UPPSALA
UNIVERSITET

Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Social Sciences 137

A Cross-Cultural Approach to Psychological Mechanisms Underlying Emotional Reactions to Music

GONÇALO T. BARRADAS

ACTA
UNIVERSITATIS
UPSALIENSIS
UPPSALA
2017

ISSN 1652-9030
ISBN 978-91-554-9818-4
urn:nbn:se:uu:diva-314870

Dissertation presented at Uppsala University to be publicly examined in Auditorium Minus, Gustavianum, Akademigatan 3, Uppsala, Friday, 31 March 2017 at 09:15 for the degree of Doctor of Philosophy. The examination will be conducted in English. Faculty examiner: Dr. Suvi Saarikallio (University of Jyväskylä, Department of Music).

Abstract

Barradas, G. T. 2017. A Cross-Cultural Approach to Psychological Mechanisms Underlying Emotional Reactions to Music. *Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Social Sciences* 137. 87 pp. Uppsala: Acta Universitatis Upsaliensis. ISBN 978-91-554-9818-4.

Music plays a crucial role in everyday life by enabling listeners to seek individual emotional experiences. To explain why such emotions occur, we must understand the underlying process that mediates between surface-level features of the music and aroused emotions. This thesis aimed to investigate how musical emotions are mediated by psychological mechanisms from a cross-cultural perspective.

Study I manipulated four mechanisms by selecting ecologically valid pieces of music that featured information relevant for each mechanism. The results suggested that listeners' emotions could be successfully predicted based on theoretically based manipulations of target mechanisms. However, Study I featured only listeners from a single culture, neglecting the possible role of contextual and individual factors.

Study II investigated the prevalence of emotions, mechanisms, and listening motives in a web survey featuring listeners from both individualist and collectivist countries. Results indicated that patterns of prevalence of emotions and mechanisms were quite similar across cultures. Still, Study II found that certain emotions such as nostalgia and the mechanism episodic memory were more frequent in collectivist cultures. In contrast, sadness and the mechanism musical expectancy were more frequent in individualist cultures. Study II also suggested that listening motives were country-specific, rather than subject to the individualism-collectivism dimension.

Study III explored how particular mechanisms are manifested within a collectivist cultural setting with great potential for deeply felt emotions: fado music in Portugal. Interviews with listeners provided in-depth information on how the cultural context might shape listening motives and emotions. The results revealed that listeners strived for musical experiences that would arouse culturally valued emotions. Music-evoked nostalgia and contextual factors were regarded as important and contributed to an enhanced sense of wellbeing.

Study IV tested the influence of lyrics on the emotions induced by Swedish and Portuguese pieces of music. The results revealed cross-cultural differences in how lyrics influenced emotions. The differences were not related to the music's origin, but to the listener's origin, suggesting that the impact of lyrics depends on the cultural background of the listener.

In conclusion, the thesis suggests that cultural factors serve as moderators of effects of biologically based mechanisms for emotion induction.

Keywords: cross-cultural perspective, emotion, functions, music, mechanisms

Gonçalo T. Barradas, Department of Psychology, Box 1225, Uppsala University, SE-75142 Uppsala, Sweden.

ISSN 1652-9030
ISBN 978-91-554-9818-4
urn:nbn:se:uu:diva-314870 (http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-314870)

To three special ones:
Jovita, Eduarda, & Zita

List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals:

I Juslin, P. N., **Barradas, G.**, & Eerola, T. (2015). From sound to significance: Exploring the mechanisms underlying emotional reactions to music. *American Journal of Psychology, 128,* 281-304.

II Juslin, P. N., **Barradas, G. T.**, Ovsiannikow, M., Limmo, J., & Thompson, W. F. (2016). Prevalence of emotions, mechanisms, and motives in music listening: A comparison of Individualist and Collectivist cultures. *Psychomusicology: Music, Mind, and Brain, 26,* 293-326.

III **Barradas, G. T.** (2016). *Understanding nostalgia and sadness in fado music: A qualitative approach to the psychological mechanisms underlying musical emotions*. Manuscript submitted for publication.

IV **Barradas, G. T.**, & Sakka, L. S. (2016). *When words matter: Lyrics and their relationship to musical emotions in Portugal and Sweden.* Manuscript.

Reprints were made with permission from the respective publishers.

Contents

Introduction 9
Music and Emotion 11
Cognition and Emotion 14
Causes of Musical Emotions 15
The BRECVEMAC Framework 16
A Cross-Cultural Perspective of Music and Emotions 19
Individualism and Collectivism 21
Music and Wellbeing 22
Lyrics and Emotions across Cultures 23

Aims of the Thesis 25

Study I – From Sound to Significance 26
Background and Aims 26
Method 27
Results 29
Emotion Ratings 29
MecScale 30
Psychophysiology 31
Conclusions 32

Study II – A Comparison of Individualist and Collectivist Cultures 34
Background and Aims 34
Method 35
Results 37
Semantic Data 37
Episodic Data 38
Conclusions 40

Study III – Nostalgia and Sadness in Fado Music 41
Background and Aims 41
Method 42
Results 43
Main Theme 1: Fado and Emotion 43
Main Theme 2: Underlying Causes 44
Main Theme 3: Fado in Context 46
Main Theme 4: Fado and Wellbeing 48
Conclusions 49

Study IV – When Words Matter 51
Background and Aims 51
Method 52
Results 54
Conclusions 56

General Discussion 57
Main Findings 57
Implications for the use of BRECVEMAC Cross-Culturally 59
Musical Nostalgia and Memory 65
Episodic Memories and Nostalgia in Collectivist Societies 65
Negative Autobiographical Memories and Nostalgia 65
Limitations 66
Future Directions 68
Final Considerations 70

Resumo em Português 71

Acknowledgments 75

References 78

Introduction

Try to remember a recent occasion when you listened to music. Did you experience an emotion? What do you think caused the emotion you felt? While the answers may come to mind easily, understanding *why* we experience an emotion in response to music is a much more complex matter.

The study of music and emotion seeks to understand the psychological relationship between music and human affect. Music has the ability to express emotions that are easily perceived by the listener. Listeners also often feel 'moved' by the expression of music, and use it to influence their own emotions. In fact, several studies suggest that people listen to music in search of emotions (Juslin & Sloboda, 2010).

The emotional component of music seems to play an essential role for many cultures around the world (Saarikallio, 2012), challenging researchers to adopt a cross-cultural perspective in this field (Balkwill & Thompson, 1999; Clayton, 2016; Juslin & Sloboda, 2010; Patel & Demorest, 2013). A large body of ethnographic research has suggested that autonomic arousal and the experience of happiness occur constantly cross-culturally, despite different listening habits (Becker, 2004). However, few researchers have taken a psychological approach to emotions aroused by music by adopting a cross-cultural approach.

There is growing evidence that music has benefits for health and wellbeing (MacDonald, Kreutz, & Mitchell, 2012), and that emotion is a central component for creating, learning, and interpreting music (Juslin & Sloboda, 2010). However, the vast body of psychological research to date has involved especially western subjects. Valuable insights on how humans are able to interpret musical emotions could be gained through the study of a wide variety of cultures.

Cross-cultural studies are essential for understanding the relative importance of enculturation on the arousal of specific emotions and mechanisms. More specifically, the extent to which cognitive processes are influenced by particular uses, functions, and listening motivations in different cultures. Additionally, empirical and field studies of ecologically valid music in diverse settings and cultures can complement traditional laboratory research, generating richer conceptions for theory development.

Individual musical experiences occur in various settings in everyday life. Hence, in order to understand musical experiences in different societies, we must address musical practices, conceptions, and sound (Merriam, 1964) both contextually and in the culture in which the experience takes place (Juslin & Laukka, 2004; North & Hargreaves, 2008; North, Hargreaves, & Hargreaves, 2004). We know that in the majority of these experiences, music can arouse an emotion (Juslin & Laukka, 2004; Juslin, Liljeström, Västfjäll, Barradas, & Silva, 2008). Nevertheless, listeners' emotional reactions to the same piece of music differ widely (Sloboda, 1996), making it hard to predict them empirically. To gain a thorough understanding of these experiences we need to consider the complex interactions between the music, the listener, and the situation (Juslin et al., 2008; Liljeström, Juslin, & Västfjäll, 2013). This includes the culture and historical background in which listening occurs.

Adopting a cross-cultural approach to how people experience musical emotions might be the key to finding potentially universal constituents of all musical experiences, as well as culturally specific uses and functions. However, to successfully explain emotional reactions to music around the world, it is vital from both a methodological and empirical perspective to obtain a better understanding of the different causes underlying emotional reactions to music. In this thesis, the term "underlying mechanism" refers to a psychological process that mediates between surface features and aroused emotions. It is a functional description of what the mind is doing in principle, not a phenomenological or neurological explanation of the experience.

A cross-cultural approach to the mechanisms underlying emotional reactions to music can provide important contributions to our understanding of these processes more broadly by: first, investigating whether these processes are cross-culturally invariant or not; second, generalizing previous results; third, generating new hypotheses; fourth, revealing the extent to which these mechanisms are shaped by learning and culture; and fifth, understanding the connection between our mechanisms and the extent to which musical emotions might contribute to listeners' subjective wellbeing.

This thesis compilation includes four empirical studies. Study I manipulated various psychological mechanisms in an experimental setting in order to successfully predict emotional reactions to music. Study II investigated the prevalence of emotional reactions to music, various psychological mechanisms, and listening motives in a cross-cultural sample of music listeners, focusing on individual personality trait differences. Study III explored how particular mechanisms are manifested within a specific cultural setting with great potential for deeply felt emotions. Study IV tested the influence of

lyrics[1] – a specific musical factor – on the emotions induced by culturally relevant Swedish and Portuguese pieces of music.

Before presenting each of the studies, the following section aims to provide a general overview of the field of music and emotions, with an emphasis on the mechanisms that are believed to mediate emotional reactions to music. The first chapters discuss the close relationships between music and emotions, and emotion and cognition. This is followed by an introduction to the causes underlying this relationship, where a recent framework is broadly described. Next, I present a cross-cultural perspective on music and emotion, followed by a brief introduction to the study of music and wellbeing more generally. Finally, I present a brief overview of the few studies connecting song lyrics to musical emotions.

Music and Emotion

A growing number of researchers in the fields of psychology, neuroscience, philosophy and musicology have shown increasing interest in the relationship between music and emotions (Juslin & Sloboda, 2010). Articles by Schubert (1999), Gabrielsson and Lindström (2001), Gabrielsson and Juslin (2003), and Juslin and Laukka (2004) reviewed associations between musical features and emotions. A list was presented by Livingstone and Brown (2005).

Describing *music* is not an easy task for music psychologists, as all definitions depend on cultural context. A working definition in western societies describes music as an art that combines instrumental sounds, vocal sounds, or both, producing beauty, harmony or expression of emotion (concise Oxford Dictionary, 1992).

The concept of *emotion* is also still the subject of debate within psychology research. According to many researchers, there is always a state of affect in humans (e.g., Beedie, Terry, & Lane, 2005). When this state is intensive, it is called an emotion; when it is not, it is usually considered a mood, though there are some disagreements in the field concerning this definition, many of which are related to the continued lack of scientific evidence. William James (1884) tried to define emotions, and many other scholars also offered definitions, but little consensus were reached. However, most researchers today agree that emotions belong to the broader field of affect, which covers all evaluative states like mood, preference, and personality traits (Fridja & Scherer, 2009; Juslin, 2011; Juslin & Scherer, 2005; Oatley,

[1] A common dictionary definition states that a lyric is: "the words of a popular song expressing the writer's emotions, usually briefly and in verses or recognized forms" (Oxford Dictionaries, 2016). According to Mithen (2006), lyrics originated with language itself.

Keltner, & Jenkins, 2006), involving *valence* (a negative or positive evaluation) and a certain degree of *arousal* (autonomic activity). Most psychologists also accept that one of the most important pieces of evidence for emotion is self-reported feeling. It is also accepted that emotion is a scientific construct, a set of the phenomena of feelings, behaviors and bodily reactions in everyday life.

A working definition offered by Juslin (2011, p. 114) states:

> Emotions are relatively brief, intense and rapidly changing reactions to potentially important events in the external or internal environment – often of a social nature – which involve a number of subcomponents (cognitive changes, subjective feelings, expressive behavior and action tendencies) that are more or less "synchronized" during an emotional episode.

Musical experiences comprise several aspects (emotional, physical, behavioral, perceptual, cognitive, and existential; see Gabrielsson, 2001). The emotional aspect is regarded as one of the most important aspects by lay listeners (Juslin, Liljeström, Laukka, Västfjäll, & Lundqvist, 2011). Researchers have also used a wide variety of methods, such as listening experiments (Waterman, 1996), questionnaires (Juslin & Laukka, 2004), experience sampling methods (Sloboda, O'Neill, & Ivaldi, 2001), qualitative interviews (DeNora, 2000) and brain imaging (Salimpoor, Benovoy, Larcher, Dagher, & Zatorre, 2011) to support the notion that music can arouse emotions.

An increasing number of studies have documented far-reaching influences of music on various components of emotion: *subjective feeling*, a felt emotion triggered during an appreciation event (Pike, 1972); *physiological arousal*, physiological manifestations in the body (Krumhansl, 1997); *brain activation*, the activation of brain regions previously known to implicate emotional responses (Brown, Martinez, & Parsons, 2004); *emotional expression,* enabling people to express their emotions (Witvliet & Vrana, 2007); *action tendencies*, enabling individuals to follow conscious or unconscious behaviors before a given situation (Fried & Berkowitz, 1979), and *emotion regulation,* an attempt to regulate their own emotional reactions to music (Becker, 2001; Gabrielsson, 2001). A few studies have provided evidence of a so-called 'synchronization' between the various components (e.g., Juslin, Harmat, & Eerola, 2014; Lundqvist, Carlsson, Hilmersson, & Juslin, 2009).

It is also worth observing that scientific papers do not always observe a distinction between *felt* emotion and *perceived* emotion. According to Gabrielsson (2001, 2002), perceived emotions are expressed by the music and have no association with physiological changes. On the other hand, *felt* emotions are aroused by the music, with pronounced responses in the autonomic

nervous system.[2] This distinction is especially important because listeners may perceive an emotional expression in the music without necessarily feeling it – a happy tune may be perceived by the listeners without the listener feeling happy. The listener may actually feel nostalgic when listening to that particular song for example. This is because perceived emotions are mainly a perceptual-cognitive process (Gabrielsson, 2002). On the contrary, listeners' emotional response to the music (felt emotions) produce pronounced responses from the autonomic nervous system, influencing listeners' physiological responses such as heart beat, respiration, skin conductance, facial expressions, etc.

Emotions are not easy to arouse in an artificial laboratory environment (Plutchik, 1994). However, obtaining cases of 'genuine' emotional reactions to music might be less of a problem in field studies, which have shown that musical emotions occur in a wide range of settings in everyday life. More importantly, field studies have documented the kinds of emotions that occur in response to music. Hence, the *prevalence*, or relative frequency of occurrence in the population of interest, of specific musical emotions must be examined in a real-world context, preferably using representative samples of participants and situations (Juslin et al., 2008; Juslin, Liljeström, Västfjäll, & Lundqvist, 2010).

Survey and experience sampling studies to date show that music arouses a relatively wide range of emotional states, *calm*, *happiness*, *nostalgia*, *interest*, *pleasure*, *sadness*, *arousal* and *pride* in particular, and numerous synonymous labels (Juslin & Laukka, 2004; Juslin et al., 2008, 2011; Sloboda, 1992; Wells & Hakanen, 1991; Zentner, Grandjean, & Scherer, 2008). These responses have been conceptualized as either 'everyday emotions' (e.g., *happiness*) or 'aesthetic emotions' (e.g., *awe*) (see Juslin, 2013, for further discussion). Accordingly, there is a strong influence of music on felt emotions. In fact, several studies have suggested that music allows listeners to change their emotions; release them; match their current emotional state with what the music conveys; relieve stress; improve their sense of well-being; find meaning and satisfaction with life, and promote prosocial behavior, to name just a few examples.

