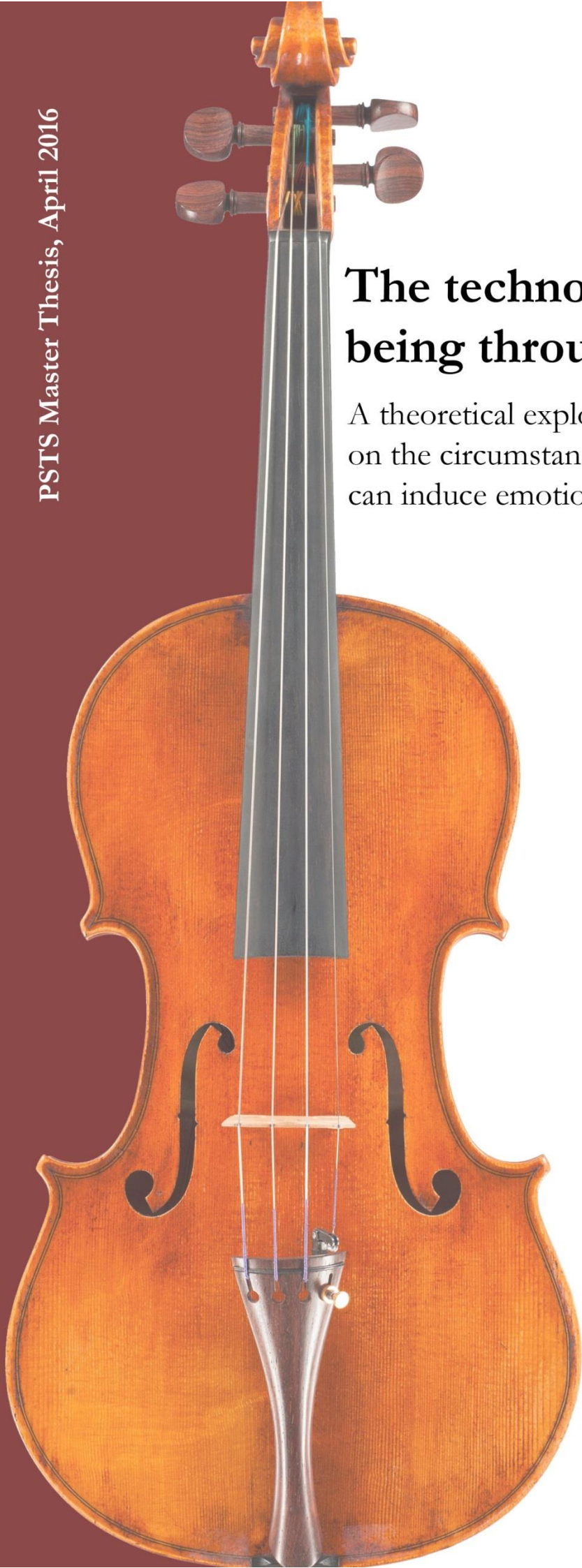




The technological impact on well-being through listening to music

A theoretical exploration of the impact of technology on the circumstances under which listening to music can induce emotions and with that influence well-being

by
Jerom van Geffen

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Master Thesis

By

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Music plays a predominant role in the everyday lives of many people. Besides that it is being used in games, movies, shops, restaurants and casinos, many people still consider music listening as a pleasant activity. I am no exception to that. I can hardly imagine a moment during a regular day that I am on my own without listening to music. Everywhere I go, I bring my old-school mp3-player with me. Music enables me to cheer me up or to drag me through difficult moments. Not in the last place it was music that helped me finishing this master thesis. Although I do not master any musical instrument myself, I do consider music to play a major role in my life. This is the reason that I decided to combine my interest for music with my study, *Philosophy of Science, Technology and Society (PSTS)*. I already explored some philosophical implications of music in a previous course in the program, *Technology and the Quality of Life*. The title of my paper back then was *Well-being and Technology: Can Spotify improve our well-being?* I explored the intuitively plausible correlation between a specific type of music-listening technology and happiness. One of the conclusions that I drew was that we should be cautious with simply presupposing that music and music-listening technologies can improve our feelings of happiness. This first inquiry led me to choosing to elaborate on the relation between music and happiness in this master thesis.

A lot of people have made their contribution to this thesis. First of all, I want to greatly thank my supervisor, Johnny Hartz Søraker. He helped me through the whole process. I could always count on his advice, ideas and encouraging words. He never hesitated to take time for me and to answer my questions about narrowing down my topic, structuring my argument and rewriting parts of my thesis. I really loved to collaborate with him. Secondly, I would like to thank Saskia Nagel. She constructively helped me with structuring my thoughts about incorporating the neurological impact of music listening. In addition, she was involved in the final judgement of this thesis. Finally, I would like to thank Sandra Nienhuis, who gratefully took the time to read my thesis and provided me with useful feedback about my style of writing.

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to put things in perspective and to make the transition between being a Student Union board member for one and a half year and writing this master thesis so easy. I am ever grateful for that.

Abstract

This study provides a comprehensive theoretical exploration in the fields of philosophy, psychology and science, technology and society (STS) about the influences of emotions while listening to music on the well-being of music listeners and about the impact of music-listening technology on those influences. The first part of this thesis highlights the ontology of music and suggests a unitary definition of music. The second part explains that music listening has been reported to be able to arouse affective responses of music listeners. These affective responses can be genuine and full-fledged emotional responses if they are aroused under the right circumstances of the musical event and through one of the BRECVEMA mechanisms. This part proposes to set apart the dominance over the musical event from the other factors of the musical event, because those factors have a totally different nature. The third part of this thesis suggests a definition of well-being from the field of positive psychology. This definition recognizes an important role for subjective well-being. The last part shows that emotional responses to music are mostly positive and that they are therefore likely to positively influence the positive affect component of subjective well-being while negatively influencing the negative affect component. So, when the music listener has a high degree of dominance over a musical event, the emotional responses to music are most likely to contribute to his or her well-being. In addition, this study explores the impact of using music-listening technologies on the influences of emotions while listening to music on well-being. The last part of this thesis also shows that music-listening technologies provide the music listener with so much dominance over the musical event that he or she can actively use music to influence his or her emotions. Up to a certain point this will contribute to the life and domain satisfaction components of subjective well-being and therewith improve the well-being of the music listeners. Going over this point of optimal dominance can lead to social exclusion, addiction, Overchoice and to the creation of musical fads. Moreover, the use of music-listening technologies has blurred the definition of music. This focus on the use of music-listening technologies and on the dominance factors in studies about the influences of music is scarce in both philosophy and psychology. Therefore, this thesis concludes with making recommendations for future research that recognize the importance of this focus and that may enable engineers to design future music-listening technologies specifically to improve the well-being of music listeners.

Samenvatting (NL)

In deze thesis zal een uitgebreid literatuuronderzoek worden gepresenteerd over de invloed van emoties tijdens het luisteren naar muziek op het welzijn van de luisteraars en over de impact van technologieën tijdens het luisteren naar muziek op deze invloed. Hiertoe wordt literatuur uit de psychologie, de filosofie en de STS gebruikt. In het eerste deel van deze thesis wordt de ontologie van muziek uitgelegd en wordt er een goede definitie van muziek gekozen. In het tweede deel wordt duidelijk gemaakt dat verschillende onderzoeken aantonen dat het luisteren naar muziek emotionele reacties teweeg kan brengen bij luisteraars. Deze emotionele reacties kunnen alleen volwaardige emoties zijn als ze onder de juiste omstandigheden tijdens het luisteren veroorzaakt zijn en door één van de BRECVEMA mechanismes. In dit deel wordt er ook voor gekozen om de mate van controle die luisteraars hebben over de omstandigheden tijdens het luisteren naar muziek apart te houden van de rest. Deze factoren verschillen immers behoorlijk. In het derde deel van deze thesis wordt er een definitie van welzijn uit de Positieve Psychologie gekozen. In deze definitie ligt een grote rol voor geluk. In het laatste deel van deze thesis wordt aangetoond dat de meeste emoties in reactie op muziek positief zijn en dat ze daardoor positief kunnen bijdragen aan de emotie-componenten van geluk. Dus als een muziekluisteraar veel controle heeft over de omstandigheden tijdens het luisteren, dan is het waarschijnlijk dat zijn of haar emoties in reactie op muziek bijdragen aan zijn of haar welzijn. Dit onderzoek focust zich ook op de impact van het gebruik van muziek technologieën op de invloeden van emoties in reactie op muziek op het welzijn van de luisteraar. In het laatste deel van deze thesis wordt daarom ook aangetoond dat het gebruik van muziek technologieën de controle van de luisteraar over de omstandigheden dusdanig vergroot, dat hij of zij het luisteren naar muziek actief en bewust kan gaan gebruiken om zijn of haar emoties te beïnvloeden. Tot op een zeker punt kan dit bijdragen aan de voldoenings-componenten van geluk en daarmee bijdragen aan welzijn. Echter, als de controle van de luisteraar over de omstandigheden tijdens het luisteren over dat optimale punt gaat, dan kan dat leiden tot sociale uitsluiting, verslaving, keuzestress en tot muzikale rages. Bovendien heeft het gebruik van muziek technologieën ervoor gezorgd dat de definitie van muziek vervaagt. Deze focus op het gebruik van muziek technologieën en op de mate van controle van de luisteraar komt in bestaande studies niet veel voor. Daarom eindigt deze thesis met enkele aanbevelingen voor vervolgonderzoek die deze focus wel hebben en die ingenieurs in staat stellen om toekomstige muziek technologieën te ontwikkelen die specifiek gericht zijn op het vergroten van het geluk van luisteraars naar muziek.

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Introduction

Music is a form of art that might be one of the most practiced and appreciated in daily life. Emotions and feelings are of paramount importance in music. In the words of composer C.P.E. Bach: “A musician cannot move others unless he too is moved” (Bach, 1985, p. 152) or more recently, in the words of guitarist Eric Clapton: “Music ... it’s a form of communication and reassurance of feelings” (Clapton, 1998, p. 20). Besides that emotions and feelings can be expressed in music, music itself is intuitively able to arouse intense emotional responses of music listeners. We all probably know that one song that makes us feel incredibly happy while listening to it. For instance, a power ballad by Michael Bolton has once saved an ex-serviceman from suicide (Kevan, 2007). This thesis aims at putting these emotions while listening to music in a more philosophical light by exploring how they can have long-term benefits for the music listeners themselves. In other words, the aim of this thesis is to find how emotions while listening to music can improve the well-being of music listeners¹.

Intuitively it seems possible that listening to the song that makes you feel incredibly happy can also improve your well-being. However, this relation is far from clear. Leonard Meyer was the first to explore the emotional influences of music listening in his book *Emotion and Meaning in Music* (1956). Psychologists and philosophers have been investigating the relatedness between music listening and emotions ever since. There are many issues that complicate these studies. For instance: what is considered as a piece of music, how can sounds arouse genuine emotional responses and what is the influence of the countless circumstances while listening to music? in general, the emotional responses to music are complex and often paradoxical (Persson, 2001, p. 275). The exploration of the emotional influences of music listening has lately become even more complicated because of the impact of technological developments on listening to music. Music-listening technologies such as the radio and the walkman have increased the accessibility and mobility of music tremendously (Avdeeff, 2012; Hargreaves & North, 1999; Skånland, 2013). Because such technologies have improved the reach of music, it is likely that they also have strengthened the possible emotional influences of music listening. However, Theodor Adorno already claimed in 1938 that this broad accessibility of music is one of the causes that have changed musical pieces into commodities (Adorno, 1938). Due to

¹ My aim is to shed more positive light on the research about emotional responses to music by dissociating current study from studies that investigate music for other purposes than for the possible benefits for the music listeners themselves. There are, for instance, studies that focus on music listening for marketing purposes (e.g. Alpert & Alpert, 1990; North & Hargreaves, 1997). Such studies have the proclivity to consider the influences of music listening on listeners objectively, whereas I will argue in chapter 2 that this influence is predominantly subjective.

such technological developments the production, reproduction and distribution of music have become standardized. Because of this standardization and due to all kinds of advertisements, music has become a commodity-like product. According to Adorno, such commodity-like pieces of music cause standardized and therefore declined emotional responses of music listeners (Adorno, 1938, p. 287). In other words, technological developments and the economic push in the world of music have led to *regressive* listening. So, it could both be that case that technological developments have improved the emotional influences of music listening and that they have diminished those influences. This illustrates that music-listening technologies have imposed additional challenges on studying the emotional influences of music listening.

All of these complexities must be taken into account in this thesis to find the possible influences of emotions while listening to music on the long-term benefits for the well-being of music listeners. This is the reason that my research question is two-folded: *how can listening to music influence the well-being of music listeners and what is the impact of music-listening technology on the ways that listening to music may do so? (Q)*. In this thesis I will present a thorough theoretical exploration about the influences of emotions while listening to music on the well-being of music listeners, about the circumstances under which these influences occur and about the impact of technology on these influences. I will only focus on the technological impact of music-listening technologies, which are technologies that are directly involved in music listening, such as loudspeakers, portable audio players or streaming services. These technologies influence the music listeners and their well-being the most. This theoretical exploration will be informed by many empirical studies. As I will come back to later in subsection 2.1.1, using such empirically informed studies should be done with caution, because most of those studies do not aim for a full explanation of emotions while listening to music and do not take all the previously indicated issues into account. Therefore, I will take a holistic approach in my theoretical exploration here and aim at finding a robust explanation of the intuitive relatedness between music, emotions and well-being.

Finding answers to my research questions is important because of four reasons. First of all, there are mainly three scientific fields involved in this investigation: philosophy, psychology and STS studies. The philosophy of music is occupied with finding a unitary definition of music and with considering the nature of the emotional responses of music listeners. The psychology of music mainly aims at finding the underlying causal mechanisms and the circumstances of these emotional responses. STS studies are mainly occupied with exploring the relation between music-listening technologies and music listeners. Finding answers to my research questions does not only contribute to giving a robust explanation of the intuitive relatedness

between music, emotions and well-being, it may also bridge the gap between these three scientific fields and bring the respective scholars together in research about the possible influences of music listening. Secondly, because music is a very common activity, getting an idea of how music may improve our well-being can help individuals to deploy music in ways that it can do so more structurally, easier accessible and less costly. Thirdly, the answers to my research questions can enable scientists to explore the consequences of music-listening technologies for both individuals and society in general. Finally, having an understanding of this impact of music-listening technologies may help engineers to design future music-listening technologies that can be used specifically to improve the well-being of music listeners by boosting the positive and avoiding the negative consequences of using such technologies.

Thesis Outline

In order to find an answer to my main research questions, I will answer five subquestions in this thesis. The first chapter of this thesis will cover the first subquestion: *What is music?* (Q_1). A prerequisite for finding the possible influences of emotions while listening to music on the well-being of music listeners is to have a unitary definition of music. I have already indicated that finding such a unitary definition of music is considered as a major challenge in the philosophy of music. This is because of several reasons. First of all, musical genres have diffused tremendously throughout time and between cultures. In the last few decades alone a variety of new genres of music has emerged because of the technological development of musical instruments. All of these and many other genres of music must be included in a unitary definition of music. Secondly, because of this variety in music, for every possibly defining musical feature there exists a counterexample (Brown, Merker, & Wallin, 2000, p. 6). In other words, if there are many pieces of music that have the same musical feature, there is always a piece of music that lacks that specific feature. That feature can therefore not be used as a defining feature for music after all. These two major ontological issues for finding a unitary definition of music will be explained in section 1.4. Based on Ludwig Wittgenstein's concept of *family resemblances* I will argue for Andrew Kania's definition of music:

“Music is (1) any event intentionally produced or organized (2) to be heard, and (3) *either* (a) to have some basic musical feature, such as pitch or rhythm, *or* (b) to be listened to for such features.” (Kania, 2011, p. 12)

In this thesis I will mainly focus on the influences of emotions while listening to music on the well-being of music listeners. I have already indicated that the idea that music can arouse emotions in music listeners is controversial. I will therefore consider the following subquestion in chapter 2: *How does listening to music influence the emotions of music listeners? (Q₂)*. I will answer this subquestion by making critically use of the literature of philosophy and psychology of music. Throughout this thesis affect is defined as an umbrella term for both moods and emotions. I will explain the controversy about considering the affective responses to music as genuine and full-fledged emotions and I will argue that they can nevertheless be considered as such in section 2.3. This arousal of emotional responses of music listeners is one of the most studied phenomena in the psychology of music. Many scholars have been occupied with finding the causes of these responses. I will illustrate in section 2.4 that the *BRECVEMA framework* of Patrik Juslin is the most complete explanatory theory of the emotional responses to music. This framework describes eight causal mechanisms of how music can arouse genuine and full-fledged emotions in its listeners. In the end, these mechanisms codetermine along with the circumstances while listening to music, whether or not affective responses are emotional (Juslin & Västfjäll, 2008; Juslin, 2013; Sloboda & O'Neill, 2001). These circumstances while listening to music are called the *musical event*. The musical event consists of the specific constellation of the music, the personality traits of the music listener and the context while listening. In subsection 2.5.1 I will propose an extension of the musical event. The *dominance* of the music listener over the musical event will be added to the musical event separately. With this dominance I mean the degree of control that a listener has over the specific musical event. For instance, a listener may in some musical events have the freedom to select the music he or she listens to without any restriction. This may result in the arousal of different emotions than in situations where the listener does not have this freedom in selecting music. This BRECVEMA framework and extended musical event will together provide a thorough explanation of how music listening can arouse genuine and full-fledged emotions in music listeners. In addition, the degree of dominance over the musical event will become useful in chapter 4 for exploring the impact of music-listening technologies on the influences of emotions while listening to music on the well-being of music listeners.

However, before the influences of emotions while listening to music on the well-being of music listeners can be explored, a definition of well-being is necessary. Therefore, I will cover the following subquestion in the third chapter: *What is well-being? (Q₃)*. To answer this subquestion, literature in the field of positive psychology will be consulted. Martin Seligman is one of the pioneers in the field of positive psychology. He tried to bring psychology and philosophy closer together. Positive

psychology aims at shifting the focus within psychology from pathologies to the good life (Seligman & Csikszentmihalyi, 2000). I will explain in section 3.1 that the *good life* is used in this thesis as an umbrella term. Well-being is one of the key elements for the good life. I will explain the different definitions and theories about well-being from positive psychology in section 3.2. In addition, I will argue that subjective well-being plays a pivotal role in all of these theories. Subjective well-being is the long-term psychological state of mind that consists of four components: positive affect, negative affect, life satisfaction and domain satisfactions (Haybron, 2011). I will explain these components in subsection 3.3.1.

The fourth chapter aims at presenting an overview of the possible influences of emotions while listening to music on the subjective well-being of music listeners and of the impact of music-listening technologies on these possible influences. It considers both my fourth and fifth subquestion: *How can listening to music influence the subjective well-being of music listeners? (Q₄)* and *What is the impact of music-listening technology on the relation between listening to music and the subjective well-being of music listeners? (Q₅)*. The central focus in this chapter lies on explaining the relation between emotional responses to music and the subjective well-being of music listeners. I will explain that because music-listening technologies have impacted the circumstances of the extended musical event while listening to music so much, that music listeners have become able to use music listening as a tool to actively and consciously influence their emotions. So, in addition to emotional responses to music, this active regulation of emotions while listening to music can influence subjective well-being. In order to structurally analyse the technological impact on these possible influences, I will use the sociological Uses and Gratifications theory in this chapter. By using this theory I will illustrate that emotions while listening to music can influence all components of subjective well-being. I will explicitly illustrate the possible negative consequences of using music-listening technologies for subjective well-being in this chapter as well. This will illustrate that the dominance factors of the extended musical event determine the influences that music listening can have on the subjective well-being of music listeners.

Throughout this thesis I will present a thorough and robust explanation about the intuitive relatedness between music, emotions and well-being. This explanation helps me to draw conclusions with regards to the main research questions in the last section of this thesis. The influence that emotions while listening to music can have on the well-being of music listeners depends highly the extended musical event, and in particular on the dominance factors over the musical event. The higher the degree of control of a music listener over a musical event, the higher the chance that his or her affective responses to music in that musical event are positive emotions and therefore

that those responses can contribute to his or her well-being. Music-listening technologies have and have had a major impact on these dominance factors of the extended musical event. By using music-listening technologies while listening to music, music listeners can actively and consciously use music as a tool for self-regulation. This use of music can improve the life and domain satisfaction components of their subjective well-being and it can therefore contribute to their well-being more structurally. However, in every musical event there is a point of optimal dominance over that musical event. If a music listener exceeds that point, music listening can have a negative influence on his or her well-being. The dominance factors over the musical event are therefore precisely the linking pin that can bridge the gap between philosophy, psychology and STS studies about the influences of music listening. In this final section I will also reflect on my conclusions by analyzing the general critiques on empirical studies and the critiques on the BRECVEMA framework. Finally, I will make some recommendations for future studies about the influences of music and music-listening technologies on well-being that recognize the importance of the dominance factors of the extended musical event. These studies may enable engineers to design future music-listening technologies specifically for improving the well-being of music listeners.

Chapter 1: Definition of Music

A requisite for exploring the influences of emotions while listening to music on the well-being of music listeners is having a good grasp about what music is. This chapter aims at creating this greater understanding about music and seeks for a unitary definition of it. Subquestion Q₁: *What is music?* will be answered in this chapter. The urge for an answer to this subquestion is illustrated by Steven Mithen: “It is perhaps astonishing that we live surrounded by music, listening to and, for some, performing music, yet we can’t really say what it is” (Mithen, 2009, p. 3). Some issues with finding a unitary definition of music are that such a definition must be able to include all genres of music, it must be able to overcome all ontological issues of music that exist and it must be able to show how music distinguishes itself from other forms of art. The subfield in the philosophy of music that is occupied with finding such a unitary definition is called *musical ontology*. This chapter will explore what has previously been argued within this field of musical ontology.

People are very often exposed to music nowadays and therefore we have become quite experienced music listeners. Due to this experience with listening to music most people have presuppositions about what music is and what not (Kania, 2014; Peretz, 2006, pp. 2–3). These presuppositions may result in strong claims about music (Sloboda & O’Neill, 2001, p. 426). However, finding a unitary definition of music is much harder than simply summarizing the common elements of these presuppositions. The classical example that complicates the presuppositions about music is John Cage’s 4’33” from 1952. 4’33” consists of 4 minutes and 33 seconds of performers not playing their instruments. The musical piece does not exist out of silence; rather it is constituted by the sounds of the audience, such as coughs, shuffling feet or laughs. John Cage tried to show that music can be constituted by *any* sound and that it is therefore not necessarily liable to the intentions and/or production of the performer (Cage, 1961; Davies, 1997, pp. 448–449). Among scholars it is often disputed that this specific piece is a form of music (Davies, 1997; Kania, 2010), but it does illustrate that there are eccentric examples of sounds that can trouble people’s presuppositions about music. 4’33” is a set of sounds that fits the musical genre that is called *Aleatoric Music*: music that consists of elements that are led by chance. Another example of aleatoric music that is considered as a piece of music by scholars is *In Futurum* from Erwin Schulhoff (Kania, 2010, p. 350). In *Futurum* is a piece of music that is fully constituted by silence. This composition does illustrate the difficulty of finding a unitary definition of music. This chapter will go into this challenge more in depth and will provide a unitary definition of music.

In section 1.1 I will explicate some general assumptions about music. Afterwards, in section 1.2, I will compare music with other forms of art to get a first hint about what music is. In section 1.3 I will shortly illustrate the relatedness between music and technology that will become important in chapter 4. The ontological issues that are defined in the subfield of musical ontology and that must be overcome by a unitary definition of music will be explained in section 1.4. Finally, in the last section of this chapter, 1.5, I will use Wittgenstein's idea of family resemblances and argue for Kania's unitary definition of music. This definition will be used throughout this thesis.

§ 1.1 Music: some presuppositions

It is important to make some general statements about key terms. So far, *music* or *pieces of music* have been discussed. Most philosophical and psychological literature is not about music in general. Often, *pure music* is considered. Pure music, or sometimes called *absolute music*, is instrumental music without any non-musical components such as lyrics or music videos. When analyzing the affective responses of music listeners, pure music is philosophically much more puzzling than music that does contain such non-musical components. It is very likely that lyrics or accompanying texts have a major influence on the affective responses of listeners (Ziv, 2015, pp. 3–4). While leaving those out, scholars try to find how the musical components can arouse affective responses of listeners (Kania, 2014). For exploring the influences of emotions while listening to music on the well-being of music listeners, it is therefore also more interesting to focus on pure music instead of music in general. Henceforth pure music is meant when music is discussed, unless mentioned differently.

A *musical work* is a second important term that will be used throughout this thesis. With a musical work I mean a specific instance of music. This can either be pure music or not. A song or a composition, but also a specific performance can be a musical work. All pieces of music that I have previously mentioned are examples of musical works. Henceforth, the term *musical work* will be used to stay in line with existing literature.

Before going into the dilemma of finding a unitary definition of music, it is useful to take a brief look into the origin of music. The oldest sign of a musical instrument that has been found is a bone flute that has been determined to be 44.000 years old (Brown et al., 2000, p. 10). Little is known about the exact origin of prehistoric music, simply because it occurred ages before we were able to record music. Besides, we can never know for sure whether our ancestors have been singing hominids before they started to use musical instruments, or even before they started to talk (Brown et al., 2000, p. 7). The field of science that is occupied with the

evolution of music is called Biomusicology. Most biomusicologists agree that it is more fruitful to look into the functionalities that music is likely to have had in the prehistory, rather than to speculate about its exact origin (Brown et al., 2000; Wallin, 1991).

It seems that music has already played an important role in the lives of prehistoric human beings (Lundqvist, Carlsson, Hilmersson, & Juslin, 2009). Music could be used to strengthen familial bonding, group cohesion and for shamanic reasons, such as summoning or dismissing ghosts (Hoppál, 2006). It is also likely that our ancestors already used music as a tool for communicating emotions (Blum, 2011; Brown et al., 2000). Emotions were already important back then, because emotions could prepare our ancestors to deal with situations that were related to reproduction and survival (Darwin, 1872). Charles Darwin argued therefore that the primitive use of music to communicate emotions provided human beings with ways to differentiate from each other. I will return to this point of communicating emotions in section 2.2. When our ancestors were able to recognize patterns in sounds and derive meaning from them, they could recognize emotions more easily and behave accordingly. Therefore, they had better chances to survive (Darwin, 1872). So, according to Darwin, both creating and recognizing music that is expressive of emotions may have led to an advantage in the sexual selection and in the struggle for life (Darwin, 1871, 1872). The ability of music to be expressive of emotions is called *musical expressiveness*. Besides being important for the evolution of human beings in the past, this expressiveness is still important nowadays. The ways in which music can be expressive of emotions may be the element that distinguishes it from other forms of art. In section 1.2 I will compare music to other forms of art and I will try to locate the value of music as an abstract art. This may give a first hint of what music is.

§ 1.2 Music as an abstract art

Music is a form of art through the medium of sound and silence (Kania, 2014). Most of the times, this form of art is constituted by sounds and silences with a certain pitch and rhythm (Scruton, 1997). Rhythm is the placement of sounds in time. It is the ordering element within music. Pitch is the position of a single sound in the whole musical work with regards to tonality. In categorizing art, *representational* and *abstract* forms of art are often contrasted. This distinction in types of art is based on the distinction between concrete and abstract objects. There is, however, little consensus in the discussion surrounding the distinction between concrete and abstract objects (Rosen, 2014). The most promising distinction is based on David Lewis' idea of *way of negation*. Following this idea, abstract objects are defined in terms of what they are not.

In other words, abstract objects are objects that lack certain features that concrete objects possess (Lewis, 1986). The definition would then be that abstract objects lack a spatiotemporal location and mechanico-causal powers (Rosen, 2014). Concrete objects, on the contrary, are objects that occupy physical space and that are capable of causing effects in the physical world. Representational arts make use of references to such concrete objects that can be elements of the real world. Abstract arts do not use such references.

Examples of forms of art that make use of references to concrete objects are paintings of a mountain or an important person. These paintings are constituted by the depicted image of the actual mountain or the actual important person. Both are references to concrete objects, because both the mountain and the person occupy physical space and are capable of causing effects in the physical world². Therefore, these examples of paintings are forms of representational art. There are also paintings that are considered as abstract art. Such paintings are not constituted by references to concrete objects; rather those are constituted by depicted abstract objects. For instance, Piet Mondriaan's composition number III. This painting is produced independent of visual elements of the real world and refers to abstract objects only. The depicted abstract objects in Mondriaan's painting are colors and shapes. It is arguable that these abstract objects are somehow derived from concrete objects. For instance, greenness might be derived from trees. However, the lack of these direct references to concrete objects results in such paintings being categorized as abstract art (Walton, 1988).

According to this categorization of art, music is a form of abstract art. It is very likely that music is derived from human speech or natural sounds (Walton, 1988, p. 351). Both do not occupy physical space and are therefore considered as abstract objects. In other words, music refers to auditory abstract objects. Kendall Walton argues subsequently that the degree of abstractness of music is different from the abstractness of other forms of abstract art (Walton, 1988). The references to abstract objects or at least the lack of references to concrete objects in other forms of abstract art are pivotal for the value of those artworks. On the contrary, in the case of music, the possible references to auditory abstract objects are not pivotal for the value of music. Music listeners ignore these references most of the times and concentrate on the *musical* significance of the sounds when they are listening to music. In other words, the value of the art of music lies in the musicality itself and not in the

² The idea that mountains can cause effects in the physical world might be a bit counterintuitive. However, consider for instance a mountain whose shape changes due to erosion or snow. This can clearly cause changes in the physical world.

references to abstract auditory objects. Therefore, the degree of abstractness in the art of music is different than the abstractness in other forms of abstract art.

The value of artworks in general can be connected to many different elements. Some examples are the impressive craftsmanship that precedes an artwork or the subjective judgement of the beauty of an artwork. The value of forms of representational art can also be located in the references to concrete objects or the manifestation of those objects. In other words, the value of representational art can also lie in what the artwork is *about* (Walton, 1988). Representational artworks can for instance be about love, life or war and people can learn from this content or simply enjoy it. The value of such artworks can then very well lie in these representations. As I have explained previously in this section, music is a form of abstract art. Besides in the impressive craftsmanship or subjective judgements, Walton argued that the value of music can lie within the musicality itself. This may give a first hint of what music is. However, there are two main views about what element of musicality determines this value of music. Some scholars argue that the value of music lies in musical expressiveness and others scholars argue that it lies in the musical features themselves (Kania, 2014; Przybysz, 2013, pp. 176–177).

Walton defends the view that the value of music is located in its expressiveness. As I have explained in section 1.1, musical expressiveness was already important for music in the prehistory. Musical expressiveness or expressivity means the ability of music to be expressive of emotions³. Expressiveness is something else than representing emotions. So, expressiveness and expression are not the same. Expressiveness is an ability that music possesses and expression is something that music can do (Kania, 2014). Walton argues that music calls for *imaginative introspection* and that the value of music lies in this mechanism (Walton, 1988). While listening to music, listeners do not just imagine themselves listening to the sounds of the music; rather they imagine their responses to the world that is portrayed⁴ in the music. This is what he calls the introspective awareness of auditory sensations (Walton, 1988). Walton claims that through imaginative introspection music listeners become imaginary aware of (the dynamics of) their affective responses to and evaluations of the world that the music portrays. So, music listeners become aware of their psychological states through imaginative introspection. In other words, music can

³ Music is able to be expressive of more than only emotions. For instance, music can also be expressive of motions, beauty, (Christian) faith, tensions and releases, events, human characters, political or social conditions (Sloboda & Juslin, 2001, p. 93). However, as I will explain in section 2.2, only musical expressiveness of emotions is important for my investigation.

⁴ Walton deliberately chooses the word *portraying* here to avoid confusion with forms of representational arts. These portrayals are different from references to concrete objects, because they are caused by the musicality of music itself.

induce listeners to experience subjective evaluations and responses to objective phenomena that are portrayed by the music (Walton, 1988). For instance, Walton would argue that if a musical work portrays a struggle, listeners become imaginary aware of their responses to and evaluations of the struggle. On the contrary, when someone perceives a representational artwork, he or she is imagining *external perception* (Walton, 1988). According to Walton, the perceiver of a painting of a landscape imagines him- or herself looking at that landscape in real life. So, the perceiver does not imagine responses or evaluations, but he or she imagines the perception of the concrete objects in that landscape.

Alan Goldman defends the view that the value of music is located in the musical features themselves. He denies the importance of musical expressiveness for the value of music. Goldman claims that it is more straightforward to say that we react affectively to the imaginary worlds portrayed by the music, rather than to say that we have imaginary affective responses to the actual world portrayed by the music, as Walton argues (Goldman, 1995, p. 66). The value of music lies in the abstractness of the musical features themselves (Goldman, 1992). This abstractness can imply detachment from the world of practicalities within music listeners. Musical features, such as pitch and rhythm, can create an imaginary world to which music listeners may react affectively. These affective responses of music listeners to the alternative world portrayed by the music can lead to the listeners being aware of their psychological states (Goldman, 1992, 1995). So, both views on the location of the value of music agree that music can lead to the experience of psychological states, either imaginary through musical expressiveness or actually through the imaginary world of music.

