Phase | | Activity | Time |
|---|---|---|---|
| Information and consent. | 1 | Researcher verbally informs participants about the research project. | 2 min. |
| | 2 | Participant reads the information letter adapted to children and provide a written consent. | 1 min. |
| Listening task with simple music, not including notational activity. | 3 | Researcher verbally describes the task. | 1 min. |
| | 4 | Participant listens to music excerpt #1 three times. | 3 min. |
| | 5 | Participant verbally or visually describes music excerpt #1. | 3 min. |
| Listening task with simple music, including notational activity. | 6 | Researcher verbally describes the task. | 1 min. |
| | 7 | Participant creates an invented notation while listening to music excerpt #2 three times. The invented notation is removed from sight immediately afterwards. | 3 min. |
| | 8 | Participant verbally or visually describes music excerpt #2. | 3 min. |
| Listening task with complex music, not including notational activity. | 9 | Researcher verbally describes the task. | 1 min. |
| | 10 | Participant listens to music excerpt #3 three times. | 3 min. |
| | 11 | Participant verbally or visually describes music excerpt #3. | 3 min. |
| Listening task with complex music, not including notational activity. | 12 | Researcher verbally describes the task. | 1 min. |
| | 13 | Participant creates an invented notation while listening to music excerpt #4 three times. The invented notation is removed from sight immediately afterwards. | 3 min. |
| | 14 | Participant verbally or visually describes music excerpt #4. | 3 min. |

# Appendix L: Pilot study #2 schedule

| Control group | | | | |
|---|---|---|---|---|
| **Phase** | | **Activity** | **Time** | |
| Information and consent | 1 | Participants and researcher read the information letter together. Participants provide a written consent. | 2 min. | *2 min.* |
| Warm-up task | 2 | Researcher verbally describes the task. | 1 min. | |
| | 3 | Participants listen to music excerpt #1 one time. | 1 min. | |
| | 4 | Participants create invented notations of music excerpt #1. | 2 min. | *6 min.* |
| Listening task | 5 | Participants listen to music excerpt #2 two times. | 2 min. | |
| | 6 | Participants create invented notations of music excerpt #2. | 6 min. | *14 min.* |
| Questionnaire and interview | 7 | Researcher verbally describes the task. | 1 min. | |
| | 8 | Participants are interviewed one by one. Those who are not being interviewed fill out the questionnaire. | 15 min. | *30 min.* |

| Treatment group | | | | |
|---|---|---|---|---|
| **Phase** | | **Activity** | **Time** | |
| Information and consent | 1 | Participants and researcher read the information letter together. Participants provide a written consent. | 2 min. | *2 min.* |
| Warm-up task | 2 | Researcher verbally describes the task. | 1 min. | |
| | 3 | Participants create invented notations while listening to music excerpt #1. The music excerpt is played one time. | 3 min. | *6 min.* |
| Listening task | 4 | Participants create invented notations while listening to music excerpt #2. The music excerpt is played two times. | 8 min. | *14 min.* |
| Questionnaire and interview | 5 | Researcher verbally describes the task. | 1 min. | |
| | 6 | Participants are interviewed one by one. Those who are not being interviewed fill out the questionnaire. | 15 min. | *30 min.* |

# Appendix M: Main and follow-up study schedule

**Treatment group 1**

| Phase | | Activity | Time | |
|---|---|---|---|---|
| Information and consent | 1 | Participants and researcher read the information letter together. Participants provide a written consent. | 5 min. | *5 min.* |
| Listening task | 4 | Participants create invented notations while listening to music excerpt. The music excerpt is played two times. | 8 min. | *13 min.* |
| Questionnaire and interview | 5 | Researcher verbally describes the task. | 2 min. | |
| | 6 | Participants are interviewed one by one. Those who are not being interviewed fill out the questionnaire. | 15 min. | *30 min.* |

**Treatment group 2**

| Phase | | Activity | Time | |
|---|---|---|---|---|
| Information and consent | 1 | Participants and researcher read the information letter together. Participants provide a written consent. | 5 min. | *5 min.* |
| Listening task | 5 | Participants listen to music excerpt two times. | 2 min. | |
| | 6 | Participants create invented notations of music excerpt. | 6 min. | *13 min.* |
| Questionnaire and interview | 7 | Researcher verbally describes the task. | 2 min. | |
| | 8 | Participants are interviewed one by one. Those who are not being interviewed fill out the questionnaire. | 15 min. | *30 min.* |