Still, it needs to be acknowledged that we frequently hear music without actually feeling any emotion at all – at least not one aroused by the music. According to some estimates, music arouses emotions in about 55-65% of listening episodes, and there seem to be wide individual differences in overall prevalence (e.g., Juslin & Laukka, 2004; Juslin et al., 2008).

[2] All four studies included in this thesis focused on felt emotions.

Cognition and Emotion

There is the notion in cognitive science that emotions may guide cognitive processes in a systematic way. Emotions are considered a fundamental element for any complex being like humans, allowing us to respond to immediate threats, for instance. Emotions are usually conceived of as being aroused when an event is thought to have the capacity to influence the goals of the perceiver. This evaluative process is called *appraisal*.

Appraisal theory is divided into *primary appraisal* and *secondary appraisal*. Primary appraisal refers to an automatic process which is language independent, while secondary appraisal occurs when emotions are directed to particular objects and people. Secondary appraisal is highly dependent on language (Keltner, Oatley, & Jenkins, 2014). Several authors have argued that appraisal is an important theory to the study of emotions in general. According to Moors (2009), this theory surpasses any other conceptualization because of a special relation with goals. Other researchers also argue that specific emotions are led by thoughts or though-like processes (Stein, Trabasso, & Liwag, 1994).

Deriving from appraisal theory, emotions are able to signal the nervous system in two different ways: automatically (the primary appraisal) or by mental models (the secondary appraisal) (Oatley & Johnson-Laird, 2011). When the nervous system is triggered automatically, the brain is set into an organizational state: the brain is ready to react, responding with basic emotion such as happiness, sadness, fear, anger, etc. On the other hand, when the information available allows us to make mental models of the events, the second kind of signaling is activated. These two types of signaling may co-occur producing a conscious emotional feeling (Keltner et al., 2014). When these two kinds of signaling are dissociated, emotions may occur with no object. Three theoretical approaches provide explanations on how emotions can affect cognition: *emotion congruence*, *affect as information*, and *styles of processing*.

Bower (1981) embraced the emotion congruency theory. According to the author, information that is congruent with our current emotion will be easier to learn. This is because moods and emotions are arguably based on associative brain networks. Each emotion is related to a specific brain pathway, in which memories, images, concepts, and interpretations are connected in semantic brain network. This theory still influences research on effects of emotion. However, it has been argued that mood incongruent memories may be recalled more often than congruent ones (Parrott & Spackman, 2000). This suggests that memory effects may also depend on specific tasks, induction of specific moods, and the individuals themselves (Eich & Macaulay, 2000).

Emotions may also influence cognition when affect acts as information (Clore & Palmer, 2009). According to this perspective, emotions may pro-

vide important information before an individual judgment of an event. This approach was especially important for understanding social interactions (Clore & Huntsinger, 2007).

Cognitive psychologists also pose that different moods and emotions may involve different processing styles. A typical example refers to when someone is feeling angry. In this situation, we may reason, weigh the situation, and draw conclusion in a different way. When it comes to positive moods and emotions, they enable us to become more creative, favor personal connections with others, cooperate, and to express affection (Waugh & Fredrickson, 2006).

Moods and emotions are also known to have an effect on perception, attention, and memory. When it comes to perception, studies have revealed that our current mood might influence how we perceive objects. These studies suggest that we have a tendency to perceive objects that are congruent with how we feel (e.g., Baumann & DeSteno, 2010).

It has also been suggested that emotions may affect attention. One of the most studied effects refers to anxiety, and how anxiety constricts attention (Mineka, Rafeali, & Yovel, 2003). Attention is able to prioritize certain emotions, enabling us to concentrate on specific tasks and objects that are relevant for a particular task.

Emotions have also many implications on memory. A classical study by Wagennar (1986) describes how salience (how frequent an event occurs), emotional involvement, and pleasantness might influence the description of memories in the future, and how current emotions can bias these memories.

Causes of Musical Emotions

Although most researchers agree that music can arouse emotions, opinions differ about the fundamental underlying psychological process. Intriguingly, most researchers focused on direct links between surface features of the music and aroused emotions (e.g., Coutinho & Cangelosi, 2011; Gomez & Danuser, 2007). However, describing the features of the music is only a first step toward a psychological explanation. Because different listeners may react differently to the same piece of music, a ‘direct’ or ‘surface’ approach immediately runs into problems.

Music does not appear to have any important implications for life goals. In fact, some scholars have found it hard to explain why (or, indeed, believe that) music could arouse real-life emotions (Kivy, 1990; Konečni, 2003; Scherer, 2003). The problem was aptly described by Krumhansl (1997). Most researchers presumed that musical emotions can be studied and described without taking into consideration the process that mediates emotional experiences with music.

Complicating matters is that all available evidence suggests that music *does* arouse 'real-life' emotions such as *happiness* and *sadness*. A challenge for music researchers has thus been to come up with alternative, yet plausible accounts of how music evokes emotions in listeners. A unifying and comprehensive framework should be able to explain both "everyday emotions" and "aesthetic emotions", why musical events arouse an emotion (*elicitation*), and why the aroused emotion is of a certain kind (*differentiation*). Hence, it was essential to provide a theoretical and empirical foundation to achieve this aim. As noted by Juslin and Sloboda (2010, p. 92), key studies from a psychological perspective on the arousal of musical emotions must include experiments that manipulate or contrast two or more underlying mechanisms.

The BRECVEMAC Framework

Juslin (2013) outlines a theoretical framework that aims to explain emotional responses to music in terms of a large set of psychological mechanisms based on an *evolutionary perspective* – a number of different *brain functions* developed progressively and in a particular order during evolution, from simple sensations and conditioning to complex processes involving language. This perspective involves the idea that our ancestors were able to survive because they could detect patterns in sounds. These patterns allowed humans to understand different meanings and when to avoid danger (Juslin, 2013; Juslin & Västfäll, 2008).

Proceeding from this assumption, it is theorized that there are several induction mechanisms consisting of a number of more or less distinct 'brain networks' which developed gradually and in a particular order during evolution – from simple reflexes to complex judgments. Each mechanism is believed to have served a unique function originally (see Juslin, 2013, Table 2), and none of the mechanisms is unique to music.

Some mechanisms will only be captured and better analyzed if sampled in a wide variety of situations, which is only possible with field studies. On the other hand, other mechanisms will be better verified in laboratory settings (Juslin et al., 2010).

According to Juslin and Västfjäll (2008), there has been a degree of neglect with regard to the mechanisms underlying the induction of emotion in music. This is based on a lack of studies addressing the issues: how does music evoke emotions? How is it possible to isolate and study each mechanism alone? According to Juslin (2013), each mechanism is triggered by a specific configuration of information in the *music*, the *listener*, and the *situation*, referred to jointly as 'the musical event'. Nine mechanisms are currently featured in the framework. The following paragraphs summarize each mechanism presented in several books and publications in the approximate order in which they may have developed during evolution (for a full descrip-

tion of each mechanism, see Juslin, 2013). The framework as a whole is able to account for both 'basic' and 'complex' emotions in response to music.

(1) Brain stem reflex refers to a hard-wired attention reaction to extreme acoustic features. It is a process whereby an emotion is induced in the listener because one or more simple acoustic features exceed a certain limit. In music, this may implicate sounds that are sudden, loud or dissonant, or that feature fast and accelerating patterns. The responses are quick, automatic, and unlearned.

The name 'brain stem reflex' serves to highlight that the reflex occurs very *early* in the auditory processing (e.g., in the inferior colliculus of the brain stem; Brandão, Melo, & Cardoso, 1993), before one has even recognized the object of attention. According to Juslin et al. (2014), brain stem reflexes normally increase *arousal* and evoke feelings of *surprise* in the listener.

(2) Rhythmic entrainment refers to the adjustment of an internal body rhythm (e.g., breathing) toward the musical rhythm. This adjustment is especially evident with certain types of music (e.g., techno, film music). This adjustment affects other components of emotion, such as feeling, increasing the listeners' arousal sensation.

Rhythmic entrainment is believed to involve several networks of multiple oscillators in particular brain regions, facilitating motor coordination. Apparently**,** humans have an intrinsic tendency to entrain (Clayton, Sager, & Will, 2005).

(3) Evaluative conditioning refers to a process by which an emotion is induced because of a previous pairing of musical stimulus with other positive or negative stimuli (De Houwer, Thomas, & Baeyens, 2001). Through repeated pairing of particular pieces of music with specific emotional life events, those pieces will ultimately arouse the emotions felt at those particular moments. Interestingly, evaluative conditioning with music might occur even without conscious recognition.

(4) Contagion consists of a mimicking process in which the perceived voice-like emotional expression is taken by the listener. According to Juslin (2000), an independent 'brain module' responds to certain stimulus features *as if* they were coming from a human voice expressing an emotion, which leads the listener to mimic the moving expression internally.

This process could be implemented by means of a 'mirror-neuron system' (Rizzolatti & Craighero, 2004). A study by Koelsch, Fritz, von Cramon, Müller, and Friederici (2006) indicated that listening to expressive music activated brain regions associated with pre-motor representations for vocal sound production. Field data suggest that contagion responses are common

in everyday life (Juslin et al., 2008), which might not be surprising considering that most music heard today is vocal music, where singers attempt to achieve expressivity. However, recent results show that voice-like features of a violin or cello can also arouse matching emotions in listeners (Juslin et al., 2014).

(5) Visual Imagery comprises a process where metaphorical mapping of the musical structure leads to emotional inner images raised by the listener (Osborne, 1980). Musical emotions aroused by this mechanism are a combination of the musical experience and these images. Listeners' ability to influence this process is a characteristic of this mechanism. Therefore, listeners often have the chance to manipulate these images either by conjuring them up or dismissing them.

(6) Episodic memory refers to the recall of a personal memory induced in the listener because of the music. It is a process whereby emotion is induced in a listener because some feature of the music (e.g., the melody) serves as a 'retrieval cue' for an autobiographical memory (Baumgartner, 1992). When the episodic memory is triggered, so is the emotion associated with the memory.

Studies indicate that episodic memories linked to music commonly arouse *nostalgia* (Janata, Tomic, & Rakowski, 2007; Juslin et al., 2011). However, this may vary depending on the emotion associated with the memory. Field studies using representative samples of listeners (Juslin et al., 2011) or situations (Juslin et al., 2008) show that episodic memory is one of the most common sources of emotional reactions to music in real-life settings.

(7) Musical expectancy consists of a violation or confirmation of listeners' expectations regarding the gradual unfolding of the musical structure. It refers to a process whereby an emotion is induced in a listener because a specific feature of the music violates, delays, or confirms the listener's expectation about the continuation of the music. However, this mechanism does not refer to any unexpected event that might occur in relationship to music (see Brain stem reflex); according to Meyer (1956), the expectations are grounded on the listener's familiarity with the same musical style. Violations of expectancies are associated with the arousal of *anxiety*, *surprise*, and *thrills*.

(8) Aesthetic judgment consists of a subjective evaluation of music's aesthetic value based on an individual set of weighted criteria. According to Juslin (2013), only some musical experiences should be regarded as aesthetic. In order to have an aesthetic experience with music, listeners must assume an aesthetic judgment, i.e., an aesthetic attitude must be adopted by the listener towards a particular piece of music. Several criteria that may con-

tribute to an aesthetic judgment of music are: *beauty*, *skill*, *novelty*, *style*, *message*, *expression*, and *emotion*.

(9) Cognitive appraisal refers to a multi-dimensional estimation of how music might implicate the listener's goals or plans in life (for a comprehensive description of this mechanism, see Scherer, 1999). Appraisal theories assume that emotions are caused by multi-dimensional appraisals of events relative to goals. However, these theories do not offer a comprehensive framework that explains the arousal of musical emotions.

Purely instrumental music seems distant from our ongoing plans or life goals (Ellsworth, 1994). However, the previous eight mechanisms along with cognitive appraisal can explain most emotions aroused by music in everyday life.

Only a few articles consider *mechanisms* in order to explain how music evokes emotions. Since mechanisms focus on different kinds of information and involve different brain areas, it is highly feasible that all the mechanisms can be activated independently.

A Cross-Cultural Perspective of Music and Emotions

An important goal in music cognition is to investigate the extent to which musical behaviors are cross-culturally invariant or not (cf. Balkwill & Thompson, 1999; Clayton, 2016; Patel & Demorest, 2013). Cross-cultural studies offer music psychologists two main advantages: they explain and describe the assortment of human behavior worldwide, linking behaviors to the cultural context from which they derive (Berry, Poortinga, Segall, & Dasen, 2002; Cole, 1996), and examine the psychological diversity of humanity and the reasons this diversity exists (Shiraev & Levy, 2010).

Defining *culture* is not an easy task. In the past, it has been defined as how a group of people shares a way of life (Berry, Poortinga, Breugelmans, Chasioitis, & Sam, 2011). It is also described as a combination of discrete behavioral norms and conditions shared by individuals of the same population that are distinctive from those shared in other populations (Lehman, Chiu, & Schaller, 2004). Additionally, the term 'culture' may apply to different phenomena. One of these phenomena is *expressive culture* – the aesthetic search for cultural group leisure experiences. Overlapping this concept are *cultural products* – speech patterns, expressions, song lyrics, and more (e.g., Morling & Lamoreaux, 2008; Schlegel, 1999).

It is widely recognized that all human behavior is dependent on cultural contexts. Regarding emotions, several authors support the idea that there are both universal constituents of emotion and cultural differences in emotional

practices (e.g., Ekman, 1992; Mesquita, Vissers, & De Leersnyder, 2015). In this sense, cultural factors may serve as emotion moderators.

When it comes to music, the majority of studies have investigated listeners' *perceptions* of emotions in different cultures (Balkwill & Thompson, 1999; Eggebrecht, 1983; Fritz et al., 2012; Gregory & Varney, 1996; Gundlach, 1932, 1935; Kleinen, 1994; Laukka, Eerola, Thingujam, Yamasaki, & Beller, 2014; for a review, see Thompson & Balkwill, 2010), revealing that at least *some* emotions can be communicated cross-culturally through music. However, few studies have attempted to investigate the relationship between the prevalence of emotions and the culture from which the music derives.

This disregard is even more obvious when it comes to cross-cultural studies of musical *arousal* of emotions. Thus, it is important to preserve and study authentic real-life situations, taking into consideration the cultural and social context of listeners (Cross, 2012; DeNora, 2013). As noticed by several authors (Juslin & Laukka, 2004; North & Hargreaves, 2008; North et al., 2004; Saarikallio, 2012) most studies continuously neglect musical emotional contexts and listeners' cultural and historical backgrounds.

Juslin (2012) recommends adopting a form of *moderate universalism*[3] when explaining the processes underlying emotional reactions to music cross-culturally. The author notes that diversity at the level of musical surface features across different cultures does not necessarily equate with diversity at the level of underlying mechanisms (e.g., although music that arouses *sadness* in listeners in one culture might *sound* rather different from music that arouses *sadness* in listeners in another culture, this does not rule out the fact that the emotion was aroused for the same reason in both cases). Hence, an account of the induction of musical emotions can thus be cross-culturally valid at the level of mechanisms, despite cross-cultural diversity in musical surface features and evoked emotions.

Several mechanisms have been tested in experimental studies (Janata, 2009; Juslin et al., 2014; Steinbeis, Koelsch, & Sloboda, 2006), though only in Western cultures. Hence, a deeper understanding of mechanisms requires exploring similarities and differences across different cultures (Thompson & Balkwill, 2010).

It seems likely that different mechanisms are important in different cultures depending on both the music itself and the uses and functions of the music in specific settings (Boer & Fischer, 2012). Since different factors in the music can activate different mechanisms, it is also true that the prevalence of mechanisms may depend on different types of music, listener environment, mood, and expression.

[3] Moderate universalism considers that all basic cognitive processes are common to every human being, everywhere. Culture might influence the content, development, and use of these processes, but does not alter the process itself (Berry et al., 2011).