Agreeing upon music as a form of abstract art that enables listeners to experience their own psychological states gives a first hint of what music *is*. This is, however, not enough to determine whether or not specific sounds are to be considered as music. Before going into the remaining ontological issues for finding a unitary definition of music in section 1.4, I will briefly illustrate the relatedness between music and technology.

§ 1.3 Music as a technology

Simon Frith already argued that music is more than a just a form of art (Frith, 2002). Music can also be used as a tool for identity creation and emotion regulation (DeNora, 1999, 2000; Frith, 2002). I will explain in this section that music in itself can be considered as a technology according to the theory of narrative technologies and according to Foucault's theory of technologies of the self. This illustrates the relatedness between music and technology that becomes important in chapter 4. In

chapter 4 I will illustrate that the use of specific music-listening technologies can strengthen the idea of music as a technology. In addition, I will illustrate that this use has and has had an impact on the possible influences of music listening on the well-being of music listeners.

Music in itself can be considered as a narrative technology. A narrative technology is an empowering system of knowledge that people can use to create stories and to communicate those among each other (Kruger, 2007; Lechtman & Merrill, 1975). For instance, hunting tools from our ancestors are narrative technologies. Only when such technologies are communicated among each other and between generations, they can be used. Besides, hunting technologies can only be fully understood when the mundane hunting techniques and the living environment of our ancestors are taken into account. In other words, hunting technologies can only be understood when taking the corresponding narrative into account. Music can be considered as such a narrative technology as well. As I have indicated in section 1.1 and as I will return to in chapter 2, people can use music to tell and share cultural values, emotions and social meaning, to explain certain phenomena and to describe certain events (Kruger, 2007; Wingstedt, Brandstrom, & Berg, 2010, pp. 193–194). For instance, in music therapy, music is often used as a way to communicate emotions and to develop conversations with a patient. Therefore, using music can improve the health of a patient (Kruger, 2007; MacDonald & Wilson, 2014). As I will return to in section 4.3, people can use music also to share and express identity. In general, Christopher Small concluded that music should not be considered as an object, but as a process (Small, 1977). He illustrated that music involves so many different performances and listening practices that it is a result of a narrative process between performer and audience rather than just an object (Pinch & Bijsterveld, 2004, p. 636; Small, 1977). Music can only be understood when these practices are taken into account (Small, 1977). So, music in itself suits the definition of a narrative technology and can therefore be considered as a technology.

Music can also be considered as a technology of the self. According to Michel Foucault, human beings themselves can be turned into subjects due to technological developments (Martin, Gutman, & Hutton, 1988)⁵. A technology of the self enables an individual to transform him- or herself in order to attain a state of happiness, of perfection or of devotion. In other words, technologies of the self provide the individual with the freedom or control to customize him- or herself (Martin et al., 1988). For instance, Yoga and Pilates can be considered as such technologies of the

⁵ Shortly before he died in 1984, Foucault gave some seminars about his ideas on *technologies of the self*. He has never finished his book about these ideas and therefore there only exists secondary literature about his ideas of technologies of the self.

self, because they provide an individual with control over him- or herself. Music can be considered as such a technology of the self as well. As I will return to in section 4.3 and 4.4, music is a useful tool for self-regulation. Music enables listeners to actively influence their feelings and emotions and it can function as a tool of *artefactual memory*. It can help listeners to remember or reconstruct how they used to be in the past and to remember specific events of the past⁶ (Bull, 2000, p. 349; DeNora, 1999, p. 45). Tia DeNora summarizes that music can be used on a personal level for creating, enhancing, sustaining and changing subjective, cognitive, bodily and self-conceptual states (DeNora, 2001, p. 169). So, because music can actively be used as a tool for self-regulation, it can be considered as a technology of the self (Batt-Rawden, 2010; DeNora, 1999, 2001).

In this section I have briefly explained that music in itself can be considered as a technology according to several theories. This illustrates the relatedness between music and technology. This also illustrates the importance of investigating the second of my main research questions: what is the impact of music-listening technology on the ways that listening to music may influence the well-being of music listeners? In chapter 4 of this thesis I will focus specifically on how music and technology are intertwined. I will do so by showing that music-listening technologies have strengthened the idea of music as a technology and by exploring the impact of those technologies on the circumstances under which the possible influences of music listening on well-being can occur. Before I can go into these possible influences, a unitary definition of music is required. In the next section I will explain the remaining ontological issues for finding such a definition of music.

§ 1.4 Ontological issues of music

In this section I will explain the ontological issues of music that remain. The subfield of philosophy that is occupied with exploring these issues and finding a unitary definition of music is called musical ontology. Within the field of musical ontology there is a fundamental debate about the metaphysical nature of musical works. There are two main positions in this debate: the realist position and the anti-realist position (Kania, 2014). The realists proclaim the existence of common properties between musical works and the anti-realists deny this existence. According to most anti-realists there are no common properties, so we need to stop referring to them. For instance, Andy Hamilton concludes that music is an unavoidably vague phenomenon and rejects the possibility to find a unitary definition of music in terms of necessary and

⁶ As I will explain in section 2.4, the process of emotional responses to music through remembering events of the past is called episodic memory.

sufficient conditions (Hamilton, 2007). However, as I have explained previously in the introduction of this chapter, people tend to be experienced music listeners that have intuitive presuppositions about what music is. It is therefore counterintuitive that there would exist no property that is common to all musical works. This is why I am inclined towards the realist position. The most common view within musical realism is *Platonism* (Kania, 2014). According to the most basic form of Platonism, musical works consist of abstract entities⁷ and the definitional challenge is to find what kind of abstract entities determine what a musical work is. These abstract entities are external existents, neither existing in time or space (Kania, 2014). According to this simple Platonism, a musical work is solely constituted by such abstract entities. The performer *discovers* the specific combination of abstract entities in a musical work and does not *produce* the entities or the musical work (Kivy, 1993). This leaves out the possibility for musical works to be produced by human doing. This is counterintuitive. Therefore, simple Platonism is adjusted into *Complex Platonism*⁸. Besides the abstract entities that constitute a musical work, Complex Platonism includes the human act of performance. According to Complex Platonism, musical works are placed in time through this human act of performance (Fisher, 1991, p. 129; Kania, 2014; Levinson, 1980, p. 28). In other words, according to Complex Platonism, a musical work is necessarily personalized. One may argue in line with simple Platonism that discovering a combination of abstract entities can be a personalized human act of performance as well. However, producing a musical work is much more than just discovering it. Only one particular musician could have produced the musical work as it is presented at a specific moment, whereas many people can discover the specific combination of abstract entities. Intuitively, many musical works only make sense within the context of a particular musician. Consider for instance a performer that plays a musical work that is originally from Elvis Presley. Even if the performer would play an exact copy of the original musical work, it is unlikely that this copy has the same value for music listeners. Therefore, the copy is not the same musical work. So, the human act of performance must certainly be taken into account when trying to find a unitary definition of music (Fisher, 1991). Complex Platonism is therefore the most suitable approach to find such a definition of music. However, some ontological issues still remain when trying to find a unitary definition. I will explain those in the remainder of this section.

⁷ These abstract entities are a type of abstract objects. I have explained abstract objects in section 1.2.

⁸ This view has been named Complex Platonism later. Most scholars holding this view do not use this term (Kania, 2014).

1.4.1 Diversity in music

One of the most compelling issues with regards to finding a unitary definition of music is caused by the way that music has been diffused in time and between cultures. All of these instances of music must be included in such a unitary definition. First of all, music has changed over time. Throughout time, the amount of possibilities in producing and reproducing music has been increased tremendously. New musical instruments were created which enabled new genres of music to emerge. The first bone flute, for instance, enabled our ancestors of 44.000 years ago to generate a whole new spectrum of sounds that probably enabled them to create new types of music. This increase of musical possibilities has been boosted by the technological developments in music production. New instruments such as the electric guitar, organ or synthesizer are result of these technological developments in music production. Technological developments in music technology enable us to manipulate sounds as well. For instance, studio technologies enable us to manipulate sounds that are produced by musicians in advance. This makes people working in studios almost equally important as the musicians themselves (Horning, 2004; Pinch & Bijsterveld, 2004). Another example of how music can be technologically manipulated is the amplifier. Amplifiers enable musicians to modify their sounds themselves. For instance, guitarist Eddie van Halen modified his amplifier which resulted in a new subgenre in rock music (Pinch & Bijsterveld, 2004, p. 639). Besides generating new possibilities to make or to manipulate sounds, technological developments also generate new genres of music that consist of sounds that are produced by computers. Techno, house, trance, dance or electro music are examples of such. These types of music can also be manipulated into new musical works at live performances by disc jockeys (DJ's). DJ's are performers that play and manipulate recorded sounds in front of an audience. Due to all of such developments in music production, musical works and genres have become highly diffused. This diffusion is related to musical preferences as well. The musical preference of an individual may push the diffusion of music. This is the case in the example of the Eddie van Halen's rock music. The opposite is possible as well: new music can push the musical preference of people towards these new genres. So, musical preferences and possibilities for music production and reproduction have diffused music tremendously.

Secondly, music has become diffused between cultures. Musical preferences do not only relate to the diffusion of music over time, they also relate to the cultural backgrounds of people. Most people are a member of a specific musical culture which partially determines what they perceive as beautiful, ugly, happy or sad (D. Boer et al., 2011; Kania, 2014). We can expect that such culturally influenced musical preferences can push the diffusion of music similarly as how technological developments have

diffused music over time. For instance, it is possible that some musical features are more appreciated in certain cultures than they are in others. As I have demonstrated in section 1.2, the basic musical features are pitch and rhythm. Many other musical features, such as harmony or melody, can reflect cultural standards (Juslin & Laukka, 2004, p. 221). Moreover, music can be produced for specific cultures. This happens, for instance, in religions. A lot of church music is produced specifically to be used in contemporary religious practices (Alcorta & Sosis, 2005, p. 336). Such tendencies can be recognized in other (non-)religious cultures as well. For instance, within the hippie culture that spread out in the United States of America in the 1960's, new subgenres of rock music that oppose consumerism and conformity emerged. Even though these subgenres of rock are mainly related to the lyrics and are therefore not examples of pure music, they do indicate how culturally influenced musical preferences may push the diffusion of music. This wide diffusion makes finding a unitary definition of music complex, because such a definition must be able to include all instances of music.

1.4.2 Contradictory elements

The second ontological issue that makes finding a unitary definition of music complex is that different musical works can contain contradictory elements. For every structural feature of a musical work that can be considered as a possibly defining feature of music, a counterexample can be found (Brown et al., 2000, p. 6). There is always a musical work or genre that lacks this feature. This makes it very hard to find common properties to all musical works. Nevertheless, in order to find a unitary definition of music, such common properties must be found. I have demonstrated in section 1.2 that music in its most general form is constituted by pitch and rhythm. To illustrate the size of this ontological issue, I will explain counterexamples of musical works that lack either pitch or rhythm in the remainder of this subsection.

Consider a moderate performer who tries to play an original piece of Mozart. The performer may fail to keep the rhythm that is prescribed in the original piece. Up to a certain amount of mistakes, we would typically still consider this as a musical work. According to Complex Platonism, the human act of performance and therefore mistakes are a part of a musical work, unless the mistakes are so pervasive that they will destroy the performance altogether (Davies, 1997, p. 459). A second counterexample of the idea that rhythm may be a defining feature of music is *Ambient Music*. Ambient music is a genre that contains musical works that put more emphasis on the tonality and atmosphere surrounding the experience of the listener than on the rhythm or harmony of the musical work (Peretz, 2006, p. 17). Brian Eno is one of the pioneers in the production of ambient music. He tries to construct new sonic worlds

by using the studio as an instrument (Eno, 2006). He showed that music can very well exist without any form of rhythm.

Aleatoric music is a counterexample of the idea that pitch can be a defining feature of music. I have explained aleatoric music in the introduction to this chapter. Especially *In Futurum* of Erwin Schulhoff is a good example of aleatoric music. This piece of music consists of silence only and is, in contradiction to John Cage's 4'33", often considered as a musical work (Kania, 2010). *In Futurum* is clearly an example of a musical work without any form of pitch (or rhythm).

These counterexamples illustrate the difficulty of finding a unitary definition of music. It is useful to make use Wittgenstein's idea of *family resemblances*. Wittgenstein recognized these ontological issues when discussing the ontology of phenomena in general. Philosophers have the tendency to search for generality (Wittgenstein, 1953). Wittgenstein has criticized this quest to one essential core in which all particular instances of a phenomenon are connected. Instead, he proclaimed family resemblances. He argued that all particular instances may be connected by more than one overlapping property and that none of them may be common to all (Wittgenstein, 1953). These similar properties are what he calls family resemblances. This is exactly the case when we search for defining musical features to find a unitary definition of music. Although there is a lot of overlap in musical features between musical works, I have explained in this subsection that none of these features is common to all. I will therefore use Wittgenstein's idea of *family resemblance* in section 1.5 to find a unitary definition of music.

§ 1.5 Towards a unitary definition

DeNora and Gary Ansdell argue that we should be less occupied with finding a unitary definition of music; rather we should focus on the things that music has shown to be capable of. According to them, the question *What can't music do?* is much more relevant than asking ourselves the more analytical question of what music is. This analytical gaze upon music obscures the possible positive impact that music can have on health and well-being. According to them, it would be beneficial for future studies to shift all focus to these possible influences of music instead of focusing on the more analytical questions (DeNora & Ansdell, 2014)⁹. However, to be able to define a clear scope for the overview of the influences of emotions while listening to music on the well-being of listeners, a unitary definition of music that can overcome the ontological issues that I have explained in section 1.4 is needed.

⁹ I will present their findings that may be relevant for my research questions in chapter 4.

Before going into Kania's definition of music that I will use in this thesis, it is useful to consider two basic presuppositions of music that are often used to define music. These presuppositions illustrate the family resemblances between musical works that can help me to find a unitary definition of music. The first basic presupposition has already been touched upon section 1.2: the presupposition of music as *organized sounds*. This presupposition does include both the requirements of Complex Platonism: the human act of performance and the abstract entities of music. Clearly, most musical works consist of sounds in a certain structure. However, as I have explained in section 1.4, *In Futurum* is an example of silent music which does not consist of sounds. So, organized sounds are a family resemblance between many, but not all musical works¹⁰. However, this basic presupposition about music alone is too broad to be used for a unitary definition, because it cannot distinguish between music and other forms of organized sounds. For instance, sounds made by animals, human speech or sounds that are produced by machines that people have created, would all fall under this definition of music as well. With the exception of some animal sounds (e.g. Doolittle & Gingras, 2015), these forms of organized sounds are typically not considered as music. Music as organized sounds alone is therefore not enough as a unitary definition, but it is a family resemblance that should be included in such a definition.

Another basic presupposition of music comes from the field of *Ethnomusicology*. Ethnomusicology is a field of science that focuses on the social sides, the functionalities and the context of music (Becker, 2001; Krüger, 2009). Ethnomusicologists use the presupposition of music as *an organized cultural activity* (Brown et al., 2000, p. 6). This presupposition can account for the wide uses of music, of which I have explained some in section 1.3. It does also include the human act of performance. However, this basic presupposition alone cannot be a unitary definition of music, because of two reasons. First of all, it does not explicitly include the abstract entities of music that are prescribed by Complex Platonism. Secondly, similar to music as organized sounds, it is too broad by itself. According to this presupposition, poetry, for instance, would be defined as music, whereas poetry is typically not considered as such. In addition, this presupposition can lead to the conclusion that music is anything that people consider music, simply because everything may count as an organized cultural activity (Brown et al., 2000, pp. 6–7). Clearly, music as an organized cultural activity alone is too broad for a unitary definition of music. However, many musical

¹⁰ A possible argument that *In Futurum* would be a form of organized sounds is that silence and sounds are equivalents. Silence is then organized in musical works just as how sounds are organized and therefore *In Futurum* would also fit in this family resemblance (Kania, 2010, p. 351). However, this is not the central concern here.

works are organized cultural activities. This presupposition is therefore a second family resemblance that a unitary definition of music should include.

Both of these family resemblances alone are too broad to count as a unitary definition of music. However, they do illustrate what a unitary definition must include. A unitary definition of music should make some appeal to musical features, as I have demonstrated by the presupposition of music as organized sounds. In addition, such a definition must make some appeal to an aesthetic experience of music, as I have demonstrated by the presupposition of music as an organized cultural activity. These family resemblances are highly connected to the requisites that Complex Platonism prescribes to a unitary definition of music. Abstract entities of music are incorporated in the family resemblance of musical features and the human act of performance is incorporated in both family resemblances¹¹. Hamilton and Kania claim that these appeals to the musical features and to an aesthetic experience are the only two family resemblances or *salient features* of music (Hamilton, 2007; Kania, 2011, 2014).

In order to reach consensus in this discussion, a unitary definition should fulfill two main conditions. First of all, the definition of music should be able to unambiguously make an appeal to both of these family resemblances and should not be too broad. Secondly, a unitary definition of music must be able to overcome the ontological issues that I have explained in section 1.4. These are the necessary and sufficient conditions of music. Kania offers a convincing unitary definition of music that fulfills these conditions:

“Music is (1) any event intentionally produced or organized (2) to be heard, and (3) *either* (a) to have some basic musical feature, such as pitch or rhythm, *or* (b) to be listened to for such features.”¹²

(Kania, 2011, p. 12)

This definition incorporates both family resemblances by making an appeal to the aesthetic experience of music and to the musical features. It states that music should have some basic musical features (3a) or should be listened to for such features (3b), which clearly makes an appeal to the musical features as was implied by the presupposition of music as organized sounds. This two-folded reason for listening to music results in a definition of music that excludes examples of non-musical organized

¹¹ One may argue that these requisites that are prescribed by Complex Platonism must occur in all possible musical works. However, in order to find a unitary definition of music I would argue that that it suffices to incorporate these requisites as family resemblances.

¹² One may argue that Kania’s definition is based on a tautology, because it makes use of the concept of *musical features* to define music. Nevertheless, this is the most suitable definition of music and therefore I will use this definition throughout this thesis.

sounds. In addition, the definition states that music should be heard (2), which makes an appeal to the aesthetic experience of music as was implied by the presupposition of music as an organized cultural activity. In addition, this definition makes an appeal to the aesthetic experience by stating that music can be listened to for musical features. Listening to music for musical features is rather subjective and highly culturally influenced. So, Kania's definition of music includes both family resemblances. Although that the two requisites of Complex Platonism are already incorporated by including the two family resemblances, this definition explicitly incorporates the human act of performance by stating that music is any event *intentionally* produced or organized (1). I will come back to this role of intentionality in music in section 2.2.

Kania's definition can also account for the ontological issues that I have explained in section 1.4. First of all, because this definition has been formulated very broadly, it is able to account for the huge diversity in musical genres that has emerged over time and between cultures. According to this definition, as long as a musical work contains some basic musical feature or when it is listened to for such features, it is music. The second ontological issue that I have explained is about contradictory elements between musical works. Because this definition gives two options for listening to music, it gives space for all kinds of musical works, even with contradictory elements. In order to illustrate this point, I will demonstrate that this definition is able to include the two extreme musical genres that I have explained in subsection 1.4.2: aleatoric and ambient music. First of all, aleatoric music is music that consists of elements that are led by chance. *In Futurum* is an example of aleatoric music that is completely silent. Davies argues that silent music does not contain any musical feature and is therefore not listened to for such features (Davies, 1997). According to Kania's definition, *In Futurum* would then not be music. However, Kania responds that silence and sounds are equivalents. So, people listen to silences equally as they would listen to sounds (Kania, 2010, p. 351). Therefore, people would listen to silent music equally as they would listen to non-silent music. *In Futurum* then fits his definition of music, because people will listen to silent music for musical features after all (Kania, 2010, p. 351). Secondly, ambient music is music that is solely constituted by musical pitches without any rhythm. Clearly, this musical genre has the basic musical feature of pitch and therefore fits in Kania's definition as well.

Kania's definition is able to fulfill the necessary and sufficient conditions. For these reasons I will use his definition throughout this thesis. However, there is one final remark about his definition that must be made. This remark is related to the example of a musician who fails to successfully copy a musical work, which I have explained in subsection 1.4.2. According to this definition, the point at which the amount of mistakes in the copy becomes so pervasive that it is not considered as

music anymore¹³ depends solely on reasons of the music listener to listen to it. Only when the music listener stops listening to that musical work for musical features, it is not music anymore. This point is very subjective. In other words, the definition does not prescribe any degree of authenticity of a musical work objectively. Before I will go into the affective responses to music in chapter 2, it is useful to briefly explain the controversy about authenticity in the field of musical ontology.

1.5.1 Authenticity

Within the field of musical ontology there is a controversy about the authenticity of musical works (Kania, 2014). The question that causes this controversy is how authentic a musical work should be in order for it to be music. The example of subsection 1.4.2 about the moderate performer who fails to play a piece of Mozart correctly illustrates this point nicely. It is interesting to determine how many mistakes by the performer are allowed for the musical work to still be considered as music. Other questions about the authenticity of a musical work may emerge as well. For instance, if the performer plays the musical work on a synthesizer instead of a piano, would that be authentic enough for it to be music? Or does the performer need to play it on a piano? Or would it even be necessary to play it on the exact same piano as Mozart himself did when he was playing the original musical work for the very first time? Such questions illustrate that authenticity is a property of musical works that can come in different degrees (Davies, 2001a; Ihde, 2007; Kania, 2014).

However, within Kania's definition that I have argued for in section 1.5, authenticity is not considered as a defining feature of music. According to his definition, a musical work is authentic enough to be music when the listener listens to it for musical features. In other words, it is left fully subjective. If a musical work contains too many mistakes, people may stop to listen to it for musical features. Only then, the musical work is not considered as music anymore. The genre of jazz music illustrates the importance of leaving authenticity fully subjective. Jazz is a musical genre that is highly based on improvisation by the performer. Jazz is often not a performance of previously composed musical works and it is therefore very hard to talk about the authenticity of jazz music at all (Kania, 2005). This would mean that if authenticity is included in the definition of music, Jazz would automatically not be included in that definition. Therefore, Kania has set apart the discussion about authenticity from the definition of music. However, it is possible that if a musical work is more authentic than another one, that it arouses more intense affective responses (Greasley, Lamont, & Sloboda, 2013, p. 418). The discussion of authenticity

¹³ I assumed in this example that the amount of mistakes has already exceeded the point at which the musical work would still have actual musical features. Whether or not this musical work is music then only depends on the subjective reasons for listening of the listener.

then becomes a discussion in the field of aesthetics. Aesthetics is a field within philosophy that is occupied with the nature, creation and appreciations of art, beauty and taste. It analyses those by studying the values and judgements of people. I will explain the influences of authenticity on our affective responses to music in section 2.5.

In conclusion, in this chapter I have explored my first subquestion: *What is music?* I have explained what the problems are with finding a unitary definition of music. In section 1.2 I have compared music to other forms of art and I have shown how the abstractness of music is different than the abstractness of other forms of art. The value of music as a form of art is that it can help us to experience our own psychological states. In addition, in section 1.3, I have demonstrated how music in itself can be considered as a technology. This illustrates the relatedness between music and technology on which I will elaborate in chapter 4. Afterwards, in section 1.4, I have explicated the main ontological issues about finding a unitary definition of music. The broad variety of musical works and the possible contradictory elements in such musical works as a result of that make it difficult to find such a definition. I have shown, by making use of Wittgenstein's idea of family resemblances, that Kania's definition of music is the most suitable. It can fulfill the necessary and sufficient conditions of incorporating both family resemblances, musical features and an aesthetic experience, and of overcoming the ontological issues. That is the reason why I will use Kania's definition of music throughout this thesis to find the influences of emotions while listening to music on the well-being of music listeners.

The aim of this thesis is to find the influences of emotions while listening to music on the well-being of music listeners and the impact of music-listening technologies on these influences. In the next chapter I will therefore focus on the controversies about emotions while listening to music. I will explore the nature and the causes of affective responses to music and argue that these responses can be genuine and full-fledged emotions. These emotional responses to music may entail important influences of music listening on well-being. In chapter 4 I will explore these possible influences on well-being and the impact of music-listening technologies on these influences more in detail. Only when having an overview of the influences of music listening on well-being and the technological impact on those influences, it may be possible to make some recommendations for future studies that may enable engineers to design music-listening technologies specifically for improving the well-being of music listeners.

Chapter 2: Music and Emotions

The aim of this thesis is to find the influences of emotions while listening to music on the well-being of music listeners. Now that I have argued for a unitary definition of music, the focus will shift towards the controversy that music can arouse genuine and full-fledged emotions in music listeners. In this chapter I will therefore explore the nature and the causes of the affective responses to music. It is important to recall here that affect is used in this thesis as an umbrella term for both moods and emotions¹⁴. This chapter will answer subquestion Q₂: *How does listening to music influence the emotions of music listeners?* This chapter makes critically use of the literature in the fields of psychology of music and philosophy of music. Empirically informed studies will be used to explore the nature and the causes of affective responses to music. In subsection 2.1.1 I will explicate why making use of such empirical findings and empirically informed studies should happen with caution. Only after reaching consensus in the controversy that music can arouse genuine and full-fledged emotions in music listeners, I can explore the possible influences of emotions while listening to music on the well-being of those listeners. I will do so in chapter 4.

In the early 90's the ideas that music could be expressive of emotions, which I have already indicated in section 1.2, and that we can have affective responses to music as a result of that were controversial. However, due to the advance of musical ontology as I have illustrated in the previous chapter and due to many empirical findings in the psychology of music (e.g. Gabrielsson & Lindstrom, 2001; Gabrielsson, 2001; Juslin & Laukka, 2004; Juslin, Liljeström, Västfjäll, Barradas, & Silva, 2008; Sloboda & O'Neill, 2001; Thoma, Scholz, Ehlert, & Nater, 2012), most scholars came to the consensus that music can possess some emotive properties that can result in some form of affective responses of music listeners (Goldman, 1995, p. 59; Kania, 2014; Kivy, 1999, p. 1). There is a growing attention to these affective responses of music listeners in both philosophical and psychological literature. In this chapter, I will go into the discussions surrounding these affective responses more thoroughly. There are six pioneering scholars in this discussion: Jerrold Levinson, Peter Kivy, Alan Goldman, Kendall Walton, Stephen Davies and Patrik Juslin. All of them will be addressed extensively in this chapter.

¹⁴ Scherer and Zentner argue that there are six types of affective responses to music: preferences, emotions, moods, interpersonal stances, attitudes and personality traits (Scherer & Zentner, 2001, pp. 362–363). However, as I already explained previously, my scope is limited to moods and emotions. These are the only two categories that influence the psychological state of the individual directly. I would argue that the other categories of affective responses influence the psychological state of the individual only via moods or emotions.

Davies summarizes the three general critiques that some philosophers of music still have on the idea that music can arouse affective responses of listeners (Davies, 2001b). His first critique is related to the probable cause of these affective responses of music listeners: musical expressiveness. This critique entails basically that musical works are not sentient and that it is therefore vague how musical expressiveness can cause affective responses. I will explain and refute this critique in section 2.2. The second critique of Davies is about the nature of these possible affective responses. As I will return to in section 2.1, many psychologists of music have shown empirically that these affective responses to music can be genuine and full-fledged emotions. However, in the case of affective responses to music, some subcomponents of emotions are lacking. Therefore, most philosophers still disagree with the empirical findings and refute the idea that the affective responses to music can be genuine and full-fledged emotions. I will explain and refute this second critique in section 2.3. The final critique of Davies is that if music would be able to arouse genuine and full-fledged emotions in music listeners, those listeners would avoid music that arouses negative emotions. However, empirical findings suggest that this is not always the case (e.g. Huron, 2011). I will refute this last critique of Davies by exploring the causes of possible emotional responses to music. In order to find these causes, I will present the BRECVEMA framework of Juslin in section 2.4. This BRECVEMA framework shows through which mechanisms music listening can actually arouse genuine and full-fledged emotions. Whether or not affective responses to music are emotional also depend on the circumstances while listening to music. I will explore these circumstances, which are called the *musical event*, in section 2.5. I will argue in subsection 2.5.1 that the degree of *dominance* that a listener has over a specific musical event should be considered as a separate feature of the musical event. This dominance over the musical event has not yet been addressed separately in the literature. Nevertheless, it is an important determinant of emotions while listening to music. A combination of the extended musical event and the BRECVEMA mechanisms can explain why music listeners would listen to music that is able to arouse negative emotions in them. This will refute the final critique of Davies on affective responses to music. This chapter will clarify how music listening can arouse genuine and full-fledged emotions in people. Afterwards, in chapter 3, I will explain the term well-being more in detail.

§ 2.1 Music and emotions: some presuppositions

As I have indicated previously, affect is used as an umbrella term for both emotions and moods. In order to discuss the nature of the affective responses to music, both

the terms must be properly defined. Although we have intuitive ideas about what emotions and moods are, there is little consensus about the precise definitions of these terms (Sloboda & Juslin, 2001, pp. 73–74). The definition of emotions that I will use in this thesis is the most commonly used definition in the psychology of music. This definition is proposed by Klaus Scherer:

Emotions are “quite brief but intense affective reactions that usually involve a number of subcomponents that are more or less synchronized. Emotions focus on specific objects, and last minutes to a few hours”.

(Scherer, 2000)

These subcomponents of emotions are: cognitive appraisal, subjective feeling, physiological arousal, expression, action tendency and regulation (Scherer, 2000). Cognitive appraisal¹⁵ is the subjective evaluation by an individual of an internal or external object or event on a variety of dimensions: in relation to the goals, motives, needs or values of that individual (Moors, 2009; Scherer & Zentner, 2001; Scherer, 1999). That event or object may arouse emotions based upon such evaluations. To explain this in the domain of music, Juslin gives an example of very loud music that can arouse anger. Loud music may retain a person from his or her goal of falling asleep and he or she may therefore get angry. However, within this example, music only plays a secondary role, because it can easily be exchanged by any other disturbing stimulus and still result in the same emotional response. A better example of how music can lead to emotional responses of listeners based on this subcomponent would consider just one musical feature. For instance, a person that is dancing on the rhythm of a musical work may become retained from his or her need for dancing if the performer suddenly plays the musical work at a different rhythm. The music listener may then become angry or irritated.

The second subcomponent of an emotion is subjective feeling. Subjective feeling is the evaluation of an emotion once it has occurred¹⁶. For instance, the music listener may *feel* angry when being retained from dancing on the original rhythm of the musical work. Physiological arousal is the bodily response to such a subjective feeling. For instance, the heart rate of the music listener may go up in response to the feeling of anger. The subcomponent expression consists of facial and/or vocal responses

¹⁵ The term “cognitive” is used here in a philosophical way. It means the beliefs, imaginings, thoughts, intentions, desires and like states of consciousness (Moors, 2009, pp. 638–643; Scherer, 1999).

¹⁶ Some scholars argue that subjective feeling is not a distinct subcomponent of an emotion, rather that it is an example of the cognitive appraisal subcomponent (Scherer & Zentner, 2001, p. 373). This is, however, not the central concern here.

to a subjective feeling. For instance, the music listener may start to yell at the performer on stage. The subcomponent action tendency is closely related to this subcomponent of expression. In response to the situation, the music listener may feel the motivation to react to his or her subjective feeling of anger. He or she may want to stop dancing or may feel the urge to adjust his or her dancing. The final subcomponent, regulation, refers to the attempts of an individual to regulate the emotional response. For instance, while being angry, the music listener may try to calm him- or herself. All of these subcomponents should occur more or less synchronized in affective responses in order for those to be emotions (Scherer, 2000).

Moods differ from emotions because they are less intense and their duration is longer (Scherer, 2000). In other words, being in an irritated or a happy mood differs from experiencing the emotion of irritation or happiness in intensiveness and duration. In addition, moods do not necessarily need a clear object to which they are directed (Juslin & Västfjäll, 2008, p. 561). *Feelings* are sometimes confused with emotions or moods. As I have explained previously, a subjective feeling is a subcomponent of an emotion. Feeling angry or happy is a part of the emotion of anger or happiness. A feeling is the subjective evaluation by an individual of an affective reaction (Juslin & Västfjäll, 2008; Juslin, 2013).

There are different approaches that are used to categorize emotions. The two most commonly used approaches are the dimensional and the categorical approach. According to the dimensional approach, emotions can be categorized according to their position on two or three dimensions (de Sousa, 2014; Lundqvist et al., 2009; Moors, 2009; Sloboda & Juslin, 2001). The most common dimensional approach is the Circumplex model of James Russell (Russell, 1980). This approach suggests that emotions are categorized in a two-dimensional circular space with the dimensions *arousal* and *valence*. An emotion can be categorized as having high or low arousal, which means the accompanied level of activity. An emotion can also be categorized as being positively or negatively valenced. For instance, happiness is a positive emotion with high arousal and boredom is a negative emotion with low arousal. This dimensional approach is mainly useful when the dynamics of an emotion are relevant (Sloboda & Juslin, 2001, p. 78). The categorical approach, on the other hand, suggests that all emotions are different categories (de Sousa, 2014; Lundqvist et al., 2009; Moors, 2009; Sloboda & Juslin, 2001). According to the categorical approach, there are several basic emotions which all have their own structure. These emotions are therefore all distinct categories. All other emotions are a mixture of basic emotions (Sloboda & Juslin, 2001, pp. 76–77). There is little consensus about which emotions can be considered as basic. However, there is some agreement that at least the following five emotions are basic: happiness, sadness, anger, fear and disgust (Sloboda & Juslin, 2001, p. 77). Both

of these approaches in categorizing emotions can be combined into one approach: every emotion can be categorized as being basic or not and according to the valence and arousal dimensions. For instance, the emotion sadness is basic, negative and low in activity. The addition of these dimensions in the categorical approach enables researchers to analyse and compare specific emotional responses more structurally (Sloboda & Juslin, 2001). Therefore, I will use this combined approach for categorizing emotions throughout this thesis. This combined approach is also suggested by Juslin and John Sloboda (Juslin, 2001, p. 315; Sloboda & Juslin, 2001, p. 78).