**Control group**

| Phase | | Activity | Time | |
|---|---|---|---|---|
| Information and consent | 1 | Participants and researcher read the information letter together. Participants provide a written consent. | 5 min. | *5 min.* |
| Listening task | 5 | Participants listen to music excerpt two times. | 2 min. | *7 min.* |
| Questionnaire and interview | 7 | Researcher verbally describes the task. | 2 min. | |
| | 8 | Participants are interviewed one by one. Those who are not being interviewed fill out the questionnaire. | 15 min. | *24 min.* |

# Appendix N: Questionnaire data

(0=strongly agree, 1=agree, 2=uncertain, 3=disagree, 4=strongly disagree)

| Control group | | | | | | |
|---|---|---|---|---|---|---|
| | Participants | | | | | |
| Items | C1-1 | C1-2 | C1-3 | C1-4 | C1-5 | C1-6 |
| Item 1 | 3 | 1 | 2 | 3 | 3 | 2 |
| Item 2 | 0 | 1 | 1 | 1 | 2 | 0 |
| Item 3 | 3 | 1 | 3 | 3 | 1 | 2 |
| Item 4 | 1 | 0 | 1 | 3 | 2 | 1 |
| Item 5 | 2 | 3 | 0 | 4 | 1 | 3 |
| Item 6 | 2 | 2 | 4 | 4 | 4 | 1 |
| Item 7 | 0 | 1 | 0 | 0 | 1 | 0 |
| Item 8 | 3 | 3 | 4 | 4 | 1 | 1 |
| Item 9 | 4 | 4 | 3 | 4 | 4 | 4 |
| Item 10 | 4 | 4 | 2 | 4 | 4 | 3 |
| **Treatment group #1** | | | | | | |
| | Participants | | | | | |
| Items | T1-1 | T1-2 | T1-3 | T1-4 | T1-5 | T1-6 |
| Item 1 | 2 | 2 | 3 | 1 | 2 | 4 |
| Item 2 | 0 | 1 | 0 | 0 | 1 | 1 |
| Item 3 | 3 | 3 | 3 | 2 | 3 | 4 |
| Item 4 | 0 | 0 | 0 | 0 | 2 | 1 |
| Item 5 | 1 | 1 | 1 | 2 | 0 | 2 |
| Item 6 | 1 | 1 | 2 | 2 | 4 | 4 |
| Item 7 | 0 | 3 | 1 | 0 | 0 | 0 |
| Item 8 | 4 | 4 | 1 | 2 | 3 | 2 |
| Item 9 | 4 | 3 | 3 | 1 | 4 | 4 |
| Item 10 | 1 | 3 | 2 | 2 | 2 | 3 |
| **Treatment group #2** | | | | | | |
| | Participants | | | | | |
| Items | T2-1 | T2-2 | T2-3 | T2-4 | T2-5 | T2-6 |
| Item 1 | 1 | 1 | 1 | 2 | 3 | 3 |
| Item 2 | 0 | 0 | 0 | 1 | 1 | 0 |
| Item 3 | 3 | 2 | 1 | 3 | 2 | 4 |
| Item 4 | 3 | 1 | 0 | 2 | 2 | 1 |
| Item 5 | 3 | 2 | 0 | 0 | 1 | 3 |
| Item 6 | 2 | 2 | 2 | 3 | 4 | 0 |
| Item 7 | 0 | 1 | 1 | 0 | 1 | 0 |
| Item 8 | 4 | 0 | 1 | 2 | 0 | 3 |
| Item 9 | 2 | 4 | 3 | 2 | 3 | 3 |
| Item 10 | 1 | 3 | 4 | 4 | 2 | 4 |

# Appendix O: Code book

## Context information
Codes/concepts that provides information about the research experiment context.

**Gender**

| | | |
|---|---|---|
| C-GE-F | = | The participant is a girl |
| C-GE-M | = | The participant is a boy. |