Given the lack of previous cross-cultural studies regarding emotional reactions to music, psychological mechanisms, and listening motives, no investigation has measured their prevalence across different cultures. According to the BRECVEMAC framework, each mechanism will be influenced differently by music that differs from one culture to another. While evaluative conditioning, visual imagery, episodic memory, musical expectancy, aesthetic judgment, and cognitive appraisal are influenced by cultural learning to a greater extent, brain stem reflex, rhythmic entrainment, and contagion are not. This is because some mechanisms are affected by learning to a greater extent than others (Juslin et al., 2010).

Individualism and Collectivism

A commonly used dimension in empirical cross-cultural research refers to individualism-collectivism (Brewer & Chen, 2007; Hofstede, 2001; Triandis, 1994). Individualistic cultures are usually characterized as valuing personal autonomy, which means that individuals strive to achieve personal goals and are perceived as independent, self-reliant beings. Collectivistic cultures, in contrast, are usually characterized as valuing social embeddedness.

More generally, studies of emotions have suggested that this dimension is linked to cross-cultural differences in the prevalence of emotions (see Kitayama, Mesquita, & Karasawa, 2006; Markus & Kitayama, 1991; Singelis & Sharkey, 1995; Triandis, 1994). To illustrate, in cultures where good relationships are defined by the 'autonomy' and 'independence' of individuals, we might expect to find that socially disengaging emotions (e.g., *pride*, *anger*) are more frequent or intense than in cultures where relationships are defined in terms of 'interdependence'. On the other hand, in cultures where these relationships are defined as 'interdependent', we might expect to find emotions related to social connectedness (e.g., *nostalgia*, *love*).

There are other differences worth mentioning. According to Triandis (2001), several aspects of communication are considered especially important in collectivist cultures (i.e., level of voice, body posture, eye contact, and gestures), while individualist cultures pay more attention to other aspects (language content – what is actually being said).

While Western cultures are associated with individualism, non-Western cultures tend to reflect a collectivistic self-concept in which individuals tend to pursue group goals over individual goals and the self is seen as interdependent and inseparable from the collective (e.g., the family). However, there a few exceptions among Western countries that are still considered collectivist (e.g., Portugal).

When it comes to musical experiences, it has also been argued that emotional properties of music might be linked to the unique emotional needs of a particular culture (Lomax, 1962; Thompson & Balkwill, 2010). For exam-

ple, it has been hypothesized that "emotions that are 'helpful' or 'functional' in a culture will be more frequent or intense" (Mesquita et al., 2015, p. 546). This may be related to the possibility that there are cultural differences with respect to 'ideal affect' (Tsai, 2007) – the kind of emotions people strive to experience in everyday life. Therefore, cultural values should strongly influence the motives for engaging with music, how frequently people attend specific musical events associated with particular emotion-induction mechanisms, and the specific emotions resulting from those events.

Most listener samples came almost exclusively from individualistic societies, neglecting whether different motives could be present in collectivistic societies. Moreover, most studies have investigated musical functions at an individual level, neglecting the collective aspects of musical experiences. This fact is criticized by a range of renowned psychological researchers (Juslin & Laukka, 2004; MacDonald, Hargreaves, & Miell, 2002; North & Hargreaves, 2008; Rentfrow & Gosling, 2006).

Preliminary data from qualitative research have indicated that individualist and collectivist cultures may also use music differently; Boer, Fischer, Tekman, Abubakar, Njenga, and Zenger (2012) looked for the potential functions of music in six different cultures considering the collectivist and individualist dimensions. They suggested that cultural values such as individualism-collectivism can help explain cross-cultural differences on the use of music in everyday life. While listeners with an individualistic background used music more frequently to dance, listeners with a collectivistic background used music more frequently to express values and cultural identity, bonding more frequently with their families over music.

On the contrary, Schäfer, Tipandjan and Sedlmeier (2012) suggested that cultural differences hardly apply to the functional use of music in everyday life. However, their results also conveyed that collectivist cultures tend to place a higher value on social and societal integration and connectedness to each other than individualistic cultures.

Hence, the individualism-collectivism dimension is potentially important when it comes to understanding cross-cultural differences in music and emotions.

Music and Wellbeing

Researchers also recognize that music can affect listeners' subjective wellbeing (MacDonald et al., 2012) and that these effects are often influenced through the emotions aroused in listeners (Chin & Rickard, 2013; Västfjäll, Juslin, & Hartig, 2012). Several studies support that a strong connection between mind and body may offer the foundation for understanding the relationship between musical engagement and health and wellbeing (Hanser, 2010).

Wide access to music, low cost, and intrinsic motivation for listening, are interesting ingredients that have been motivating researchers to build a bridge between public health interventions and music (Västfjäll et al., 2012). However, little is known about the mechanisms that relate to wellbeing and music.

A complex interaction between specific listeners' characteristics (listeners' musical preferences, experiences, and personality traits), the music being played (where particular factors of the music play a specific role), and the situation (where factors of the context influence this interaction), is probably the key to understanding the relationship between the music being played and the aroused emotion. But what effects can be expected influencing health and wellbeing?

A recent study based on self-reports suggests that different mechanisms may influence stress in different ways (Västfjäll et al., 2012). If the purpose is to study mechanisms, and they depend on the context in which the music is played, it is necessary to study them both in laboratory settings and in a wide variety of real-life situations (Juslin et al., 2010).

Despite the importance of emotional and social elements (Saarikallio, 2012), most studies were conducted in artificial laboratory environments. Only a few recent studies have explored the functions of music in different cultures (Boer & Fischer, 2012; Saarikallio, 2008; Saarikallio & Erkkilä, 2007). This could lead us to underestimate the role of social listening motivations (Boer & Fischer, 2012).

Saarikallio (2012) suggests several reasons for why the strong effect of music on emotions has an impact on listener's mental health: the simple aesthetic enjoyment of music, an increased affective awareness, and music's ability to evoke personal emotional experiences and memories. In addition, several studies describe this effect on listener's physical health (e.g., Chanda & Levitin, 2013). In order to explore how particular emotions and induction mechanisms are manifested within specific cultural settings, one must adopt methodologies that better capture these interactions in-depth.

Lyrics and Emotions across Cultures

Understanding the interactions between music and emotion should also take into consideration a constantly neglected feature of the music – the presence, narrative, and salience of lyrics for music listeners. Several studies do not even mention whether the musical stimuli used in their experiments featured lyrics or not.

The way in which lyrics are combined with instrumental music often reflects cultural norms that are rarely explored empirically (Rothbaum & Tsang, 1998). Yet the majority of studies focusing on the relationship between music and emotion have examined instrumental music in particular,

neglecting the role of lyrics, as noted by Juslin (2005). This has probably been motivated by studies showing that lyrics rarely underlie emotional reactions to music (Juslin et al., 2008, 2011), or simply because lyrics themselves comprise a difficult construct to measure (Mori & Iwanaga, 2013).

Certain genres, such as pop and rock, are emotionally characterized in terms of the relationship between lyrics and music (North et al., 2004; Rentfrow & Gosling, 2003). A few studies have investigated listeners' mood *perception* with songs from different societies (e.g., Cho & Lee, 2006; Singhi & Brown, 2014). These studies have found that lyrics might influence the perception of a song's mood. However, these studies have focused on emotion perception. As previously explained, perceived emotions refer to what the music may be expressive of (e.g., this music expresses happiness), while felt emotions refer to how music makes listeners feel (Juslin & Sloboda, 2010, p. 188). Very few cross-cultural studies have examined how lyrics moderate listeners' emotional arousal in different societies and the mechanism underlying such experiences.

The few studies aimed at finding a relationship between music and lyrics somehow offer contradictory results. Most of these studies were especially interested in the impact of lyrics on mood or emotions, distinguishing between music with and without lyrics. In a review of the few available studies of lyrics until then, Ali and Peynircioğlu (2006) highlight the conflicting conclusions of the impact of lyrics. They also point out the difficulty in trying to study lyrics outside the context of music.

Recent studies also support the idea that in some cases, lyrics may actually play an important role in the arousal of musical emotions (e.g., Baltes, Avram, Miclea, & Miu, 2011; Brattico et al., 2011; Mory & Iwanaga, 2013). However, few studies have adopted a cross-cultural approach to how lyrics might influence emotional responses to music.

Aims of the Thesis

The central aim of this thesis is to investigate how musical emotions are mediated by various psychological mechanisms from a cross-cultural perspective. Five main research questions are raised: 1) Can hypothesized psychological mechanisms be empirically distinguished? 2) What is the relative prevalence of different mechanisms? 3) Does their prevalence vary as a function of cultural context? 4) How are mechanisms manifested in a specific cultural setting? 5) How are mechanisms influenced by the presence of lyrics? These questions were addressed using a multi-method approach featuring experiments, surveys, and interviews.

The objective of Study I was to manipulate various psychological mechanisms in an experimental setting in order to successfully predict emotional reactions to music. Thus, Study I aimed to test four of the causal mechanisms using existing pieces of music, increasing the ecological validity of the study.

To provide a deeper perspective on the prevalence of emotions, psychological mechanisms, and listening motives in different cultures in a large cross-cultural sample of music listeners, we conducted Study II. This study used a web survey that covered demographic variables, emotional reactions to music and individual differences focusing on the individualist-collectivist dimension.

Study III explored how particular mechanisms are manifested within a specific cultural setting. Moreover, the study aimed to capture adequate levels of detail, complexity, and nuance of individual uses of a specific genre within a particular country, adopting a qualitative approach.

The aim of Study IV was to test the influence of lyrics on emotions as induced by Swedish and Portuguese pieces of music. Lyrics are a common feature of music, but are rarely tested in experimental studies. Accordingly, we explored how lyrics may influence mechanisms in two different societies.

Study I – From Sound to Significance

Background and Aims

Few studies have tested underlying mechanisms explaining emotional reactions to music. Hence, separating the effects of distinct mechanisms is a crucial goal for understanding the processes mediating musical emotions. In an effort to distinguish four mechanisms included in BRECVEMA[4], Study I attempted to find existing pieces of music that include musical characteristics considered relevant to the arousal of these mechanisms (brainstem reflex, contagion, episodic memory, and musical expectancy). We also used a control condition (a 'neutral' piece of music) to help rule out alternative explanations.

To distinguish between the effects of each mechanism, it is possible to activate and to suppress specific mechanisms by manipulating various aspects of the *music*, the *context* where the music is played, and the *listener*. At least three different methods can be used to achieve this aim: first, using the principle of *information selection* – manipulating pieces of music in a way that provides or withholds certain types of information required for the activation of a specific mechanism; second, using the principle of *interference* – designing a specific test procedure that prevents specific information from triggering a mechanism; and third, using the principle of *procedural history* – manipulating listeners (Juslin, 2013).

Two complementary strategies in experimental studies of mechanisms underlying emotional reactions to music might also be used – synthesized pieces of music or existing pieces of music that include musical characteristics that are relevant to specific mechanisms. Juslin et al. (2014) adopted the first approach, permitting strong conclusions about causal relationships. Study I adopted the second approach. While the first approach suffers from low ecological validity, the second approach increases it, despite reducing internal validity.

Thus, the aim of Study I was to selectively manipulate these four mechanisms through the careful selection of existing and ecologically valid pieces of music in order to explore whether listeners' responses would show predictable patterns. Four experiments were carried out, seeking to demonstrate

[4] Before the recent inclusion of *Cognitive Appraisal*, the framework consisted of eight mechanisms (BRECVEMA).

similar effects despite the use of different pieces that featured partially different musical features: tempo, dynamics, tone attack, frequency spectrum, pitch, and key clarity.

This methodological approach allowed us to predict and control aroused emotions in terms of specific mechanisms, providing the theoretical basis for the following studies.

It was crucial to develop a set of diagnostic questions that could help researchers determine which mechanism caused a particular emotion in a self-report context. This resulted in the MecScale[5] (Juslin et al., 2014), a scale aiming to capture the mechanisms that occur. It consists of simple questions, each targeting one of the mechanisms in the BRECVEMAC framework.

To increase the validity of our conclusions about aroused emotions, multiple measures were used: self-reports of emotions, post hoc self-reports with regard to mechanisms (MecScale), and psychophysiological measures.

Based on previous research on mechanisms, we predicted that: the brain stem reflex condition would arouse mainly surprise; the contagion condition would arouse mainly sadness; the expectancy condition would evoke mainly surprise; the memory condition would arouse mainly nostalgia and happiness, and the neutral condition would arouse no emotions. We also expected the MecScale items to predict their target mechanisms as in the aforementioned study (Juslin et al., 2014).

Regarding participants' psychophysiological reactions and taking into consideration that: (a) skin conductance is a reliable measure of autonomic arousal; (b) zygomatic muscle activity in the face might reveal positive emotions; and (c) corrugator muscle activity is reflective of negative emotions (Andreassi, 2007; Lang, Greenwald, Bradley, & Hamm, 1993), we expected that: the brain stem reflex condition would produce higher levels of skin conductance than the contagion condition; the memory condition would produce more zygomatic muscle activity than the contagion condition; and finally, that the contagion condition would produce more corrugator activity than the memory condition.

Method

Participants

Participants for Study I were recruited by means of posters put up throughout Uppsala University. Sixty participants were recruited in total (29 male and 31 female, aged 19-58 years, $M = 26.2$, $SD = 7.7$). Most participants were students, 63% of whom played at least one musical instrument and

[5] This scale is used in all four studies included in this thesis.

55% of whom had received music education. The study consisted of four experiments and 15 participants were assigned to each of them.

Design

The experiments used a within-subject design with target mechanism as the independent variable (5 levels: brain stem reflex, contagion, episodic memory, musical expectancy, and neutral condition). The dependent variables were self-reported feelings (15 scales), mechanism impressions (MecScale), facial expression (zygomaticus and corrugator muscles) and autonomic activity (skin conductance level).

Stimuli

Five pieces of music were used in each experiment. They were chosen with consideration for the information believed to activate each target mechanism. These assumptions were based on previous studies correlating target mechanism conditions and musical features such as tempo, dynamics, attack, spectrum, pitch, and key clarity.

Brain stem mechanism was targeted by selecting pieces of music with extreme features, such as high sound level, quick attack, and sharp timbre; contagion mechanisms was targeted by selecting pieces of music that included a sad expression and solo voices performed on the cello or violin; episodic memory mechanisms was targeted by selecting highly familiar pieces of music for Swedish listeners; and musical expectancy mechanism was targeted by using unexpected melodies, harmonies, and rhythmic sequences. In order to target the neutral condition, we selected a piece of music that did not feature any type of information believed to arouse an emotion through the aforementioned mechanisms.

Measures

Experiential measures

The subjective component of listeners' aroused emotion was measured with 15 adjective scales. These scales were selected for inclusion because they represent response formats currently used in the field (Zentner & Eerola, 2010); "basic" emotion characteristics (Izard, 1977); all four quadrants of a circumplex model (Russell, 1980), and other terms such as *nostalgia*, *expectancy*, and *awe* (Juslin & Laukka, 2004), which possibly represent more music-related terms. Moreover, listeners also rated liking, familiarity, and "chills" experience. All ratings (except for "chills") were rated on a scale from 0 (*not at all*) to 4 (*a lot*).

Furthermore, in order to capture the mechanisms, participants filled out a second scale (MecScale). This scale comprised eight questions, each of which targeted one of the BRECVEMA mechanisms (Juslin et al., 2010), plus appraisal. All ratings were also on a scale from 0 (*not at all*) to 4 (*a lot*).

Psychophysiology

To increase the validity of self-report measures, physiological indices were also measured in terms of facial expression (recording EMG) and SC (measuring electrodermal activity). Both indices were obtained using the BIOPAC MP 150 System. The goal was to obtain evidence of an emotional response, distinguishing *felt* emotions from *perceived* emotions.

Procedure

Participants received detailed instructions about the experiment. They were tested individually at the Music Psychology laboratory, a sound-proofed room, sitting in a comfortable armchair. Both the stimuli and data collection were handled using the MediaLab software. The sound level was kept constant and comfortable for all listeners. After a 50-minute experimental session, participants were asked to fill out a short background variables questionnaire.