The valence dimension of emotions will be particularly important in my thesis, because the possible influences of emotions while listening to music on well-being depend highly on this dimension. Examples of positive emotions are amazement, beauty, calm, contentment, elation, thrill, wonder and relaxation. Examples of negative emotions are anger, anxiety, gloom, hate, terror, worry, scare and sadness¹⁷. Many psychological studies presuppose such a clear distinction between positive and negative emotions. However, whether an emotion is considered as positive or negative is very subjective. It highly depends on the situation and on the individual. For instance, sadness-melancholy can be a positive emotion for people when it helps them getting through difficult moments, whereas it is often considered as a negative emotion (e.g. Gabrielsson, 2001, p. 446; Juslin et al., 2008, p. 677). Nevertheless, for exploring the possible influences of emotions while listening to music on the well-being of music listeners, it is important to have an idea what the valence dimension of emotions entails. I will return to this point in chapter 4.

The combined approach further distinguishes basic, complex and aesthetic emotions. The categories of basic and complex emotions together are often called everyday or garden-variety emotions. I will consider the previously mentioned five emotions as the basic emotions. Complex emotions are emotions that have a more complicated structure. Nostalgia and pride are examples of such. Aesthetic emotions are derived from the field of aesthetics and used to be defined as more *special* emotions that can only be aroused when people perceive artworks (Juslin, 2013). In other words, artworks could arouse *art-specific* emotions¹⁸. It has been shown in recent empirical studies that emotions that were previously ascribed to forms of art only can occur in everyday life as well (Juslin, 2013, pp. 237–238). Therefore, Juslin connects the distinction between everyday and aesthetic emotions to the underlying causal

¹⁷ See table 19.2 in (Gabrielsson, 2001, p. 446) for a complete overview of which emotions are often considered as positive and which often as negative.

¹⁸ This distinction has been influenced by Kant's division between *aesthetic pleasure* and other types of pleasure.

mechanism. In other words, aesthetic emotions are emotions that are solely aroused by the aesthetic properties of a piece of art. Examples of such emotions can be awe and wonder. These emotions do not only occur in response to the aesthetic properties of artworks, they can occur in daily life as well (Juslin, 2013, p. 238). When these emotions occur in daily life, Juslin would call them complex emotions. A mixed emotion is the result of a combination of emotions out of these three categories. This combined approach for categorizing emotions underlies the theoretical exploration of the possible influences of emotions while listening to music on the well-being of music listeners.

2.1.1 Problems with empirical findings

Many arguments throughout this thesis are based on empirical findings or empirically informed studies. As I have already indicated in the introduction to this chapter, making use of such studies should happen with caution. This is because of several reasons. First of all, most of these studies are based on self-reports: participants answer questions about their affective responses or well-being themselves. The major advantage of using self-reports is that it is the only method that provides results that include the subjective evaluation of affective responses, well-being or musical preferences (Scherer & Zentner, 2001, p. 379). However, self-reports are heavily criticized for their predictive value of these phenomena (e.g. Diener, Suh, Lucas, & Smith, 1999; Gabrielsson, 2001; Juslin et al., 2008; Lamont, 2011; Moors, 2009; Sloboda & Juslin, 2001). There are several biases that must be taken into consideration when using empirical studies that are based on self-reports. First of all, the outcomes of self-reports can be highly culturally biased. For instance, French respondents are less likely to report positive emotions such as happiness, whereas Americans are more likely to do so. This is not because American people experience positive emotions more often, but they tend to give a more positive spin towards general experiences (Haybron, 2011). Secondly, self-reports may fail in predicting psychological states simply because the participants are mistaken about their own psychological states (Scherer & Zentner, 2001, p. 379). Meyer summarized this critique: “it may well be that when a listener reports that he felt this or that emotion, he is describing the emotion which he believes the passage is supposed to indicate, not anything which he himself has experienced” (Meyer, 1956, p. 8). Participants are in particular likely to be mistaken about the causes or components of their psychological states (Juslin et al., 2008, p. 679; Scherer & Zentner, 2001, p. 375). In addition, in the case of self-reports about well-being specifically, it is unlikely that all participants have the same view as the researcher on what well-being is. They fill in self-reports according to their own view and presuppositions about well-being. These biases make comparing results and

drawing conclusion based on self-reports about psychological states problematic. Thirdly, many self-reports ask questions about psychological states in retrospect. The provided answers may then be influenced by memory distortions (Gabrielsson, 2001, p. 447). Finally, empirical studies in general and particularly those based on self-reports often have the problem of demand characteristics, which is sometimes called the *Hawthorne effect*. If participants of empirical studies interpret the purpose of an experiment, they might change their behavior subsequently (Orne, 1969). The results of these studies are then influenced by the experimental setting and that makes them unfit to draw conclusions. The size of this Hawthorne effect depends highly on the format of the self-report. There are three traditional formats: an open-ended format, a checklist or a rating scale (Schubert, 2001, p. 394; Sloboda & Juslin, 2001, p. 74). Both the checklist and the rating scale format can steer the participant during the experiment and those are therefore easily subject to the Hawthorne effect. The open-ended format is the least biased by the Hawthorne effect. However, open-ended self-reports are hardly used, mainly because they depend too much on the linguistic competence of participants (Sloboda & Juslin, 2001, p. 74). Therefore, open-ended self-reports often result in little coherence between the answers of participants. This makes it hardly possible to draw any conclusion while using this format for self-reports at all.

Another issue with regards to many empirical studies, especially in the field of psychology of music, is that they have relatively few respondents and most of the times only consider university students. Hardly any of these studies considers more than one hundred respondents, which I would argue to be too few to make general claims about such a broad phenomenon as affective responses to music. To the best of my knowledge, subsequent studies towards the general public are often still to be conducted.

A final issue regarding empirical studies is about the interrelatedness of the causes and circumstances of affective responses to music. Many empirical studies are laboratory studies that single out specific musical features to evaluate the influences of those features on the participants. In other words, these are reductionist approaches to the influences of music. Reductionist approaches presuppose that a system in general can be considered as a sum of its features. However, in the case of music, analyzing such isolated features is hardly possible because they highly interact with each other (Gabrielsson & Lindstrom, 2001; Juslin, 2001; MacDonald, 2000). For instance, it is often assumed in such studies that every listener will respond in the same way to music, that the affective responses depend solely on the music, that there is only one cause of these responses and that the responses are necessarily relevant in explaining the physiological responses of music listeners (Västfjäll, Juslin, & Hartig,

2012, p. 408). In addition, such laboratory experiments do not consider the context of listening (Gabrielsson, 2001, p. 448). For instance, participants in these studies are hardly ever allowed to listen to their own music (Goethem & Sloboda, 2011, p. 211). Field studies, on the other hand, do consider the context of listening. However, these studies can hardly make exact causal claims about affective responses to music because of the interrelatedness between context, listener and musical features (Gabrielsson, 2001). Decent empirical studies in the field should therefore always combine both types of studies (Gabrielsson, 2001, p. 448).

Because all of these reasons, making use of empirical studies about affective responses to music and about well-being should happen with caution. Nevertheless, I would argue that such studies can be used to give some useful insights and possible counterarguments in the exploration of the influences of emotions while listening to music on the well-being of music listeners. In other words, empirical findings can be used to make arguments, but they should not be taken as general truths. This claim is also supported by Anneli Haake and Raymond MacDonald. They have argued for a holistic approach in exploring the influences of music listening to counteract some of these problems of empirical findings (Haake, 2011, p. 121; MacDonald, 2000). Holistic approaches, in contrast to reductionist approaches, presuppose that systems can only be considered as wholes and cannot be explained by the sum of their parts (Smuts, 1927). Therefore, in order to counteract the problems that I have presented in this subsection, I will take a holistic approach in this thesis where possible. I will do so by taking as many circumstances of music listening into account while exploring the influences of emotions while listening to music on well-being. However, these problems with the validity of empirical findings can pose some serious issues to the validity of my conclusions. I will come back to this point in the discussion section of this thesis.

In the remainder of this chapter I will explore the nature and the causes of affective responses to music. In the next section I will go into the ability of music to be expressive of emotions, which I have introduced in section 1.2. This section gives a first insight in how music and affective responses are intertwined and it will refute the first critique of Davies that music cannot be expressive of emotions because musical works are not sentient. Afterwards, in section 2.3, I will focus on the nature of the affective responses of music listeners.

§ 2.2 Musical expressiveness: Emotions in music

Before I will go into the views and theories about the nature and the causes of affective responses of music listeners, it is useful to go more extensively into the

ability of music to be expressive of emotions, which I have introduced in section 1.2. As I have illustrated in section 1.2 with the disagreement between Walton and Goldman and as I have illustrated in the introduction to this chapter with the three critiques that Davies has on affective responses to music, there are still some controversies about affective responses to music. The first controversy is focused on the cause of musical expressiveness. There is disagreement about the way that musical expressiveness is caused and whether or not it causes the affective responses of music listeners. Especially because musical works themselves are not sentient it is controversial that they do possess emotive properties (Davies, 2001b, pp. 29–37). In other words, because musical works are vibrations moving through the air and no psychological agents, it is strange that they could be expressive of emotions (Przybylski, 2013, p. 185). In this section I will explain different theories about how musical expressiveness can be caused and how it is related to the affective responses of music listeners.

Before I will go into this discussion about musical expressiveness more extensively, it is important to make three remarks. First of all, it is important to recall here that I am solely talking about pure music. The reason for this is that my main concern in this chapter is how musical features can arouse affective responses of music listeners. Music with an accompanying text or other non-musical components can easily be expressive of emotions due to these components rather than due to the musical features themselves (Ziv, 2015, pp. 3–4). It could then also be the case that the musical expressiveness is caused by a collaboration between both the musical features and the non-musical components, which makes the discussion unnecessarily complex (Ali & Peynircioglu, 2006; Kivy, 1999, p. 4; Ziv, 2015, pp. 3–4). Secondly, as I have explained in section 1.2 as well, there is a distinction between expressions in music and musical expressiveness. Expressiveness is the ability of music to be expressive of an emotion. The expression or representation of emotions is something that music can do. Hence, it is important to have this distinction between the both clear when going more extensively into the discussion about musical expressiveness. Finally, it is useful to make some clarifications about intentionality here. As I have already shown by the definition of music in section 1.5, music is something intentionally produced or organized. So, a kind of intentionality is involved in musical works. Intentionality is sometimes called *aboutness*, because intentionality is always directed towards some form of representational content (Jacob, 2014). Although there is little consensus about intentionality, many scholars follow the distinction of John Searle between *original* or *intrinsic* intentionality and *derived* or *derivative* intentionality (Searle, 1980). Objects with derived intentionality are objects that do not have any meaning on their own. Language, for instance, has only meaning when people use it to

communicate. Therefore, language has derived intentionality when it is used to communicate. This derived intentionality of language is inherited from the people that use language. These people then have original intentionality (Jacob, 2014). This is similar with musical works. Musical works have derived intentionality because they are used to communicate the content of musical expressiveness. As I have indicated, this section aims at creating an understanding about the causes of musical expressiveness. In other words, this section aims at creating an understanding of the representational content of the original intentionality of music.

There are different theories about how musical expressiveness is caused and how it is related to the affective responses of music listeners. Most of these theories agree that musical expressiveness can directly cause affective responses of music listeners. The most direct theory about the cause of musical expressiveness states that musical works *are* expressions of emotions. Musical expression is then the cause of musical expressiveness. This theory is called the *expression theory* within aesthetics. A huge proponent of this theory is Leo Tolstoy (Tolstoy, 1898). He claims that artists experience emotions and communicate those emotions to the observer through the artworks they create. The representational content of the original intentionality is then the emotion of the musician and the musical work is an expression of that emotion. These expressions directly cause the musical expressiveness of musical works and this expressiveness may cause the affective responses of music listeners (Kania, 2014). It has been found empirically that people tend to be quite successful in decoding and experiencing such emotional expressions in music, already at a young age (e.g. Gabrielsson & Juslin, 1996; Honing, 2012; Juslin, 2001; Peretz, 2001). These findings support the expression theory¹⁹. However, the expression theory is untenable for explaining the general cause of musical expressiveness. This theory cannot account for all musical works that are expressive of emotions. It is rather an exception that musical expressiveness is caused by musical expression than the general rule (Davies, 2001b, p. 32). For instance, consider a moderate musician who fails to express his or her emotions correctly in a musical work. It could be that this musical work is still expressive of an emotion, but it would not be an expression of the emotion of the musician. This musical work is then automatically independent of the emotions of the musician. Moreover, if the musician fails miserably, the musical work may arouse irritation in music listeners, which is clearly independent of the emotion of the musician (Goldman, 1995, p. 61). Secondly, imagine a musician who copies a musical

¹⁹ Some empirical studies suggest that the recognition of emotional meaning in music can happen without any *felt* affective experience (e.g. Peretz, 2001, p. 126). This is not the central concern here, but it illustrates how ambiguous empirical studies in the field of psychology of music can be.

work of another musician perfectly. This new musical work would intuitively be expressive of the same emotions as the original was. However, according to the expression theory, this is only the case when the copyist experienced exactly the same emotion while copying the musical work as the original musician experienced while creating the original. This is not necessarily the case. Therefore, these counterexamples illustrate that the expression theory cannot give a thorough explanation about how musical expressiveness is caused and how it is related to the affective responses of music listeners.

A second theory of how musical expressiveness can be caused is *Associationism*. This theory claims that musical features themselves are the cause of musical expressiveness (Kania, 2014). In that sense, musical expressiveness is a property of music, just as redness is to an apple. Musical expressiveness is directly derived from the sonic profile of the musical work because this profile can be associated with emotions (Davies, 2001b; Gabrielsson & Lindstrom, 2001; Kania, 2014). Musical features, such as rhythm, pitch, volume or the musical instruments, determine the expressiveness of a musical work. For instance, music that is slow, that has a low volume and a low tonality is perceived as sad music because we associate these musical features with sadness. Happy music, on the contrary, tends to be fast, relatively loud and tends to have a sharp contrast between long and short notes (Gabrielsson & Juslin, 1996, p. 86; Gabrielsson & Lindstrom, 2001, p. 225)²⁰. These musical features are associated with emotions and therefore cause musical expressiveness. The affective responses of music listeners are caused by this expressiveness (Kivy, 1999). The representational content of the original intentionality are then the associations of musical features with emotions.

The third theory is closely connected to Associationism and claims that musical expressiveness is caused because musical works as *wholes* are resemblances with aspects of human beings experiencing emotions. This theory is called the *Contour theory*. Such aspects of human beings experiencing emotions may be facial expressions, vocal expressions or other aspects of the phenomenology of experiencing emotions (Budd, 1985, pp. 31–36; Davies, 2001b, pp. 34–37). These resemblances are then the representational content of the original intentionality and cause musical expressiveness. The affective responses of music listeners are caused by this expressiveness. For instance, we consider a musical work as sad, because what we perceive in the musical work resembles sadness. This is similar to the way that we say that a weeping willow or the face of a bloodhound dog resembles sadness (Davies,

²⁰ See table 10.2 in (Gabrielsson & Lindstrom, 2001) or figure 14.2 in (Juslin, 2001) or table 5.1 in (Juslin, 2005) for a decent overview of which musical features are associated with which emotion(s).

1994; Kania, 2014; Kivy, 1990). These resemblances are subject to cultural norms (Juslin, 2001, p. 322). Davies and Kivy are proponents of this theory. Levinson and Walton go one step further. They argue that anything can have resemblances with any emotion, so there must be more to the Contour theory. Therefore, they argue that we imagine some kind of agent that is portrayed in the music that experiences aspects of emotions that are equivalent to the aspects of such emotions of human beings in real life (Davies, 2001b, pp. 33–34; Kania, 2014; Levinson, 1996; Walton, 1988). In contradiction to the expression theory, both Associationism and Contour theory are not fundamentally challenged as causal theories of musical expressiveness. There are some troubling counterexamples, of which I will explain one in the second last paragraph of this section.

The last theory that I will consider in this section is the *Arousal theory*. The Arousal theory proclaims that musical expressiveness is caused through the audience. This is the only theory that I will consider that proclaims that the affective responses of music listeners cause musical expressiveness instead of vice versa. Musical expressiveness is caused by the tendency of music to generate affective responses of understanding listeners (Kania, 2014). The representational content of the original intentionality is then the affective responses of music listeners. These affective responses of listeners depend on the degree of understanding of and engagement with the musical work (Kania, 2014). In section 2.5 I will explain more in depth how understanding and engagement relate to the affective responses of music listeners. A problem with the Arousal theory is the logical-priority problem: in order for a listener to respond affectively to music, there must be something in the music that causes that response (Kania, 2014). It is unlikely that these affective responses of the audience cause musical expressiveness, while these responses themselves are caused by something else available in the music. It is more likely that musical expressiveness causes the affective responses of music listeners, as was the case in the previous three theories. Jenefer Robinson offered a possible solution for the logical-priority problem. She argues that it is necessary to make a distinction in affective responses to music: basic responses and more reflexive responses (Robinson, 1994)²¹. Music can result automatically in basic affective responses (Davies, 2001b, p. 27; Robinson, 1994). Goldman contributes to this argument by claiming that listeners are likely to have direct basic affective response to music, because they are aware that musical works are created by human beings (Goldman, 1995, p. 63)²². Examples of such basic affective

²¹ This distinction is equivalent to the distinction between basic and complex emotions.

²² There are examples of music that are fully produced by computers (e.g. Supper, 2001). This type of music is not included in the study of Goldman about the basic affective responses of music listeners. I will come back to this point in the recommendations section of this thesis.

responses to music are disgust or happiness (Robinson, 1994). These responses are not subjects to any cognitive evaluation of the individual²³. Rather, these are lower-level and less cognitive responses to music. According to the Arousal theory, specifically these basic affective responses cause musical expressiveness. On the contrary, the more reflexive affective responses to music are subject to cognitive evaluations of the individual and are therefore caused by musical expressiveness (Robinson, 1994). Examples of these more reflexive responses are nostalgia or patriotism. These responses need some cognitive evaluation, whereas the basic affective responses do not.

Goldman offers a rather convincing unification between Associationism, the Contour theory and the Arousal theory about the cause of musical expressiveness and its relation with the affective responses of music listeners. He argues that Associationism and the Contour theory jointly can be one cause of musical expressiveness. According to Goldman, musical features, which are pivotal in Associationism, are resemblances of human beings experiencing emotions (Goldman, 1995). Goldman highlights the resemblances between the pitch and rhythm in music and the expression of emotions in voice, demeanor and behavior. For instance, as I have explained previously, sad music has the tendency to be slow, to have low tones and to be soft regarding volume. According to Goldman, these are resemblances of the emotional qualities of sadness (Goldman, 1995). When someone is sad, he or she speaks with low tones and with a lack of energy that may be expressed by a slow tempo and a low volume. Due to such resemblances between musical features and aspects of human beings experiencing emotions, music can be expressive of emotions (Goldman, 1995; Huron, 2011, pp. 149–150). Goldman continues his argument that music does not only get its expressiveness because of these resemblances in the sonic profile of musical works, but also because of the basic affective responses to music. This is in line with the theory of Robinson. According to Goldman, musical expressiveness is a result of the relation between both basic affective responses and the resemblances between musical features and people experiencing emotions (Goldman, 1995, pp. 63–64). If a musical work is expressive of happiness, this is caused by the interaction between our automatic happy responses to it and the resemblances in the musical features with people experiencing the emotion of

²³ This is the psychological view on the term *cognitive*, which means the processing of underlying information (Juslin & Västfjäll, 2008, p. 606). The philosophical view on *cognitive* is used for the subcomponent *cognitive appraisal* of emotions. Henceforth, unless mentioned differently, I will use the psychological view on the term.

happiness²⁴. After a cognitive evaluation this musical expressiveness can cause reflexive affective responses, such as nostalgia or pride.

Goldman combines these three causal theories of musical expressiveness into one because there are a lot of possible situations imaginable in which musical expressiveness depends on more than just one cause. Imagine, for instance, that you have listened to the same song for more than a thousand times. It is very likely that the expressive power of that song has decreased, but that some expressive power still remains. This cannot be explained when using only one of the theories that I have explained previously. According to Associationism or the Contour theory, the expressive power should not have decreased because both the sonic profile and the resemblances with aspects of human beings experiencing emotions have remained the same. According to the Arousal theory, it is possible that the expressive power of that musical work has been reduced, because the aroused basic affective responses may have become conditioned (Goldman, 1995). However, the Arousal theory alone cannot answer for the presumption that some expressive power remains. The combined theory of Goldman, on the contrary, combines these ideas and is therefore able to give an explanation of the musical expressiveness in this example.

In conclusion, Goldman's theory shows that musical expressiveness is caused by a combination of both basic affective responses of music listeners and the resemblances between musical features and aspects of people experiencing emotions. It combines Associationism, the Contour theory and the Arousal theory. According to this theory, musical expressiveness can mainly cause the more reflexive affective responses of music listeners. In the next section I will focus on the nature of these affective responses of music listeners.

§ 2.3 Emotions in listeners

In the previous section I have explained that although musical works are not sentient, they can be expressive of emotions and cause affective responses of music listeners. The second critique of Davies on affective responses to music is about the nature of these responses. There is disagreement about whether or not the affective responses of music listeners are genuine and full-fledged emotions. Although there are some conceptional differences, there are two major positions that can be recognized in this discussion. These are the emotivist position and the cognitivist position. The emotivists claim that that music can arouse genuine and full-fledged emotions in listeners as a result of, among others, musical expressiveness. They presume that the

²⁴ Goldman has adjusted his view on the value of musical expressiveness. In his earlier works he denied the value of musical expressiveness. Compare with section 1.2 (cf. Goldman, 1992, 1995).

affective responses to music can be emotions just as how other daily events may arouse emotions (Egermann, Pearce, Wiggins, & McAdams, 2013; Lundqvist et al., 2009). The cognitivists, on the contrary, claim that the affective responses of music listeners are merely the result of a cognitive evaluation of musical expressiveness and that those responses are moods or emotion-like. According to the cognitivists, affective responses can ever be genuine and full-fledged emotions. Most philosophers of music that are used throughout this chapter hold the cognitivist view²⁵. Within this section I will explain both positions more in detail and I will argue in favor of the emotivists that the affective responses to music can be genuine and full-fledged emotions.

As I have indicated in the introduction to this chapter, empirical studies have shown that music is able to arouse affective responses of listeners. These affective responses to music have been further investigated empirically with regards to the subcomponents of emotions, which I have explained in section 2.1. Especially the subcomponent physiological arousal has been investigated (e.g. Juslin & Laukka, 2004; Lundqvist et al., 2009; Rickard, 2004). These empirical studies have in general shown that music is able to arouse genuine and full-fledged emotions, because the affective responses to music can contain most subcomponents of emotions (e.g. Gabrielsson, 2001; Juslin & Laukka, 2004; Juslin et al., 2008; Thoma et al., 2012). This favors the emotivist position. However, cognitivists argue that this empirical evidence is not convincing enough for two reasons. First of all, cognitivists argue that it is necessary that such empirical data demonstrates that music itself arouses such emotional responses of listeners without any external influence (Egermann et al., 2013, p. 535). They argue that it may be the case that some subcomponents of an emotion, in particular physiological arousal, can easily be a result of external influences (Scherer & Zentner, 2001, p. 375). Secondly, cognitivists deny the value of empirical evidence because of the reasons that I have explained in subsection 2.1.1. Cognitivists emphasize that listeners may be convinced that they experience genuine and full-fledged emotions, but they could be mistaken and experience moods or emotion-like states instead. This is what Kivy calls the *error-theory*: listeners attribute emotions to affective responses, based on *pathetic-fallacies* (Kivy, 1999, p. 10). The term pathetic-fallacy is used for the tendency of people to attribute emotions to aspects of nature (Kivy, 1999, p. 10). In the remainder of this section I will elaborate on the arguments of both the emotivists and the cognitivists.

²⁵ This is because of Descartes' distinction between emotions and reason. Reason has always received much more attention in both philosophy and psychology. Only recently, some scholars in these scientific fields have made a shift towards studying emotions in addition to reason (Peretz, 2001, pp. 105–106).

I will start with exploring the additional critiques that cognitivists have on the emotivist position besides their critiques on the empirical evidence. The additional critiques are mainly based on the definition of emotions that I have presented in section 2.1. According to cognitivists, some subcomponents of emotions are missing in affective responses to music and these responses can therefore never be genuine and full-fledged emotions. First of all, an emotion should by definition always focus on a specific object. Emotions are *about* something. For instance, you are angry at the person who stole your wallet. Many disagreements between emotivists and cognitivists are related this object of an emotion. In the case of music, some cognitivists deny the existence of such objects, whereas other cognitivists argue that music cannot include all necessary objects to answer for all the affective responses to music that have been reported in the literature. According to the latter group of cognitivists, music cannot possibly account for the wide variety of both basic and reflexive affective responses to music, because it cannot include all the objects that are necessary for all of these affective responses to be genuine and full-fledged emotions (Kania, 2014; Kivy, 1981, 1990, 1999). Secondly, in order for the emotions to make sense, these specific objects of emotions should always be accompanied by a relevant belief or set of beliefs (Kivy, 1999, pp. 3–4; Scherer, 2000). For instance, you believe that the person you are mad at has stolen your wallet. Even if such beliefs are false, they can cause emotional responses. So, even if that person has not stolen your wallet, your belief that he or she did so causes you to be angry. Cognitivists argue that even if the object of an emotion would exist, these beliefs about that object do not. According to them, music listeners know at all times that what causes their affective responses is fictional. It is hardly possible that we can have such beliefs about the objects of emotions in the case of music (Kivy, 1999). The final subcomponent of emotions that some cognitivists argue to be lacking in case of the affective responses to music is action tendency. While listening to music, behavioral manifestations of emotions are different from the behavioral manifestations of the same emotions in daily life (Kivy, 1999, p. 7). For instance, if you would become genuinely sad while listening to music, you should behave similarly than when you would become sad in daily life. However, most of the times while listening to music you would remain seated and keep on listening to the music. For these reasons cognitivists argue the affective responses to music cannot be genuine and full-fledged emotions.

Based on these critiques cognitivists argue that affective responses to music can never be genuine and full-fledged emotions; rather they are moods or emotion-like. Music listeners merely process musical expressiveness cognitively which can result in moods or emotion-like states. Among cognitivists there are some slightly different views about the nature of these affective responses. These differences are the

result of the value that scholars attach to the different critiques that I have explained in the previous paragraph. For instance, Davies argues that we perceive *emotions in a weaker form*, because the beliefs about the objects of the emotions are lacking. According to him, the object of the emotion-like responses are the in music expressive qualities of that emotion (Davies, 1994, p. 307). Levinson argues that the affective responses to music are *quasi-emotions*, because these responses do not amount for all subcomponents (Levinson, 1982, pp. 313–314). Finally, Walton proclaims, as I have explained in section 1.2, that we perceive *imaginary emotions* as affective responses to what is portrayed in the music (Walton, 1988, p. 360). According to him, the specific object at which the imaginary emotions are directed is the world that is portrayed in the music.

There are several counterexamples in which the affective responses of music listeners are incongruent with musical expressiveness. These examples trouble the cognitivist position, because it claims that affective responses are always a result of cognitively processing musical expressiveness. First of all, consider a sad song that has been played very often while being paired with positive stimuli. The listener may unconsciously respond positively to the musical work while it is expressive of sadness. For instance, if you have been dancing very closely with a person you like plenty of times while listening to a sad song, listening to that song without dancing with that person may nevertheless arouse a positive affective response. That affective response is then incongruent with the emotion that the music is expressive of. The second counterexample occurs when one musical work can cause a variety of affective responses of music listeners. A musical work can only be expressive of a limited set of emotions (Juslin, 2013, p. 247). So, if a musical work causes a variety of affective responses, then there must be some affective responses that are incongruent with the emotions that that musical work is expressive of. These two counterexamples trouble the cognitivist view. I have already indicated briefly that emotivists consider musical expressiveness only as one of the possible causes of the affective responses of music listeners. Therefore, the emotivist position is more suitable to include these counterexamples than the cognitivist position.

However, the cognitivist view of Kivy is able to include these counterexamples. His view is slightly different from the previously explained cognitivist views. Although he has argued for a radical cognitivist position in the past, he has slightly adjusted his view towards a more emotivist one (cf. Kivy, 1981, 1999). Kivy argues that affective responses to music do not necessarily have to mirror musical expressiveness. According to Kivy, the object of the cognitive evaluation by music listeners is the myriad of ways in which music can be beautiful or successful (Kivy, 1999). The affective responses that are result of these cognitive evaluations can

never be genuine and full-fledged emotions, because of the lack of some of the subcomponents of emotions. Rather, he argues that the affective responses to music are elevated states of excitement or enthusiasm (Kivy, 1999). Musical works can be beautifully sad or beautifully happy and such musical successes arouse excitement or enthusiasm in music listeners. People tend to attribute all sorts of emotions to affective responses, while they are only experiencing elevated states of excitement or enthusiasm (Kivy, 1999). This is the error-theory that I have explained previously in this section. Kivy states that these elevated states can be emotion-like, but that they are not genuine and full-fledged emotions. According to Kivy, if we would listen to a beautifully sad song, we would experience a sadness-like elevated state of excitement instead of the emotion of sadness. Kivy recognizes only one exception in which music can actually arouse genuine and full-fledged emotions. This exception occurs when a specific musical work has associations for an individual. This is called the *our song*-phenomenon (Kivy, 1999, p. 4).

In this paragraph I will argue in favor of the emotivists that the lack of certain subcomponents of emotions does not necessarily mean that the affective responses to music can never be genuine and full-fledged emotions. Robinson has illustrated that it is far from clear that every emotion must have all the specific subcomponents (Robinson, 1994, p. 183). So, even if some subcomponents are lacking in the affective responses to music, these responses can still be genuine and full-fledged emotions. In this paragraph I will consider the three subcomponents that cognitivists argue to be lacking, which I have explained previously in this section. First of all, some cognitivists argue that affective responses to music lack a specific object at which they are directed. Goldman argues in favor of the emotivists that emotions without any specific object can occur in real life as well (Goldman, 1995, p. 61). People can sometimes be angry or sad without knowing what they are angry or sad about. In addition, he illustrates that music often arouses specifically these kinds of emotions in music listeners (Goldman, 1995, p. 61). So, similar as I have explained in section 2.2 with Robinson's idea of basic affective responses, it is very well possible that people can experience basic emotions automatically in response to music. These basic emotional responses do not need a specific object at which they are directed (Kania, 2014; Robinson, 1994). In other words, basic emotions can be aroused through listening to music without any specific object at which they are directed. These emotions can occur without a cognitive evaluation of musical expressiveness or of the myriad of ways in which music can be beautiful, as Kivy has argued. Secondly, cognitivists have argued that the beliefs about such objects are lacking in the case of music. Because basic emotional responses to music do not necessarily need an object at which they are directed, they do not necessarily need such beliefs either. Similar as

that being in a room full of sad people can arouse sadness without any clear object of the sadness or beliefs about the object, being exposed to sad music can automatically arouse sadness in music listeners (Kania, 2014). So, it is possible that music can arouse genuine and full-fledged basic emotions without having any objects or beliefs about these objects. The last subcomponent that some cognitivists have argued to be lacking in order for affective responses to be genuine and full-fledged emotions is action tendency. Action tendencies may indeed differ between affective responses to music and emotions in daily life. However, I would argue that this does not mean that the action tendencies in response to music are no action tendencies at all. These tendencies are highly influenced by the music listener and the situation of listening (Juslin & Västfjäll, 2008; Juslin, 2013). This makes it very hard to make general claims about the action tendencies in affective responses to music. I would therefore claim that this argument of cognitivists is not persuasive enough to refute the idea that affective responses to music can be genuine and full-fledged emotions.