**Group type**

| | | |
|---|---|---|
| C-GR-C | = | Participant is grouped in a control group |
| C-GR-T | = | Participant is grouped in a treatment group |

## Children's visual representations of music
Codes/concepts that may be used to analyze participants' drawings.

**Elkoshi (2015):** AFC-Responses

| | | |
|---|---|---|
| V-E2-A | = | Association (depictions of emotions, stories, atmosphere and events evoked by the music) |
| V-E2-F | = | Formal (notations providing references to sound, sometimes through strict formal terminology) |
| V-E2-C | = | Compound (includes both associative and formal responses) |

## Children's verbal accounts of music listening experiences
Codes/concepts that may be used to analyze participants' verbal accounts.

**Listening styles**

| | | |
|---|---|---|
| L-AA | = | Attentive-analytical listening (focus on structures or material) |
| L-E | = | Emotional listening (emotional or personal approach, association or imagination) |

**Nielsen (1998):** Layers of musical meaning

| | | |
|---|---|---|
| L-F-A | = | Acoustic layers |
| L-F-S | = | Structural layers |
| L-F-KM | = | Kinetic-motoric or "bodily" layers |
| L-F-T | = | Tension layers |
| L-F-E | = | Emotional layers |
| L-F-EX | = | Existential or "spiritual" layers |

**Elliott (1995):** Ways to talk about music

| | | |
|---|---|---|
| L-E-S | = | Systematic (using terms such as fugue and dominant) |
| L-E-R | = | Relatively (comparing musical qualities, such as short-long or repeated-varied) |
| L-E-P | = | Phenomenologically (talking about music in terms of thick and thin sounds, or bright and dark sounds) |
| L-E-D | = | Descriptively (describing music as sounds of mourning, "sounds-like-a-train", and so on) |
| L-E-E | = | Emotionally (talking about music as emotional expressions, such as sadness or happiness) |

# Appendix P: Qualitative group comparison table

| Concept | Category | Group comparison findings |
|---|---|---|
| Analytical and emotional listening | | All participants appeared to listen emotionally and most of them ($n$=14) also listened analytically. In other words, the majority of participants seemed to combine emotional and analytical listening styles. There were no significant group differences. |
| Layers of musical meaning | Acoustic layers | Five control group participants appeared to focus on acoustic layers, while four participants in both treatment groups did the same. Treatment groups appeared to produce slightly more differentiated descriptions of acoustic layers than the control group, but there were no significant group differences. |
| | Emotional layers | Two participants in treatment group #1 displayed a focus on emotional layers, while four participants in both control group and treatment group #2 did the same. Treatment group #2 appeared to provide the most varied and complex descriptions of emotional layers. |
| | Structural layers | Nearly all control group participants ($n$=5) exhibited attention towards structural layers, while only a few participants in treatment group #1 ($n$=2) and #2 ($n$=3) did the same. There were no apparent group differences related to the kind of structural layers participants described. |
| Ways to talk about music | Descriptively | Treatment group #1 had the largest number of participants talking about music in a descriptive way ($n$=5), while the control group had the smallest number ($n$=2). Treatment group #2 landed somewhere in between ($n$=3). The amount of descriptive talk appears to be linked with how strongly listening and drawing activities are connected. |
| | Emotionally | Four participants in the control group talked about music in an emotional way. There were fewer participants doing the same in treatment group #1 ($n$=1) and #2 ($n$=3). The amount of emotional talk appears to be linked with how strongly listening and drawings are connected. The group with no drawing activity had the largest number of participants talking emotionally. |
| | Relatively | Nearly all control group participants ($n$=5) talked about music relatively, while there were less participants doing the same in treatment group #1 ($n$=2) and #2 ($n$=3). The amount of emotional talk appears to be linked with how strongly listening and drawings are connected. The group with no drawing activity had the largest number of participants talking about music in a relative way. |
| | Systematically | Five participants in the control group, four participants in treatment group #2 and two participants in treatment group #1 talked about music systematically. The amount of systematic talk appears to be linked with how strongly listening and drawings are connected. The group with no drawing activity talked more about music in a systematic way than the group that drew while listening. |