Results

Emotion Ratings

Because there were no significant differences between the four experimental groups in how they rated the neutral piece of music (common to all 4 experiments) on any of the 15 rating scales, this summary will focus only on data combined across experiments. Regarding emotion ratings, correlations confirm that the results were mostly in line with our predictions: the brain stem condition aroused mostly *surprise-astonishment*, the contagion condition aroused mostly *sadness-melancholy*, the expectancy condition aroused mostly *anxiety-nervousness*, and the memory condition aroused mostly *happiness-elation* and *nostalgia-longing*. The neutral condition was negatively correlated with all emotions, as we predicted (see Table 1).

Contrary to our predictions, the contagion mechanism aroused *nostalgia-longing*, and the expectancy mechanism aroused *sadness-melancholy*. On the other hand, the correlations for the predicted emotions were significantly larger than the one for the non-predicted emotion ($p > .05$).

The results also indicate that the neutral piece of music was negatively correlated with all emotions, providing a lower emotional intensity than the mechanism conditions; the brain stem reflex conditions produced the most

intense reactions; the contagion pieces were best liked and the expectancy pieces were least liked overall; and finally, the correlations for familiarity confirm that only the music in the memory condition was highly familiar to the listeners.

Table 1. *Correlations between emotion rating and target mechanism conditions across experiments 1-4 (N = 300)*

	Condition				
Emotion Scale	**Neutral**	**Brain stem**	**Contagion**	**Expectancy**	**Memory**
Happiness-elation	-.11	.07	-.09	-.31*	**.43***
Sadness-melancholy	-.27*	-.13	**.44**	**.19**	-.23*
Surprise-astonishment	-.02	**.59***	-.39	.01	-.20*
Nostalgia-longing	-.30*	-.19	**.28***	-.23*	**.44***
Anxiety-nervousness	-.11	.12	-.17	**.42***	-.26*
Intensity	-.41*	**.20***	.13	-.04	.11
Liking	-.33*	.02	**.32***	-.19*	.18
Familiarity	-.31*	-.16	-.15	-.22*	**.84***

Note: Correlations that are both statistically significant and positive in direction are shown boldface.

*p < *.00125.*

MecScale

The results for the MecScale were mainly as could be expected, considering the predictive value regarding mechanims. All conditions correlated for the most part with the corresponding items. The neutral condition was negatively correlated with all the items, which suggests that this piece had no necessary information to activate any of the mechanisms. Other additional correlations (significantly smaller than the predicted correlations) also occurred.

In order to assess the predictive power of the listener's MecScale ratings, we conducted a multiple discriminant analysis. This analysis aimed at predicting the target mechanism condition (four levels: brain stem reflex, contagion, memory, and expectancy) based on the MecScale items ratings. Because our combined analyses across all four experiments featured 240 cases, we were able to run this analysis. The results presented in a classification matrix showed that the overall hit ratio across the four emotion categories was 75% correct.

Classification accuracy ranged from 57% to 94%, with the best result for memory and worst for expectancy. Individual predictors (the MecScale items) showed that the majority of items made a unique contribution to the prediction.

Psychophysiology

With regard to SC level, measurements showed that the experimental conditions were clearly separated from baseline. Despite this distinction, the brain stem reflex and memory conditions tended to show higher levels of SC than the contagion and expectancy conditions (see Figure 1).

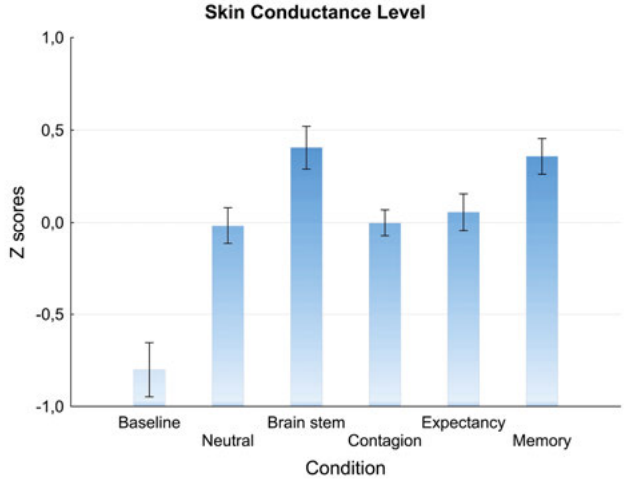

Figure 1. Means and standard errors for the listeners' skin conductance level (z scores) as a function of target mechanism condition, across Experiments 1-4.

A clearer differentiation between conditions was suggested by Facial EMG: a) zygomatic activity was lower for the contagion and expectancy conditions and higher for the brain stem reflex and memory conditions; b) corrugator activity was higher for the contagion and expectancy conditions and lower for the brain stem and memory conditions, and finally c) zygomatic activity was lower for contagion conditions than baseline and corrugator activity was lower for memory conditions than baseline.

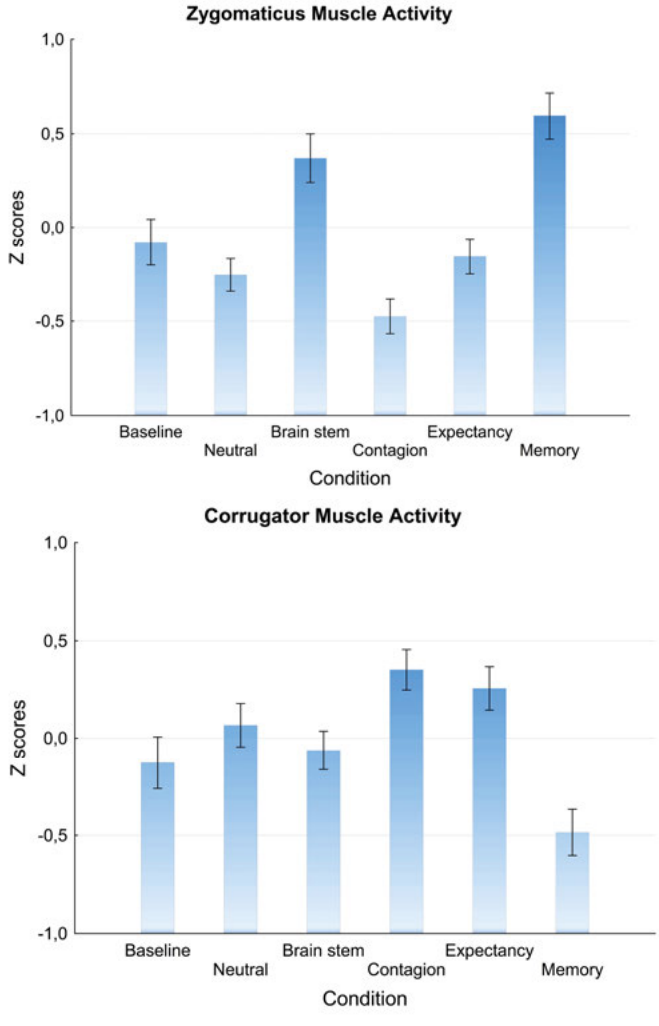

Figure 2. Means and standard deviation errors for the listeners' zygomaticus and corrugator muscle activity (z scores) as a function of target mechanism condition, across Experiments 1-4.

Conclusions

The results from Study I indicate, first, that target mechanisms aroused emotions in listeners largely in accordance with our theoretical predictions: The listeners' self-reports revealed that the brain stem reflex conditions aroused the most *surprise*; the contagion conditions aroused the most *sadness*; the episodic memory conditions aroused the most *nostalgia* and *happiness*; and the musical expectancy conditions aroused the most *anxiety*.

Second, these results were supported by psychophysiology in terms of autonomic and facial expression. This validates that listeners actually experienced the emotions reported rather than perceiving the emotion in the music, displaying patterns consistent with the emotion rating.

Third, the results regarding emotion ratings and psychophysiology were extended by the eight subjective impressions self-report items (MecScale). A multiple discriminant analysis indicated that these items could predict the target-mechanism condition with a high level of accuracy.

To conclude, listeners' emotional reactions to music can be successfully predicted based on theoretical manipulations of various psychological mechanisms. The present findings may be compared with those of a previous study, which used computer-manipulated versions of a piece (Juslin et al., 2014). This study corroborates the findings in that study, by showing that reasonably predictable response patterns can be obtained also with existing pieces of music.

This study also showed that musical features are not meaningful by themselves. Our mechanisms are responsible for this meaning: the difference between *sound* and *significance*. By showing that it is feasible to empirically distinguish between different mechanisms, and by partly validating the self-report measures (MecScale), Study I provided the theoretical and empirical foundation for the following studies.

Despite the manipulation of mechanisms, other emotions were also aroused in a weaker form. When using real pieces of music, it is clearly harder to differentiate between mechanisms. Real pieces of music afford several different kinds of emotionally relevant information that are difficult to separate. The contagion condition aroused *nostalgia-longing*, commonly associated with episodic memory. One possible explanation could be that nostalgia was an additional effect of this condition, because sadness is also a common trigger of nostalgia (Wildschut, Sedikides, Arndt, & Routledge, 2006).

We also acknowledge that the listener sample was small and featured listeners from only a single Western culture, disregarding individual and contextual variables. These limitations provided the impetus for Study II.

Study II – A Comparison of Individualist and Collectivist Cultures

Background and Aims

The aim of Study II was to investigate the prevalence of emotional reactions to music, psychological mechanisms, and listening motives using a cross-cultural sample of music listeners. Cross-cultural studies are essential to assess the generalizability of previous results and also have important implications for theory development (Juslin & Sloboda, 2010).

Four research questions were the basis of this study: does music arouse emotions in all cultures? If so, how often? Which emotions does music arouse? How does music arouse the emotions? Which functions does music serve in everyday life?

Taking into consideration that emotions depend on 'brain circuits' with a long evolutionary history (Striedter, 2004), cross-cultural similarities in emotional functioning are quite plausible. Juslin (2012) suggested that there are both differences and similarities between cultures, but that manifestations of cultural differences in behavior do not necessarily indicate different cognitive processes. Hence, we expected to see the same underlying mechanisms at work in different cultures, despite occurrence variation of emotions, mechanisms, and listening motives.

The analyses focused on the aforementioned dimension commonly used in cross-cultural studies – individualism and collectivism (Brewer & Chen, 2007; Hosftede, 2001; Triandis, 1995).

Concerning the prevalence of emotions, it has been hypothesized that "emotions that are 'helpful' or 'functional' in a culture will be more frequent and intense" (Mesquita, Vissers, & De Leersnyder, 2015, p. 546). Regarding the prevalence of mechanisms, the relative contributions made by culture and biology will differ depending on the particular mechanism involved. Certain mechanisms (e.g., memory) are influenced to a greater extent by cultural learning than others (Juslin, 2013). Finally, concerning the prevalence of listening motives, there might be a tendency to select musical events that lead to culturally valued emotions – described as 'ideal affect' (Mesquita et al. 2015; Tsai, 2007).

To address the above research issues, we conducted a web survey study (Tourangeau et al., 2013) covering three areas: 1) demographics variables;

2) emotional reactions to music; and 3) individual differences. This method allowed us to collect similar data from six groups and systematically compare data.

Web surveys share two characteristics with other types of surveys: they are presented visually and self-administered. There are mainly two types of web surveys: those relying on non-probability samples and those relying on probability samples. Study II used the first type of sampling.

Concerning emotional reactions, we used two kinds of emotional self-report based on a distinction in memory research (Robinson & Clore, 2002a): self-reports of emotion episodes that are close in time to the report, involving judgments based on *episodic memory* and abstract and frequency-based emotion episodes, involving judgments based on *semantic memory*.

This study was mainly exploratory, given the lack of previous cross-cultural studies of the issues at hand. However, we hypothesized that collectivist cultures would show a higher prevalence of *nostalgia* and its associated mechanism, *episodic memory*. Why would we expect differences in *nostalgia* cross-culturally? First, *nostalgia* involves shared social memories, so it should be especially important for collectivist cultures. Second, this emotion may serve specific psychological functions, such as enhancing social connectedness, identity, and meaning in life.

Moreover, collectivist cultures arguably show greater resistance to change and modernity. It has been suggested that nostalgia might serve the function of preserving social identity by reliving one's past (Shaw & Chase, 1989).

Method

Participants

Six hundred and sixty-eight participants (59% female, 41% male, $M = 32.8$, $SD = 13.4$) took part in the study. Participants did not receive any monetary compensation for their participation. The samples consisted of two groups: three individualist countries (Australia, Sweden, and the US) and three collectivist countries (Brazil, Kenya, and Portugal). They were recruited through advertisements on the internet posted on various forums and also through posters at universities.

Questionnaire

We designed a web questionnaire divided into four separate sections. The first section concerned a broad selection of demographic and individual variables. This section also included the measurement of music preferences – locally important genres from each country were included.

The second section measured *semantic knowledge* concerning emotional reactions to music based on fifteen scales measuring emotional reactions to music, and ten questions targeting eight BRECVEMA mechanisms, cognitive appraisal, and lyrics. Participants were asked to rate these aspects on a scale from 0 (*rarely*) to 7 (*often*). At the end of the survey, three items that also concerned semantic data asked participants about, first, the prevalence of nostalgia in life in general; second, how important *musical nostalgia* was in the participant's life, and finally, if they believed that listening to music enhanced their subjective wellbeing.

A third section measured *episodic knowledge* of musical emotions. Participants were asked to remember the most recent episode featuring the arousal of a musical emotion. Additional questions aimed to capture specific characteristics of the episode.

The fourth and final section featured a number of trait variables such as: (a) the Satisfaction With Life Scale (SWLS) – measuring wellbeing (Diener, Emmons, Larson, & Griffin, 1985); (b) the TIPI, a brief version of the Big Five Inventory (Costa & McCrae, 1992) – measuring extraversion, agreeableness, conscientiousness, emotional Stability (neuroticism), and openness to experience; and (c) the Rumination and Reflection Scale (Trapnell & Campbell, 1999) – the rumination subscale measuring individuals' self-attentiveness on perceived losses, threats, and injustices, while the reflection scale measured individuals' reflection and curiosity about the self.

Procedure

Participants in each country completed the survey on the internet using the web-based platform *eSurv*[6]. The survey was translated into Swedish and Portuguese by two of the authors, who are native speakers of each respective language. A brief cover letter enabled participants to decide whether or not they wanted to participate in the study. A total of 719 subjects completed the survey, of which 51 came from non-target countries, which had to be excluded from the final sample, to avoid problems in terms of interpretation. We also excluded another four participants who were too young to participate.

[6] *eSurv* is funded by several research institutions in the world and is based on a free and open-source platform.

Results

Semantic Data

Prevalence of emotions

A one-way between subjects MANOVA revealed a significant effect of culture category on prevalence of emotions, Wilks = .79, F (15, 651) = 11.34, p < .001, though the effect size was small in terms of Ferguson's guidelines for interpretation (Ferguson, 2009). Post hoc tests (Tukey's HSD) revealed a significant effect for eight of the 15 scales (= 53%).

The most prevalent emotions across the culture categories were *pleasure-enjoyment*, *happiness-elation*, *calm-contentment*, *love-tenderness*, and *nostalgia-longing*. Significant differences between the culture categories, with the largest effects across countries, occurred for *nostalgia-longing*, *love-tenderness*, and *spirituality-transcendence*, which were rated as more frequent in Collectivist cultures than in Individualist cultures.

Prevalence of mechanisms

A significant effect of culture on the prevalence of mechanisms was also revealed, Wilks = .78, F (10, 657) = 18.67, p < .001, but again with a small effect size. The most prevalent mechanisms were *rhythmic entrainment*, *aesthetic judgment*, *contagion*, *episodic memory*, and *evaluative conditioning*. Significant differences between the culture categories, with the largest effects across countries, occurred for *episodic memory*, *contagion*, and *cognitive appraisal,* which were also rated as more frequent in collectivist cultures than in individualist cultures.