In the previous paragraph I have shown that affective responses to music can be genuine and full-fledged basic emotions. Some emotivists continue Robinson's idea that basic emotional responses to music do not necessarily need an underlying cognitive process and argue that this is the case for complex or aesthetic emotional responses as well (e.g. Gabrielsson, 2001; Scherer & Zentner, 2001). Both Juslin and Alinka Greasley conclude that an underlying cognitive process is just one of the mechanisms that can cause complex and aesthetic emotions (Greasley et al., 2013; Juslin & Västfjäll, 2008; Juslin, 2013). Juslin calls this mechanism *cognitive appraisal*. The mechanism of cognitive appraisal is not the same as the subcomponent of emotions *cognitive appraisal*. Here, the psychological use of the term *cognitive* is used. Juslin argues that the cognitive evaluation of the music itself can lead to emotional responses of music listeners. To be precise, he states that the object of emotional responses through cognitive appraisal is certain information in the music that is relative to individual and situational factors while listening to music (Juslin & Västfjäll, 2008, pp. 562–563). In other words, the objects of the genuine and full-fledged emotions through cognitive appraisal are the circumstances while listening to music. I will return to this point in section 2.5. So, in line with the emotivist position, I have illustrated that affective responses to music can be genuine and full-fledged emotions.

Most of the times when genuine and full-fledged basic, complex or aesthetic emotions are aroused through music, other mechanisms than cognitive appraisal cause these affective responses (Juslin & Västfjäll, 2008, p. 561; Scherer & Zentner, 2001, pp. 366–372). Kivy's exception of his cognitivist view, the *our song*-phenomenon, gives a first insight in other mechanisms of how genuine and full-fledged emotions can be aroused through listening to music. These underlying mechanisms must be identified

and studied in their own rights (Juslin & Västfjäll, 2008, p. 561). In section 2.4 I will consider Juslin's BRECVEMA framework that summarizes all mechanisms besides cognitive appraisal through which music can arouse genuine and full-fledged emotions in listeners. The circumstances while listening to music do not only determine the object of emotions that are aroused through the cognitive appraisal mechanism, they also determine which mechanism of emotion arousal is activated and codetermine whether the aroused affective responses to music are genuine and full-fledged emotions. I will explain in section 2.5 how these circumstances are related to emotion arousal through listening to music.

2.3.1 Tragedy paradox

When adopting the view of emotivists that music can arouse genuine and full-fledged emotions, only the third critique of Davies about the affective responses to music is remaining. As I have already indicated in the introduction to this chapter, this critique is about the choice to listen to music that is able to arouse negative emotions in music listeners. In section 2.3 I have argued that music can arouse emotions in music listeners. If this is the case, then it would be counterintuitive that people would listen to music that is able to arouse negative emotions. However, empirical findings suggest that we do (e.g. Huron, 2011). This is called the *tragedy paradox* (Kania, 2014). The tragedy paradox is an ancient problem in the field of aesthetics (Goldman, 1995, p. 67).

There are several partial solutions to this paradox, but none of them is rather convincing and can answer for the full paradox. Some scholars simply deny that such aroused emotions are negative. For instance, Kivy would argue that we enjoy the beauty of musical sadness and therefore experience a state of excitement that may be sadness-like (Kivy, 1999). However, besides that this does not correspond with empirical data, Kivy's exception of the *our song*-phenomenon can also arouse negative emotions and therefore the tragedy paradox would still exist. Other scholars argue that negative music may have benefits for music listeners and that they therefore would listen to it (e.g. Huron, 2011; Kania, 2014). *Catharsis* is one of these possible benefits. Catharsis is an ancient idea of Aristotle, which means the purification of the soul through affective experiences (Aristotle, 1903, pp. 36–39). Listening to negative music may bring benefits to music listeners because it helps them to understand or savor negative emotions or to find comfort (Kania, 2014). In addition, listening to negative music may benefit music listeners, because it offers them a safe way of experiencing negative emotions (Kania, 2014). David Huron himself argues that negative emotions can bring benefits to music listeners because our hormonal reaction to negative emotions is pleasant. He calls this an *after-effect* (Huron, 2011). It could also

be the case that we listen to negative music simply because we enjoy the craftsmanship of the musician (Kania, 2014). Finally, Davies argues that the ancient presupposition that people always try to avoid negative experiences and emotions is false (Davies, 2001a, 2001b, p. 41). According to him, people sometimes deliberately choose not to avoid negative emotions. All of possible solutions do not give a thorough explanation of the tragedy paradox. Juslin illustrates that this tragedy paradox can only be fully explained when the underlying causal mechanisms of emotion arousal through music are understood. Therefore, I will explain his solution to the tragedy paradox in subsection 2.4.1 after I have introduced the BRECVEMA framework.

To conclude, in this section I have focused on the affective responses of music listeners. I have argued that the cognitivist position is untenable and that affective responses to music can be genuine and full-fledged basic, complex and aesthetic emotions. Whether or not these affective responses are emotional responses depends on the causal mechanism through which the affective response is aroused and on the circumstances while listening to music. In section 2.4 I will explain the BRECVEMA framework of Juslin that summarizes all mechanisms through which emotional responses to music can be aroused. The circumstances while listening to music are called the musical event and they also codetermine which mechanism of the BRECVEMA framework is activated. I will explain the musical event in section 2.5.

§ 2.4 The BRECVEMA framework

The musical event and the causal mechanism determine the nature of affective responses to music. In this section I will explain the eight causal mechanisms, besides the cognitive appraisal of musical expressiveness, through which music can arouse genuine and full-fledged emotional responses of listeners. This framework is called BRECVEMA, which is the abbreviation of the eight causal mechanisms: Brain stem reflex, Rhythmic entrainment, Evaluative conditioning, emotional Contagion, Visual Imagery, Episodic memory, Musical expectancy and Aesthetic judgements (Juslin & Västfjäll, 2008; Juslin, 2013). All of these mechanisms will be briefly explained here.

a) Brain stem reflex refers to the mechanism through which emotions are aroused within a music listener because the musical features are adopted by the brain stem. The brain stem can alarm a potentially important or urgent event and can be activated through music. For instance, a sudden sound of a drum can make a music listener extra aware of what follows. These brain stem reflexes are results of sudden changes in the music. Besides that this extra awareness may increase the arousal of emotions in general, brain stem reflexes may arouse surprise in the listeners.

b) Rhythmic entrainment is a process through which an emotional response to music is aroused, because a rhythm is adopted internally by the listener and gets locked in for a period. For instance, a certain rhythm can slightly adjust the heart rate or breathing of the music listener. Rhythmic entrainment may cause communion-related emotions, such as connectedness and solidarity.

c) Evaluative conditioning refers to the mechanism that is often used in marketing. Evaluative conditioning is a mechanism through which an emotion is aroused because the music has often been paired with other positive or negative stimuli. It involves subconscious, unintentional and effortless processes that can only be slightly changed. If music arouses emotions with no apparent reason, evaluative conditioning is often the cause of these emotions (Juslin & Västfjäll, 2008, p. 565). I have already given an example of evaluative condition in section 2.3. In that example sad music has been paired with the positive stimulus of dancing closely with a nice person. Listening to that sad song may arouse a positive emotion in the music listener. However, this is only an example of evaluative conditioning if the process is unconsciously. If it happens consciously, it is an example of episodic memory, which I will explain later in this section. Evaluative conditioning can arouse a broad variety of emotions.

d) Emotional Contagion is a mechanism through which an emotion is aroused through music, because the emotion that is expressed in the music becomes mimicked by the listener. I have already given an example of emotional contagion in section 2.3 with the example of an emotional response to music that is caused similarly as how being in a room full of sad people causes genuine sadness. The aroused emotion is then a non-cognitive reflection of musical expressiveness. Emotional Contagion may be one of the causes of the evolutionary value of music that Darwin has proclaimed and which I have explained in section 1.1. Through Emotional Contagion our ancestors may have communicated emotions among each other (Peretz, 2001, p. 115, 2006, p. 24). Emotional Contagion can arouse a broad variety of emotions.

e) Visual Imagery refers to a process whereby an emotion is aroused within music listeners, because they imagine images while listening to music. For instance, a musical work can induce images of a beautiful landscape and these images of the landscape can arouse emotional responses of music listeners. According to Juslin, listeners often conceptualize the sonic profile of music through nonverbal metaphors between musical features and visual images (Juslin, 2013, p. 242). Therefore, visual

imagery depends highly on the individual²⁶. Visual imagery can mainly arouse pleasure- and relaxation-related emotions.

f) Episodic memory is the mechanism that can arouse emotions in listeners because a musical work evokes a personal memory of a specific event in their lives. This is the mechanism that resembles Kivy's *our song*-phenomenon, which I have explained in section 2.3. Episodic memory can mainly arouse emotions of nostalgia and pride. This mechanism does not depend much on the music itself; rather it highly relates to personal memories. Therefore, it depends even stronger on the individual listener than visual imagery does. The difference between evaluative conditioning and episodic memory is that evaluative conditioning happens unconsciously and can only occur when the musical work has been paired with other stimuli plenty of times. Episodic memory happens consciously and it refers to a personal memory that most of the times has only occurred once.

g) Musical expectancy is a process in which an emotion is aroused because a musical feature violates, delays or confirms the expectations of the music listener about the continuation of the musical work (Egermann et al., 2013; Meyer, 1956). The expectations are highly influenced by the musical experience that the listener has had with regards to this specific type of music or with this musician. Therefore, this mechanism highly depends on the musical training of a listener. I will return to this point in section 2.5. Musical expectancy can mainly arouse thrills and emotions such as anxiety or surprise (Goldstein, 1980).

h) The mechanism of aesthetic judgements is the latest addition of Juslin to the framework and works differently than the previous seven mechanisms. This mechanism focuses on the aesthetic experience of music. Aesthetic judgements are highly influenced by cultural variables and are a subject to change over time (Juslin, 2013, pp. 246–247). An aesthetic judgement consists of a few steps. The first step is the aesthetic attitude that an individual holds towards pieces of art in general and to the art of music particularly. This attitude highly depends on cultural standards, musical understanding, musical engagement and the situation of listening (Jacobsen, 2006). The second step of an aesthetic judgement is the perceptual, the cognitive and emotional analysis of the musical work according to the aesthetic attitude of the music listener. These analyses will provide input for the aesthetic judgement itself. Perceptual analysis gives the input for the aesthetic judgement that is uniform among listeners. Sensory impressions are an example of such. Cognitive analysis provides the input that involves more knowledge-based concepts. Examples of such are information about the musician and his or her specific historical context. Emotional analysis does not

²⁶ This mechanism is therefore useful for musical therapies (MacDonald & Wilson, 2014; Magee, 2011).

necessarily occur. Emotional analysis only occurs when one of the other BRECVEMA mechanisms has been activated as well (Juslin, 2013, pp. 248–249). If it occurs, the emotional input can be used for an aesthetic judgement. Whether or not this input generates an aesthetic judgement depends on the individual's subjective criteria for aesthetic value. This is the third step. Although that these criteria are very subjective, some of them are considered as more important than others. Examples of subjective criteria are: beauty, expressive power, novelty, emotion arousal, craftsmanship, the communication of a message and the style of art in general. Because of the subjectivity of these criteria, it remains very hard to make any predictions about the outcomes of aesthetic judgements (Juslin, 2013, p. 251). The fourth and last step in an aesthetic judgement is the actual judging process itself. If and only if an individual considers a musical work very good or very bad according to his or her subjective criteria, an emotion may be aroused. If a musical work is considered as *just* good or *just* bad, it does not arouse emotions. Rather, the music listener just *likes* or *dislikes* that music. The point at which an emotion can be aroused by a musical work through an aesthetic judgement is very subjective.

According to Juslin, aesthetic emotions can be aroused if aesthetic judgement is the only activated BRECVEMA mechanism. An aesthetic judgement involves a cognitive process, because the perceptual, cognitive and emotional input is judged according to subjective criteria. The aesthetic judgement mechanism is therefore closely related to Kivy's cognitivist view. Kivy argued that elevated states of excitement are aroused by the myriad of ways in which music can be beautiful or successful. However, the difference between the both is that Kivy argues that only an elevated state of excitement or enthusiasm can be the result of the cognitive process, whereas Juslin argues that all emotions can be the result of the cognitive process. According to Juslin, the emotions that can be aroused through aesthetic judgements depend on the subjective criteria of the individual. For instance, when a musical work scores high on the subjective criterion novelty, it may arouse surprise in the listener. When a musical work scores high on the criterion craftsmanship, admiration may be the result of the aesthetic judgement. I will explain some applications of Juslin's BRECVEMA framework in the next subsection.

2.4.1 Applications of the BRECVEMA framework

Every mechanism of the BRECVEMA framework works differently. Therefore, all of these mechanisms have separate dependencies. For instance, evaluative conditioning does not depend much on the musical structure, whereas musical expectancy does. Another example is that episodic memory depends highly on cultural values, whereas brain stem reflexes do not. The requisites for some mechanisms to cause emotional

responses of music listeners have been developed prior to birth, whereas with other mechanisms these requisites have emerged later. For instance, the requisites for brain stem reflexes already existed prior to birth, whereas visual imagery starts to have a noticeable effect in pre-school years (Juslin, 2013, pp. 243–244)²⁷. These examples illustrate that all mechanisms are very different. This complexity and diversity of the mechanisms in the BRECVEMA framework illustrate Juslin's urge for exploring the underlying mechanisms in their own right, which I have indicated in section 2.3. Understanding the BRECVEMA mechanisms is necessary to be able to determine how music listening can arouse emotions in music listeners and to explore the possible influences of these emotions on well-being.

Often while listening to music, more than one mechanism is activated. The combination of these mechanisms codetermines the emotion that is aroused through listening to music. This explains how music can arouse mixed emotions in addition to basic, complex and aesthetic emotions. That music is able to arouse mixed emotions has been reported in several empirical studies (e.g. Gabrielsson, 2001, pp. 440–441; Juslin et al., 2008). How the BRECVEMA mechanisms can collaborate will be illustrated with two examples: the example of the tragedy paradox that I have explained in subsection 2.3.1 and the example of guilty pleasures.

The tragedy paradox can be fully explained by a collaboration between two BRECVEMA mechanisms. According to Juslin, emotional contagion and aesthetic judgement are involved in the tragedy paradox (Juslin, 2013). This collaboration can generate positive emotions in response to negative music. This is the reason why music listeners would listen to negative music. Sad music is likely to arouse sadness in music listeners through the mechanism of emotional contagion: the listeners mimic the sadness that is expressed in the music. However, through aesthetic judgements they can also experience positive emotions. For instance, the aesthetic beauty of such a sad musical work may be judged as very good and may therefore arouse a positive emotion such as admiration. If that sad musical work would be aesthetically ugly as well and it does not arouse any positive emotion through one of the other BRECVEMA mechanisms, it can only arouse negative emotions. Music listeners would then have no reason to listen to that musical work (Juslin, 2013, p. 258). The explanations of the tragedy paradox that I have given in subsection 2.3.1 can be incorporated as subjective criteria in the aesthetic judgement. So, the BRECVEMA framework can incorporate the previously given explanations of the tragedy paradox

²⁷ Table 2 in (Juslin, 2013, pp. 243–244) summarizes a full overview of hypotheses for each BRECVEMA mechanism with regards to its information focus, its mental representation, the key brain regions, cultural impact, ontogenetic development, aroused affect, temporal focus of affect, induction speed, degree of volitional influence, availability to consciousness, modularity, dependence on musical structure and survival value of brain function.

and it therefore offers the most thorough explanation of the paradox. Secondly, guilty pleasures are musical works that we enjoy listening while they are often perceived as aesthetically ugly. This is another example of how two BRECVEMA mechanisms collaborate. Such musical works are aesthetically judged as poor, but they may arouse positive emotions through one of the other BRECVEMA mechanisms that are not influenced by this judgement. For instance, through episodic memory this poor musical work can still arouse positive emotions (Juslin, 2013).

The BRECVEMA framework provides a complete overview of how music listening can arouse genuine and full-fledged emotions within listeners. As I have already indicated in section 2.3, whether or not the affective responses through these mechanisms are genuine and full-fledged emotions depend on the musical event as well. The musical event also codetermine which BRECVEMA mechanism is activated. I will explain the musical event in section 2.5.

§ 2.5 Musical event

As I have already indicated in sections 2.3 and 2.4, the context of listening determines to a large extent whether or not affective responses to music are genuine and full-fledged emotions and it determines what BRECVEMA mechanism can be activated. If only the music itself would determine whether or not the affective responses to music are emotions, then it would be possible to design *the perfect* musical work that arouses the highest amount of positive emotions. This is very unlikely, because music listeners take the circumstances while listening to music into account as well (Kivy, 2006). The importance of these circumstances in determining the nature of the affective responses of music listeners has been stressed extensively in both philosophical and psychological literature (e.g. Batt-Rawden, 2010; Gabrielsson, 2001; Juslin & Sloboda, 2001; Juslin & Västfjäll, 2008; Juslin, 2013; Liljeström, Juslin, & Västfjäll, 2012; Scherer & Zentner, 2001; Sloboda & O'Neill, 2001). These circumstances while listening to music are called the *musical event* or sometimes *music-plus-what*. The musical event consists of three types of factors: musical, individual and situational factors. The musical event will be used in chapter 4 as a tool to analyse the possible influences of emotions while listening to music on the well-being of music listeners and the impact of music-listening technologies on these possible influences.

A lot of empirical research has been conducted about the relation between these separate factors of the musical event and emotion arousal through listening to music. Some of these empirical findings are summarized here to give an illustration of how the musical event codetermines whether or not affective responses are emotional

responses²⁸. First of all, I will explore the musical factors. A lot about how musical factors determine emotion arousal through music has already been said in section 2.2 while explaining the causal theories of musical expressiveness Associationism and the Contour theory. According to those theories, musical features such as volume, syncopations, instruments, harmony, melody and monotony codetermine musical expressiveness. These features can determine the emotions that can be aroused through listening to music (Sloboda & Juslin, 2001). Some types of music can resemble the human experience of emotions as well. In our western culture, for instance, classical music is often connected to seriousness and Latin music to energetic situations (DeNora, 1999, p. 54). These cultural resemblances do not necessarily lead to emotional responses that suit these contexts, rather they are examples of musical factors that can codetermine emotional responses (Haake, 2011, p. 119). There are some musical factors of the musical event that are worth addressing separately. First of all, the context of the musician codetermines the musical factors of the musical event. Musical features are not experienced by the music listener in isolation. They are always experienced in relation to the musician and his or her characteristics (Gabrielsson, 2001, p. 442; Juslin, 2001, pp. 309–311; Persson, 2001, pp. 282–283; Scherer & Zentner, 2001, pp. 362–364). For instance, a rhythm that is played by B.B. King does not necessarily arouse the same emotions as exactly the same rhythm played by a mediocre musician²⁹. This is closely connected to the second important musical factor of the musical event that I will explain here separately: authenticity. Authenticity, which I have explained in subsection 1.5.1, is a musical feature that has been reported to influence emotion arousal (e.g. Persson, 2001; Simonton, 2001). If a musical work is more authentic than another one, it can arouse more intense emotions. To be more precise, authenticity may be one of the subjective criteria within aesthetic judgements. So, authenticity can codetermine the emotional responses to music mainly through the mechanism of aesthetic judgements. A degree of authenticity may also be an important determinant for the mechanism of musical expectancy. For instance, if a musical work is considered as less authentic, the confirmation or the violation of the expectations of the music listener about the continuation of that musical work may not arouse emotions equally as when that musical work is considered as authentic. These two examples also illustrate how the musical factors of the musical event correlate with the BRECVEMA mechanisms.

²⁸ See table 8 in (Juslin et al., 2011, p. 193) for an overview of the reported coherences between factors of the musical event and the affective responses of music listeners.

²⁹ This example is similar to the example of a performer playing a musical work of Elvis Presley live, which I have presented in section 1.4.

As I have illustrated with the BRECVEMA mechanism of aesthetic judgement, whether or not emotions can be aroused through listening to music differs from person to person (Gabrielsson, 2001; Goldman, 1995; Huron, 2011; Scherer & Zentner, 2001). This is partially because of the *stable* individual factors of the musical event. Unstable factors of the musical event, on the contrary, are those that are easily influenced by the music listener. These unstable factors are, as I will call them, the *dominance* factors over the musical event. I will explain those dominance factors in subsection 2.5.1. Within literature, music listeners are often presumed to be silent and static (Västfjäll et al., 2012). However, stable individual factors, such as personal characteristics and personality traits codetermine the emotional responses to music (Becker, 2001, p. 135). Stable personal characteristics such as age or gender influence emotion arousal through listening to music. For instance, women tend to report more intense emotional responses to music than men do (Juslin, Liljeström, Laukka, Västfjäll, & Lundqvist, 2011, p. 177). Also, young people are more likely to experience more intense emotional responses to music than older people do (Laiho, 2004). Other examples of important stable personal characteristics for emotion arousal are musical training and musical culture. As I have already indicated in section 2.4, the musical understanding is of major importance in two BRECVEMA mechanisms: musical expectancy and aesthetic judgements. The musical understanding of a listener depends on his or her musical training. There are two types of musical training. First of all, there are musical skills that people can learn through experience. Experience with a specific musical genre may, for instance, give more musical understanding about authenticity in that specific genre³⁰. This may result in different interpretations of musical works in that genre and it may therefore arouse other emotions while listening to such musical works (Greasley et al., 2013, p. 414; Juslin, 2001, pp. 310–311). For the cognitive appraisal of musical expressiveness this type of musical understanding is important as well. It has been shown empirically that we are more likely to have emotional responses to music that we know very well (Peretz, 2006, p. 23). I would argue that this type of musical training is a dominance factor, because it is easily influenced by the music listener. I will return to this point in subsection 2.5.1. The second type of musical training contains musical skills that are innate and therefore genetically determined. An example of such musical skills is absolute pitch. Absolute pitch is the ability to categorize isolated auditory stimuli on basis of just those pitches. This musical skill of absolute pitch cannot be taught (Brown et al., 2000, pp. 12–13). This type of musical training codetermines the nature of the affective responses to music. For instance, due to this type of musical training the mechanism of aesthetic

³⁰ This is a nice example of how different factors of the musical event are intertwined. I will return to this point later in this section.

judgements may be activated more quickly and may have stronger emotions as a result (Juslin et al., 2008, p. 669). Although the first type of musical training can be influenced by the individual, this second type can clearly not be influenced by the individual. Therefore, this is an example of a stable individual factor that codetermines the nature of affective responses to music. Another important stable individual factor of the musical event is the musical culture that a listener is a part of (Juslin & Västfjäll, 2008, p. 569). Every music listener is a part of a musical culture and these cultures can imply connotations of music or they can imply some important subjective criteria for the mechanism of aesthetic judgements (Meyer, 2001, p. 348). Although being a member of a musical culture can be chosen by an individual and can therefore be considered as relatively unstable, it does imply some general tendencies in music listening that can hardly be influenced by the individual (Kania, 2014). Therefore, I would argue that the musical culture is a part of the individual factors of the musical event, rather than of the dominance factors over the musical event, which I will explain in subsection 2.5.1. The final stable individual factors of the musical event that I will address here are personality traits. Personality traits can also codetermine what types of emotions are aroused through listening to music. Listeners that score high or low on specific personality traits can experience different emotional responses to music. Empirical studies based on the *five-factor* model of personality³¹ have shown that, for instance, people that score high on the personality trait openness to experience or extraversion are likely to experience more intense emotions than listeners who do not (Juslin et al., 2008, pp. 678–679; McCrae, 2007). If a listener scores high on the trait *neuroticism*, he or she is likely to experience pleasant emotions more quickly (McCrae, 2007). Although personality traits can be slightly influenced by the individual, I would argue that they are quite stable. Therefore they are considered here as a part of the individual factors of the musical event, rather than of the dominance factors.

The situational factors are the last type of factors of the musical event that codetermine whether or not affective responses to music are genuine and full-fledged emotions. Because music is a social practice, the context of listening is very important for emotion arousal (Becker, 2001, p. 154; Gabrielsson, 2001, p. 445; Juslin, 2013; Scherer & Zentner, 2001, pp. 364–365). Although that it is arguable that the situation of listening is always controllable by the music listener³², often we cannot control the full situation in which we are exposed to music. Therefore, there are some examples

³¹ This model decomposes personality in five traits: extraversion, agreeableness, openness to experience, neuroticism, and conscientiousness (Costa & McCrae, 1980).

³² For instance, by putting on different music an individual can change the musical event. However, I would argue that this way a new musical event is created rather than that the original musical event is influenced.

of more or less stable situational factors. The physical location of the listener and other people being present in the situation are examples of such stable situational factors (Greasley & Lamont, 2011, pp. 55–56; Juslin et al., 2008, p. 674). First of all, the physical location is important for emotion arousal (Sloboda & O'Neill, 2001, p. 422). For instance, listening to a musical work live at a concert can easily arouse different emotions than listening to the same musical work on a CD at home. In addition, the fit between the physical location and the music is important. For instance, very loud music in a restaurant can easily arouse irritation because it does not fit the occasion. These situational factors clearly interact with the individual factors of the musical event (Sloboda & O'Neill, 2001, pp. 425–426). In the example of the restaurant, for instance, it is very likely that older people are more easily irritated by the loud music than younger people. In general, all factors of the musical event can interact with each other. The people that are present in a musical event are also important situational factors. Empirical studies have shown that the company of others is often correlated with the arousal of positive emotions (e.g. Fischer, Manstead, & Zaalberg, 2003). Especially while listening to music with just one close friend or partner, the aroused emotions are most likely to be positive and intense. The intensity of the aroused emotions is smaller when listening alone or when listening in bigger groups of people (Liljeström et al., 2012, p. 9). In addition, within solitary settings, emotions such as nostalgia and sadness are more likely to be aroused (Liljeström et al., 2012, pp. 11–13). I will explain the factors of the musical event that are unstable, which I will call the dominance factors, in subsection 2.5.1.

2.5.1 Addition of *dominance* over musical event

Empirical findings suggest that the control over situations has a positive impact on health and well-being (e.g. Lachman & Weaver, 1998; Laiho, 2004; Lee, Ford, & Gramotnev, 2009; Schulz, 1976). More specific empirical findings suggest that the autonomy and agency of a music listener over the circumstances while listening to music influence whether or not affective responses to music are genuine and full-fledged emotions (e.g. Krause, North, & Hewitt, 2014; Krause & North, 2016; North, Hargreaves, & Hargreaves, 2004; Sloboda & O'Neill, 2001). That is why I propose a fourth category of factors in the musical event: the *dominance* over the musical event³³. With the *dominance* I mean the extent to which a music listener is or *feels* able to exert control over the musical event. Feeling in control over a situation, while actually not

³³ I have lent the addition of this fourth category of factors to the musical event from Mehrabian and Russell's addition to the circumplex model for categorizing emotions. Their extended model is called the PAD-model. They proclaim that emotions should be categorized according to three rather than two dimensions: Pleasure (or valence), Arousal and *Dominance* (Mehrabian & Russell, 1974). These three dimensions together are the necessary and sufficient conditions to categorize emotional episodes of an individual (Krause & North, 2014, p. 3).

being so, can have the same impact on the individual than actually being in control (Lachman & Weaver, 1998; Mehrabian & Russell, 1974; Schulz, 1976). The dominance factors over the musical event have not yet been addressed separately within the psychology of music and the philosophy of music. Previous studies have considered these dominance factors to be parts of the individual and situational factors of the musical event. However, it is useful to set these dominance factors apart from the individual or situational factors, because their nature differs tremendously. Individual and situational factors are more or less stable and can hardly be controlled by the music listeners, whereas the dominance factors are much more unstable or at least experienced as unstable. Examples of dominance factors of the musical event are the ability to self-select music, musical preference³⁴, the engagement while listening, the motives for listening to music and the psychological state while starting to listen to music. Empirical research has demonstrated the importance of these dominance factors for emotional responses to music (e.g. Krause, North, & Hewitt, 2014; Krause & North, 2016; North et al., 2004; Sloboda & O'Neill, 2001). In other words, the dominance over a musical event determines to a large extent whether or not affective responses to music are emotional responses. That is precisely what makes this extended musical event a decent tool to structurally explore the possible influences of emotions while listening to music on the well-being of music listeners and the impact of music-listening technologies on these possible influences. I will return to this point in chapter 4.

In section 2.5 I have already provided some insights in the unstable dominance factors over the musical event. In the remainder of this subsection, I will explore these dominance factors, besides the unstable musical training, more in depth. First of all, listening to self-selected music increases the probability of positive emotional responses to music, whereas listening to randomly sampled music increases the probability of negative emotional responses. Self-selected music is more likely to arouse emotions such as happiness-elation, sadness-melancholy, calm-contentment, nostalgia-longing, interest-expectancy, love-tenderness, admiration-awe, enjoyment-pleasure and pride-confidence (Liljeström et al., 2012). Listening to music in bigger groups of people, for instance at concerts or parties, diminishes the freedom to self-select music and therefore decreases the dominance of a music listener over the musical event. It is likely that this is the reason why music listening in bigger groups is

³⁴ The ability to self-select music and musical preference are deliberately separated, because many situations prescribe types of music. These situations make it impossible to unrestrictedly listen to preferred music. In such cases, the selected music is clearly different from the preferred music of a music listener. Examples of situations that are subject to such injunctive norms are funerals and weddings (Krause & North, 2014, p. 5). In many other situations the musical preferences and self-selected music are likely to be similar.

correlated with less intense emotions (Sloboda & O'Neill, 2001, pp. 421–422), as I have explained in section 2.5. Secondly, as I have already indicated in section 2.4, musical engagement while listening to music has shown to be important for the mechanism of aesthetic judgements. The main activity while listening to music determines this degree of musical engagement to a large extent (Greasley & Lamont, 2011; Meyer, 1956). The main activity while listening to music is determined by the location while listening and the motives for listening. Most of the times, people listen to music while traveling, while being at home or while being at someone else's place (Greasley et al., 2013; Greasley & Lamont, 2011; Krause, North, & Hewitt, 2014; Krause & North, 2016). In addition, the most important motives for listening to music are for enjoyment and for relaxation (Greasley & Lamont, 2009, 2011; Juslin et al., 2011, pp. 186–192). Empirical findings illustrate that music particularly arouses emotions that are congruent with the main motive for listening (Sloboda & O'Neill, 2001, p. 419). For instance, while trying to relax with music, emotions such as calm-contentment are more likely to be aroused (Juslin et al., 2008, p. 677). Another example of how the motives for listening to music influence the emotional responses occurs when someone is listening to music in order to work through negative experiences. Especially sadness-melancholy is more likely to be aroused in such situations (Juslin et al., 2008, p. 677). Finally, the psychological state while starting to listen to music codetermines the nature of affective responses to that music (Gabrielsson, 2001, pp. 443–445; Scherer & Zentner, 2001, pp. 364–365). For instance, if a music listener is happy when he or she starts to listen to a musical work, the music is more likely to arouse positive emotions than when the music listener would have been angry when starting to listen to it³⁵.

Just as is the case with the other factors of the musical event, these dominance factors highly interact with each other and with the other factors of the musical event. This is also supported empirically (e.g. Avdeeff, 2012; Greasley et al., 2013; Juslin & Isaksson, 2014; Salimpoor & Zatorre, 2013; Schubert, Hargreaves, & North, 2014). For instance, musical preferences depend on the individual factors of the musical event, such as age and gender (Avdeeff, 2012, p. 267). In addition, the motives for listening to music depend on the age, gender and musical training of the music listener (Juslin et al., 2011, pp. 187–188). Clearly, many factors of the extended musical event interact with each other.

³⁵ Both the controllable musical training and the psychological state while starting to listen to music can only be influenced by the individual before the musical event has started. Over the course of the musical event, these factors are rather stable.

In conclusion, in this chapter I have considered my second subquestion: *How does listening to music influence the emotions of music listeners?* I have discussed the nature and the causes of affective responses to music. In section 2.2 I have discussed the causes of musical expressiveness and the link to affective responses of music listeners. I have argued for Goldman's combined causal theory of musical expressiveness. In section 2.3 I have argued in favor of the emotivist position that affective responses to music can be genuine and full-fledged emotions. However, whether or not a specific affective response is a genuine and full-fledged emotion depends on the underlying causal BRECVEMA mechanism, which I have explained in section 2.4, and on the musical event, which I have explained in section 2.5. In the final subsection of this chapter, 2.5.1, I have proposed an extension of the musical event. This extended musical event is constituted by the dominance of a music listener over the musical event. As I will return to in chapter 4, the ability of music to cause emotional responses of music listeners can have major influences on their well-being. Therefore, this extended musical event is a useful tool to explore these possible influences and to explore the impact of music-listening technologies on these influences. These explorations provide me with an answer to my main research questions. Before I will go into the possible influences of emotions while listening to music on well-being, I will explain the term well-being in the field of positive psychology. I will do this in the next chapter.

Chapter 3: Well-Being

In the previous chapters of this thesis I have explained what music is and how it can influence the emotions of music listeners. In order to answer my main research questions and to find the possible influences of these emotions while listening to music on the well-being of music listeners, a definition of well-being is necessary. This chapter aims at creating a greater understanding about well-being. It will answer subquestion Q₃: *What is well-being?* by making critical use of literature in the field of positive psychology. I have explained in chapter 2 that emotion arousal through listening to music depends highly on the musical event and it can therefore be considered as subjective. Therefore, I will explain the term *subjective well-being* in this chapter that can explain how emotions while listening to music can influence the well-being of music listeners. I will explore in chapter 4 how music listening can influence the subjective well-being of music listeners.