Prevalence of listening motives

Regarding the listening motives, another MANOVA revealed a significant effect of culture on the prevalence of listening motives, Wilks = .81, F (16, 651) = 9.47, p < .001. Another small effect size was found. The most prevalent motives across cultures were *interest in the music*, *appreciate beauty*, *get energized*, and *create atmosphere*. A significant and large difference between the cultures occurred only for the motive *create atmosphere*.

Other items

Only 3% of all Pearson correlations between trait variables and listeners' prevalence of emotion were significant, all of them corresponding to a small effect size (Cohen, 1988). Regarding music and nostalgia, a t test, between subjects, showed no significant difference in rated *overall* nostalgia prevalence in everyday life between individualist and collectivist cultures. Similarly, there was no significant difference with regard to the belief that listening to music enhances one's wellbeing. Both cultures gave similarly high ratings on this item, t (666) = -1.05, p = .30, d = -0.09. Conversely, there was

a significant difference with respect to the rated importance of music-aroused nostalgia, where collectivist cultures rated *musical nostalgia* as more important (M = 5.09, SD =1.58) than did individualist cultures (M = 4.73, SD =1.65), t (666) = -1.05, p = .003, although the effect was small, d = 0.22.

Episodic Data

Figure 3 presents the prevalence of musical emotion across the two culture categories. A highly significant effect on emotions was revealed by a Cochran's Q test[7] (Q = 1171.05, df = 15, p < .001).

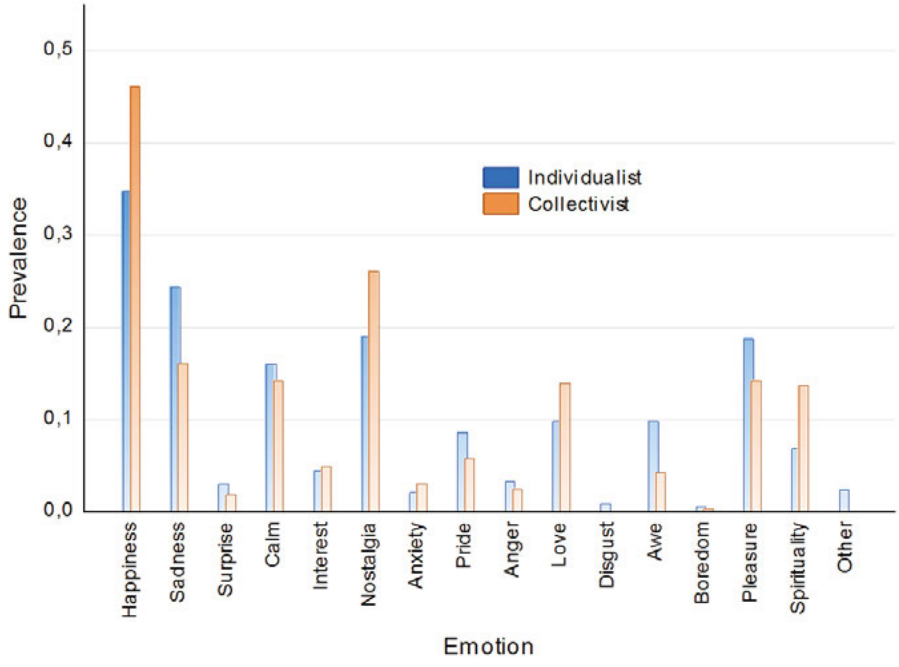

Figure 3. Prevalence of musical emotions in individualist and collectivist countries (episodic data).

Chi-square tests revealed a significant difference between the culture categories for five of the fifteen emotions (33%). *Happiness-elation*, *nostalgia-longing*, and *spirituality-transcendence* were all more frequently reported by collectivist cultures, while *sadness-melancholy* and *admiration-awe* were more frequently reported by individualist cultures, $\chi 2$ (1) = 4.69-8.71, *ps* =

[7] Cochran's Q test is a non-parametric test for three or more matched sets of frequencies or proportions where data are supplied as dichotomous (0/1) variables (Conover, 1999).

.03-.003, N = 668. Overall, *happiness-elation*, *nostalgia-longing*, *pleasure-enjoyment,* and *calm-contentment* were the most common emotion categories reported.

Figure 4 presents the prevalence of mechanisms across the two culture categories. A significant mechanism effect was revealed by a Cochran's Q test (Q = 1182.75, df = 11, p < .001).

Chi-square tests also revealed a significant difference for five mechanisms. Episodic memory was more frequently reported by collectivist cultures, while visual imagery, contagion, expectancy and lyrics were more frequently reported by individualist cultures, χ^2 (1) = 5.42-19.42, ps = .02-.001, N = 668. Regarding the tone of episodic memories, negative memories were more commonly reported by collectivist cultures (40%) than individualist cultures (6%). The opposite occurred for positive memories.

Regarding the listening motives, few significant differences were found between collectivists and individualists, despite an overall effect, Q = 525.79, df = 16, p < .001.

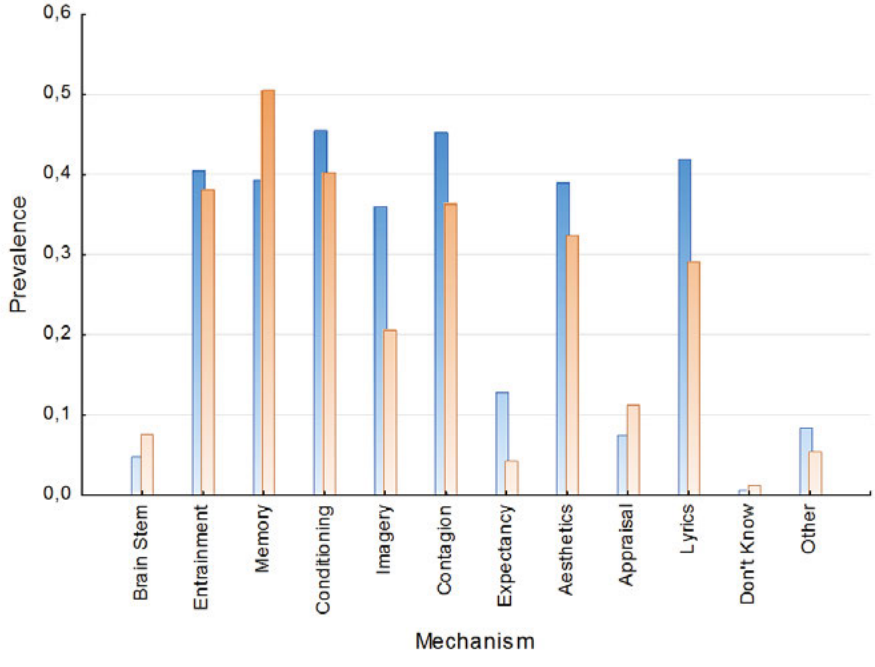

Figure 4. Prevalence of causal mechanisms in individualist and collectivist countries (episodic data)

Conclusions

Study II revealed cross-cultural differences regarding prevalence of emotions, mechanisms, and listening motives. Yet these difference were fewer and smaller than expected (63% of the contrasts between cultures were significant and 92% of these did not exceed a small effect size).

First, the largest and most consistent effects across countries occurred for *nostalgia-longing*, *love-tenderness*, and *spirituality-transcendence*. These emotions were more frequent in collectivist cultures than individualist cultures. Hence, collectivist cultures reported a higher prevalence of *nostalgia-longing* as hypothesized. They also attached higher importance to *musical nostalgia*, and reported a higher prevalence of the episodic memory mechanism.

Second, the episodic data were mainly consistent with the semantic data: *nostalgia-longing*, *spirituality-transcendence* and *happiness-elation*, and the mechanism *episodic memory* were more prevalent in collectivist cultures while *sadness-melancholy* and *admiration-awe*, and the mechanism *musical expectancy* were more prevalent in individualist cultures.

Third, *negative memories* were more common in collectivist cultures whereas *positive memories* were more common in individualistic cultures. According to Batcho (2007), unhappy memories can also evoke nostalgia, if this memory reinforces one's sense of self and connectedness to others.

In conclusion, we found specifically that, first, patterns of the prevalence of emotions and mechanisms are quite similar across cultures; second, the same psychological mechanisms occur across different cultures, despite prevalence variation; and third, these results support the idea that mechanisms are biologically-based.

In addition to these results, Study II also indicated that listening motives may be country-specific rather than subject to "individualism-collectivism". One must probably seek explanations of listening motives at the level of more specific interactions between the *listener*, the *cultural context*, and the *specific music genre*. In order to explore such interactions in-depth, I decided to conduct Study III.

.

Study III – Nostalgia and Sadness in Fado Music

Background and Aims

Study II revealed that the prevalence of emotional reactions to music and their underlying psychological mechanisms are relatively similar across collectivist and individualist societies. Despite prevalence similarity across cultures, collectivists reported a higher prevalence of *nostalgia-longing* and a greater sense of importance regarding *musical nostalgia* in their daily lives.

However, contextual variables mapped in the episodic data provided few clues concerning how to explain the found differences between the two culture categories. To explore how particular mechanisms are manifested within a specific cultural setting, I decided to adopt a qualitative approach in Study III, looking at specific interactions between the listener, the cultural context, and the music. According to Juslin (2013), each mechanism could be associated with specific genres, the listener's mood, and the listener's activities. Accordingly, musical, contextual, and individual factors play a crucial role in the activation of these mechanisms.

One of the most common forms of qualitative data collection is in-depth interviews. The main goal of coded research interviews is to gather enough relevant information from participants to reliably code the interview. The interviews allow us to go beyond the content of our participants' words and capture the psychological processes that might be at work. Some research questions are very hard to answer through other means (Josselson, 2013). This approach allows for a broad and rich picture of the listener's reality, depicting schemes and constructions that can be subject to thematic analyses.

Taking into consideration the social and cultural context of music listeners, Study III aimed to investigate emotional reactions to music, capturing the individual uses of music at sufficient levels of detail, complexity and nuance by answering four main questions: 1) what are the most common emotions evoked by fado music? 2) What is the relationship between the emotions aroused by fado and the BRECVEMAC mechanisms? 3) How is the listener's experience influenced by the physical and social context? 4) Does fado music enhance listeners' sense of wellbeing?

This approach explored the functions and affordances of music taking into consideration the interaction between listener, context, and music. Furthermore, this study explored how different factors influence specific mechanisms. This enabled the possibility of exploring how particular mechanisms and emotions are used within a specific cultural setting.

The study focused particularly on nostalgia, defined as a "sentimental longing or wistful affection for the past" (Pearsall & Hanks, 1998). Due to the strong focus on nostalgia, I decided to explore the emotions aroused by fado music in Portugal, one of the last collectivist societies in Western Europe (Hofstede, 2001). As noted by several researchers (Juslin & Laukka, 2004; North & Hargreaves, 2008; North et al., 2004), most studies have neglected music's emotional contexts. Because fado music is intertwined with particular venues, this aspect was broadly explored.

Fado originated in the streets of Lisbon, Portugal. It is known for its strong stress on loss, memory, sadness, and nostalgia-longing (Elliot, 2010; Gray, 2007; Nielson, Soares, & Machado, 2009). This genre is mostly performed in *tascas* (local bars) or *fado houses* (small restaurants with live music), contexts considered particularly important for evoking strong emotions with fado music (Gray, 2007).

Method

Participants

Thirty-four participants, 17 males and 17 females, aged 19-65 (M = 34.3, SD = 13.7) participated in the study. Due to the aim of the research, a *maximum variation sampling* strategy was implemented (Polkinghorne, 2005). The intention of this selection process was to explore the variation within fado fans as well as the common essential of being a fado fan. Of the 34 participants interviewed, 12% had attended only primary school, and 41% had attended university. Nineteen participants (56%) received basic music education training, and fifteen participants (44%) received high music education training from music centers or conservatoires. Two participants were unemployed and other two were pensioner. The remaining participants either worked or studied.

They were approached in fado music bars (*tascas*) and restaurants (*fado houses*) in three Portuguese cities, where they were invited for an in-depth interview about their emotional experiences with fado music. Participants were further recruited through advertisements and Facebook fado fan groups.

Interview Schedule

An interview schedule was built consisting of demographic questions, four key research questions, and open-ended follow-up questions. The key questions targeted specifically (a) emotions aroused by fado; (b) emotion causation; (c) the role of context, and (d) wellbeing. The follow-up questions for emotion causation consisted of an adapted version of the MecScale (Juslin et al., 2014), each question targeting one of the mechanisms in the BRECVEMAC framework, plus lyrics.

Procedure

The study was conducted between February and April 2015. Before the interviews, participants were informed about the goals and the length of the study and signed a written consent form. They were also informed that the interview would be recorded using a digital voice recorder. Interviews took place at participants' homes (11 participants) and in several other quiet places (23 participants). Interview techniques such as clarification, confrontation, and paraphrasing were used, following Josselson's (2013) recommendations. The interviews were conducted in Portuguese.

Analyses

The interviews were evaluated following Braun and Clarke's (2006) thematic analysis principles. In order to facilitate the transcription process, I used online software that enables pausing, rewinding and slowing down audio. After being checked for precision, the transcriptions were translated from Portuguese to English. Topics of concern were noted, divided into themes and sub-themes, and analyzed deductively.

The data were first coded using pen and paper, and then analyzed with qualitative data software, *QDA Miner*. The final themes and sub-themes were obtained after first reading all the interviews; second, allocating data into initial codes; and finally, by finding additional codes during the translation process.

Results

Main Theme 1: Fado and Emotion

To create an emotion frequency distribution graph, emotion categories were created using participants' own words. The results suggest that fado music especially aroused *nostalgia-longing* (88%), *sadness-melancholy* (62%), and *happiness-elation* (38%). Words used by only one participant were assigned to a broader related category (e.g., sorrow and loss were assigned to *sadness-*

melancholy; euphoria and ecstasy to *happiness-elation*; pain to *anguish-suffering*; tranquility and harmony to *calm-contentment*; and passion to *love-tenderness*).

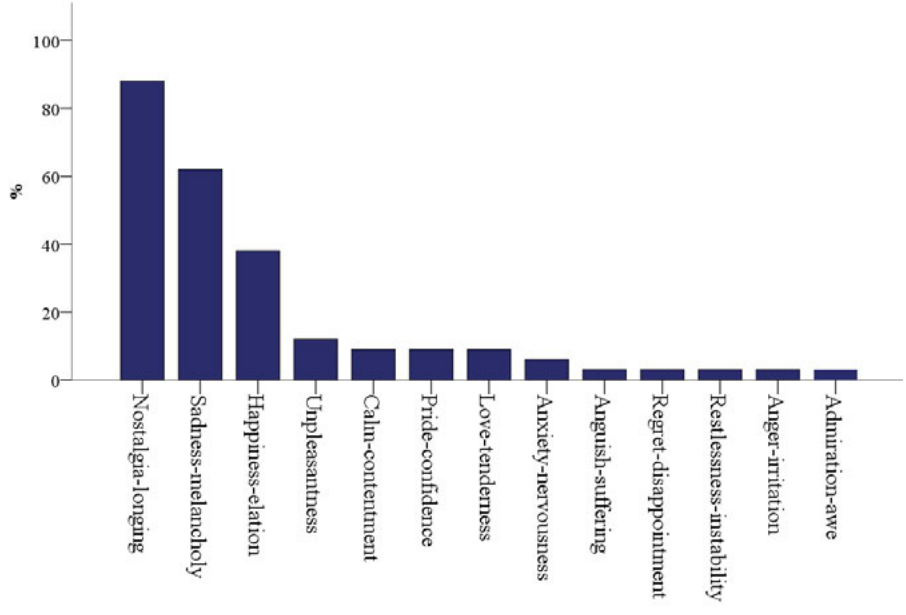

Figure 5. Percentage of participants (*N = 34*) who mentioned each emotion at least once on key question 1 (What are the most common emotions fado evokes in you?)

A certain ambivalence between nostalgia, happiness, and sadness was commonly reported, in line with previous descriptions of nostalgia (Barret, Grimm, Robins, Wildschut, Sedekides, & Janata 2010). Nostalgia was also associated with anguish, love, and pride, while sadness was associated with pain and regret.

Main Theme 2: Underlying Causes

Participants could answer *yes* or *no* to each of the probe questions based on the MecScale. Based on these answers, it could be estimated how often these were regarded as a cause (e.g., what participants thought to be the cause of the previously mentioned emotions). The results show that emotions aroused by fado were mediated in particular by episodic memory, contagion and aesthetic judgment, lyrics, and visual imagery. The remaining mechanisms were either infrequently regarded as a cause for emotions aroused by fado music (e.g., cognitive appraisal, brain stem reflex, and rhythmic entrainment) or involved few explanations of *which* emotions were mediated (e.g., musical expectancy and evaluative conditioning.

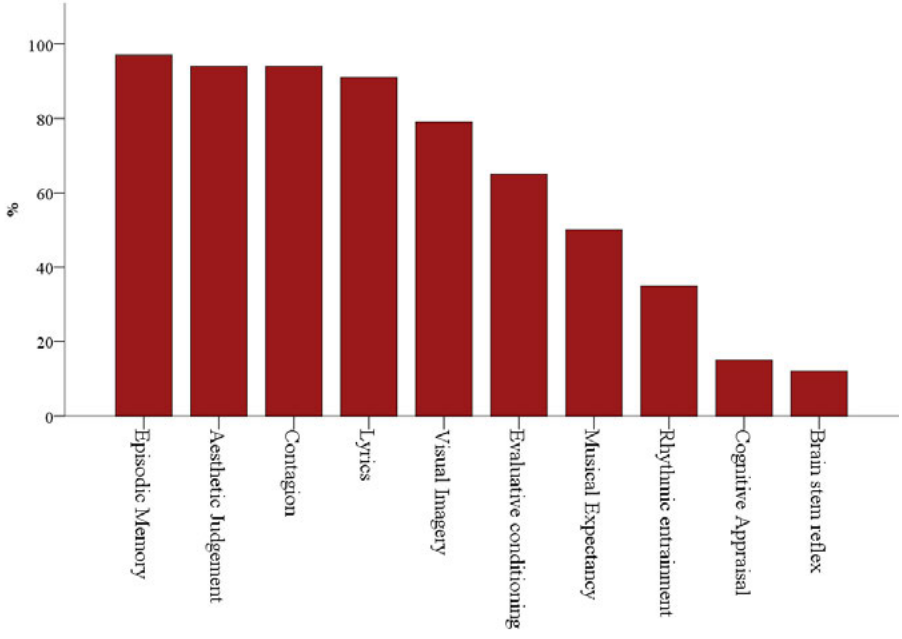

Figure 6. Percent of participants ($N = 34$) who answered "yes" on key question 2 probe questions (an adapted version of MecScale).

Four particular mechanisms underlying experiences with fado music were explored: First, there was a clear connection between episodic memories and nostalgia. When the emotion was thought to have been caused by the episodic memory mechanism, the emotional tone of these memories was *negative* for 43 % of the interviewees, followed by *mixed* (36%), and *positive* (21%). Negative and mixed memories were related to nostalgia or sadness, serving as reflections or ways to overcome specific past experiences. These memories allowed participants to direct future behavior, reinterpret the past, and reinforce their sense of self and connectedness with others. On the other hand, positive memories served as bonding experiences and enjoyment in particular.

Despite also enjoying other genres in everyday life, all participants reported to be fado fans, with 78% of participants reporting family history reasons. These results suggest that preference for fado music might be linked to the reported autobiographical memories and familiarity.

Second, the contagion mechanism was related to three main musical aspects: the singer's voice, the instruments and the melody, and contextual factors related to place, such as the atmosphere and intimacy created at fado venues. These made it possible for participants to identify and vent particular emotions.

The artist's voice was regarded as one of the most fundamental causes of musical emotions and was related to five different aspects: first, the expression of the voice; second, the body expression; third, how emotions were conveyed by the voice; fourth, the singer's experience and finally, how the singer's apparel (e.g., black dress and shawl) matched the sad and nostalgic themes sung by the artist.

Third, the influence of lyrics was mediated by the episodic memory and contagion mechanisms. These allowed participants to feel a sort of *historical nostalgia*[8] conveyed by the words, serving *identity* and *venting* functions. Lyrics also provided the necessary context and narrative description to trigger emotions via the visual imagery mechanism.

Fourth, aesthetic judgements of fado music relied on four main criteria: *message*, *beauty*, *style*, and *expression*. These results are in line with Juslin, Sakka, Barradas, and Liljeström (2016a), providing further evidence that there are large individual differences in aesthetic judgement between listeners.

Fifth, the visual imagery mechanism overlapped in particular with episodic memories and lyrics, suggesting the simultaneous occurrence of some mechanisms. This mechanism mediated sadness and nostalgia especially, allowing participants to counter their loneliness, relax, and reflect.

Finally, all of the remaining mechanisms (brain stem reflex, rhythmic entrainment, evaluative conditioning, musical expectancy, and cognitive appraisal) included in the BRECVEMAC were mentioned at least once as a whole.

Main Theme 3: Fado in Context

Three main sub-themes were found in the data: *the atmosphere*, *interaction and proximity between listener and performers*, and *community strength and bonding*. Participants reported that fado venues influence their emotions due to: first, intimate properties of the place, a proper atmosphere; second, the settings and rituals; third, the silence afforded while the artist performs; fourth, whether these venues enabled public venting experiences (e.g., crying); and fifth, how these contexts were evocative of specific emotions, mainly nostalgia and sadness. Particular rituals like lighting candles and dimming the lights were considered important for strong emotions associated with fado music. For quotation examples, see Table 2.

[8] When the past is perceived as superior to the present, the object of nostalgia is the past history, referred to as *historical nostalgia*, even if it involved struggle and displeasure (Batcho, 2007).

Table 2. *Main theme 3 – fado in context*

Sub-themes	Quotations examples
The atmosphere (85%)*	"Finally there's this entire atmosphere: the musicians, the Portuguese guitar. Dimmed lights, quiet environment: fado will be sung! And all this makes fado what it really is." (P8, M, 59yrs) "I think that the main reason why people join fado houses is the search for emotions." (P16, M, 40yrs)
Interaction and proximity between listener and performers (41%)	"The proximity is so great [at the fado house]; in fact we establish a relationship between the person who is singing and the listener. The body expression and the facial expression are part of the message." (P19, F, 32yrs) "People can stay all night singing together with the performers… it is smaller, it is more intimate, it is more personal, we feel more. Here you feel the emotions that the musicians and especially the singer are feeling. You can see their expressions while singing." (P14, F, 25yrs)
Community strength and bonding (41%)	"Many people don't know each other, but we have something in common. I look people in the eyes and I feel that I know them because they share this experience with fado. All of us get moved by the music. We don't know each other but we understand what each of us is feeling. It is special." (P24, F, 22yrs)

*Percentages show the proportion of participants (N = 34) who contributed data to the sub-theme. Note: P = Participant; F = female; M = male.

Figure 7. Contexts for fado (from top left to right: traditional fado house; Lisbon *tasca*; Coimbra fado house; Coimbra *serenade*).

At these venues, fado fans could meet their peers and friends and nurture a sense of belonging, community, group solidarity, and union. The results suggest that bonding with others is a common function for fado listeners and further support the notion that nostalgia may also boost the perception of social support in special musical contexts.

Main Theme 4: Fado and Wellbeing

The results for this theme were divided into five main sub-themes: (1) *overcoming past experiences* – participants reported how negative and mixed memories helped them reflect and find ways to overcome difficult life situations; (2) *crying through fado* – venting emotions through this genre (e.g., crying, releasing tears) increased participants' sense of wellbeing; (3) *reflection and rumination* – in certain circumstances, fado music caused participants to dwell and ruminate on their feelings, while sometimes it helped them reflect on their lives; (4) *identification and mood matching* – fado lyrics helped participants identify with what the singer wanted to convey, matching their current mood with fado themes; and (5) *nostalgia and loneliness* – nostalgic memories helped decrease feelings of loneliness. The majority of participants reported using fado music for emotional regulation purposes. For quotation examples, see Table 3.

Table 3. *Main theme 3 – fado and wellbeing*

Sub-themes	Quotations examples
Overcoming past experiences (38%)*	"[Fado songs] are life lessons. Reflections on life. Reminiscing on these feelings reminds me that these events have passed, but also that I have overcome them, making me indestructible." (P31, M, 20yrs)
Crying through fado (74%)	"Yes I do cry. It's not a sad cry. It fills our hearts. It [fado] touched me and I cry. Those tears, my glazed eyes because the identification was so strong. It happens many times." (P28, F, 34yrs)
Reflection and rumination (76%)	"Some fado songs make me feel better because they take me to the early stages of my life and then I can reflect on who I am." (P1, M, 43yrs) "Sadness, like happiness, is something that we can become addicted to, isn't it? And sometimes we allow ourselves to be, we let it happen. And if we have a trigger to do it, because it is easier, why not use it? That trigger is fado, yes it can be." (P24, F, 22yrs)
Identification and mood matching (50%)	"Sadness makes you feel good because it sublimates your sadness. (…) I put on a song of Amália [fado singer], those that reflect the greatest sadness, and I listen to it, I identify myself with every word she sings and I think: you know what this is, you know what I am feeling. When I have finished listening I am feeling better." (P10, F, 52yrs)
Nostalgia and loneliness (62%)	"It's very personal when I am feeling alone and nostalgic. (...) fado music gives me the sensation that there is someone who understands me. […] when you are not well, feeling down… there is someone […] who might be listening to that specific music. The music itself understands me... I think I feel understood." (P24, F, 22yrs)

*Percentages show the proportion of participants (N = 34) who contributed data to the sub-theme; Note: P = Participant; F = female; M = male;

Conclusions

Study III explored in depth the individual uses of fado music, and how particular mechanisms and emotions are manifested within a specific cultural setting.

The results clearly suggest that fado music serves specific functions in its original culture. Fado listeners seem to prefer musical experience at *fado houses*, *tascas* and *serenades*, especially because these contexts lead to nostalgic and sad experiences associated with fado music – culturally valued emotions for the Portuguese people, due to both historical reasons and individual uses of music. Additionally, nostalgic experiences with fado were related to an increased sense of wellbeing.

Importantly, *nostalgia-longing* and *sadness-melancholy* were the most frequent emotions experienced by fado listeners, in line with descriptions from other disciplines. The use of probe questions also highlighted how all the BRECVEMAC mechanisms may occur as emotion mediators, some more commonly than others. The most frequently reported mechanisms mediate specific emotions and involve partly distinct functions.

First, the episodic memory mechanism mediated in particular nostalgia and happiness, making participants recall mostly negative and mixed autobiographical memories. These memories were in turn often related to nostalgia or sadness, serving to aid reflection or inspire ways to overcome specific past experiences, allowing listeners to direct future behavior, reinterpret the past (reappraisal), and reinforce their sense of self and connectedness with others.

Second, the contagion mechanism was triggered by three main musical aspects – the voice, the instruments, and the melody – and by contextual factors of place such as the atmosphere – the intimacy created at fado venues – allowing the participants to identify with and vent particular emotions.

Third, the influence of lyrics was usually mediated by the episodic memory and contagion mechanisms, allowing participants to feel a sort of historical nostalgia conveyed by the words. The narrative description or message fado conveyed also served identity and venting functions.

Fourth, listeners judged the aesthetic value of fado music relying particularly on four main criteria: message, beauty, style and expression.

Finally, the visual imagery and episodic memory mechanisms overlapped throughout the interviews, with frequent references to the lyrics as well, suggesting that some mechanisms may occur simultaneously on specific occasions. Visual imagery mediated sadness and nostalgia, making it possible for some participants to counter their loneliness, relax, and reflect.

These results highlighted the extent to which the context of fado music influenced emotions and their underlying mechanisms. The same participants also gave primacy to how these contexts contributed to their wellbeing.

An important and surprising finding of Study III is that participants regarded *lyrics* as a dominant cause of musical emotional responses to fado. Other studies found that lyrics accounted for only 4-10% of self-reported causes of musical emotional responses in a Swedish music context (see Juslin et al., 2008, 2011). This finding supported my motivation for Study IV, an experiment aimed at exploring the effect of lyrics on emotions and mechanisms in two different societies.

Study IV – When Words Matter

Background and Aims

One of the factors neglected in the study of music and emotion is lyrics. Despite the fact that the majority of music heard today features lyrics, few studies have explored their influence on listeners' emotional arousal (Juslin, 2005; Mori & Iwanaga, 2014; Stratton & Zalanowski, 1994).

There are contradictory results on the relationship between music and lyrics. For example, Straton and Zalanowski (1994) found that, when comparing emotional responses to music alone with a combination of music and lyrics, the addition of lyrics to music resulted in a stronger effect on mood. However, Sousou's findings (1997) did not replicate these results. The contrasting findings were interpreted by the author as the result of a difference in stimulus selection. The perception of song lyrics seems to be influenced by personal opinions and experience, inspiring distinct feeling among adolescents and young adults (Schlegel, 1999). In addition, the way in which lyrics and music are combined often reflects specific cultural norms (Rothbaum & Tsang, 1998).

Study II revealed that listening to the lyrics was regarded as an important motive for music listening, especially in collectivist societies. This is in line with the results of Study III, which suggested that lyrics are regarded as a paramount cause of fado's musical emotions and their main cause after episodic memories and contagion.

Given the lack of previous studies regarding the relationship between lyrics, culturally valued musical genres, arousal of emotions, and underlying mechanisms, this study was partly exploratory. The aim of this study was to explore the extent to which the induction of musical emotions is influenced by the presence of lyrics, and if this differs cross-culturally. More specifically, the study tests which musical emotions and mechanisms are moderated, and whether this relation is affected by the origin of the music (Portuguese/Swedish), or by the cultural background of the listener.

Based on previous findings (Brattico et al. 2011), we hypothesized that, the presence of lyrics would result in higher levels of sadness, while happiness ratings would not be affected by the lyrical content (in both groups). Based on results from Studies II and III, we also we hypothesized that, in the Portuguese sample, nostalgia ratings would be higher when lyrics were present.

Method

Participants

The sample consisted of fifty participants (50% female, 50% male) between the ages of 18 and 44. There were 25 Portuguese participants (12 males and 13 females, aged 18-34 years, $M = 24.3$, $SD = 4.4$) and 25 Swedish participants (13 males and 12 females, aged 19-44, $M = 25.8$, $SD = 5.2$).

Statistical tests indicated no significant difference between the two groups with regard to age, experience with playing a musical instrument or music education. The Portuguese participants were recruited via response to an email sent to Madeira University students in Portugal, while the Swedish participants were recruited via posters hung up throughout Uppsala University in Sweden.

Design

The study employed a 2*3*2 mixed factorial design, with *participant origin* as the between-subjects factor (2 groups: Portuguese and Swedish), and *lyrics* and *music origin* as the two within-subjects factors.

The *lyrics* factor featured three levels: *instrumental*, *lyrics on screen*, and *sung lyrics*. *Music origin* featured two levels: *familiar piece* and *foreign piece*. Finally, the dependent variables consisted of aroused emotions and MecScale items (ten items each targeting one of the BRECVEMAC mechanisms, plus lyrics).

This was considered an *incomplete factorial design* (Byar, Herzberg, & Tan, 1993) because: first, the conditions for the two participant groups feature different, although matched, stimuli. That is, the conditions including the *familiar piece* featured the Portuguese piece for the Portuguese participants, and the Swedish piece for the Swedish participant. Therefore, the analysis was done in two steps, one step for each participant group.

Second, the condition *lyrics with voice - foreign piece*, featured only the voice but not the lyrics aspect of the condition. This is because the sung version was not translated - the Portuguese participants only understood the meaning of sung lyrics when the Portuguese sung version was played, and the Swedish participants only understood the meaning of sung lyrics when the Swedish piece was played. So, we decided to omit this condition from the analyses. According to Byar et al., (1993) incomplete factorial designs may offer a reliable option in these situations. Note that this was not the case with *lyrics on screen*, because these lyrics were translated either to Portuguese or Swedish, taking into consideration if the group was Portuguese speaking or Swedish speaking.