Many theories in the field of positive psychology recognize the importance of positive experiences for well-being. One of the most common theories to well-being within positive psychology is *hedonism*. Hedonism claims that well-being increases when pleasures are maximized and when pains are avoided. The greatest balance of pleasure over pain leads to well-being (Crisp, 2015). Considering positive emotions in response to music as pleasures, proponents of this theory may claim that the well-being of music listeners may increase due to the arousal of such emotions. I will explore this intuitive conclusion in the next chapter after I have explained the concepts of *well-being* and *subjective well-being* more in detail in this chapter.

In section 3.1 I will explain some basic presuppositions in the field of positive psychology. In section 3.2 I will define the terms *good life* and *well-being* and I will explain the most common theories to well-being in positive psychology. In section 3.3 I will explain what subjective well-being is and how the increase in subjective well-being can contribute to well-being more in depth. Finally, in section 3.4 I will present some empirical findings about subjective well-being that are relevant for my theoretical exploration. After having clarified all of these concepts, I will explore in chapter 4 the possible influences of emotions while listening to music on the subjective well-being and therewith on the well-being of music listeners and the impact of music-listening technologies on these influences.

§ 3.1 Well-being: some presuppositions

Well-being is one of the most important topics in the field of positive psychology. Positive psychology is a rather new field of psychology that has emerged in 1998

mainly by Martin Seligman. Positive psychology is “a science of positive subjective experience, positive individual trait and positive institutions promises to improve quality of life and prevent the pathologies that arise when life is barren and meaningless” (Seligman & Csikszentmihalyi, 2000, p. 5). The aim of positive psychology is to shift the focus within regular fields of psychology from pathologies and helping people to recover from mental issues towards helping people in general to achieve well-being and satisfactory lives. In other words, positive psychology considers the *good life*. Topics such as happiness, subjective well-being, autonomy, self-regulation, optimism, hope, wisdom, talent and creativity are broadly discussed within the field of positive psychology (Seligman & Csikszentmihalyi, 2000, p. 5).

The *good life* is often used as an umbrella term within both positive psychology and moral philosophy or *ethics*. The *good life* means a life that is good all things considered (Haybron, 2011). All values that matter in life are taken into account in the good life. A lot of components contribute to the good life. One of the major components is *well-being*. Within the field of philosophy, well-being is often used to describe what is non-instrumental and ultimately good for a person (Crisp, 2015). For instance, if social relationships such as having a partner or close friends are ultimately good for an individual, these relationships can increase his or her well-being and with that contribute to the good life. The good life, however, is not only constituted by well-being. Other values can contribute to the good life as well. For instance, Immanuel Kant has argued that besides well-being, morality contributes to the good life. According to him, the good life is not only determined by factors that are ultimately good for the individual, it is also determined by factors that are ultimately good *for others* (Kant, 1785). For instance, not hitting other people may in some contexts not be good for the individual, but it is often good for others. According to Kant, this does therefore not contribute to well-being, but it does contribute to the good life. This component of the good life serves as a main concept within moral philosophy. However, this component is not the central concern here, because my focus in this thesis lies on the possible influences of emotions while listening to music on the well-being of music listeners.

There is little consensus within the positive psychology about the different concepts of *well-being* and the *good life*. This chapter will therefore explicitly explain all the relevant concepts in order to explore the possible influences of emotions while listening to music on the well-being of music listeners. In section 3.2 I will explain the concept of well-being and the most commonly used theories of well-being within positive psychology.

§ 3.2 Well-being in positive psychology

Well-being is often related to health. According to the World Health Organization (WHO) well-being is defined as:

“A state in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community”

(World Health Organization, 2001)

This definition differs from the philosophical concept of well-being that I have indicated in section 3.1, which describes well-being as what is non-instrumental and ultimately good for a person (Crisp, 2015). The philosophical concept of well-being has a broader scope than the concept of well-being for more health-related purposes. The major difference is that the philosophical concept also includes the negative spectrum. If an individual is ill, for instance, philosophers would still talk about his or her (negative) well-being, whereas people that use the health-related concept would in that case talk about the disappearance of well-being. As I have indicated in section 3.1 as well, well-being is considered in the positive psychology as an important component of the good life. To be more precise, well-being is often considered as a prudential value that is important for the good life. A value that is good *for* someone is called a prudential value (Crisp, 2015). Other examples of values are aesthetic values or moral values. Aesthetic values are the values of pieces of art. I have explained in section 1.2 that the aesthetic value of music lies in the fact that it can enable music listeners to experience their own psychological states. Moral values are the values that are good for others. The example of not hitting other people, which I have presented in section 3.1, is an example of a moral value. In the next subsection I will explain the most commonly used theories of well-being and the corresponding issues of those theories.

3.2.1 Theories of well-being

There are three commonly used types of theories of well-being that all have their strengths and weaknesses: hedonistic theories, desire-satisfaction theories and objective-list theories. This taxonomy has been made by Derek Parfit and is widely used within philosophy and positive psychology (Parfit, 1984). All theories of well-being distinguish between substantive and formal aspects. The substantive aspects of a theory of well-being are the actual components of well-being. The formal aspects, on the other hand, are the properties of these components that make them ultimately

good for people. In other words, the formal aspects are the properties of substantive aspects that make them a contribution to well-being (Crisp, 2015). The hedonistic theories are the first type of theories of well-being that I will consider here. As I have already indicated in the introduction to this chapter, hedonism states that well-being increases when pleasure is maximized and pain is avoided. The greatest balance of pleasure over pain leads to well-being (Crisp, 2015). In other words, “every episode of pleasure is intrinsically good; every episode of pain is intrinsically bad” (Feldman, 2004, p. 27). The substantive aspects of hedonistic theories are pleasant and unpleasant experiences. The formal aspects of hedonistic theories, which makes the substantive aspects ultimately good for an individual, are the pleasantness of pleasant experiences and the unpleasantness of unpleasant experiences (Crisp, 2015). Hedonistic theories of well-being make a connection between what is good for an individual and what seems good by that individual. Pleasant experiences seem good by most individuals and can therefore contribute to well-being. The duration and the intensity of these pleasant and unpleasant experiences determine the degree of well-being of an individual. In conclusion, according to hedonistic theories, the more pleasure there is to encounter in life, the better that life is and the more pains there are to encounter, the worse it is. A major concern with hedonistic theories is related to false pleasures. This is illustrated by Shelly Kagan’s thought experiment of a deceived businessman (Kagan, 1998, pp. 34–36). Imagine two businessmen with exactly the same pleasures and pains throughout their whole lives. Their wives, their colleagues and their children love them. Clearly, these businessmen both have a relatively high well-being. However, one of them is unknowingly deceived and everybody actually hates him. In other words, his pleasures have been false throughout his whole life. The question of this thought experiment is whether or not the undeceived businessman has a higher well-being than the deceived one. According to hedonistic theories the undeceived businessman would not have a higher well-being as long as the deceit happens unknowingly (Crisp, 2015). When the deceit happens unknowingly, the pleasantness of the pleasant experiences and the unpleasantness of the unpleasant experiences are exactly the same for both businessmen. However, such deceit would intuitively make a difference for their well-being, because not being deceived seems better for our well-being than being deceived.

The second type of theories of well-being that I will address here are the desire-satisfaction theories. According to these theories, the well-being of an individual is determined by the amount of satisfied desires. Desire-satisfaction theories take all desires in the life of that individual into account (Crisp, 2015). The substantive aspects of desire-satisfaction theories are, similar as with hedonistic theories, pleasant and unpleasant experiences. However, the formal aspects are different. The formal

aspects are not the pleasantness and unpleasantness of experiences; rather they are the desire-satisfaction of these experiences. This desire-satisfaction is what makes the experiences ultimately good for a person. A major concern of this type of theories is related to the degree of being informed. Imagine, for instance, a monk who has always been a monk. He is offered two possibilities for the continuation of his life: he can remain a monk or he can become a gardener outside the monastery. It is likely that he will remain a monk, because he does not have any clue about the life outside the monastery. However, it is perfectly possible that it is better for his life to become a gardener outside the monastery. In more desire-satisfactionist terms, it is perfectly possible that more of his desires can be satisfied outside the monastery than when he remains a monk. He simply cannot know this. This shows the importance of being informed for desire-satisfaction theories. There is a second, more urgent concern with desire-satisfaction theories. It is hardly possible that the desire-satisfaction determines the contribution of pleasant and unpleasant experiences to well-being. It is more likely that desires are consequences of the view of an individual on well-being, instead of that they are the causes of that view on well-being. In other words, people desire experiences because they think those are good for them. They do not think that these experiences are good, because those will satisfy their desires (Crisp, 2015).

The final commonly used type of theories of well-being that I will address here are the objective-list theories. These theories aim at creating a list of the components of well-being. The substantive aspects of this type of theory are the specific components that are on that list. Objective-list theories all consist of different components and therefore differ highly in their substantive aspects. Some examples of components that often reoccur on such lists are: friendship, pleasures, love and knowledge. The formal aspect of the objective-list theories, which makes every component on the list ultimately good for an individual, is subject to discussion. It might be *perfectionism*. All items on the list try to perfect human nature and that may be property that makes those items a contribution to the well-being of an individual (Crisp, 2015). A major concern with objective-list theories is that they can easily have items listed that an individual does not wish for. An individual might, for instance, not get any pleasure or any desire-satisfaction from friendship. It is counterintuitive then to say that friendships would nevertheless contribute to his or her well-being. So, objective-list theories can have a relatively objectionable paternalistic and objective view on well-being. In response to this critique, some objective-list theorists have created a list with only one element of well-being on it: pleasant experiences. However, these objective-list theories are then hardly distinguishable from hedonistic theories (Søraker, 2010, p. 178).

All three types of theories of well-being recognize that pleasant experiences can contribute to well-being. According to hedonistic theories, pleasant experiences themselves contribute to the well-being of an individual. According to desire-satisfaction theories, the desire-satisfaction of pleasant experiences contributes to the well-being of an individual. And finally, according to *most* objective-list theories, some form of pleasant experiences is on the list of components that contribute to the well-being of an individual. It is useful to make a distinction between two types of pleasant experiences here: attitudinal and sensory pleasures. Sensory pleasures are more short term basic pleasant experiences through one of the five senses. Attitudinal pleasures are more long-term pleasant experiences of some state of affairs. Attitudinal pleasures are always directed at *something*. This type of pleasures involves a reflexive character and is similar to *caring about* (Søraker, 2010, pp. 188–189). Attitudinal pleasures can contribute to well-being after reflection. For instance, studying for a very long period may in itself not be a pleasant sensory experience. However, reaching graduation after that period of studying is upon reflection quite a pleasant outcome. This is a typical example of a pleasant attitudinal experience. All three types of theories of well-being recognize a pivotal role for both sensory and attitudinal pleasant experiences in well-being. As I will return to in the next section, these experiences are related to *subjective well-being*.

Before I will go into the concept of subjective well-being, it is important to find a solution to the issue of false pleasures that I have previously introduced in this subsection. There are some empirical examples that support the idea that true and false pleasant experiences contribute equally to well-being. For instance, Edward Diener found that it is not just the health of the individual, but rather it is his or her subjective evaluation of the health that contributes to well-being. This evaluation is not necessarily true and can easily be a false evaluation, but it would still contribute to the well-being of that individual (Diener et al., 1999, p. 281). However, intuitively it remains likely that in the case of the two businessmen, the undeceived one has a better life than the deceived one. A possible solution may be to add a truth condition to the experiences. Fred Feldman suggests his Truth Adjusted Intrinsic Attitudinal Hedonism (TAIAH)³⁶, which claims that true pleasant experiences contribute more to well-being than false pleasant experiences (Feldman, 2004). This would offer a solution to the issue of false pleasures. However, adding such a truth condition to experiences results in a paternalistic theory, which is an objection to the objective-lists theories. Therefore, Johnny Søraker proposes his Confidence Adjusted Intrinsic Attitudinal Hedonism (CAIAH) instead. According to CAIAH, experiences about

³⁶ Attitudinal hedonism claims that attitudinal experiences rather than sensory experiences contribute to well-being (Feldman, 2004).

which an individual is confident that they are true contribute more to well-being than experiences about which the individual is uncertain (Søraker, 2010, pp. 191–192). In other words, in case of the two businessmen, if the deceived businessman is absolutely confident that he is undeceived, his pleasures can indeed contribute to well-being equally as those of the undeceived businessman. So, the confidence about sensory and attitudinal experiences is an important feature for their contribution to well-being. As I have already indicated, both sensory and attitudinal experiences are related to *subjective well-being*. In the next section I will explain the term subjective well-being more in detail.

§ 3.3 Subjective well-being

In the previous sections I have explained how well-being is related to the good life. This section aims at giving a clear idea about subjective well-being and its relation to well-being. Before going into subjective well-being, I will make some general remarks about the term *happiness*. Subjective well-being is in fact often considered as a more empirical term for happiness in positive psychology (Haybron, 2011). Throughout this thesis I choose to use the term subjective well-being, because happiness has a wide variety of meanings that may confuse the discussion:

- a) Happiness is sometimes considered as the basic emotion of *feeling* happy. The ancient Greek used the term *Hedonia* for that, which literally means pleasures (Chin & Rickard, 2013; Haybron, 2011). I have used this meaning of happiness previously in this thesis to discuss some examples of emotional responses to music.
- b) Sometimes happiness is considered as a kind of value: a life that goes well for the person leading it. This meaning of happiness includes a value judgement. The ancient Greek used the term *Eudaimonia* for this form of happiness, which literally means a life of good fortune (Haybron, 2011). This meaning of happiness is what I have called *well-being* in this thesis. I have explained well-being in section 3.2.
- c) Finally, happiness can also be used for a more long-term state of mind. This specific meaning of happiness is in the positive psychology often considered as an important component of well-being and therefore an important component of the good life (Haybron, 2011).

This last meaning of happiness needs some extra explanation. There are different views on this type of *happiness*: hedonism, the life satisfaction view and the emotional-state view (Haybron, 2011). The hedonistic view is similar to the hedonistic theories of well-being, but the focus here lies on the long-term psychological state of mind rather

than on well-being. According to this type of hedonism, happiness as the long-term state of mind is a result of the individual's balance of pleasant over unpleasant experiences. Secondly, the life satisfaction view claims that this type of happiness occurs when an individual is satisfied with his or her life as a whole. Finally, the emotional-state view identifies this type of happiness with the full emotional condition of an individual. This also includes the nonexperiential aspects of emotions and moods. Examples of such nonexperiential aspects of emotions are the propensity and predispositions of an individual to experience specific emotions during pleasant or unpleasant experiences (Chin & Rickard, 2014, pp. 3–4; Haybron, 2011). These three different views on happiness as a long-term psychological state of mind are unified in one hybrid theory. This hybrid theory identifies happiness with all of the aforementioned aspects: pleasures, life satisfaction, and emotion states. Within this hybrid theory happiness is called *subjective well-being* (Haybron, 2011).

In summary, the *good life* is used in this thesis as an umbrella term that means a life of an individual that is good all things considered. *Well-being* is one of the major components of the good life. Well-being describes what is ultimately good for the one leading the life. In that sense, well-being is a prudential value. The long-term psychological state of mind of the individual is a major component of his or her well-being. This psychological state is called *subjective well-being* and entails life satisfaction, pleasures and emotion states³⁷. The term *happiness* is merely used throughout this thesis as the basic emotion of feeling happy. In subsection 3.3.1 I will go into the relevant components of subjective well-being more in depth. When having a good grasp about these components, I can use subjective well-being to explore the possible influences of emotions while listening to music on the well-being of music listeners and to explore the impact of music-listening technologies on these possible influences.

3.3.1 Relevant components of subjective well-being

Although I should be careful with using empirical studies, as I have explained in subsection 2.1.1, it is interesting to note that already in 1996 it was empirically found that in 86% of the 43 nations that were considered, people reported a relatively high level of subjective well-being (Diener & Diener, 1996). This conclusion highly

³⁷ Most philosophers seem to agree that subjective well-being alone is insufficient to determine well-being and it is even less so for the good life (Haybron, 2011). One of the biggest objections to this central role for subjective well-being is related to the process of adaptation, which I will explain in section 3.4. The subjective well-being of individuals who are exposed to bad circumstances will adapt to a default level. That is why individuals may experience a positive subjective well-being, while actually having miserable lives (Haybron, 2011). This is related to the issue of false pleasures. I would therefore argue, similarly as with the two businessmen, that if the individual is confident about his or her subjective well-being, then it can contribute to his or her well-being. However, there can be more relevant components of well-being than only subjective well-being. I will come back to this point in the discussion section of this thesis.

depends on the view of subjective well-being that has been adopted in the study. Subjective well-being consists of different components that highly correlate with each other. Nevertheless, they all must be understood in their own right. For this reason, subjective well-being is an area of interest in positive psychology that brings philosophers and psychologists together. Subjective well-being is most commonly considered to consist of four separate components that can be investigated separately: positive affect, negative affect, life satisfaction and domain satisfactions (Diener et al., 1999, p. 277). These components highly correlate with the three aspects that subjective well-being is identified with: pleasures, life satisfaction, and emotion states. In this subsection I will explain these four components of subjective well-being separately.

As I have explained in the introduction to chapter 2, affect is used as an umbrella term for both moods and emotions. So, the affect components of subjective well-being are related to the emotions and moods of an individual. Examples of positive affect are happiness, joy and elation. On the contrary, examples of negative affect are: stress, depression, anger and sadness. Positive and negative affect mainly correlate with respectively the pleasant and unpleasant sensory experiences of an individual, which I have explained in section 3.3 (Haybron, 2011). Life satisfaction is the cognitive evaluation by an individual of his or her own life as a whole. It is not just what happens to people that determines their life satisfaction, it is how they interpret or believe what happens (Seligman & Csikszentmihalyi, 2000, p. 9). Examples of things that are important for life satisfaction are: satisfaction with the past, current and future life, the desire to change life and the view of significant others on the individual's life. Life satisfaction is therefore mainly correlated with the more long-term experiences. These more long-term experiences are the attitudinal experiences that an individual may experience over the course of his or her life, which I have explained in section 3.3. Consider the thought experiment of the two businessmen again. The deceived businessman is likely to have a similar subjective well-being as the undeceived businessman, because his positive and negative affect and his life satisfaction are similar. Now imagine that the deceived businessman found out that he had been deceived all of his life. His previously experienced positive and negative affect remain the same, whereas his life satisfaction will decrease, because he probably will not be satisfied with his life anymore. Finally, domain satisfactions are the cognitive evaluations by an individual of specific domains in life that have been determined to be important for subjective well-being. Examples of domain satisfactions are: the satisfaction with work, family, finances and friends. Domain satisfactions also correlate with the more long-term attitudinal experiences. In order to explore subjective well-being, all components are important. One component is not

enough to determine the subjective well-being of an individual. For instance, if only positive and negative affect are taken into account, it would be possible that an individual who has many pleasant experiences but is not satisfied with his or her life at all has a high subjective well-being. This is counterintuitive. Clearly, all components must be included in studies about subjective well-being.

As I have illustrated in chapter 2, emotional responses to music are very subjective. In order to explore how these emotions while listening to music may influence the well-being of music listeners, it is therefore more useful to focus on the subjective well-being of those listeners. In other words, to find how emotions while listening to music can possibly influence the well-being of music listeners, I will explore how emotions while listening to music can possibly influence the four components of subjective well-being. I will do this in chapter 4. In that chapter I will also use the extended musical event as a tool to explore the impact of music-listening technologies on these possible influences. In the next section I will present some empirical findings about subjective well-being that are relevant for that theoretical exploration in the next chapter.

§ 3.4 Empirical findings of subjective well-being

In this section I will present some empirical findings that are important for my theoretical exploration in the next chapter about the possible influences of emotions while listening to music on the subjective well-being of music listeners. Empirical studies have resulted in some coherent findings about subjective well-being (Seligman & Csikszentmihalyi, 2000, p. 9). Most of these studies use a top-down approach. Researchers try to find structural coherences between the subjective well-being of an individual and external influences. Bottom-up approaches, on the contrary, investigate individuals to find elements that can contribute to subjective well-being in general (Diener et al., 1999). Mainly top-down studies have provided interesting insights for my investigation in this thesis.

First of all, the personality traits of an individual have shown to be important for subjective well-being. For instance, the predisposition of an individual to experience certain emotions more quickly than other people do so has a tremendous influence on the positive and negative affect components of subjective well-being (Diener et al., 1999). These predispositions are quite stable over time. In other words, although the context of an individual may change continuously, his or her predispositions to experience certain emotions remain the same in these contexts. In addition, Paul Costa and Robert McCrae concluded that the personality traits

extraversion and neuroticism³⁸ have a major influence on subjective well-being: people scoring high on the trait extraversion are likely to experience more positive affect, whereas people scoring high on the trait neuroticism are likely to experience more negative affect (Costa & McCrae, 1980). The personality trait optimism is also positively correlated to subjective well-being. An individual who has automatic positive cognitions and who can quickly diminish negative experiences has a higher level of subjective well-being (Diener et al., 1999). Some personality traits that can influence the subjective well-being of an individual are subjects to cultural norms. For instance, self-esteem may increase the life satisfaction component of subjective well-being. This finding, however, is only significant with people that live in more individual cultures and not with people that live in more collectivist cultures (Diener et al., 1999).

Secondly, empirical studies have shown that people have a so-called *set point* of subjective well-being. This is also called the *happiness set point* sometimes. This set point is a default level of subjective well-being to which individuals tend to return to after positive and negative experiences (Lykken & Tellegen, 1996). The aforementioned personality traits that can influence the subjective well-being of an individual determine this default happiness set point. The processes of *adaptation* and *coping* result in individuals returning to the happiness set point after experiences. Adaption is the process of habituating external conditions. Due to adaptation, responses to events are the strongest in the beginning and decrease over time. In other words, adaption is the diminishing of responses to repeated or continued stimuli (Diener et al., 1999). Adaptation can result in a *hedonic treadmill*. The hedonic treadmill theory states that people completely and rapidly adapt to all circumstances and always get back to the happiness set point very quickly (Diener et al., 1999). So, influences on subjective well-being are always temporal. The classical example of adaptation considers two persons: one person who has won the lottery and experiences a momentary peak in subjective well-being and a person who has become disabled and experiences a momentary decrease in subjective well-being. Adaption causes these boosts in their respectively positive and negative affect to diminish after a while. After a short period, their subjective well-being will be near-default again. However, they will not reach their original happiness set point again, because, besides the affect components, their life satisfaction component of subjective well-being is also influenced by these experiences. Life satisfaction is not so easily adapted (Diener et al., 1999). This is why the theory of the hedonic treadmill is only applicable up to a certain degree: some experiences can have more long-term influences on subjective well-being. Coping is a

³⁸ They based their study on the *five-factor* model of personality, which I have explained in section 2.5.

process of self-regulation that helps individuals to actively deal with negative experiences. The difference between coping and adaptation is the active role for the individual in coping. Coping strategies, such as seeking help, rational action or faith, have a great influence on subjective well-being. Coping may help individuals to return to their happiness set point or even exceed it after negative experiences (Diener et al., 1999). This happiness set point is the reason that researchers in positive psychology try to focus on both long-term and momentary emotions and moods in order to say something about subjective well-being (Diener et al., 1999, p. 277). These momentary emotions, or sensory experiences, highly correlate with the positive and negative affect components of subjective well-being, whereas the long-term emotions and moods, or attitudinal experiences, correlate with the life and domain satisfaction components of subjective well-being. I will use this distinction for my exploration in chapter 4.

Finally, the personal goals or aspirations of an individual influence subjective well-being as well (Diener et al., 1999). The life satisfaction component of subjective well-being is based on such goals and aspirations. Individuals tend to see their goals and aspirations as standards in life. The proximity to these standards can influence their life satisfaction and therewith their subjective well-being (Diener et al., 1999). These goals and aspirations depend on cultural norms. For instance, maintaining harmony among people is a goal that is more related to collectivist cultures than to individual cultures (Diener et al., 1999, p. 284).

In conclusion, in this chapter I have considered my third subquestion: *What is well-being?* I explored the term well-being in the field of positive psychology. I have explained that well-being is an important component of the good life. There are a lot of different theories of well-being and most of them recognize an important role for pleasant and unpleasant sensory and attitudinal experiences. Therefore, I have shifted my focus towards subjective well-being. Subjective well-being is a long-term psychological state of mind that consists of four components: positive affect, negative affect, life satisfaction and domain satisfactions. I have argued in chapter 2 that emotional responses to music are quite subjective because they highly depend on the extended musical event. So, in order to find the possible influences of emotions while listening to music on the well-being of music listeners and the impact of music-listening technologies on these possible influences, it is more useful to focus on subjective well-being. In the next chapter I will therefore explore the possible influences of emotions while listening to music on the four components of the subjective well-being of music listeners and the impact of music-listening technology on these possible influences.

Chapter 4: Music, Technology and Subjective Well-Being

Before going into the possible influences of emotions while listening to music on the subjective well-being of music listeners, I will provide a short recapitulation of what has been argued in the previous chapters. In the first chapter I have explored the term music and the problems about finding a unitary definition of this type of abstract art. Kania's definition of music has been chosen, because it is able to fulfill the necessary and sufficient conditions of incorporating the family resemblances between musical works and it is able to overcome the ontological issues regarding music. With this definition I can explore the influences of emotions while listening to music on the subjective well-being of music listeners and the relevant circumstances under which these influences occur. Therewith I can find an answer to the first of my main research questions: how can listening to music influence the well-being of music listeners?

In chapter 2 I have focused on the relation between music and emotions. The ability of music to be expressive of emotions can cause affective responses of music listeners. I have used Juslin's BRECVEMA framework to show that there are eight mechanisms besides the cognitive appraisal of this musical expressiveness that can cause affective responses of music listeners that are potentially emotional responses. Only if these affective responses are caused through one of these mechanisms and when they occur under the right circumstances of the musical event, they can be genuine and full-fledged emotions. I have proposed a fourth category of factors to the musical event. Besides the musical, individual and situational factors, the dominance factors over the musical event are important. This category includes all factors that are relatively unstable, because the music listener can easily control them or feels that he or she can control them. This extended musical event is a useful tool to analyse the impact of music-listening technologies on the circumstances under which emotions while listening to music can possibly influence the subjective well-being of music listeners. With this tool I can find an answer to the second of my research questions: what is the impact of music-listening technology on the ways that listening to music can influence the well-being of music listeners?

In chapter 3 I have explored the term well-being within the field of positive psychology. Well-being describes what is non-instrumental and ultimately good for a person. The most widely used theories of well-being all recognize an important role for pleasant and unpleasant experiences. Therefore, I have shifted my focus to subjective well-being. Subjective well-being is the long-term psychological state of mind of an individual that consists of positive and negative affect, life satisfaction and domain satisfactions. If emotions in specific musical events can positively influence

subjective well-being, these emotions can also contribute to well-being. If emotions in other musical events can negatively influence subjective well-being, these emotions can also negatively influence well-being. The four components of subjective well-being can be used to structurally explore how emotions while listening to music can possibly influence the subjective well-being of music listeners and to explore the impact of music-listening technology on these possible influences. That is the aim of this chapter.

This chapter will answer subquestions Q₄ and Q₅, respectively: *How can listening to music influence the subjective well-being of music listeners?* and *What is the impact of music-listening technology on the relation between listening to music and the subjective well-being of music listeners?* In this chapter I will critically explore the literature in the fields of psychology of music and STS³⁹ to find the influences of music listening on subjective well-being. Especially the musical events in which music listening can cause emotional responses are relevant. An important assumption that underlies my exploration in this chapter is namely that the arousal of positive emotional responses through listening to music can be considered as pleasant experiences. At the same time, the arousal of negative emotional responses through listening to music can be considered as unpleasant experiences. This assumption is supported by many empirical findings (e.g. Croom, 2015; Morinville, Miranda, & Gaudreau, 2013; Salimpoor, Benovoy, Longo, Cooperstock, & Zatorre, 2009). I have argued in subsection 3.3.1 that specifically these experiences can influence the components of subjective well-being. My scope in this chapter is therefore limited by the ways that music listening can influence the subjective well-being through the emotions of music listeners⁴⁰.

In chapter 2 I have argued that music listening can cause genuine and full-fledged emotions in music listeners. I will explore in section 4.1 whether or not these emotional responses of music listeners can influence their subjective well-being and in particular the positive and negative affect components. As I have explained in chapter 2 as well, emotional responses to music highly depend on the BRECVEMA mechanism and on the extended musical event. This is the reason, besides counteracting the problems with empirical studies⁴¹, that I will take a holistic approach in section 4.1. In subsection 4.1.1 I will explore the neurological impact of music listening while taking the full musical event into account. This enables me to find the

³⁹ Many of the studies in these fields are empirical. As I have explained in subsection 2.1.1, the use of such literature should happen with caution.

⁴⁰ There may be other ways than through emotions in which music listening can influence the subjective well-being of music listeners. However, these are not of pivotal importance for my investigation here.

⁴¹ I have explained this in subsection 2.1.1.

general influences of music listening on the affect components of subjective well-being. This will answer my fourth subquestion.

I have already argued in section 1.3 that there are several ways in which music in itself can be considered as a technology. The use of technological devices while listening to music can strengthen this idea of music as a technology (e.g. Born, 2005; DeNora, 1999; Morton, 2000). In addition to that, I will investigate in this chapter what the impact is of the use of music-listening technologies on the circumstances under which music listening can influence the subjective well-being of listeners. This relatedness between the use of music-listening technologies and the influences of emotions while listening to music on subjective well-being is the reason that I address both subquestions, Q₄ and Q₅, in this chapter. My scope is limited by the technologies that are directly involved in listening to music⁴². As I have indicated in the introduction to this thesis, these are the technologies that I refer to with music-listening technologies. So, my aim in sections 4.2, 4.3 and 4.4 is to explain how the use of music-listening technologies has had an impact on the relation between listening to music and the subjective well-being of music listeners. I will explore this impact by using the Uses and Gratifications theory that I will explain in subsection 4.2.2. This theory consists of three steps. The first step is to analyse how people use music-listening technologies. I will do this in subsection 4.2.3.

In section 4.3 I will execute the second step of the Uses and Gratifications theory, which aims at exploring the motives for using music-listening technologies. One of the major reasons of music listeners for using such technologies is to enable themselves to actively use music listening as a tool for self-regulation (Greasley & Lamont, 2006, p. 965; Juslin & Västfjäll, 2008, p. 559). Using music-listening technologies for self-regulatory aims can have an influence on their subjective well-being and in particular on the life and domain satisfaction components (Gross & John, 2003; John & Gross, 2004).

This is closely related to the third step of the Uses and Gratifications theory, which I will execute in section 4.4. I will explore the consequences of the different uses of music-listening technologies for the subjective well-being of music listeners. In other words, in this section I will answer the fifth subquestion and explore the impact of music-listening technologies on the relation between listening to music and subjective well-being. I will explain that music-listening technologies enable us to actively listen to music in order to influence the satisfaction components of our

⁴² In other words, technologies that might influence music listening indirectly are not the central concern here. In subsection 1.4.1 I have already briefly demonstrated some examples of technological developments in creating and distributing music that have had an indirect impact on the way we listen to music. Such technologies are not considered here.

subjective well-being. In other words, due to such technologies some additional influences of music listening on our subjective well-being have emerged, besides the ones that I will explain in section 4.1. This focus on music-listening technologies in studies towards the influences of music listening on subjective well-being is relatively new and therefore scarce (Krause & North, 2016, p. 130). This is the reason that extensive literature about the impact of music-listening technologies is lacking. Therefore, in contrast to my holistic approach in section 4.1, I will take a reductionist approach⁴³ in section 4.4 to find the impact that music-listening technologies may have on the subjective well-being of music listeners⁴⁴.

The overview in this chapter of how emotions while listening to music can influence subjective well-being and of the impact of music-listening technologies on this relation provide an answer to my main research questions (Q): *how can listening to music influence the well-being of music listeners and what is the impact of music-listening technology on the ways that listening to music may do so?* These overviews also provide an indication about how future music-listening technologies can be designed to specifically improve the well-being of music listeners. I will elaborate on this last point in the recommendations section of this thesis.

§ 4.1 Impact of emotional responses on subjective well-being

In this section I will focus on the influences of emotional responses to music on the subjective well-being of music listeners. I have demonstrated in chapter 2 that whether or not affective responses to music are emotional depend on the BRECVEMA mechanism and the circumstances of the extended musical event. These possible emotional responses are rather short-term pleasant or unpleasant experiences. I have explained in subsection 3.2.1 that sensory experiences are short-term pleasant or unpleasant experiences, typically through one of the five senses. Therefore, emotional responses to music can be considered as sensory experiences. I have argued in subsection 3.3.1 that the affect components of subjective well-being are mainly constituted by sensory experiences. In other words, emotional responses to music are precisely the experiences that can influence the positive and negative affect components of subjective well-being. Furthermore, as I have indicated in the introduction to this chapter, I assume that musical events that are able to arouse positive emotions correlate positively with the positive affect and negatively with the

⁴³ I have explained what reductionist approaches are in subsection 2.1.1.