Stimuli

Two pieces of music were selected for inclusion in the study, a Portuguese fado folk song and a Swedish folk song. The piece "Vem kan segla förutan vind?", recorded in a single by Nina Lizells and Lee Hazel Woods in 1971, represented the Swedish origin of the melody. Representing the Portuguese origin was the fado song "Segredos", written by Paulo Valentim in 2013. This fado song represents the themes normally associated with fado for the Portuguese. Both songs featured lyrics usually *perceived* as sad.

All conditions were based on these two original pieces of music (one with Portuguese origin and another with Swedish origin), which were manipulated regarding the presence of lyrics.

Measures

Aroused emotions were measured by means of a 12-item adjective scale, previously used in other experiments at Uppsala University specifically for the measurement of emotions in response to music (e.g., Juslin et al., 2014; Liljeström et al., 2013). Two additional scales measured emotion intensity and familiarity. The activation of the nine BRECVEMAC mechanisms was measured with the MecScale (Juslin et al., 2014). A final item measured if lyrics had an influence on participants' emotions.

Procedure

The experiment took place in two countries, Portugal and Sweden. Participants were informed that they would need to listen carefully to previously selected pieces of music. They also received instructions for describing their emotions, the intensity of these emotions, and how familiar the pieces were. Participants were also informed that ten other questions would explore other aspects of their music experience. Each participant was tested individually and listened to the music through high-quality headphones. Participants completed the study using the *MediaLab* software. An experimental session lasted about 30 minutes.

Results

In order to test the main effect of *lyrics* and the interaction effect between *lyrics* and *music origin* on emotions and mechanisms, we computed 2*2 repeated measures ANOVAs, with *lyrics* (2 levels: *instrumental* and *lyrics on screen*) and *music origin* (2 levels: *familiar piece* and *foreign piece*) as factors, and emotions/mechanisms as the dependent variables. Significant main effects of lyrics are presented in Table 4 for the Portuguese group and Table 5 for the Swedish group.

A one-way repeated measures ANOVA, with *lyrics* as independent variable (3 levels: *instrumental*, *lyrics on screen*, and *sung lyrics*) controlled for the effect of written lyrics on the screen for the familiar piece[9]. This enabled controlling for differences between level 1 and 3 (i.e., if the *sung lyrics* condition was also significantly different than the *instrumental* condition), and if there was a lack of significance between levels 2 and 3 (i.e., if *lyrics on screen* and *sung lyrics* conditions did not differ significantly). These results are not further explored in this summary.

Portuguese group

In line with our hypotheses, the presence of lyrics significantly increased ratings of *sadness-melancholy* and *nostalgia-longing*, while there was no effect on *happiness-elation*. These effects were independent of the origin of the music. Regarding the remaining emotions, the presence of lyrics significantly increased ratings of *interest-expectancy* and *emotion intensity*.

Regarding the mechanisms, lyrics had a significant effect on *episodic memory*, *contagion*, *evaluative conditioning*, and *visual imagery*. Specifically, mean ratings for all mechanisms were higher in the *lyrics on screen* condition compared to the *instrumental* condition, while the origin of the music did not interact significantly with the presence of lyrics for no mechanism.

Repeated measures ANOVAs with *lyrics* as the independent variable (3 levels: *instrumental*, *lyrics on screen*, and *sung lyrics*) on the emotions and mechanisms revealed that all ratings were significantly higher for the *sung lyrics* condition compared to the *instrumental* condition. The only exception occurred for nostalgia-longing.

[9] This could only be done for the familiar piece, because the foreign piece did not feature a valid *sung* condition in both groups.

Table 4. *Significant main effects of Lyrics on self-reported emotions and mechanisms for the Portuguese sample*

	Significant main effect of lyrics in both songs		
Emotion[1]	*F*	*p*	η_p^2
Sadness-melancholy	27.00	$p < .001$	.53
Interest-expectancy	11.37	.0025	.32
Nostalgia-longing	11.22	.0027	.32
Emotion intensity	15.11	.001	.39
Mechanism[2]			
Episodic memory	26.00	$p < .001$	.52
Evaluative conditioning	19.84	$p < .001$	.45
Contagion	24.52	$p < .001$	.50
Visual imagery	16.00	.40	.40

1) The alpha level is adjusted for multiple comparisons ($n = 13$) from $\alpha = .05$ to $\alpha = .0038$

2) The alpha level is adjusted for multiple comparisons ($n = 9$) from $\alpha = .05$ to $\alpha = .0055$

Swedish group

Regarding our hypotheses, the presence of lyrics did not have a significant effect on *happiness-elation* or *sadness-melancholy* ratings. Regarding the remaining emotions, the presence of lyrics significantly increased ratings of *surprise-astonishment*. There was no significant interaction effect between *lyrics* and *music origin* (familiar or foreign) for any of the ratings.

Regarding mechanisms, lyrics had a significant main effect on *episodic memory*. Specifically, mean ratings for episodic memory was higher in the *lyrics on screen* condition compared to the *instrumental* condition, while the origin of the music did not interact significantly with the presence of lyrics for no mechanism.

Repeated measures ANOVAs with *lyrics* as the independent variable (3 levels: *instrumental*, *lyrics on screen*, and *sung lyrics*) on the emotions and mechanisms revealed that all ratings were significantly higher for the *sung lyrics* condition compared to the *instrumental* condition.

Table 5. *Significant main effects of Lyrics on self-reported emotions and mechanisms for the Swedish sample*

	Significant main effect of lyrics in both songs		
Emotion[1]	F	*p*	η_p^2
Surprise-astonishment	15.92	.001	.40
Mechanism[2]			
Episodic memory	10.63	.003	.31

1) The alpha level is adjusted for multiple comparisons ($n = 13$) from $\alpha = .05$ to $\alpha = .0038$

2) The alpha level is adjusted for multiple comparisons ($n = 9$) from $\alpha = .05$ to $\alpha = .0055$

Conclusions

Study IV aimed to explore the effect of lyrics on emotions and mechanisms with music and whether there might be a cultural difference in this effect. Our results clearly support the existence of cross-cultural differences regarding how lyrics influence emotions and mechanisms: first, lyrics had an additional effect on musical emotions and the induction of underlying mechanisms; second, this effect varied between groups of different cultural backgrounds; and finally, the differences between groups were not determined by the music's origin, but by the participants' origin.

These differences were found between the different emotions and mechanisms and between the two societies, indicating that the overall pattern was significantly different across Sweden and Portugal.

Differences involved a wider range of emotions and mechanisms in the Portuguese group than the Swedish group. This is in line with previous results suggesting that lyrics are not a main cause of musical emotions for Swedish listeners (Juslin et al., 2008, Juslin et al, 2011). The results are also in line with Study III which featured a Portuguese listener sample, where fado lyrics were considered important for 91% of participants.

The finding that the patterns of responses were similar for both pieces of music (Portuguese fado and Swedish folk) indicates that this potential interest in sadness and nostalgia might be independent of the music's origin or familiarity. It may therefore be that sadness and nostalgia represent culturally valued emotions for Portuguese listeners, as supported by the results of Study III.

Regarding reports for mechanisms in the Portuguese group, the presence of lyrics resulted in higher ratings of evaluative conditioning, contagion, visual imagery, and episodic memory. Interestingly, contagion, visual imagery, and episodic memory were the three mechanisms found to be associated with lyrics in Study III.

General Discussion

The general aim of this thesis was to investigate how musical emotions are mediated by various psychological mechanisms from a cross-cultural perspective. The thesis also aimed to answer five main research questions. The first question focused upon the empirical distinction between hypothesized mechanisms. The second question concerned the relative prevalence of the different mechanisms. The third question regarded their prevalence variance as a function of cultural context. The fourth question related to how mechanisms are manifested in a specific cultural setting. Finally, the fifth question concerned the influence of lyrics on mechanisms cross-culturally.

This thesis contributes to filling these gaps in music psychology literature by presenting a number of novel findings. I will begin this discussion by summarizing the main findings of this thesis. Second, I will present the implications for each question by elaborating on each study. Third, I will point to some other findings outside the scope of the main objectives of the thesis before concluding with some limitations, future directions, and concluding remarks.

Main Findings

The overall main findings of this thesis can be summarized as follows. First, listeners' emotional reactions to music can be successfully predicted based on theoretically based manipulations of various psychological mechanisms. These results were supported by psychophysiological data in terms of autonomic activity and facial expression, which served to validate our conclusion that the listeners actually *experienced* emotions rather than merely perceiving emotions in the music, and which showed patterns consistent with the emotion ratings.

Second, Study II indicated that patterns of emotions and mechanisms are quite similar across the individualism-collectivism cultural dimension. In general, there are larger differences between the different emotions, mechanisms, and motives than between culture categories, indicating that the overall patterns of prevalence are relatively similar across cultures. This is consistent with previous findings that suggest that for emotions, cross-cultural similarities tend to be larger than cross-cultural differences (e.g., Berry et al., 2011; Scherer, 1997). However, collectivist cultures reported a higher preva-

lence of *nostalgia-longing* as hypothesized. These cultures also attached higher importance to *musical nostalgia* and reported a higher prevalence of the episodic memory mechanism. Moreover, the results of Study III suggest that because musical and context factors act as moderators of aroused emotion, they lead to cultural differences that cannot be explained in purely biological terms. Hence, features of a particular genre experienced in a particular place and cultural setting strongly influence specific emotions and mechanisms.

Third, the same psychological mechanisms occurred across different cultures, despite prevalence variation, suggesting that mechanisms are biologically based. This was the case in all four studies comprising this thesis, supporting that an account of the induction of emotions can be cross-culturally valid at the level of mechanisms despite cross-cultural diversity in musical surface features and evoked emotions (Juslin, 2012).

Fourth, fado music served specific functions in its original culture (see Study III). In fact, fado listeners seemed to seek out musical experiences at fado venues, especially because these places, combined with the fado music itself, lead to nostalgic and sad experiences with music – culturally valued emotions for the Portuguese people, due to both historical reasons and individual uses of music. The search for specific contexts and emotions were highly connected to listeners' wellbeing. One may speculate that musical genres around the world (e.g., tango, flamenco, samba) may serve specific functions and individual uses in their original cultures. Traditions reflect distinct individual and cultural needs, leading to different listening motives and expectations conveyed by the situation itself. This explains why specific mechanisms occur more frequently in some contexts than in others.

Fifth, lyrics influence musical emotions and the induction of underlying mechanisms. This effect seems to vary between groups of different cultural backgrounds. In Study IV, differences were found on emotions and mechanisms between Portuguese and Swedish listeners. Lyrics were more important for the mediation of musical emotions in Portugal than in Sweden. The results also revealed that the differences between groups were not based on the music's origin, but on the participants' origin. There is a possibility that certain lyrical themes may have different effects on emotions and mechanisms depending on the culture being studied.

Implications for the use of BRECVEMAC Cross-Culturally

Can hypothesized mechanisms be empirically distinguished?

We argue in Study I that it is possible to obtain predictable emotional responses using real pieces of music. But what would determine which mechanism (if any) is 'activated' by a particular musical event? Previous research has suggested that to answer this question, one must rely on several factors (Juslin & Västfjäll, 2008). Each mechanism relates to its own type of information that can be derived from the music, listener or context. Some information could be provided by the *music* (e.g., a passionate voice-like expression); other information might derive from the *context* (e.g., a specific atmosphere), or from the *listener* (e.g., that a piece has frequently occurred in a particular context in the person's life). But most of the time, it reflects a *combination* of these factors (e.g., music-listener: a tone sequence that is very unexpected for one particular listener, but not necessarily for another listener, depending on the notes themselves, as well as the listeners' previous experiences).

These combinations often also happen at an individual level – a musical event may 'afford' (Gibson, 1979) a particular emotional response by featuring information that is relevant to a particular mechanism, but whether this information will activate the mechanism depends on the listener's *attention*, which in turn may depend on the context (alone at home or at a pub with friends), and on what other types of potentially competing information are occurring at the same time. One factor of the music that might potentially compete with other musical information is the presence of lyrics.

In Study IV, we suggest that lyrics associated with specific genres might influence different listeners depending on how *salient* lyrics are for specific societies, and how much *attention* particular lyrics attract (described later in this discussion). This is in line with the notion that cultures know and normally agree on what elements to pay attention to and how much to weigh certain elements (Triandis, 2001). First, lyrics might be associated with particular functions in specific countries (see Study III); second, certain lyrical themes may represent cultural products that are not appealing for certain societies. Finally, genres associated with traditional lyrics, might represent a cultural product that is no longer appealing to every society or subculture (discussed later on this thesis). When lyrics become a priority, other features of the music might become secondary. At an unconscious level, attention is able to filter incoming information to our consciousness (Keltner et al., 2014) as described earlier in the introduction of this thesis. When it comes to attention to particular musical features, listeners and contextual characteristics will determine whether these will activate a particular mechanism (Juslin, 2013).

The assumptions above also suggest that if a given musical event *fails* to include information that is relevant for the activation of any mechanism, then consequently, no emotion will be aroused. As noted in Study I, if the music does *not* include extreme sound events (brainstem reflex), a very pronounced and catchy rhythm (entrainment), a passionate and voice-like expression (contagion), a structural feature that invites metaphorical analogies to external events (visual imagery), an unexpected tonal, harmonic, or rhythmic sequence (musical expectancy), an aesthetic quality such as vast beauty (aesthetic judgment), or if it has not been linked with emotional life events (evaluative conditioning, episodic memory), or – less plausibly – if it does not have crucial implications for one's goals or plans in life, then the chances are slim that the music will arouse any emotion.

Study II extended the generalizability of the findings of Study I, helping to specify the 'boundary conditions' for effects demonstrated in a laboratory setting. All the BRECVEMAC mechanisms occurred at least occasionally, despite prevalence variation. Study III further extended the ecological validity of these findings by demonstrating that by using in-depth interviews and an adapted version of the MecScale, it was possible to highlight all mechanisms included in the framework. Study IV also strengthens this claim by showing that despite an overall effect of lyrics on some mechanisms; all of them were reported at least once, regardless of the presence of lyrics.

This overall pattern supports and strengthens the idea reported in Study II and Study III that mechanisms are biologically based - emotions depend on 'brain circuits' with a long evolutionary history (Striedter, 2004). Hence, it is not surprising that there were more cross-cultural similarities than differences in emotional functioning. These results are in line with a *moderate universalism* approach, as suggested by Juslin (2012).

What is the relative prevalence of mechanisms? Can they vary as a function of cultural setting?

I decided to discuss these two questions together, because one might help explain the other. On the one hand, comparing previous assessments of the prevalence of emotions and mechanisms from studies using a representative sample of listeners (Juslin et al., 2011), situations (Juslin et al., 2008), and musical stimuli (Juslin, Sakka, Barradas, & Liljeström, 2016b; Liljeström et al., 2013) from a single individualistic culture (Sweden) with a cross-cultural sample (Study II) and a collectivist sample (Study III), the broad patterns of prevalence are surprisingly similar.

Regarding prevalence and looking at the results of Study II, collectivist cultures reported a higher prevalence of *nostalgia* and *happiness* and the mechanism *episodic memory*. Looking at the results of Study III, based on a collectivist society, *episodic memory* and *nostalgia-longing* were the most

prevalent mechanism and emotion dimension. Study IV further indicated that this mechanism and associated *nostalgia-longing* can also be moderated by lyrics in Portugal (a collectivist society). Lyrics also had an effect on episodic memory in Sweden. However, no emotion associated with this mechanism (happiness and nostalgia) was significantly influenced by the presence of lyrics. The effect size was also larger in the Portuguese group.

This prevalence variation follows a pattern suggesting the idea that episodic memories and nostalgia aroused by music serve specific functions in collectivist societies. This is supported by the results of Studies II, III, and IV: in Study II, collectivist cultures attached higher importance to *musical nostalgia* than individualistic cultures; in Study III, nostalgia was involved with specific functions related to emotion regulation and wellbeing for a collectivist society, and in Study IV, the arousal of nostalgia was affected by the presence of lyrics only in Portugal.