⁴⁴ Most existing empirical studies about the technological impact on the influences of music listening take a reductionist approach as well. These studies are often about specific technological features and consider the general impact of a music-listening technology to be the sum of the impacts of these separate technological features.

negative affect component of subjective well-being and the musical events that are able to arouse negative emotions vice versa⁴⁵. Clearly, the factors of the extended musical event do not only determine whether or not affective responses to music are emotional, they also determine the valence of that response. This relatedness between the influences of emotional responses to music on subjective well-being and the extended musical event is the reason that I take a holistic approach in this section. I will present an overview of the possible influences of music listening on emotions and therewith on subjective well-being along with the corresponding factors of the extended musical event. This overview provides insights in the general influences of emotions while listening to music on the affect components of subjective well-being. This gives an answer to my fourth subquestion: *How can listening to music influence the subjective well-being of music listeners?*

I will not present this overview by giving a list of all emotional responses to music that have been reported in the literature and explore whether those are positive or negative. As I have explained in chapter 2, emotional responses to music are very subjective and highly depend on the extended musical event. In addition, I have explained in subsection 2.1.1 that there are many problems with empirical studies about emotional responses to music. This makes it hard to include all possible emotional responses in such an overview and draw some general conclusion about the influences of emotions while listening to music on subjective well-being. Therefore, this approach could easily slip into ambiguous and imprecise conclusions. For instance, many empirical findings support the claim that if music arouses emotions, that these emotional responses are mostly positive (e.g. Gabrielsson, 2001; Goldstein, 1980; Juslin & Laukka, 2004; Juslin et al., 2011, 2008; Sloboda & O'Neill, 2001; Västfjäll et al., 2012). These findings could easily lead to the conclusion that emotional responses to music often contribute to subjective well-being, independent of the musical event. However, as I will return to in later in this subsection and later in this chapter, there are many examples of musical events in which music negatively influences subjective well-being. So, this conclusion lacks precision and fails to include the full musical event. I would therefore argue that it is more beneficial to explore the literature about the neurological impact of music listening and connect that to the broader psychological literature about emotions in order to find the influences of music listening on subjective well-being. Emotions are linked to brain activation

⁴⁵ This focus on positive and negative emotional responses illustrates the importance of the valence dimension of emotions that I have explained in section 2.1. This dimension determines whether an emotion has a positive or negative influence on the affect components of subjective well-being. I have also explained in section 2.1 that this dimension is very subjective. Most empirical findings are based on self-reports of music listeners and those reports are able to include these subjective aspects. So, it is possible to say something objectively about the valence dimension of emotions, but it should happen with caution.

(Peretz, 2001)⁴⁶. Exploring the neurological impact of music listening and comparing it to correlations between brain activity and emotions may provide some more objective insights in the influences of music listening on emotions, especially because brain activity can be measured more objectively than emotions. So, in subsection 4.1.1, I will explore the neurological impact of music listening along with the corresponding musical events. In addition, I will check whether this impact is positively or negatively correlated with emotions and therefore with subjective well-being and in particular with the affect components⁴⁷.

4.1.1 Neurological impact of music listening

The aim of this subsection is to explore the neurological impact of music listening that underlies the emotional responses⁴⁸ and therewith to find general influences of music listening on the affect components of subjective well-being. There are a lot of controversies and disagreements about the neurological organization of emotions. These controversies are mainly caused by the disagreements in the field of psychology that I have explained in chapter 2 and by the amount of available knowledge about the neurological organization of emotions. Moreover, these controversies are caused by the different approaches that scholars take in categorizing emotions (Schmidt & Trainor, 2001, pp. 487–491; Sloboda & Juslin, 2001, pp. 76–79). In section 2.1 I have explained the two most commonly used approaches, the dimensional and the categorical approach. Supporters of the dimensional approach, which suggests that emotions can be categorized on basis of two or three dimensions, proclaim that every dimension of emotions correlates with a different neurological system in the brain. An emotion is then basically determined by the degree of activation of these different neurological systems (e.g. Blood, Zatorre, Bermudez, & Evans, 1999; Peretz, 2001; Schmidt & Trainor, 2001). On the other hand, supporters of the categorical approach, which suggests that every basic emotion is a separate category, proclaim basically that every basic emotion has its own underlying neurological substrate and that more

⁴⁶ How the relation between emotions and brain activity looks like is rather controversial in the field of cognitive neuroscience (de Sousa, 2014). Some theories claim that brain activity is a consequence of an emotion, whereas other theories claim that it is the cause of an emotion. However, consensus exists that there is some brain activity involved in emotions (de Sousa, 2014). This conclusion is important for my investigation here.

⁴⁷ One may argue that this approach could lead to imprecise conclusions on a different level, because it is very hard to include the full neurological impact of music listening. However, I would argue that this approach is more beneficial, because it leaves out an individual's subjective evaluation of an emotional response to music and searches for more general consequences of music listening in the psychological literature about emotions.

⁴⁸ Although I speak of emotional responses in this subsection, the nature of the affective responses to music is not solely determined by the neurological organization. This nature highly depends on the BRECVEMA mechanism and the extended musical event, as I have explained in chapter 2. However, I choose to use the term emotional responses in this subsection to stay in line with the literature.

complex emotions are caused by interactions of these neurological substrates (e.g. Koelsch, 2005; Menon & Levitin, 2005; Peretz, 2001). Consensus between both approaches is currently lacking, because empirical findings do not unambiguously support one of them. In section 2.1, I have argued for a combination of these two approaches for categorizing emotions: an emotion is categorized as basic, complex, aesthetic or a mixture of those categories and according to the valence and arousal dimensions. The ambiguous empirical findings about the neurological organization of emotions support this conclusion. These findings also suggest that an emotional response to music involves many different brain regions that highly overlap with each other. An emotional response to music is a result of an interaction between many, but not all, of these different brain regions. This is also empirically supported (e.g. Koelsch, 2005; Menon & Levitin, 2005; Peretz, 2001; Schmidt & Trainor, 2001). In the remainder of this subsection I will therefore present a rough overview of relevant empirical findings about the neurological impact of music listening. This overview enables me to find possible correlations between music listening and emotions and therewith to find the influences of emotions while listening to music on the affect components of subjective well-being. Before I will go into this neurological impact of music listening, it is useful to explain the basic anatomy of relevant brain regions. This provides a more thorough idea about the impact of music listening on the brain. In addition, as I will return to later in this subsection, this is also useful to illustrate how different brain regions overlap and interact with each other while listening to music. I will use the neuroscientific topography of the brain as it is presented by Michael Fitzgerald, Gregory Gruener and Estomih Mtui (Fitzgerald, Gruener, & Mtui, 2012).

The central nervous system of human beings consists of four parts: the hindbrain, the midbrain, the forebrain and the spinal cord (Fitzgerald et al., 2012, pp. 7–29). The first three parts together form the brain. The brain regions that are relevant for emotions are mainly located in the forebrain. The forebrain consists of the Diencephalon and the Telencephalon, or the *cerebrum* (Fitzgerald et al., 2012, pp. 1–6). As I will return to later in this subsection, the relevant brain regions of the Diencephalon that can be activated in response to music are the thalamus and the hypothalamus (Koelsch, 2005). The cerebrum is known as the biggest part of the brain and consists of the left and right cerebral hemispheres (Fitzgerald et al., 2012, p. 8). The outer layer of each cerebral hemisphere is called the cerebral cortex. The cerebral cortex consists of the frontal, the parietal, the occipital and the temporal lobes, the insula and the cingulate cortex (Fitzgerald et al., 2012, pp. 7–8). Especially the temporal lobe of each cerebral hemisphere consists of brain regions that can be activated in response to music: the superior temporal gyri, cingulate gyrus and the parahippocampal gyrus. This is supported by empirical findings (e.g. Blood et al.,

1999; Koelsch, 2005, 2009; Liegeois-Chauvel, 1998; Menon & Levitin, 2005). To be more precise, these brain regions are located on the paralimbic cortex of the temporal lobes. Below this cerebral cortex, each hemisphere consists of subcortical brain regions of which some can be activated in response to music as well. Empirical studies illustrated that mainly the hippocampus, the amygdala and the basal ganglia are subcortical brain regions that can be activated in response to music (e.g. Blood & Zatorre, 2001; Bressler & Menon, 2010; Croom, 2015; Koelsch, 2005; Lamont, 2011; Menon & Levitin, 2005). The *Limbic system* is the network of brain regions that are involved in emotions (Fitzgerald et al., 2012, pp. 353–376). The limbic system also plays an important role in behavior, motivation, long-term memory and olfaction (Fitzgerald et al., 2012, pp. 353–376). These limbic brain regions are spread out over the cerebrum, the Diencephalon and the midbrain. There is no consensus about the exact constitution of the limbic system (Fitzgerald et al., 2012, pp. 353–376). Nevertheless, most of the previously mentioned brain regions that have been found empirically to be activated in response to music are included in the limbic system. This illustrates that music listening and emotions are highly correlated. Finally, the paralimbic cortex of the temporal lobes, which I have mentioned previously, provides the transition from the limbic system to the cerebral cortex (Koelsch, 2005, 2009).

To make the overview of the neurological impact of music listening that underlies the emotional responses manageable, Juslin suggests that such a response can involve three functions that are reflected in the brain (Juslin, 2013, p. 244). First of all, brain regions are involved in an emotional response to music because sounds are perceived. This is mainly the auditory cortex (Juslin, 2013, p. 244). The auditory cortex is located in the temporal lobes of both the cerebral hemispheres (Fitzgerald et al., 2012, pp. 229–233). The second and third functions that are involved in emotional responses to music correspond with the two different types of emotional responses that I have explained in section 2.3: the automatic responses and the responses that have an underlying cognitive process. Both of these types of emotional responses to music are reflected in activated brain regions. The automatic emotional responses to music only involve brain regions because of the experience of emotions. These are mainly limbic and paralimbic brain regions. More cognitive emotional responses to music, on the other hand, also involve some additional brain regions. These responses also involve non-limbic parts of the cerebrum, because of the underlying information-processing function (Huron, 2011, p. 154). This is also empirically supported: musical stimuli that activate networks of limbic and paralimbic regions can result in automatic subcortical emotional responses to music (e.g. Bressler & Menon, 2010; Koelsch, 2005; Zajonc, 1984) and musical stimuli that activate non-limbic cortical brain regions as well, can result in emotional responses to music with underlying cognitive processes

(e.g. Liegeois-Chauvel, 1998; Peretz, 2001, p. 113). Therefore, mainly the limbic, paralimbic and non-limbic brain regions are relevant to find the neurological impact of music listening that underlies emotional responses.

In the remainder of this subsection I will explore the relevant empirical findings about the activation of limbic, paralimbic and non-limbic brain regions in response to music and explicate the possible emotional consequences of those activations. This provides some insight in the general influences of music listening on the affect components of the subjective well-being of listeners. Empirical findings suggest that most brain regions of the limbic system are activated in rewarding stimuli, such as food or sex (Ferguson & Sheldon, 2013; Gabrielsson, 2001; Sloboda & O'Neill, 2001; Ward, 2014). Therefore, the activation of most limbic brain regions is related to pleasant experiences, in particular to pleasant sensory experiences (Blood et al., 1999; Blood & Zatorre, 2001). The brain regions that have been reported to be activated through listening to music and that are related to pleasant experiences are: the hippocampus, hypothalamus, basal ganglia, cingulate gyrus and the parahippocampal gyrus (Bressler & Menon, 2010; Koelsch, 2005, 2009). The activation of these brain regions through listening to music is likely to result in automatic positive emotional responses, which are precisely the pleasant sensory experiences that can contribute to the positive affect component of subjective well-being.

I will illustrate this point with some examples. Anne Blood and Robert Zatorre found that listening to music can activate the ventral striatum, a part of the basal ganglia, which is a subcortical brain region (Blood & Zatorre, 2001; Koelsch, 2005). The activation of this brain region increases the release of dopamine (Blood & Zatorre, 2001). Other empirical studies illustrate the correlation between listening to music and the release of dopamine through the activation of other brain regions, such as the hypothalamus and the insula (e.g. Menon & Levitin, 2005; Salimpoor, Benovoy, Larcher, Dagher, & Zatorre, 2011; Västfjäll et al., 2012, p. 407). Dopamine is related to feelings of happiness and desire (Menon & Levitin, 2005, p. 185) and functions as a reward for the organism (Alcorta & Sosis, 2005, pp. 333–334). The release of dopamine may contribute to the affect components of subjective well-being⁴⁹. Another example of how listening to music can activate brain regions that are correlated with automatic positive emotional responses, is through the release of cortisol. Empirical studies illustrate that the activation of the hypothalamus can lead to

⁴⁹ Whether or not the release of Dopamine contributes to subjective well-being is somewhat contested. Some scholars argue that this release most often leads to desires instead of to feelings of happiness. Desires can lead to addiction and decrease subjective well-being (Alcorta & Sosis, 2005, pp. 333–334). This is not the central concern here.

this release (e.g. Hébert, Béland, Dionne-Fournelle, Crête, & Lupien, 2005; Västfjäll et al., 2012, p. 407). Cortisol is a hormone that is released in response to stress and decreases the feelings of stress. It can decrease heart rate, decrease muscle tension, increase skin temperature and increase skin conductance. This explains the calming power of music that is often suggested (e.g. DeNora, 1999, 2000; Scherer & Zentner, 2001, p. 374). Empirical findings have also suggested a correlation between the activation of the hypothalamus through listening to music and an increased release of oxytocin (Västfjäll et al., 2012, p. 407). The hormone oxytocin plays an important role in the bonding and trust between people. This may explain the reported ability of music to increase the contact, coordination and cooperation with other people and the ability of music to increase cultural cohesion in general (Suttie, 2015). Other empirical findings suggest that the activation of the hypothalamus through listening to music can also increase the release of endorphins and serotine (Morinville et al., 2013; Rickard, 2014; Suttie, 2015; Västfjäll et al., 2012; Ward, 2014). Both are correlated with feelings of happiness. Finally, the activation of parts of the basal ganglia through listening to music has reported to help storing events into memory (Ward, 2014). This enables music listeners to experience positive emotional responses through the BRECVEMA mechanism episodic memory. All of these neurological impacts of music listening can result in positive automatic emotional responses of music listeners, which can be considered as pleasant sensory experiences. These positive emotional responses can therefore contribute to the affect components of subjective well-being.

However, as I have argued in sections 2.5 and 4.1, the intensity of previously given examples of automatic emotional responses to music do not only depend on the activated brain regions, but they highly depend on the extended musical event as well (Juslin, 2013, p. 244; Peretz, 2006, p. 23). In other words, the extended musical event determines the precise contribution of the activation of these brain regions to the subjective well-being of music listeners⁵⁰. Many factors of the musical event are important. First of all, in order to increase the release of dopamine, cortisol, endorphins and serotonin the most, the musical work must be pleasurable (Salimpoor et al., 2011). The musical factors play an important role in determining the exact influence of these hormones on subjective well-being⁵¹. For instance, it has been

⁵⁰ Recall here that I speak of emotional responses in this section, but whether or not these affective responses to music are actually emotional and therefore whether or not these responses can actually contribute to subjective well-being also depend on the extended musical event. I have explained this in section 2.5.

⁵¹ Stefan Koelsch has investigated how specific musical features can activate different brain regions. Although the results depend highly on the other factors of the musical event, he found for instance that harmonious music activates brain regions that are related to positive emotional responses, whereas unharmonious music activates brain regions that are related to negative emotional responses (Koelsch, 2005, pp. 412–415).

found empirically that arousing musical works can diminish the increase of cortisol and decrease the calming power of music (Barlett, 1996; Scherer & Zentner, 2001, p. 374). Secondly, the context of listening and in particular the other people being present while listening, is reported to be important for the release of oxytocin (Suttie, 2015). Especially with just one good friend or partner, music can increase the release of oxytocin. Thirdly, the listener, his or her motives for listening to music and the main activity while listening determine the intensity of the emotional responses (Juslin et al., 2008, p. 677). I have already indicated in section 2.5.1 that if a music listener tries to relax through listening to music, it is significantly more likely that emotions such as calm-contentment are aroused through an increased release of cortisol. In addition, Daniël Västfjäll empirically concluded that the personality traits neuroticism and extraversion diminish the increase of cortisol levels in responses to music (Västfjäll et al., 2012). So, also the individual and dominance factors of the extended musical event determine the intensity of the automatic emotional responses to music.

There are three ways in which the activation of brain regions through listening to music can lead to negative emotional responses. In these cases, music listening can negatively influence the affect components of subjective well-being. The first is related to the dependency of emotional responses on the extended musical event. Besides the intensity, the extended musical event can determine the valence dimension of automatic emotional responses to music. The empirical study of Silvie Hébert et al. illustrates that the musical event can arouse a negative emotional response, whereas purely the activated brain regions would result in a positive emotional response. They investigated the influence of listening to music on cortisol levels while playing video games (Hébert et al., 2005). In contrast to the empirical studies that I have referred to previously, they concluded that within the stressful context of video games music can decrease the release of cortisol. Especially genres like rock and techno music in video games can decrease the release of cortisol and increase the feelings of aggressiveness, hostility, tension, anxiety and discomfort (Burns et al., 2002; Hébert et al., 2005). In this study, the musical event, which is mainly the video game itself, clearly codetermines whether or not the impact of music on the release of cortisol is positive. Secondly, the activation of subcortical limbic and paralimbic brain regions can be mediated by cognitive cortical brain processes in the non-limbic brain regions and therefore have negative emotional responses as a result (Peretz, 2001, p. 113). As I have explained previously in this subsection, these mediations result in emotional responses to music that have underlying cognitive processes, such as nostalgia and patriotism. This is also supported by the literature in the psychology of music (e.g. Liegeois-Chauvel, 1998; Peretz, 2001, 2006). Whether or not such mediations occur highly depends on the BRECVEMA mechanism, because every mechanism is

correlated with a different combination of limbic, paralimbic and non-limbic brain regions (Juslin & Västfjäll, 2008; Juslin, 2013). For instance, an emotional response to music through the mechanism episodic memory involves the activation of non-limbic brain regions, whereas an emotional response through the mechanism brain stem reflexes does not involve any non-limbic brain region (Juslin, 2013, pp. 243–244). So, it could be that a musical work, despite that it activates brain regions that are correlated with automatic positive emotional responses, has a negative emotional response as a result because of cognitive cortical brain processes. Especially the BRECVEMA mechanism of episodic memory can have this result (Juslin & Västfjäll, 2008; Juslin, 2013). Finally, although unlikely, music listening can have a neurological impact that underlies automatic negative emotional responses. For instance, Nathalie Gosselin et al. empirically found that music listening can activate the amygdala, which is a subcortical limbic brain region (Gosselin et al., 2005; Koelsch, 2005). The amygdala is associated with threat-related experiences and can increase the feelings of stress. So, music listening can also directly arouse negative automatic emotional responses that can negatively influence subjective well-being. However, as I have explained in chapter 2 with the tragedy paradox, it is very unlikely that we would listen to music that is *only* able to arouse negative emotional responses. According to Juslin, it is most likely that other BRECVEMA mechanisms or the musical event arouse positive emotional responses at the same time. In the example of the video game that decreases the release of cortisol, it is very likely that the video game itself, which mainly constitutes the musical event, brings an additional pleasant emotional response. Otherwise we would not play that game. So, it is most likely that the neurological impact of music listening that underlies negative emotional responses, arouses positive emotional responses in addition⁵².

I assumed that if emotional responses to music are positive, they contribute to the positive affect component of subjective well-being. On the contrary, if they are negative, they contribute to the negative affect component of subjective well-being. I have illustrated in this subsection that listening to music mostly activates brain regions that are involved in positive emotions. Even if it activates brain regions that are involved in negative emotions, it is likely that there are additional positive emotional responses. Therefore, I am inclined to conclude that most emotional responses to music can be considered as positive sensory experiences that can positively influence the affect components of subjective well-being. As I have illustrated in this subsection as well, to draw this conclusion more strongly, the full extended musical event must be taken into account. The extended musical event can determine the valence and

⁵² It is important to note here that this is only likely when the music listener has enough dominance over the musical event in order to have the possibility not to listen to that music.

intensity of an emotional response to music. In order to do so, the musical event and in particular the dominance factors over the musical event must be operationalized. I will come back to this point in the recommendations section of this thesis.

I will end this subsection by giving one example that illustrates how a BRECVEMA mechanism and an extended musical event can jointly activate brain regions that result in an emotional response to music that can influence the affect components of subjective well-being. I will consider the BRECVEMA mechanism musical expectancy. A musical work can confirm or violate the expectations of a music listener about its continuation. Especially when people have a great understanding of a specific musical genre and when their main activity is listening to that music, they tend to have huge expectations about its continuation (Honing, 2011; Meyer, 1956). The violation or confirmation of specifically such expectations can lead to a strong emotional response (Meyer, 1956; Salimpoor & Zatorre, 2013). An unexpected continuation of a musical work activates the orbital frontolateral cortex, which is a non-limbic brain region in the frontal lobes of the cerebral hemispheres (Fitzgerald et al., 2012, pp. 7–8; Koelsch, 2005, pp. 414–415). The activation of the orbital frontolateral cortex is correlated with the activation of the amygdala which can result in increased feelings of stress (Bigand, Parncutt, & Lerdahl, 1996; Gosselin et al., 2005). Such feelings of stress are unpleasant sensory experiences and can decrease subjective well-being. So, the violation of strong expectations about the continuation of a musical work can decrease subjective well-being. This example illustrates how a BRECVEMA mechanism and a musical event codetermine the neurological impact of music listening that underlies an emotional response to music that may influence the subjective well-being of the music listener.

In the remainder of this chapter I will explain how music-listening technologies have enabled music listeners to use music actively and consciously to influence their subjective well-being and in particular to influence the life and domain satisfaction components. In the next section I will start by exploring how music-listening technologies have changed the ways in which people listen to music. Afterwards, in section 4.4, I will explore how these changes have had an impact on the relation between emotions while listening to music and the subjective well-being of music listeners.

§ 4.2 Music-listening technologies in use

I have already explained in section 1.3 that music can be considered as a technology in itself. In addition, I will elaborate in this section on the ways that music-listening technologies have changed the ways we listen to music. It is likely that this impact of

using such technologies does also have an impact on the ways that emotions while listening to music can influence our subjective well-being, which I have explained in section 4.1. In subsection 4.2.1 I will start by briefly analyzing how music-listening technologies have changed our ways of listening to music. In other words, I will analyse how these technologies have had an impact on the musical event. I will use examples of the most influential developments in music-listening technologies to do so. In subsection 4.2.2 I will explain the Uses and Gratifications theory. I will use this theory to explore how music-listening technologies are used and the motives for and the consequences of these uses. In subsection 4.2.3 I will only execute the first step of this theory and elaborate on the ways that music listeners use music-listening technologies. I will execute the other steps of the Uses and Gratifications theory in sections 4.3 and 4.4.

4.2.1 Impact of music-listening technologies on the musical event

The most obvious impact that music-listening technologies have and have had on music listening is that they increased the accessibility and mobility of music. This is also widely supported in the literature (e.g. Avdeeff, 2012; Hargreaves & North, 1999; Skånland, 2011, 2013). Due to these developments in music listening it was no longer necessary to listen to live performances in order to experience music⁵³ (Davidson, 1997; Krause, North, & Hewitt, 2015). The development of music recording technologies and the development of loudspeakers made it possible to make recordings of musical works and play those recordings at almost any time at almost every location (Douglas, 1999; Horning, 2004; Morton, 2000; Pinch & Bijsterveld, 2004). The first possibility of personalizing a music collection this way emerged with the mixed tapes (Kania, 2005, p. 134). Although it was rather inflexible, people used tapes to make compilations of music that they liked and were able to play it on occasions of their own choosing (Bull, 2005). This accessibility of music has been further increased with the advance of music-listening technologies such as streaming services or downloading programs (Greasley & Lamont, 2006; Krause et al., 2015; Pinch & Bijsterveld, 2004). As a result, people have an easy access to an incredible amount of music nowadays. This development has led to music being selected by music listeners instead of music being presented to them, which was often the case previously.

The mobility of music has been increased tremendously when portable audio players emerged. One of the first portable audio players was the walkman. It enabled

⁵³ However, many people still go to concerts. This can be explained by social reasons (Davidson, 1997). It could also be the case that some music listeners consider themselves as real fans of musicians and desire authentic performances of those musicians. See subsection 2.5.1 for an explanation about the authenticity of musical works.

music listeners to carry small portions of their music collection with them in a miniature device (Greasley & Lamont, 2006). Many portable audio players use headphones and can therefore be used as personalized audio players. A music listener can select him- or herself which music he or she listens to without anyone else hearing the selected music. Portable audio players have been developed over the years. Nowadays, mp3-players and iPods can carry large portions of music and sometimes they can even stream those from the internet. In addition, their battery endurance has been improved and their size has been reduced. This has made music listening even more mobile. Clearly, all of these developments in music-listening technologies have increased the accessibility and mobility of music tremendously.

This exponential growth in the accessibility and mobility of music has provided the music listener with almost endless possibilities for listening to music. These music-listening technologies offer the music listener the possibility to determine how, when and where he or she experiences self-selected music. This claim is also supported in the psychology of music and in STS studies (e.g. Avdeeff, 2012; Bull, 2000; DeNora, 2000; Greasley et al., 2013; Greasley & Lamont, 2009, 2011; Krause et al., 2015; Krause, North, & Hewitt, 2014; Krause & North, 2016; Pinch & Bijsterveld, 2004; Skånland, 2011, 2013). In other words, music-listening technologies have considerably contributed to the dominance factors of the musical event. For instance, our freedom to listen to self-selected music has been increased through the development of music-listening technologies. Also, the psychological state while starting to listen to music has become much more manageable, because by using portable audio players we can choose when we listen to music and when we do not. So, we can decide to put music on or off in specific psychological states. The degree of dominance over the musical event depends on the specific music-listening technology that is used. For instance, online streaming services, mp3-players and other mobile audio players offer a very high degree of dominance. The radio, CD's and the television do so to a lesser extent, because they do not enable the music listener to fully decide what he or she listens to.

This increase in the accessibility and mobility of music and therewith the increase in the dominance over the musical event by using music-listening technologies enables us to access the influences of music listening on our subjective well-being more easily. I have argued in chapter 2 that whether or not affective responses to music are emotional highly depends on the extended musical event. Increasing the dominance over the musical event by using music-listening technologies enables music listeners to experience emotional responses easier than without using such technologies. As I have explained in section 4.1, these emotional responses to music can influence their subjective well-being. I have also explained in

section 4.1 that most emotional responses to music can be considered as positive and that these responses therefore positively contribute to the affect components of subjective well-being. So, music-listening technologies have made these positive influences on subjective well-being more accessible and improved their endurance. In other words, music-listening technologies can strengthen the relation between emotions while listening to music and the affect components of subjective well-being. This conclusion is also supported by empirical findings (e.g. Krause et al., 2015; Lyubomirsky, Sheldon, & Schkade, 2005, pp. 114–116; Mitchell, MacDonald, & Knussen, 2008; Morinville et al., 2013; North et al., 2004).

As I have indicated previously, music-listening technologies can also enable music listeners to actively and consciously use music as a tool to improve their subjective well-being. This is a result of the strong impact of these technologies on the circumstances of the extended musical event. In order to explore this impact of using music-listening technologies on the relation between emotions while listening to music and subjective well-being more in depth, I will use the Uses and Gratifications theory. I will explain this sociological theory in the next subsection.

4.2.2 The Uses and Gratifications theory

In order to explore how music-listening technologies have and have had an impact on the way that music listening can influence subjective well-being and in particular the life and domain satisfaction components, I will focus on how and why these technologies are used. I will do so by using the Uses and Gratifications theory. This sociological theory tries to find answers to the questions how and why people use specific media, while presupposing active users of media (C. Boer & Brennecke, 1999). This theory is often suggested for the exploration of the influences of music listening and the influences of specific music-listening technologies (e.g. Hargreaves & North, 1999, p. 78; Krause, North, & Heritage, 2014; Krause, North, & Hewitt, 2014, p. 322). As I will explain later in this chapter, music-listening technologies enable us to become active music listeners. So, the presupposition of the Uses and Gratifications theory that users are active is applicable in this context as well. Therefore, this theory can be used to explore the uses of music-listening technologies. I will explain the Uses and Gratifications theory in the remainder of this subsection.

The Uses and Gratifications theory consists of three steps: the first step is to explain the individual uses of media, the second one is to discover the underlying motives for these uses and the final step is to identify the positive and negative consequences of these uses of media (C. Boer & Brennecke, 1999). To apply this theory in my investigation here, I will execute the first step in the next subsection. I will briefly explore how music listeners use music-listening technologies. I will

illustrate that these uses highly correlate with the extended musical event. Afterwards, in sections 4.3 and 4.4, I will execute the second and third step of the Uses and Gratifications theory. In section 4.3 I will explore the most important motives of music listeners for using music-listening technologies and in section 4.4 I will focus on the positive and negative consequences of these specific uses.

4.2.3 Impact of the musical event on music-listening technologies

In this subsection I will execute the first step of the Uses and Gratifications theory and explore how music-listening technologies are used by music listeners. As I have explained in subsection 4.2.1, music-listening technologies are highly capable of influencing the extended musical event and in particular the dominance factors of the musical event. On the contrary, the extended musical event is also capable of influencing the use of music-listening technologies. This relatedness is investigated empirically (e.g. Greasley & Lamont, 2006, 2009; Krause, North, & Heritage, 2014; Krause et al., 2015; Krause & North, 2016). This correlation between the extended musical event and the use of music-listening technologies provides some insights in how these technologies are used by music listeners.

Due to the developments in music-listening technologies that I have explained in section 4.2.1, music listening has become a more widely used activity than ever before. Already in 1978, Bertil Sundin suggested that “children who begin school today have probably listened to more music than their grandparents heard during their entire lives” (Sundin, 1978, p. 9). This illustrates once more the major role that music plays in our everyday lives nowadays. In 2015, Amanda Krause empirically concluded that most people listen to music over one hour a day (Krause et al., 2015). She also concluded that music is nearly always perceived through music-listening technologies: through mobile phones, mp3-players, computers, televisions, radios, loudspeakers in public spaces, etc. Melissa Avdeeff has drawn a similar conclusion (Avdeeff, 2012). The radio, the computer, mobile audio players and the television have been reported to be the most frequently used music-listening technologies (Greasley & Lamont, 2011; Krause et al., 2015; Krause & North, 2016). However, the use of music-listening technologies highly depends on factors of the extended musical event. The ways in which music-listening technologies are used are not uniform across all music listeners. It is rather a personal choice to use specific music-listening technologies (Horning, 2004, p. 703; Krause, North, & Heritage, 2014, p. 72). In this subsection I will therefore briefly summarize the ways in which the use of music-listening technologies differs between music listeners. I will make critical use of the literature in the fields of psychology of music and STS.

First of all, age and gender differences are reflected in the uses of music-listening technologies (Krause & North, 2016). For instance, older people tend to use CD's, radios and legal internet sources for listening to music more often, whereas younger people are more likely to use illegal sources, mobile and computer devices (Avdeeff, 2012, pp. 271–272; Krause et al., 2015). As I will come back to later in this subsection, this is also related to the attitude that individuals have towards technologies in general (Krause & North, 2016). Another example of how differences between music listeners are reflected in their use of music-listening technologies is related to gender. Females tend to use the radio and specifically the shuffle function of music-listening technologies more often than males do (Krause & North, 2016).

Secondly and closely related to these age and gender differences, the uses of music-listening technologies highly depend on the general attitude of an individual towards technologies (Krause & North, 2016). For instance, younger people tend to be quite innovative in their use of music-listening technologies, because they are relatively more benevolent to the progressive advantages that these technologies can offer (Krause & North, 2016, pp. 137–138). Especially students tend to be early-adopters and opinion leaders about such music-listening technologies. This attitude towards technologies results in quickly using the newest music-listening technologies, such as cloud streaming services (Krause & North, 2016; Tepper & Hargittai, 2009). In addition, opinion leaders tend to use playlists while listening to music more often than other people (Krause & North, 2016). Opinion leaders tend to influence their friends with their uses of technologies. Therefore, the newest music-listening technologies are often spread out among younger people the quickest (Krause & North, 2016).

Finally, the commitment of an individual to music in general is also relevant for their use of music-listening technologies (Avdeeff, 2012). People that are more committed to music, consider it to be more important in their lives and listen to it more often than people who are less committed (Krause & North, 2016)⁵⁴. This commitment is reflected in their use of music-listening technologies. For instance, less committed music listeners tend to use the shuffle function of music-listening technologies more often (Heye & Lamont, 2010). On the contrary, people who are more committed tend to use computer devices more often and mainly listen to self-selected music (Greasley & Lamont, 2006, 2009; Krause et al., 2015).

⁵⁴ In this study, commitment to music is measured according to four indicators that are subjectively measured in self-reports: the enjoyment of music, the importance of music in life, the amount of owned music and the number of preferred genres of music (Greasley & Lamont, 2006, p. 962).

In subsection 4.2.1 I have explored the ways in which music-listening technologies have had an impact on the musical event. In subsection 4.2.2 I explained the Uses and Gratifications theory that I will use to analyse how the use of music-listening technologies can have an additional impact on subjective well-being next to the more general influences of emotions while listening to music that I have explained in section 4.1. Finally, in this subsection I have explored how music listeners use music-listening technologies. In the next section I will execute the second step of the Uses and Gratifications theory and explore the most important motives for using music-listening technologies. Afterwards, in section 4.4, I will execute the third step and explore the consequences of these uses for subjective well-being. These findings contribute to the overview of the impact of music-listening technologies on the relation between emotions while listening to music and subjective well-being.

§ 4.3 Motives for using music-listening technologies

In this section I will execute the second step of the Uses and Gratifications theory. I will explore the motives of music listeners to use specific music-listening technologies. I explained in subsection 4.2.1 that music-listening technologies increased the accessibility and mobility of music and that the use of these technologies increases the dominance over a musical event. So, the use of music-listening technologies enables us to become engaged listeners and access the influences that music listening can have on us more quickly and freely. In other words, music-listening technologies enable music listeners to become active agents in purposeful music listening (Croom, 2015; Skånland, 2011, 2012, 2013). This is the reason why, as I have indicated in subsection 4.2.2, the Uses and Gratifications theory is applicable in my investigation here.

In order to execute the second step of the Uses and Gratifications theory, I will explore the purposes that the use of music-listening technologies can have for most listeners. The most obvious purpose of using music-listening technologies is related to considering music as a technology of the self, which I have explained in section 1.3. The use of music-listening technologies can boost the possibility of music to be used for self-regulatory aims. This is illustrated in many empirical studies (e.g. Avdeeff, 2012; Bull, 2000; Greasley et al., 2013; Greasley & Lamont, 2009, 2011; Krause et al., 2015; Krause, North, & Hewitt, 2014; Krause & North, 2016; North, Hargreaves, & O'Neill, 2000; Papinczak, Dingle, Stoyanov, Hides, & Zelenko, 2015; Skånland, 2011, 2013; Theorell, 2014). Self-regulation is nowadays one of the most common goals of music listening (Greasley & Lamont, 2006, p. 965; Juslin & Västfjäll, 2008, p. 559). As I have explained previously, through the use of music-listening technologies people can easily become engaged music listeners (Krause et al., 2015).

Engaged music listeners can use music listening actively for self-regulation (Lyubomirsky et al., 2005, pp. 114–116). Kathleen Vohs and Roy Baumeister define self-regulation as “any efforts by the human self to alter any of its own inner states or responses” (Vohs & Baumeister, 2004, p. 2). One of the most important examples of self-regulation through music is emotion regulation. I will explain the impact of using music-listening technologies for emotion regulation and for other forms of self-regulation on subjective well-being in subsection 4.4.1.

A second important group of motives for the use of music-listening technologies is that these technologies enable music listeners to actively use music to influence the perception of time (Berger, 2014; Cassidy & MacDonald, 2010), the self (DeNora, 1999; Hargreaves & North, 1999) and of public spaces (Bull, 2005; Skånland, 2011, 2013). Firstly, music has reported to be able to change the perception of time. Music is embodied within a separate, quasi-independent concept of time. This concept of time is able to negate normal time (Berger, 2014)⁵⁵. Therefore, we can experience time as flying by or standing still during specific activities. Music listening by using technologies can strengthen this ability. So, a motive for using music-listening technologies is to change the perception of the duration of specific tasks, such as walking or travelling (Berger, 2014; Greasley & Lamont, 2009; Skånland, 2011, p. 24; Västfjäll et al., 2012, p. 419). Secondly, music listening by using technologies can also be used to influence the perception of the self. Music can contain a lot of symbolic and social information about a person (D. Boer et al., 2011). Therefore, using music-listening technologies is related to considering music as a narrative technology, which I have explained in section 1.3. It can help people to use music for expressing or validating their identity to others (Croom, 2015, pp. 54–55; DeNora & Ansdell, 2014, p. 8; DeNora, 1999; Greasley et al., 2013; Hargreaves & North, 1999, p. 77; North et al., 2000)⁵⁶. By using music-listening technologies listeners can actively express only specific features of their identity (DeNora, 1999, p. 51, 2000, p. 16). They can do so, for instance because women find men more attractive and sophisticated when they

⁵⁵ The brain processes timespans in two separate ways (Berger, 2014). In the first way the brain makes an explicit estimation about the duration of stimuli. The second way involves the implicit timespan between stimuli as well. The first way of processing time is relatively objective and can be checked by using a stopwatch. This second way of processing time involves both memory and attention and can therefore change the perception of time passing by (Berger, 2014). This second way of processing time is related to subjective self-awareness. As I have illustrated in subsection 4.1.1, music has reported to be able to activate the insula and the cingulate cortex, which are important brain regions for self-awareness (Berger, 2014; Menon & Levitin, 2005; Przybysz, 2013). Therefore, music listening can influence the perception of time.

⁵⁶ In contrast to these empirical findings, Zoe Papinczak et al. did not find empirical evidence that music is related to the expression of the self (Papinczak et al., 2015). This illustrates once more the caution that must be taken when using empirical findings, which I have explained in subsection 2.1.1.

express musical preferences for classical music and less attractive when they express musical preferences for heavy metal (Zillman & Bhatia, 1989). Particularly adolescents use music-listening technologies as a tool for identity validation, because mainly at that age people are trying to find out who they really are (Laiho, 2004; Morinville et al., 2013, p. 384; North et al., 2000, p. 269; Nuttall, 2009). This expression and validation of identity can be a motive for using music-listening technologies. Finally, music has reported to be able to change the perception of public spaces. Consider the example of Malcolm:

“... If I’m wearing it [iPod] on a crowded city street, the crush of people seems like an obstacle course and a fun challenge to wend my way through. Without it, I would be annoyed and frustrated at my lack of progress through the crowd, but with it, it’s almost as if I’m dancing. If I’m frustrated or angry, intense, driving music makes me feel like I have company in my mood. Pleasant weather seems that much more pleasant with music to accompany me. I am aware that, even when I’m not singing along, the way I walk and move and my facial expressions are affected by what music is playing.”

Malcolm in (Bull, 2005, p. 352)

Or, another example:

“If I’m listening to music, then a lot of chaos in town will be just fantastic, and there are only masses of fine people when you are listening to happy music”

Female informant in (Skånland, 2013, p. 7)

These examples illustrate that music-listening technologies can be used by music listeners to actively change their cognitive orientation towards public spaces (Bull, 2000, 2005; Simun, 2009; Skånland, 2011, 2012, 2013). In other words, a purpose for music listeners to use music-listening technologies is to actively change the way they perceive and interact with public spaces.

Another group of motives for using music-listening technologies is to regain control over the sonic environment (e.g. Bull, 2000, 2005; Simun, 2009; Skånland, 2011, 2013). Loudspeakers have changed many public spaces, such as shops or restaurants, into spaces with music playing. Due to this development many musical events in these public spaces have become imposed to music listeners. Such musical events are easily perceived as noise or can lead to negative emotional responses of music listeners. Noise is defined as *unwanted sounds* (Skånland, 2011, p. 20). Music is mainly perceived as noise when the music listener has nothing to do with the source

(Frith, 2002; Marti, 1997)⁵⁷. Examples of imposed musical events that can be perceived as noise are sounds from a festival while not being at that festival, bad street musicians, rehearsing musicians, bad music from the radio and loud music coming from private portable audio players of other people. These are examples where music transgresses the sonic environment of the individual that is involved with the source of the sounds (Frith, 2002; Lincoln, 2005; Marti, 1997, p. 16). Music listeners can use music-listening technologies, particularly mobile audio players, to regain control over their own private sonic environments. In other words, music-listening technologies enable music listeners to choose their degree of attendance in these imposed musical events and therewith to influence the emotional outcomes of those events (Bull, 2005; Frith, 2002; Krause et al., 2015, pp. 155–156; Laiho, 2004; North et al., 2004). So, music listeners can use music-listening technologies to close themselves off from such imposed musical events and manage interruptions that they may encounter (Bull, 2005; Haake, 2011; Skånland, 2011, 2013). For instance, putting on headphones can help a music listener to close him- or herself off from conversations or stressful surroundings. Such private sonic environments can also help the music listener to get a desired degree of focus or inspiration (DeNora & Ansdell, 2014; Haake, 2011; Ward, 2014), to relieve stress (DeNora, 1999; Gormanley, 2013; Greasley & Lamont, 2009) or they can be used in religious practices (Becker, 2001). So, another motive for music listeners to use music-listening technologies is to create their own private sonic environments or *soundscape*s (Skånland, 2011, pp. 20–21). Music-listening technologies have led to the development of imposed musical events in the first place, but it has also led to a possible solution (Frith, 2002, p. 36; Pinch & Bijsterveld, 2004; Sterne, 2003, p. 98).

The final group of motives for using music-listening technologies is related to social activities (e.g. DeNora & Ansdell, 2014; Hargreaves & North, 1999; Papinczak et al., 2015; Ruud, 1997). First of all, as I have already illustrated in subsection 4.1.1, music can increase the release of oxytocin and therewith improve the bonding between people. Music-listening technologies have been reported to improve this ability of music (e.g. D. Boer et al., 2011; DeNora & Ansdell, 2014; Hargreaves & North, 1999; Ruud, 1997). In addition, some music-listening technologies offer the music listener new possibilities for discovering music and sharing it with other people. These social activities can also be motives for using music-listening technologies (DeNora, 2000; Krause, North, & Heritage, 2014). For instance, Spotify can offer the music listener suggestions for new music. Motives for using Spotify can therefore be that these suggestions can introduce the music listener to new music, that it can make

⁵⁷ The distinction between noise and music imposes a serious issue for the definition of music that I have argued for in section 1.5. I will come back to this point in subsection 4.4.5.

the music listener more affirmative to new music and that it can make them more contact-seeking (Skånland, 2013). Using music-listening technologies can also help in generating a desired ambiance and in improving the social connection and cohesiveness among music listeners (Bull, 2000; Greasley & Lamont, 2009). I have explained in section 2.5 that the fit between the physical location and the music is important for emotional responses. For instance, a funeral march is only used during funerals and in other situations it can easily arouse anger-related emotions (Meyer, 2001, p. 348). Music-listening technologies can be used to match the situations to the connotations of musical works and therewith generate a desired ambiance or social connection. The final motive for using music-listening technologies is to prepare for social activities (DeNora & Ansdell, 2014; Skånland, 2013). Using such technologies can enable people to listen to self-selected music that can help them to reach the desired mood for activities such as parties.

In the next section, I will execute the third step of the Uses and Gratifications theory. This third step is to find the positive and negative consequences of the uses of music-listening technologies that I have presented in this section: self-regulation, influencing perception, regaining control and social activities. This will provide insights in the impact of music-listening technologies on the relation between emotions while listening to music and subjective well-being.

§ 4.4 Consequences of using music-listening technologies

In this section I will execute the third step of the Uses and Gratifications theory and explore the consequences for subjective well-being of the previously explained uses of music-listening technologies. I have already indicated several times that using such technologies can cause a new way in which emotions while listening to music can influence the subjective well-being of music listeners. Besides that the use of music-listening technologies can make the influences of emotions while listening to music on the affect components of subjective well-being more accessible and improve their endurance, which I have explained previously in this chapter, these technologies enable music listeners to actively and consciously use music to influence the life and domain satisfaction components of their subjective well-being. In this section I will elaborate specifically on this impact of music-listening technologies on the relation between emotions while listening to music and subjective well-being. This will provide me with an answer to my fifth subquestion: *What is the impact of music-listening technology on the relation between listening to music and the subjective well-being of music listeners?* I have argued in chapter 3 that such an impact on subjective well-being also impacts the well-being of music listeners. Therefore, this section will also answer the second of my

main research questions: what is the impact of music-listening technology on the ways that listening to music can influence the well-being of music listeners?

Before going into the consequences of the specific uses of music-listening technologies, I will explain how these technologies enable us to actively use music listening to influence the satisfaction components of subjective well-being. Sonja Lyubomirsky et al. concluded that the level of subjective well-being is determined by three factors: the circumstances of the individual, the happiness set point that I have explained in section 3.4 and intentional activities (Lyubomirsky et al., 2005)⁵⁸. Intentional activities determine the subjective well-being of an individual for a large part, because these activities are aimed at the satisfaction components of subjective well-being. As I have explained in section 3.4, the satisfaction components of subjective well-being are in particular resistant to the hedonic treadmill (Lyubomirsky et al., 2005). In section 4.3 I explained that because music-listening technologies mainly improve the dominance over the musical event, these technologies boost the possibility for people to become engaged music listeners. As a result of this, music listeners can actively use music for all kinds of purposes. In other words, music-listening technologies enable music listeners to use music as an intentional activity that can influence their subjective well-being. Using music listening as such an intentional activity involves a reflexive process (Lyubomirsky et al., 2005). Without reflecting on the consequences, music listeners can hardly use music to actively influence their subjective well-being. Music-listening technologies enable people to reflect on the outcomes of music more easily. So, due to the use of music-listening technologies music can result in attitudinal experiences. I have explained in subsection 3.2.1 that attitudinal experiences are experiences that require such a reflexive character. I have argued in subsection 3.3.1 that attitudinal experiences mainly contribute to the life and domain satisfaction components of subjective well-being. This explains why music-listening technologies enable people to actively and consciously use music as an intentional activity for influencing the satisfaction components of their subjective well-being, which I have indicated previously.

In the remainder of this section I will explain the consequences of using music-listening technologies for the satisfaction components of subjective well-being more in detail. I have explained in section 4.3 that there are several motives for using

⁵⁸ Lyubomirsky et al. distinguish three types of intentional activities that can contribute to subjective well-being: behavioral, cognitive and volitional activities (Lyubomirsky et al., 2005). Behavioral activities are intentional activities directed towards the behavior of an individual, such as exercising or being nice to others. Cognitive activities are activities that aim at reframing certain situations. For instance, cognitive reappraisal, which I will explain in subsection 4.4.1, is a cognitive activity. Finally, examples of volitional activities are striving for personal goals or devoting effort to certain causes. As I will explain throughout this section, by using music-listening technologies, individuals can use music as one of all these.

music-listening technologies. I have categorized them into four groups of motives: using music-listening technologies for self-regulation, for influencing perception, for regaining control or for social reasons. In the following subsections I will explore the positive and negative consequences for subjective well-being of each of these motives for using music-listening technologies. In addition, I will explain the relevant circumstances of the extended musical event under which these consequences occur. Finally, in subsection 4.4.5, I will address some remaining positive and negative consequences of using music-listening technologies for subjective well-being.

4.4.1 Consequences of self-regulation

In this subsection I will consider the consequences of using music-listening technologies for self-regulatory aims. I already explained in section 4.3 that self-regulation is nowadays one of the most common goals for listening to music. Most of the times when people use music-listening technologies to regulate themselves, it is aimed at their emotions. This is also supported by empirical findings (e.g. Chin & Rickard, 2013; DeNora & Ansdell, 2014; DeNora, 1999; Sloboda & O'Neill, 2001; Thoma et al., 2012). Emotion regulation is defined as: “a process by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions” (Gross, 1998, p. 275). This illustrates once more that this motive for using music-listening technologies is closely related to the way in which music can be considered as a technology of the self, which I have explained in section 1.3. Music-listening technologies that enable music listeners to regulate their emotions can present an *augmented reality* to them. In this augmented reality people can imagine, reflect and reset emotions and they can work out grief or sorrow (Batt-Rawden, 2010, p. 308; DeNora, 2000). Music listeners can also use music-listening technologies to intensify specific emotions in order to process them or vice versa, weaken emotions to suppress them (Juslin et al., 2011; Papinczak et al., 2015). In addition, music listeners can regulate their emotions by using music-listening technologies to reflect on their own states of mind (Skånland, 2013). This may lead to an awareness about their own emotions and to an enhanced emotional intelligence (Ruud, 1997). In other words, music-listening technologies provide a tool for music listeners to reach Catharsis. This ability of music-listening technologies is also empirically supported (e.g. Greasley & Lamont, 2006, p. 965; Lamont, 2011, p. 232; Sloboda & O'Neill, 2001, p. 427). As I have explained in subsection 2.3.1, Catharsis is Aristotle's idea of purification of the soul through affective experiences (Aristotle, 1903, pp. 36–39). Finally, using music-listening technologies can help music listeners to structurally experience the emotional responses to music and its influences on the affect components of subjective well-being, which I have explained in subsection 4.1.1 (Thoma et al., 2012, p. 228). I have

explained that it can be tentatively concluded that most emotional responses to music are positive. By using music-listening technologies to actively regulate these responses, music listeners may become more satisfied with their lives as a whole or with specific domains of their lives. I have explained in subsection 4.1.1 that music can have negative emotional responses as well. However, according to the tragedy paradox, there must be an additional reason to listen to such music. Music-listening technologies may increase the probability of the presence of such a reason. Because music-listening technologies help the music listener to reflect on the emotional outcomes of music, these technologies may enable them to twist these negative emotional responses and have positive attitudinal experiences in addition to these negative sensory experiences (Batt-Rawden, 2010; Krause et al., 2015, p. 158; Liljeström et al., 2012; Skånland, 2013). Therefore, I would argue that emotion regulation by using music-listening technologies can positively influence the satisfaction components of subjective well-being. This is also supported by empirical findings (e.g. DeNora, 2000; Gross & John, 2003; John & Gross, 2004; Morinville et al., 2013). In the remainder of this subsection I will explain how people regulate their emotions through music and the consequences of these strategies for subjective well-being more in detail.

There are two common strategies for emotion regulation: cognitive reappraisal and expressive suppression⁵⁹ (Gross & John, 2003; Gross, 1998; John & Gross, 2004). Cognitive reappraisal involves a cognitive transformation of a situation that can potentially arouse emotions in a way that changes the emotional impact of that situation. Cognitive reappraisal happens before an emotional response has occurred. For instance, cognitively reappraising a negative emotional response to a movie may lead the observer to experience the negative emotional response to that movie less intense the next time he or she watches it. Music listening, especially by using music-listening technologies, is a useful tool for cognitive reappraisal (Laiho, 2004, p. 58). Expressive suppression involves a modulated response in which the expressive behavior of an emotion is diminished. This happens after an emotional response has occurred. In the example of watching a movie with negative emotional content a second time, the strategy of expressive suppression would lead to the observer actually experiencing the same emotion, but he or she does not express this emotion in the same way as before. James Gross and Oliver John concluded empirically that people who use the strategy of cognitive reappraisal experience and

⁵⁹ Other examples of emotion regulation strategies are: searching distraction, changing circumstances or social regulation (Västfjäll et al., 2012, pp. 413–414). However, these additional emotion regulation strategies do not necessarily consider music itself as the tool for regulating emotions and they are therefore less relevant for my cause here.

express more positive emotions and less negative emotions, whereas people who use expressive suppression experience and express less positive emotions and experience more negative emotions (Gross & John, 2003). Therefore, cognitive reappraisal is a better emotion regulation strategy for improving subjective well-being. This conclusion is also supported by other empirical studies (e.g. Chin & Rickard, 2013; Haga, Kraft, & Corby, 2009; John & Gross, 2004). The structural use of music-listening technologies for emotion regulation, especially through cognitive reappraisal, can also influence people's moods (Chin & Rickard, 2014, p. 10). As I have explained in section 2.1, moods are less intense than emotions, but they have a longer duration. So, emotion regulation by using music-listening technologies can have a more long-term influence on subjective well-being. This also implies that mainly the satisfaction components of subjective well-being are influenced by using music-listening technologies for emotion regulation.

I have argued in chapter 2 that the extended musical event and the BRECVEMA mechanism determine whether or not affective responses to music are emotional and whether those are positive or negative. These dependencies are less important for the influences of music on the satisfaction components than for the influences on the affect components of subjective well-being, because of the fact that attitudinal experiences have a more reflexive character. Nevertheless, whether or not the consequences of using music-listening technologies for emotion regulation can contribute to the satisfaction components depends on the musical event and on the BRECVEMA mechanism⁶⁰ as well. Alexandra Lamont concluded that especially the subjective factors of the musical event are important for emotion regulation (Lamont, 2011; Sloboda & O'Neill, 2001, p. 427). Other studies have drawn similar conclusions (e.g. Krause, North, & Hewitt, 2014; Lachman & Weaver, 1998; Mitchell et al., 2008). In other words, especially the dominance factors over the musical event appear to be important for the influences of using music-listening technologies for emotion regulation on the satisfaction components of subjective well-being. For instance, Yuna Ferguson and Kennon Sheldon showed empirically that an intrinsic motivation to feel happier while listening to music increases the life satisfaction component of subjective well-being considerably (Ferguson & Sheldon, 2013). On the contrary, if the researchers would present feeling happier as a task to the music listener, it would backfire and decrease his or her life satisfaction (Ferguson & Sheldon, 2013, p. 26; Morinville et al., 2013). So, the motivation to use music-listening technologies for

⁶⁰ Some BRECVEMA mechanisms are more receptive for influences of the music listener than others. For instance, visual imagery is a mechanism that can be easily influenced by the individual, whereas brain stem reflexes cannot (Juslin, 2013, pp. 244–245). Especially the BRECVEMA mechanisms that are receptive for individual influences are used for emotion regulation (Juslin, 2013, pp. 244–245).

emotion regulation must be intrinsic. For instance, only when music listeners are intrinsically motivated to regulate their emotions with music, they can positively twist the negative emotional responses that I have explained in subsection 4.1.1. Another example of important dominance factors over the musical event is musical engagement. Only if music listeners are engaged while using music-listening technologies for emotion regulation, they are able to apply the cognitive reappraisal strategy (Chin & Rickard, 2013, p. 4; Greasley & Lamont, 2006, 2009). The reason for this is that emotional responses to music in general depend on the level of engagement, which I have already explained in subsection 2.5.1. More engaged people experience emotional responses to music explicitly, whereas the less engaged music listeners experience them more implicitly (Greasley & Lamont, 2006, pp. 965–966). I have explained that the main activity while listening to music determines the musical engagement to a large extent and therefore that is an important dominance factor for emotion regulation as well. This is also supported empirically (Chin & Rickard, 2013; Croom, 2015; Papinczak et al., 2015, p. 1120). Music listeners regulate emotions while using music-listening technologies most often when they are alone and when their main activity is listening to music for pleasurable ends (Juslin et al., 2011, pp. 186–192). Finally and probably most importantly, the music should be self-selected by the music listeners in order to be used for emotion regulation. Many empirical studies support this claim (e.g. Greasley et al., 2013, p. 415; Juslin & Isaksson, 2014, p. 180; Lamont, 2011, p. 232; Papinczak et al., 2015, pp. 1121–1122; Västfjäll et al., 2012, pp. 417–418). Only if the music listener can listen to self-selected music, he or she is able to regulate his or her emotions most efficient⁶¹. So, using music-listening technologies for emotion regulation depends highly on the dominance factors of the musical event. As I have explained in subsection 4.2.1, music-listening technologies increase the dominance over the musical event and these technologies therefore can increase the efficiency of emotion regulation through listening to music. This can have positive influences on the satisfactions components of subjective well-being.

Next to the dominance factors of the musical event, some individual factors are important for emotion regulation as well. For instance, as I have demonstrated in section 3.4, people scoring high on the personality trait extraversion are more likely to have an increased life satisfaction, especially in comparison with people who score high on the personality trait neuroticism (Costa & McCrae, 1980, p. 668). So, people who use music-listening technologies for emotion regulation and that score high on

⁶¹ Although emotional responses to music can sometimes surprisingly overwhelm the music listener and help them to regulate their emotions, in general the music listener knows best what musical works he or she can use for emotion regulation (Greasley et al., 2013; Krause & North, 2014, pp. 5–9; Ziv, 2015, p. 4). I will return to this element of surprise in the discussion section of this thesis.

the trait extraversion, are more likely to have an increased subjective well-being. Also, girls have reported to use music-listening technologies for emotion regulation more often than boys (Sloboda & O'Neill, 2001, p. 424). In addition, personal characteristics also determine which emotion regulation strategy fits the individual best and which music is preferred for emotion regulation (Lyubomirsky et al., 2005, p. 124). So, individual factors determine to a smaller extent whether or not the use of music-listening technologies for emotion regulation can positively influence the life and domain satisfaction components of subjective well-being.

A possible negative consequence for subjective well-being of using music-listening technologies for emotion regulation is caused by ineffective emotion regulation. This consequence is related to the goals and admirations that are important for subjective well-being, as I have explained in section 3.4. Setting high goals regarding emotion regulation while using music-listening technologies can lead to feelings of stress and depression (Diener et al., 1999; Larsen & Prizmic, 2004). Especially when a music listener fails to reach those goals, this use of music-listening technologies can negatively impact the affect components of subjective well-being. There are several ways in which music-listening technologies can lead to ineffective emotion regulation. For instance, as I have already indicated in section 4.3, Spotify can recommend new music to people. These recommendations may undermine self-selection and lead to ineffective emotion regulation. So, recommendations can therefore negatively influence subjective well-being. Another example is the radio. The radio can also undermine the ability of music listeners to self-select the music they listen to for emotion regulation and can therefore negatively influence subjective well-being.

4.4.2 Consequences of changing perception

In this subsection I will explore the consequences for subjective well-being of using music-listening technologies to change the perception of time, the self and of public spaces. First of all, using music-listening technologies to change the perception of time can elongate or compress the duration of emotions while listening to music (Berger, 2014; Cassidy & MacDonald, 2010). This ability of music-listening technologies can be used by music listeners to improve or reduce the endurance of both sensory and attitudinal emotional experiences and therefore strengthen and weaken the influences of music on both the affect and satisfaction components of subjective well-being. Secondly, as I have explained in section 4.3, using music-listening technologies to influence the perception of the self can enable music listeners to express or validate their identity. Similar musical preferences may imply a similar identity. This may, according to the similarity-attraction principle, lead to more social

bonds between individuals with similar musical preferences (D. Boer et al., 2011). So, using music-listening technologies to change the perception of the self can lead to social inclusion. On the contrary, using music-listening technologies to express or validate identity can also lead to social exclusion. Social inclusion is positively correlated and social exclusion is negatively correlated with the life and domain satisfaction components of subjective well-being, in particular with the domain satisfaction about relationships (DeNora, 1999; Nuttall, 2009; Sortheix & Lönnqvist, 2014, p. 37). Social exclusion is also a consequence of using music-listening technologies for social reasons. I will therefore return to this point in subsection 4.4.4. Finally, using music-listening technologies to change the perception of public spaces can enable music listeners to experience more positive emotions while being in such public spaces (Bull, 2005; Simun, 2009; Skånland, 2013). This can clearly have a positive impact on subjective well-being. These influences on subjective well-being of using music-listening technologies to change the perception of time, the self and of public spaces are strongly related to, if not solely constituted by, the musical preferences of music listeners. This is supported by many empirical studies (e.g. Croom, 2015; DeNora & Ansdell, 2014; DeNora, 1999; Greasley et al., 2013; Hargreaves & North, 1999; North et al., 2000).

A possible negative impact of using music-listening technologies to change perception besides social exclusion is that some technologies, such as Spotify and Youtube's suggested videos, automatically objectify musical preferences of a music listener based on their listening history (Krause, North, & Heritage, 2014). Based on these objectified musical preferences, such technologies can provide music listeners with suggestions for new music, as I have explained in section 4.3. However, this process of objectifying musical preferences is far from perfect (Krause, North, & Heritage, 2014). So, if Spotify or other music-listening technologies suggest new music to a music listener that he or she actually disgusts, he or she may start doubting his or her own musical identity or even his or her identity in general (Krause, North, & Heritage, 2014). This can undermine the positive impact on subjective well-being of using such music-listening technologies to change the perception the self. Moreover, it can have a negative impact on the life satisfaction component of subjective well-being (Krause, North, & Heritage, 2014).

4.4.3 Consequences of regaining control

In this subsection I will consider the consequences for subjective well-being of using music-listening technologies to regain control in imposed musical events. In section 4.3 I have explained that music-listening technologies can be used to create private soundscapes. As I have explained there as well, a motivation of music listeners for this

application of music-listening technologies can be to close themselves off from all kinds of external sounds or to get a desired degree of focus or inspiration. In other words, music-listening technologies can help music listeners to deal with interruptions. These ways of using music-listening technologies to create private soundscapes can have similar consequences for the affect components of subjective well-being as emotional responses to music in general can have, which I have explained in subsection 4.1.1. For instance, external sounds that are considered as noise by music listeners can negatively impact the affect components of subjective well-being because they can increase feelings of stress (Marti, 1997; Pinch & Bijsterveld, 2004). Using music-listening technologies to create private soundscapes can prevent this from happening and therefore have a positive impact on the affect components of subjective well-being. In addition, these private soundscapes can help music listeners to regulate their emotions, which I have explained in subsection 4.4.1, more effectively. Private soundscapes can in particular help music listeners to cope with negative experiences (Batt-Rawden, 2010; Goethem & Sloboda, 2011). I have explained in section 3.4 that coping is a process in which an individual puts effort in reappraising negative experiences. The emotion regulation strategy cognitive reappraisal, which I have explained in subsection 4.4.1, is an example of a coping process (John & Gross, 2004). So, using music-listening technologies to create private soundscapes can also have similar consequences for the satisfaction components of subjective well-being as using such technologies for emotion regulation. Using music-listening technologies to create private soundscapes does also increase the likeliness to have positive attitudinal emotional experiences as a result of emotion regulation in addition to possible negative sensory emotional experiences (Skånland, 2013). This can further boost the positive impact of using music-listening technologies on subjective well-being. Finally, Haake empirically concluded that using music-listening technologies to create private soundscapes can arouse feelings of privacy in music listeners and therefore contribute to the positive affect component of their subjective well-being (Haake, 2011). So, the use of music-listening technologies to create private soundscapes can have a major positive impact on the subjective well-being of music listeners. The single most important factor of the extended musical event for these consequences to occur is the dominance over the musical event⁶². Only if a music listener has a lot of dominance over the musical event, he or she can create these

⁶² One may argue that the musical factors are also important for using music-listening technologies, for instance, to focus. As I already explained in section 2.5, people often use classical music to focus. However, I would argue that this is a cultural connotation of classical music rather than a causal relation. There are empirical counterexamples that illustrate that people get distracted by classical music (DeNora, 1999, pp. 42–44; Greasley & Lamont, 2011, pp. 54–55; Haake, 2011, p. 120). The degree of dominance over the musical event is much more important to reach a desired degree of focus.

private soundscapes. In order to find the amount of dominance that is necessary to create private soundscapes, the extended musical event must be operationalized. I will return to this point in the recommendations section of this thesis.

A possible negative consequence for subjective well-being is that the excessive use of music-listening technologies to create private soundscapes can lead to decreased social interaction with others and therefore result in social exclusion. If you would continuously close yourself off from everything that is happening around you by creating private soundscapes, the psychological distance to other people is increased and therefore social interaction is reduced. I will return to the point of social exclusion in subsection 4.4.4. The excessive use of music-listening technologies can also generate a negative outlook (Brabazon, 2008). This is what Antje Cockrill et al. call the *iPod bubble* (Cockrill, Sullivan, & Norbury, 2011, p. 164). This iPod bubble can even result in music listeners that become addicted to music listening. Cockrill et al. empirically found that some heavy users of music-listening technologies may pass the point of healthy enthusiasm about music listening and show symptoms of addiction (Cockrill et al., 2011). I have explained in subsection 4.2.1 that music-listening technologies enable people to consume music practically anywhere at any time. For some music listeners this may result in such an excessive use that their daily lives lose significance. For instance, if an individual continuously uses music-listening technologies to influence his or her perception of public spaces, these spaces can lose significance (Bull, 2005, pp. 353–354). This excessive use can also lead to isolation which often results in complaints of friends and family members (Bull, 2005, pp. 353–354; Cockrill et al., 2011). Therefore, the excessive use of music-listening technologies can lead to social exclusion. I will explain in subsection 4.4.4 an additional way of how using music-listening technologies can lead to social exclusion and how it negatively impacts subjective well-being. Clearly, the excessive use of music-listening technologies can negatively influence the lives and subjective well-being of the addicted music listeners (Cockrill et al., 2011). However, Cockrill concludes that for most individuals music listening is a positive and life enhancing experience (Cockrill et al., 2011; Skånland, 2013).

4.4.4 Consequences of social reasons

In this subsection I will explore the consequences for subjective well-being of using music-listening technologies for social reasons. As I have suggested in section 4.3, music can play an important role in group formation because of several reasons. Music can be used to share and discover music, it can create the right ambiance among music listeners and it can help people to prepare for social activities. In addition, music-listening technologies can boost group formation by enabling music

listeners to comfort themselves (Bull, 2000) and to communicate emotions with others (DeNora, 2000). For these reasons, DeNora et al. even conclude that music is active in social life (DeNora, 2000). The most important factor of the extended musical event for these consequences to occur is the dominance factor musical preference. As I have explained in section 4.3, musical preferences can entail symbolic and social information about individuals and enable music to be used to create bonds between people (D. Boer et al., 2011). The musical preference of a music listener can affirm or disprove to which social group he or she belongs. In other words, musical preferences can lead to social inclusion and social exclusion, as I have illustrated in subsections 4.4.2 and 4.4.3 as well. Another important factor of the musical event is the cultural background of the music listener (Bryson, 1996; Ziv, 2015, p. 12). For instance, in some cultures it may be more common to influence social interaction with music than it is in other cultures (Bryson, 1996).

I have explained throughout section 4.4 that music and using music-listening technologies can lead to social inclusion and social exclusion, which both influence subjective well-being and in particular the domain satisfaction about relationships. This is also empirically supported (Bryson, 1996; Greasley et al., 2013)⁶³. In this paragraph I will focus on social exclusion. Besides that private soundscapes can lead to social exclusion, the symbolic and social information about the identity of a music listener can be used to construct symbolic boundaries between groups of individuals (Bryson, 1996). Most of these symbolic boundaries are stereotypical images of people with a specific musical preference. These boundaries can lead to the rejection of other musical genres and exclude the people who prefer those genres of music. For instance, people who listen to reggae are stereotyped into people that always smoke weed. Some respondents in the study of Greasley literally said that they did not want to be associated with those people (Greasley et al., 2013). In general, people who prefer musical genres such as gospel, country, rap and heavy metal are most likely to be rejected by people with other preferences (Bryson, 1996, p. 884). Clearly, these social boundaries can lead to social exclusion and therefore negatively impact the satisfaction components of subjective well-being, in particular the satisfaction about relationships⁶⁴. Using music-listening technologies such as Spotify and Facebook listening applications can impact the influences of social inclusion and particularly of social exclusion on subjective well-being. These technologies made the musical

⁶³ Boer et al. did not find any empirical support for the claim that music may lead social exclusion (D. Boer et al., 2011, pp. 1162–1163). This illustrates once more the caution that must be taken when using empirical findings.

⁶⁴ Although not the central concern here, Bryson concluded that education could be the remedy of social exclusion through musical preferences. Educated people tend to be more tolerant in general and therefore break through stereotypes more easily (Bryson, 1996).

preferences of individuals more transparent (Avdeeff, 2012; Krause, North, & Heritage, 2014). Knowledge about the musical preferences of other people can mainly boost social exclusion. This is also empirically supported (e.g. D. Boer et al., 2011; Bryson, 1996; Sørtheix & Lönnqvist, 2014). For instance, if I would learn that a good friend of mine has a strong preference for music of Justin Bieber; it can easily have a negative impact on my relationship with that friend. Many music-listening technologies aim at increasing the transparency and at objectifying of musical preferences. Clearly, this can boost social inclusion and social exclusion and therefore strengthen the impact of music and music-listening technologies on the subjective well-being of music listeners and in particular on the domain satisfaction about relationships.

4.4.5 Additional consequences of using music-listening technologies

The use music-listening technologies in general can change the circumstances of the musical event in ways that can have additional consequences for the relation between listening to music and subjective well-being than those that I have explained in the previous subsections. These consequences are less related to the emotions of music listeners. In this subsection I will briefly explain the relevant additional consequences of the use of music-listening technologies for the subjective well-being of music listeners.

First of all, the use of very specific music-listening technologies can have a positive impact on subjective well-being through the image of these technological devices. For instance, Cockrill empirically found a correlation between the possession of an iPod and the life satisfaction component of subjective well-being (Cockrill, 2012). Having an iPod is correlated with the image of being cool, more than having another type of mp3-player is (Bull, 2005; Cockrill, 2012). This example illustrates that purely the possession of a specific music-listening technology can have an impact on the subjective well-being of an individual. This correlation depends mainly on the individual's sensitivity for possessions (Cockrill, 2012), which can be considered as an individual factor of the musical event.

Secondly, as I have already indicated in section 1.3, music listening can influence the health of an individual. The use of music-listening technologies therefore enables music listeners to actively influence their health⁶⁵. This is also supported by

⁶⁵ In addition to music listening, making music and especially musical improvisation are tools for improving health. Many studies suggest that making music can be used for the amelioration of neurological damage or for the communication of complex or suppressed emotions of children with autistic disorders (e.g. Bunt & Pavlicevic, 2001; DeNora & Ansdell, 2014; MacDonald & Wilson, 2014; Magee, 2011). Mainly through making music, a therapist can get access to the unconscious emotions of clients. This can improve the quality of the therapy and may therefore contribute to the health of clients. However, this is not the central concern here.

empirical findings (e.g. DeNora & Ansdell, 2014; DeNora, 1999; Koelsch, 2009). Influencing health by using music-listening technologies does not necessarily lead to an improved subjective well-being. As I have already explained in subsection 3.2.1, Diener et al. claimed that not the health of an individual per se, but the subjective evaluation of his or her health can result in life satisfaction and therefore contribute to subjective well-being (Diener et al., 1999, p. 281). Kari Batt-Rawden has drawn the same conclusion (Batt-Rawden, 2010, pp. 302–303). By using music-listening technologies music listeners can influence their subjective evaluation of health by coping with symptoms of disorders and diseases, such as depression, anxiety and stress. Many empirical studies support this claim (e.g. Batt-Rawden, 2010; Chin & Rickard, 2014; Haake, 2011; MacDonald & Wilson, 2014; MacDonald, 2000; Magee, 2011; Menon & Levitin, 2005). In addition, using music-listening technologies for emotion regulation can also contribute to the subjective evaluation of health, because emotions are often correlated to the evaluation of health (Kubzansky, 2009). Just as is the case with emotion regulation and coping with negative experiences in general, these possible influences on subjective well-being highly depend on the dominance factors the ability to self-select music and the motives for listening. It is crucial that music listeners can listen to self-selected music to influence the subjective evaluation of their health (Batt-Rawden, 2010; Västfjäll et al., 2012). In addition, only if a music listener is intrinsically motivated to listen to music in order to cope with the symptoms of disorders or diseases, music can actually do so and improve the subjective evaluation of health (Thoma et al., 2012). Using music-listening technologies can also have some possible negative consequences for the health of the music listener that can directly influence his or her subjective well-being. For instance, loud music can cause hearing loss and in traffic situations using music-listening technologies can cause traffic danger (Neider, McCarley, Crowell, Kaczmariski, & Kramer, 2010). These consequences for the health of music listeners may influence their subjective well-being directly if they occur.

Using music-listening technologies in general can also have some negative consequences for the relation between listening to music and subjective well-being. For instance, due to the decrease in size of digital music files in order to increase the amount of music that can be brought along on a mobile audio player, the quality of those music files has been decreased. This loss of quality results in a loss of authenticity of those specific musical works. Especially for expert listeners this loss of authenticity may cause a degradation of emotional responses to those musical works

(Juslin, 2013)⁶⁶. This can result in a diminished effect of emotions while listening to music on the subjective well-being of music listeners. There are three additional possible negative consequences of using music-listening technologies in general that I will explain in this subsection: having too many choices, the creation of music fads and a blurred definition of music.

First of all, the exponential growth in the possibilities for listening to music due to the development of music-listening technologies can lead to a decrease in subjective well-being. There are several ways in which it can do so. First of all, according to the paradox of choice, the increase in options will lead to poorer choices and degraded satisfaction about these choices (Markus & Schwartz, 2010; Oulasvirta, Hukkinen, & Schwartz, 2009; Schwartz, 2004). This is sometimes called *Overchoice* (Markus & Schwartz, 2010). So, the increase in possibilities for listening to music may result in a diminished satisfaction about our choices of how we listen to music. This diminished satisfaction can result in a decreased subjective well-being (Haybron, 2011; Markus & Schwartz, 2010). For instance, if you would be appointed to make a playlist for a party, there are almost endless possibilities for its exact composition. It is likely that you will not be fully satisfied with the final composition, because there are always possibilities to make it even better. This might lead to a decrease in the satisfaction components of your subjective well-being. Secondly, as I have explained in subsection 4.2.1, the use of music-listening technologies enables people to listen to music nearly at any time and at nearly every location. This can result in increased feelings of stress, because there are many situations in which it is inappropriate for people to listen to music. For instance, in conversations with other people or in official meetings it is inappropriate to listen to music. Haake empirically concluded that this possible conflict between injunctive norms in certain situations and the musical desires of an individual can cause a tension. This tension can result in feelings of stress and therefore negatively impact subjective well-being (Haake, 2011). Finally, the limited access to the endless possibilities for listening to music can lead to a negative impact on subjective well-being. Spotify is a good example of this. A major drawback of Spotify is that some well-known musicians are not available. So, the use Spotify as a music-listening technology systematically excludes listening to the music of those musicians, whereas using other music-listening technologies would not. This limited access to the endless possibilities for listening to music also occurs when a music

⁶⁶ As I have argued in section 2.4, authenticity is mainly important for the BRECVEMA mechanism of aesthetic judgements. I have explained in subsection 4.4.1 that some BRECVEMA mechanisms are more receptive to individual influences than others. This example illustrates that aesthetic judgements is a mechanism that highly depends on such individual influences. In this case, the preferred degree of authenticity of the music listener is important for the emotional outcome of the musical work.

listener has lost his or her portable audio player or when he or she is not able to buy the desired music-listening technology (Cockrill, 2012, p. 413). The people in these examples know that under different circumstances they would have a better access to the endless possibilities for listening to music. This limited access to the possibilities for listening to music that is caused by music-listening technologies can increase the feelings of stress and therefore have a negative impact on subjective well-being (Cockrill, 2012).

The second possible negative impact of using music-listening technologies in general is related to the creation of musical fads. Musical preferences are in constant flux. We all remember, for instance, the music we loved when we were in primary school or in high school. It is very likely that we do not listen to that music anymore or even disgust it nowadays. These musical fads in our lives are precisely the reason that music can work as an artefactual memory, which I have explained in section 1.3⁶⁷ (DeNora, 1999; Douglas, 1999, p. 83). As I have explained in section 4.3, music-listening technologies have generated countless ways for music listeners to share and discover music (Avdeeff, 2012; Greasley et al., 2013; Greasley & Lamont, 2006, 2015). This enables music listeners to encounter many new musical genres in a short period of time. Musical preferences are therefore even more in flux nowadays. In other words, due to music-listening technologies, people shift from one musical preference to another very easily. In addition, due to music-listening technologies, people are not limited to one preferred genre anymore; rather they engage in a variety of genres. This results in musical preferences that become eclectic (Avdeeff, 2012; Greasley et al., 2013; Jones, 2000). Avdeeff calls this the *democratization of taste* (Avdeeff, 2012). These eclectic musical preferences result in an increase of the number of musical fads (Avdeeff, 2012; MacDonald, 2000). I have explained previously in this chapter that the influences of music listening on subjective well-being do not solely depend on the musical factors of the extended musical event and listening to fads in itself does therefore not negatively impact subjective well-being. However, these musical fads are exactly the commodity-like musical works that Adorno warned for in 1938 (Adorno, 1938), which I have introduced in the introduction to this thesis. If using music-listening technologies results in people going along with musical fads more quickly, those fads can be used as marketing tools (Adorno, 1938; Frith, 2002). According to Adorno, this results in music being a collective commodity instead of an individual tool for self-regulation. This can lead to regressive listening (Adorno, 1938). In other words, the use of music-listening technologies can result in the creation of musical

⁶⁷ This artefactual memory is the reason that music listeners can use music to travel through their own past and feel nostalgic, which I have illustrated in subsection 4.1.1 (Bull, 2005, p. 349).

fads and therefore in diminished emotional responses to music (Adorno, 1938). So, the commodification of music into musical fads by music-listening technologies may have an indirect negative impact on the subjective well-being of music listeners.

The final possible negative impact of using music-listening technologies in general is not related to the emotions of music listeners. This possible impact is closely related to the eclecticism of taste that I have explained previously in this subsection. The use of music-listening technologies can also lead to an eclecticism of music itself (Avdeeff, 2012; Greasley & Lamont, 2006; Hargreaves & North, 1999). In other words, due to the use of music-listening technologies music itself can become democratized (Hargreaves & North, 1999). For instance, music videos on Youtube are often tagged by music listeners rather than by musicians themselves as a specific genre. This way of tagging is very subjective and therefore the boundaries between musical genres can become blurred. Another example occurs when Spotify makes recommendations for new music, which I have illustrated several times throughout this chapter. These recommendations can further blur the boundaries between musical genres (Avdeeff, 2012; Greasley & Lamont, 2006). In general, people that are less engaged with music have more difficulties with defining boundaries between musical genres. They tend to prefer a very wide spectrum of musical genres (Avdeeff, 2012; Greasley & Lamont, 2006). As a result of this, musical genres become less salient. These blurred boundaries between musical genres lead to a shift in the allegiance of music listeners from a specific genre towards specific songs (Avdeeff, 2012, p. 268).

The use of music-listening technologies has not only complicated the boundaries between musical genres, it also complicated the definition of music that I have argued for in section 1.5:

“Music is (1) any event intentionally produced or organized (2) to be heard, and (3) *either* (a) to have some basic musical feature, such as pitch or rhythm, *or* (b) to be listened to for such features.”

(Kania, 2011, p. 12)

The distinction between noise and music that I have explained in section 4.3 has become blurred because of the use of music-listening technologies. As I have explained there, technologies such as loudspeakers can produce loud music that can easily be considered as noise by music listeners that have nothing to do with the source (Frith, 2002; Marti, 1997). In other words, there are sounds that meet the requirements of Kania’s definition of being intentionally produced or organized to be heard and of having some basic musical feature or of being listened to for such features, but that are still considered as noise rather than music. I have illustrated in

chapter 1 that finding a suitable definition of music was notoriously difficult. This blurred distinction between music and noise makes the definitional challenge of music even bigger. I will illustrate this blurred distinction between noise and music with two examples. Firstly, it is likely that a music listener would consider the loud music of the portable audio player of someone else as noise rather than as music. Secondly, when a music listener tries to concentrate, the sounds of a belfry are likely to be considered as noise rather than as music. Both of these examples are about sounds that meet the requirements of Kania's definition of music, but that are still considered as noise. These examples illustrate that due to the use of music-listening technologies the definition of music itself has become much more subjective than that I have argued for in section 1.5. So, whether or not sounds are considered as music does not only depend on the musical features and the motives of music listeners to listen to the sounds, it also depends on the situation of the music listener and his or her degree of dominance over that situation (Becker, 2001, p. 136; Frith, 2002, pp. 44–45; Skånland, 2011, p. 20). Clearly, the dominance factors over the musical event do not just codetermine the nature and valence of affective responses to music; they also codetermine whether or not sounds are considered as music in the first place. If sounds are not considered as music, it is likely that they will arouse other affective responses of music listeners and therefore have a different impact on subjective well-being. For instance, the sounds of the belfry while trying to concentrate and the sounds of the portable audio player of someone else are likely to arouse irritation rather than positive affective responses. These noises can therefore negatively impact the subjective well-being of listeners. So, future music-listening technologies for improving the well-being of music listeners should be able to recognize whether the produced sounds are considered as noise or as music in specific situations. Such technologies can only do so if they recognize the musical event and in particular the dominance factors. I will return to this point in the recommendations section of this thesis.

To conclude, in this chapter I have considered the possible influences of emotions while listening to music on the subjective well-being of music listeners. I have explained in section 4.1 that listening to music activates brain regions that are mostly correlated with positive emotions. In other words, most of the possible emotional responses to music are positive, both the automatic responses and those with an underlying cognitive process. These responses can be considered as positive sensory experiences that may contribute to the positive affect component of subjective well-being while reducing the negative affect component. This provided an answer to my

fourth subquestion: *How can listening to music influence the subjective well-being of music listeners?*

I have explained in subsection 4.2.1 that music-listening technologies mainly increase the accessibility and mobility of music listening. This also increases the accessibility and mobility of the influences of music listening on the affect components of subjective well-being. In addition, music-listening technologies change the circumstances of the musical event so much, in particular the dominance factors, that nowadays music can be actively and consciously used by music listeners to influence the life and domain satisfaction components of subjective well-being as well. In order to analyse this technological impact on the relation between emotions while listening to music and subjective well-being more structurally, I have used the Uses and Gratifications theory. Music-listening technologies are used by music listeners to regulate their emotions, to change the perception of time, the self and of public spaces, to regain control in imposed musical events and for social reasons. These uses of music-listening technologies enable music listeners to have mostly positive attitudinal emotional experiences while listening to music. These attitudinal experiences contribute to the life and domain satisfaction components of their subjective well-being. This provided an answer to my fifth subquestion: *What is the impact of music-listening technology on the relation between listening to music and the subjective well-being of music listeners?* However, the use of music-listening technologies can also have some possible negative consequences for the relation between emotions while listening to music and subjective well-being. In other words, the increase in the amount of dominance over a musical event by using music-listening technologies does not unlimitedly lead to an increase in subjective well-being. Apparently there is a point of optimal dominance and if music listeners exceed that point, these possible negative consequences for their subjective well-being may occur. The most important possible negative consequences of the excessive use of music-listening technologies are that it may lead to ineffective emotion regulation, social exclusion, an increased chance of addiction to music listening, a higher chance of Overchoice, it can create musical fads and it can blur the definition of music. This point of optimal differs per musical event. In other words, every musical event has an optimal degree of dominance over that musical event that music listeners should have in order to improve their subjective well-being the most.

Conclusion

The aim of this thesis was to present a holistic and robust theoretical exploration about the influences of emotions while listening to music on the well-being of music listeners, about the circumstances under which these influences occur and about the impact of music-listening technologies on these influences. With this theoretical exploration I have found an answer to my main research questions: *how can listening to music influence the well-being of music listeners and what is the impact of music-listening technology on the ways that listening to music may do so?* In chapter 2 I have refuted the general critiques on the idea that the affective responses to music that we so commonly experience can be genuine and full-fledged emotional responses. Only under the right circumstances of the musical event and if they are caused through one of the BRECVEMA mechanisms or through the cognitive appraisal of the emotions that a musical work is expressive of, affective responses to music can be genuine and full-fledged emotions. In subsection 2.5.1 I have proposed to set apart the dominance factors over the musical event, because their nature differs a lot from the other factors of the musical event. The dominance factors are those factors that can be influenced by the music listener and determine the extent to which a music listener is or feels in control over a musical event. These factors are the most important for determining whether or not affective responses to music are emotional. The dominance factors are also influenced the most by using music-listening technologies. This became important in chapter 4. I have explained in chapter 3 that most theories of well-being recognize an important role for both sensory and attitudinal experiences. Therefore, I have shifted my focus towards subjective well-being. Subjective well-being is the long-term psychological state of mind that consists of positive affect, negative affect, life satisfaction and domain satisfactions. I have explained in section 4.1 that the neurological impact of music listening is mostly correlated with positive emotions. Therefore, emotional responses to music can be considered as pleasant sensory experiences. These experiences can contribute to well-being through their positive influence on the positive affect component of subjective well-being and through their negative influence on the negative affect component. Important here is that these influences highly depend on the extended musical event. This provides an answer to the first of my main research questions: *how can listening to music influence the well-being of music listeners?* In addition, I have used the sociological Uses and Gratifications theory to explore the impact of music-listening technologies on these influences. I have explained in sections 4.2 that the use of music-listening technologies influences the circumstances of the musical event and in particular the dominance factors so much that it enables music listeners to actively and consciously use music listening. In

section 4.3 I have explained that music listeners can actively use music as a tool for self-regulation, for changing their perception of time, the self and of public spaces, for regaining control in imposed musical events and for social reasons. In section 4.4 I have explained that these different uses of music-listening technologies can have additional consequences for the subjective well-being of music listeners. The most important positive consequence of using music-listening technologies is that it can lead to positive attitudinal emotional experiences. These attitudinal experiences can contribute to the life and domain satisfaction components of subjective well-being. Therefore, the use of music-listening technologies can contribute to the well-being of music listeners. However, the increase in the amount of dominance over a musical event by using music-listening technologies does not unlimitedly lead to an increase in well-being. If the use of music-listening technologies exceeds a certain point of dominance over a musical event, some negative consequence for the well-being of music listeners may occur. The most important possible negative consequences of this excessive use of music-listening technologies are: ineffective emotion regulation, social exclusion, an increased chance of addiction to music listening, a higher chance of Overchoice and the creation of musical fads. Moreover, the use of music-listening technologies can blur the definition of music. Clearly, in every musical event there is an optimal degree of dominance over that musical event that music listeners should have to improve their well-being the most. This provides an answer to the second of my research questions: *what is the impact of music-listening technology on the ways that listening to music can influence the well-being of music listeners?*

What we have learned from the holistic theoretical exploration throughout this thesis is that especially the dominance factors of the musical event are the linking pin for the influences of music listening on the well-being of music listeners. The dominance factors determine whether or not affective responses to music are emotional and whether these responses are positive or negative. In other words, the motives for listening, the ability to self-select music, musical preferences and musical engagement determine the influence of music listening on the well-being of music listeners. Even more fundamental, these factors determine to a large extent whether sounds are considered as music or as noise. Finally, the impact of music-listening technology on the influences of music listening on well-being is also directed towards these dominance factors over the musical event. Music listeners can influence their degree of dominance over a musical event by using music-listening technologies. In general, the greater the actual or felt dominance of a music listener over a musical event, the greater the chance is of positive influences of music listening on his or her well-being. However, in every musical event there is an optimal degree of dominance over that musical event that music listeners can have to improve their well-being the

most. Clearly, these dominance factors form the true linking pin for the influences of music listening on well-being and for the impact of music-listening technologies on these influences. Therefore, these factors are an important extension of the musical event that other studies about the influences of music and music-listening technologies should recognize. In the recommendations section of this thesis, I will give specific recommendations for future philosophical, psychological and engineering studies on how these dominance factors should be incorporated in their current research agenda about music and music-listening technologies. This can bridge the gap between philosophical, psychological and STS studies about the influences of music because it bundles the focus points of these three scientific fields into a clear goal: understanding and operationalizing the dominance factors over the musical event. Subsequently, these findings can inform engineers about how future music-listening technologies should be designed specifically for improving the well-being of music listeners, because, as I have illustrated throughout this thesis, an understanding of these factors is necessary to do so.

Discussion

In this section I will consider some questions about the theoretical exploration in this thesis that still remain. Some of these questions imply important inquiries for subsequent studies that should be conducted to review my conclusions. Afterwards, in the recommendations section, I will present three specific suggestions for future studies about the dominance factors that may result in deploying music listening and music-listening technologies in ways that those can increase the well-being of music listeners.

Many of my conclusions throughout this thesis are based on empirical findings. I have already discussed the problems of using such findings extensively in subsection 2.1.1. Subsequent studies with more participants should be conducted to check the validity of these empirical findings and therewith the validity of my conclusions for the general public. In addition, these subsequent studies, especially about the impact of music-listening technologies, should be done while using holistic methods that take the full extended musical event into account rather than reductionist laboratory methods that single out only one feature of the musical event. One of the most widely used holistic methods is the *Experience Sampling Method (ESM)*. Within the ESM participants use handheld computers or smartphone applications that ask them randomly during the day to fill in short questionnaires about their latest experience with music. This method is already often used (e.g. Greasley & Lamont, 2009, 2011; Juslin et al., 2008; Krause et al., 2015; Sloboda & O'Neill, 2001). Another holistic method is the *Day Reconstruction Method (DRM)* in which researchers ask participants to reconstruct their day on basis of the activities they participated in and then ask them to evaluate the pleasantness of each activity that day. This can lead, for instance, to conclusions about the pleasantness of music listening (Diener & Tay, 2014). Clearly, these holistic methods do not offer solutions to all problems with empirical findings that I have explained in subsection 2.1.1. Nevertheless, these methods are able to take the full extended musical event into account and should therefore be used for subsequent studies to check the validity of my conclusions.

Another major point of discussion is that I have presented emotions throughout this thesis as states. However, emotions are constantly changing episodes (Scherer & Zentner, 2001; Scherer, 2000). Music listening is not able to arouse static emotional responses of people, rather it can push these constantly changing emotional episodes towards an emotional response (Gabrielsson & Lindstrom, 2001, p. 243; Scherer & Zentner, 2001, p. 373). Subsequent studies should therefore not just focus on the dimensions and categories of emotions that I have explained in section 2.1,

those studies should also focus on the dynamics of emotional responses to music. One way to study these dynamics of emotional episodes is to use continuous self-reports (Schubert, 2001). Although that the problems with self-reports that I have explained in subsection 2.1.1 would still remain, using these continuous self-reports can help researchers to explore the moment-to-moment fluctuations of emotional episodes. In addition, as I have already explained in subsection 4.4.5, musical preferences are not static. So, besides investigating the dynamics of emotional episodes, it may also be useful to investigate the dynamics of musical preferences in subsequent studies. To do so, longitudinal studies must be conducted in addition to cross-sectional studies. Longitudinal studies consider the same data at different points in time, whereas cross-sectional studies consider a broad set of data at the same point in time. Longitudinal studies are particularly useful for investigating the dynamics of musical preferences. A good method for longitudinal studies about musical preferences is to frequently interview participants at home about their CD collections or playlists. This method is often suggested in the psychology of music (e.g. Batt-Rawden, 2010; Greasley et al., 2013; Greasley & Lamont, 2009; Krause, North, & Hewitt, 2014; Krause & North, 2014; Thoma et al., 2012).

A third point of discussion is that I mainly focused on the influences of music listening on *subjective* well-being in this thesis. Subsequent studies should also focus on possible influences of music listening on other elements of well-being. I have already explained in section 3.2 that the importance of subjective well-being for well-being is rather controversial and that according to most theories, well-being consists of more elements (Haybron, 2011). Music listening may also have influences on these other elements of well-being. For instance, Naomi Ziv concluded empirically that the compliance of music listeners to do bad things to other people was bigger while listening to pleasant music (Ziv, 2015). This finding is not directly relevant for my theoretical exploration in this thesis, because it happens unconsciously and will therefore not influence the emotions of the music listener. Nevertheless, according to some theories, this consequence of music listening may influence well-being. So, it is worth to investigate the influences of music listening on possible other elements of well-being in subsequent studies.

A fourth point of discussion is related to the BRECVEMA framework. There is an issue in the psychology of music about the BRECVEMA framework that is worth investigating in future studies. I have explained in chapter 2 that the extended musical event and the activated BRECVEMA mechanism determine whether or not affective responses to music are emotional. However, an explanation about the relation between the extended musical event and the BRECVEMA mechanisms is lacking (Hargreaves, North, & Schubert, 2013). For instance, questions about the

relative importance of the extended musical event and the BRECVEMA mechanisms still remain. Also, questions about the influences of inter-personal, inter-group and cultural influences on the BRECVEMA framework still remain. Subsequent studies should aim at exploring this relation between the BRECVEMA mechanisms and the factors of the extended musical event. This may provide some additional insights about the exact influences of music listening on subjective well-being. The *Reciprocal-Feedback Model (RFM)* can be used for subsequent studies. This model presupposes that affective responses to music are only determined by the musical event and that any of the factors of the musical event simultaneously influences the others. So, RFM may be able to clarify the relative importance of factors of the musical event. RFM is also able to include components of the production of musical works. For instance, factors such as authenticity or the context of the musician can be included in the musical event. All of these factors together determine whether or not affective responses to music are emotional (Hargreaves et al., 2013; Hargreaves, 2012; Schubert et al., 2014). RFM is not occupied with the hierarchical processes of affective responses to music, but it aims at finding the relation between all factors of the musical event (Schubert et al., 2014, pp. 1–2).

A final point of discussion is related to the element of surprise while listening to music. A lack of dominance over the musical event can sometimes surprise music listeners. We probably all have had the experience of coincidentally hearing a song on the radio of which you do not remember the name. Listening to that song can make you feel happy, maybe even happier than when you would have listened to it deliberately. This element of surprise cannot be used actively to influence the satisfaction components of subjective well-being, because we typically use familiar music for self-regulation (Frith, 2002, p. 42). Nevertheless, surprising music can influence the affect components of subjective well-being. In addition, it can help us to avoid over-familiarity of songs that we often use for self-regulation. Over-familiarity can lead to diminished affective responses to that music (Greasley & Lamont, 2006, p. 964). So, besides having a high degree of dominance over a musical event, the lack of dominance may positively influence subjective well-being. It is worth to investigate this element of surprise further in subsequent studies.

Recommendations for future research

The focus on the dominance factors while listening to music has not yet received much attention in the literature. However, as I have shown in this thesis, these factors are of pivotal importance for and hardly separable from the influences of music listening and music-listening technologies on the listener. Studies about the influences

of music and music-listening technologies that do not acknowledge this role have become obsolete. Future philosophy, psychology and technological studies should further investigate the influences of these dominance factors. Only with knowledge about these factors engineers can be informed about how future music-listening technologies should be designed specifically to improve the well-being of music listeners. These future music-listening technologies can enable people to deploy music as a well-being increasing activity. In this section I will give three recommendations of how the dominance factors should be incorporated in the current research agendas.

First of all, the influence of using music-listening technologies on the definition of music must be further explored in the philosophy of music. As I have explained in subsection 4.4.5, the broad use of music-listening technologies has blurred the distinction between music and noise. A prerequisite for the influences of music listening on well-being to occur is that the perceived sounds are considered as music by the listener. Based on the definition of Kania, I have argued in section 1.5 that if sounds suffice the conditions of being an intentionally organized or produced event to be heard and of having basic musical features or at least being listened to for such features, these sounds are considered as music. Music-listening technologies have increased the dominance of a music listener so much that whether sounds are considered as music or as noise depends highly on that degree of dominance over a musical event. In other words, the definition of music itself has become something subjective that can differ in every musical event. In addition, there are examples of music that is fully created by computers (e.g. Supper, 2001). When computers are fully responsible for the creation of music, question is whether or not these sounds are intentionally produced or organized. This poses some additional challenges to Kania's definition of music. Philosophers of music should further investigate these influences of the dominance factors over the musical event and of music-listening technologies on the definition of music and they should aim at finding a definition that is able to include these influences.

Secondly, I have already suggested at several points throughout this thesis that the musical event and in particular the dominance factors over the musical event must be operationalized. I have argued in this thesis that mainly the dominance factors over the musical event determine the positive influence of music listening on the well-being of music listeners. In addition, I have explained in section 4.4 that too much dominance over a musical event can lead to a negative influence on well-being. The point of optimal dominance differs per musical event. Only if the dominance factors are operationalized, exact claims can be made about the influences of music listening on the well-being of music listeners and about this point of optimal dominance. Therefore, psychologist of music should further investigate these dominance factors

by finding all relevant components of the dominance over a musical event and they should aim at finding a way to operationalize these factors. One way to operationalize the dominance factors that is worth pursuing is to consider them as a scale and measure them with self-reports (Greasley & Lamont, 2009; Krause, North, & Hewitt, 2014). Self-reports are applicable here, because the dominance over a musical event is not necessarily constituted by the objective amount of dominance. I have explained in subsection 2.5.1 that the subjective feeling of being in control can also constitute the dominance factors. This way of operationalizing the dominance factors may enable scientists to make exact claims about the influences of music listening on well-being and about the optimal amount of dominance over musical events.

Finally, engineers and scientists in STS studies should focus on the possibilities for music-listening technologies to recognize the musical events that these technologies are used in. In particular the situation of listening and the degree of dominance over that situation are important. Current technological developments of music-listening technologies aim at improving the battery endurance, increasing the memory and objectifying preferences of music listeners based on their listening histories. However, in order to create music-listening technologies that can improve the well-being of people, engineers should focus on the recognition of the extended musical event. If music-listening technologies would be able to recognize the factors of the extended musical event and in particular the dominance factors, those technologies can enable music listeners to actively use music to improve their well-being without going over the point of optimal dominance. There are some interesting examples of music-listening technologies of which it can be argued that they more or less interact with the musical event already. For instance, the *democratic jukebox* is a music-listening technology that enables all music listeners in a room to have an equal say in what music is played (Sprague, Wu, & Tory, 2008). Secondly, Guitar Hero has changed making music into a social activity in which everyone, even non-musical people, can participate. It is arguable that these music-listening technologies already interact in some sense with the musical event in which they are used. However, these technologies do not recognize the dominance over those musical events. A more thorough possibility of enabling music-listening technologies to recognize the extended musical event is to incorporate Ambient Intelligence in those technologies. Ambient Intelligence is the idea that in the near future people will live and work in environments in which technologies recognize and respond to them in intelligent ways (Aarts, Harwig, & Schuurmans, 2001; Brey, 2005). Some important features of Ambient Intelligence are context awareness, the recognition of emotions, the recognition of preferences and the recognition intrinsic motives (Brey, 2005). So, Ambient Intelligence could clearly enable music-listening technologies to recognize

the musical event and in particular the degree of dominance of a music listener over that musical event. Although that a further understanding of the dominance factors is necessary for this development, engineers and scientists in STS studies should already explore the possibilities for incorporating Ambient Intelligence in music-listening technologies.

Seligman once said in a TED talk that technology and design can increase the amount of human happiness on the planet (Seligman, 2008). Nevertheless, the use of antidepressants and pain relievers has been increased tremendously in the last few decades. I have illustrated in section 4.4.5 that music listening can help people to cope with symptoms of disorders and diseases and that it can help them to manage stress and anxiety. In addition, empirical findings suggest that music listening can enable people to relieve pain (e.g. Finlay & Anil, 2016; Mitchell et al., 2008; Thoma et al., 2012). Music listening is an easily accessible and cheap activity for most people around the world. In the near future, music listening may therefore be used as an alternative to these medicinal drugs or to rather expensive psychological therapies. Especially when future music-listening technologies aim at recognizing the musical events in which those technologies are used, people may become able to use music listening and music-listening technologies to avoid medicinal drugs and to improve their well-being in general. This may contribute towards reaching Seligman's utopia.

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