But what would motivate a researcher to believe that the prevalence of mechanisms might vary cross-culturally? Each mechanism is unique, based on gradually developing *brain functions* that involve distinct individual characteristics (Juslin, 2013). However, different cultures are known to value different aspects of musical experiences and engage in different musical activities. Thus, particular emotion-induction mechanisms and the specific emotions resulting from those activities are expected to vary across cultures.

Several studies support that the individualism-collectivism dimension is useful in accounting for cross-cultural differences in emotional experiences (Kitayama et al., 2006; Mesquita, 2001; Singelis & Sharkey, 1995). In Study II, however, contextual factors mapped in the data offered few clues regarding how to explain the obtained differences between individualist and collectivist societies. Several explanations were proposed in Study III, which explored musical emotion at the level of more specific interactions between the listener, cultural context, and the 'affordances' of a particular musical genre.

How are mechanisms manifested in a specific cultural setting?

To understand how particular mechanisms are manifested within a specific society, several premises were fulfilled in Study III: first, the chosen culture preserved an authentic and genuine genre that took into consideration the social context in which the music is played; second, the sample was selected based on the principle of high musical commitment with a specific genre involving fans that described their experiences with the genre (LeBlanc, 1980); and third, the specific genre was able to arouse deep emotions in its listeners.

Several ethnomusicology and musicology studies have suggested that fado has a strong focus on nostalgia and sadness (Elliott, 2010; Gray, 2007; Nielson et al., 2009; Vernon, 1998). However, no psychological studies ever tried to clarify why these emotions were so deeply felt by Portuguese listen-

ers. Hence, Study III moved one step further by exploring how particular mechanisms are manifested within Portugal, one of the last collectivist societies in Western Europe, looking at specific functions these mechanisms may serve locally.

According to the cue-redundancy model proposed by Balkwill and Thompson (1999), familiarity with a specific genre makes it relatively easier to interpret emotional meaning in that genre. Similarly, the fractional emotional systems model suggests that musical experiences are subject to *enculturation* – a process by which people learn the requirements of their culture and derive values and behaviors suitable or necessary in that culture. With development, this process leads to sensitivity to culture-specific emotional cues (Thompson & Balkwill, 2010). Both models offer an explanation to how Portuguese listeners perceived particular cues. When it comes to how listeners felt, these models could partly explain these complex emotional experiences with music based on the contagion mechanism. It is possible that participants in Study III could have perceived the emotional expression of the music and 'mimicked' it internally.

Furthermore, because Study III participants were familiar to the genre and were exposed to it more often than listeners from other cultures, they might reproduce behavior patterns that proceed through enculturation. As noted by Hannon and Trainor (2007), everyday exposure to a particular music system creates culture-specific representations that might influence listeners' behavior. This might arguably account for some of the uses and functions reported. Musical experiences may be individual, but are certainly bound by culture and historical background (Becker, 2010; Saarikallio, 2012).

Cross-cultural differences in emotional reactions also occur due to different uses and functions of music in different cultures (Merriam, 1964). However, only a few studies have looked at these functions from a cross-cultural point of view (Boer & Fischer, 2012). Several functions of music were proposed by various authors, from a variety of disciplines. A comprehensive review was presented by Saarikallio (2012). This review summarized three psychological aspects that occur regularly across the literature: 1) an emotional element (e.g., the use of music for expression, experience, or emotion regulation); 2) an introspective element (e.g., the use of music for reflection, mental work, personal growth and spirituality); and 3) a social element (e.g., the use of music to reinforce social bonding, belonging, cohesion and identity). However, these studies offered no link between these functions and possible psychological mechanisms.

The results of Study III suggest that several mechanism are involved in specific functions of fado music: episodic memory related to *reflection* – the capacity to reflect and examine the self; *overcoming* – dealing with particular past experiences; *reappraisal* – reinterpreting the past; *identity* – identifying with the melody, lyrics and the musical experience overall; *social bonding* – attachment to other members of a given society; contagion related to

mood matching – a mood-related response; *venting* – an emotion-regulation strategy; and finally, the visual imagery related to *counteracting loneliness*, *relaxation*, and *reflection*. The presence of lyrics seems to be related to some of these functions, namely *identity* and *venting*.

How are mechanisms influenced by the presence of lyrics cross-culturally?

As explained in the introduction, few studies have explored the connection between lyrics, emotions, and mechanisms. Moreover, no study has explored these factors cross-culturally. The results of Study III provided some clues about the overlap between mechanisms and lyrics: episodic memory, contagion, and visual imagery were related to specific functions associated with lyrics. However, these results were not sufficient to formulate a hypothesis for Study IV.

Overall, the results of Study IV revealed three main findings: first, lyrics had an additional effect on musical emotions and underlying mechanisms; second, this effect varied between Portugal and Sweden; and, third, the differences between the two societies were not based on the origin of the music, but on the participants.

Looking at the second main finding, Study IV revealed that for the Portuguese, the presence of lyrics is associated with conditioning, contagion, visual imagery, and episodic memory. These mechanisms were activated regardless of song origin, suggesting that these results were not related to familiarity effects.

The pattern of the mechanisms involved with the presence of lyrics is surprisingly similar in Study III and Study IV, suggesting that in Portuguese society, this mechanism pattern is involved with particular functions when lyrics are present. Interestingly, three of these mechanisms (episodic memory, conditioning, and visual imagery) are closely dependent on some sort of memory (Juslin, 2013). This suggests that lyrical narratives may facilitate the recollection of explicit memories, enabling the activation of memory-related mechanisms in specific societies.

This pattern might be explained by the role of *musical nostalgia*, a higher prevalence of the episodic memory mechanism in collectivist cultures (Study II), and specific functions lyrics may serve in certain cultures. Previous studies have suggested that lyrics might facilitate the exploration of feelings, issues and difficulties (Hargreaves, Miell, & MacDonald, 2002), helping to overcome everyday problems (Gibson, Aust, & Zillman, 2000). Interestingly, these were some of the functions highlighted in Study III, which might offer some explanation for why Portuguese listeners gave so much emphasis to fado lyrics.

Regarding the third main finding, previous studies have suggested that the way in which lyrics and music are combined often reflects specific cultural norms (Rothbaum & Tsang, 1998). Thus, lyrics that comply with these norms become more salient for that particular culture. When lyrics are salient in a certain culture, that type of information will have priority over other types of information in the music – it will attract the listener's attention to that feature, interfering with the trigger of a specific mechanism. However, when the lyrical theme is not salient in that particular society, the lyrics will no longer compete for the listener's attention.

But is this enough evidence to support the effect of lyrics in the Portuguese sample and no generalized effect in the Swedish sample? Study IV presents several clues that may help explain this trend: first, there was an overall effect of lyrics on *interest* and *emotion intensity* for the Portuguese, which might indicate that lyrics are more salient in this society. This is in line with previous studies suggesting that cultures agree on which elements to pay attention to and how much weight to give certain criteria (Triandis, 2001).

Second, Study IV used the same genre for studying both societies (folk), which is highly related to tradition. Tradition is an important aspect of collectivist societies (Triandis, 1995). Thus, sad lyrics associated with folk music might represent a cultural product that is no longer appealing to Swedish youth, while the opposite may be the case in Portuguese society, as evidenced by the findings from Study III.

Third, lyrics related to self-focus and antisocial behavior have been increasing in recent decades, while lyrics related to social interactions have been decreasing (Dewall, Pond, & Capmpbell, 2011). However, collectivist societies seem to prefer themes associated with social interaction (e.g., love and friendship) as represented by the stimuli in Study IV.

Health, Bell, and Sternberg (2001) have suggested that when cultural meanings are shared, emotional ideas are more likely to be communicated. Therefore, the cultural differences in prevalent lyrical themes may have influenced the emotions these themes evoke in different societies.

Properties of the genre itself may have influenced the prevalence of specific emotions and mechanisms. According to Juslin (2013), the music may afford a particular feature, but this is not sufficient for the activation of mechanisms. Since some aspects might be more salient than others, they normally depend on listeners' attention. Attention might explain why lyrics become salient in some societies and not so much in others.

Musical Nostalgia and Memory

Episodic Memories and Nostalgia in Collectivist Societies

By definition, nostalgia is an affective process that can accompany autobiographical memories (Batcho, 2007; Leboe & Ansons, 2006; Sedikides, Wildschut, Arndt, & Routledge, 2008; Wildschut et al., 2006). Individuals treasure nostalgic memories as a resource for maximizing wellbeing (Zauberman, Ratner, & Kim, 2009) by strengthening social connectedness (Wildschut et al., 2006) and stimulating a more strongly perceived affiliation with others (e.g., Zhou, Sedikides, Wildschut, & Gao, 2008).

Recent studies have also implicated nostalgia as an emotion often aroused by music (Janata et al., 2007; Juslin et al., 2008; Zentner et al., 2008). But to what extent will a particular piece of music arouse nostalgia? The autobiographical salience of a particular piece of music is first individual, and second, related to how prone listeners are to nostalgia (Barret et al., 2010). However, since different cultures use music differently (Boer & Fischer, 2012), we could expect that cultures valuing social embeddedness (e.g., social belonging, social identity, social relationships) would search for nostalgic musical experiences.

In general, this thesis extends our knowledge about nostalgia by suggesting that: *musical nostalgia* is more important in collectivist societies than in individualistic societies (Study II) and serves wellbeing in the flow of everyday life. It increases community strength and bonding, allows listeners to reflect on their past and make better choices for the future, and facilitates coping with loneliness in times of struggle (Study III). Study IV highlights the connection between lyrics and nostalgia in collectivist societies, especially when lyrics are present, which is consistent with Study III, where episodic memories, nostalgia and lyrics were often related.

Similar arguments have been made by DaSilva and Faught (1982, p. 49-50), who suggest that nostalgia is "a collective emotional reaction" that "represents an unfulfilled search for community…a quest for communality".

Negative Autobiographical Memories and Nostalgia

Field studies indicate that episodic memories are a considerably more common source of emotion than many other mechanisms, such as expectancy (Juslin et al., 2008, 2011). Most studies have also shown that autobiographical frequently involve positive events rather than negative events (Talarico, Berntsen, & Rubin, 2009).

Rasmussen and Bernstsen (2009) demonstrated that positive memories have more self and social functions than negative ones, and that the positive ones facilitate bonding. However, these authors also found that negative memories are used to help direct future behavior and avoid similar past negative situations. In addition, emotional reactions due to negative memories

were related to feelings of sadness (Bluck & Li, 2001). These negative memories may signal danger and have a more direct function compared to positive memories. Ford, Addis, and Giovanello (2012) also support the notion that negative events are remembered due to their importance in preventing past events from happening again in the future.

In Study II, negative memories were more common in collectivist societies (40%) than in individualist ones (6%). In contrast, positive memories were more common in individualist societies (50%) than in collectivist ones (11%). Study III participants also recalled negative memories more often than positive memories with fado music. When an emotion was thought to have been caused by the episodic memory mechanism, the emotional tone of the memory was negative in 43% of the cases, followed by mixed (36%), and positive (21%).

Negative autobiographical memories were associated with sadness and nostalgia and were regarded as important for personal growth and the avoidance of past mistakes (Study III). This supports previous arguments regarding nostalgia/sadness and negative autobiographical memories: reinterpreting the past may allow listeners to find meaning in their present and future (e.g., Batcho, 2007; Bluck & Li, 2001; Cassia, 2000).

The results of Studies II and III are consistent with the view that collectivist cultures feature a larger number of people who resist change and modernity and for whom nostalgia can serve the function of preserving social identity through reliving one's past (Shaw & Chase, 1989). Moreover, this trend also seems to be related to the concept of *historical nostalgia*.

Exploring the narratives of some fado lyrics reveals several examples that describe historical nostalgia and "longing for times of struggle". An anecdotal example describes how a young lady felt extremely cold when she washed her clothes in a freezing river with her mum when she was young. She had little to eat and she dreamt of better times. Now she is old and she longs for those days, because the food she has now does not taste very good anymore; she feels cold every day because she is old and ill, and she can't dream, because there is nothing to anticipate besides dying alone.

Historical nostalgia with music in collectivist societies is arguably related to differences in economic resources between collectivists and individualists (e.g., Allik & Realo, 2004), but also to themes in music that represent different societies and their recent historical background.

Limitations

Several limitations should be addressed. Although our manipulation of mechanisms aroused primarily the predicted emotions in Study I, a few other emotions were also aroused to some extent, albeit in weaker forms.

This may be symptomatic of the greater difficulty in clearly separating different mechanisms when using 'real' pieces of music, which commonly feature several different kinds of emotionally-relevant information. One promising approach to better separating the effects of distinct mechanisms when using 'ecologically valid' music might be to *combine* 'real' compositions with synthesized ones (e.g., Juslin & Madison, 1999), for instance, by editing features to reduce or enhance the effects of a particular mechanism.

A second limitation found in all studies is related to self-report measures. Participants only report what they can or are willing to report, and their responses can be influenced by social desirability and demand characteristics (cf. Visser, Krosnick, & Lavrakas, 2000). Participants may not have conscious access to all the underlying mechanisms involved in their behavior. Hence, self-reports regarding causal mechanisms based on self-report alone need to be interpreted with due caution.

Third, all studies included in this thesis have relied on convenience samples rather than a truly random and representative sample of listeners (cf. Juslin et al., 2011). Self-selection bias is clearly an issue and has influenced the characteristics of the samples in three of the studies. Studies I and IV mainly included students and Study II included students and employed individuals with higher education. All participants were people who are more interested in music than the general population, and this should be taken into account in the interpretation. However, this is not a unique limitation of this thesis. The majority of studies in psychology more generally feature volunteer psychology students who differ from the population as a whole as well.

In addition to the above issues, each methodology also has limitations. Regarding Studies I and IV, the artificiality of the setting may have produced unnatural behavior that does not reflect real-life situations, introducing low ecological validity to these studies.

Regarding Study II, web surveys share many of the same limitations as other types of surveys, such as self-report reliance, self-selection bias, questionnaire inflexibility, and non-observation errors. I also acknowledge that despite increasing availability of internet access worldwide, a considerable amount of people have no internet access.

Despite these limitations, web surveys offer several advantages over other data collection methods. Online recruiting can provide a more diverse sample, despite the fact that internet access is far from universal. Question-by-question administration might reduce social desirability, since no interviewer effect is present. By controlling the survey pace, respondents have more time to read each question, reflect and provide a more precise answer. However, experimental studies controlled in laboratory settings may not be the solution for obtaining more ecologically valid studies of music and emotion. The social context is not present in a laboratory, which may be reflected in poor ecological validity.

On other hand, the qualitative approach of Study III may have introduced some subjectivity and bias, which can be a problem in the analysis. Little control over extraneous variables might induce biased results, making it difficult for another researcher to replicate the study in exactly the same way. Nevertheless, adopting a multi-method approach only strengthened this thesis as a whole. While experiments revealed inconsistencies that were not evident in interviews, interviews provided nuances that were not captured in experiments and online surveys.

According to the literature, qualitative methods may be used along with other types of research to obtain an additional perspective on the problem, thus clarifying unexpected or significant connections made in quantitative studies (Willig & Stainton-Rogers, 2013). When the aim is to achieve an in-depth sense of what people think of a particular object or event, qualitative methods are deeply important. Qualitative methods allow research within people's contexts, so in comparison to more quantitative methods, they can produce results that directly represent how people feel, increasing external and ecological validity. Moreover, getting closer to the reality of a person's life allows for space within the research structure to explore new ideas as they arise.

Future Directions

Several findings of this thesis present implications for future research. With regards to the primary role of mechanisms, there are important questions that need to be investigated in future research. For instance, what types of information have priority in the activation of a mechanism, and why? Although empirical studies have produced initial awareness to these questions, future studies need to address these issues.

It seems plausible that an account of particular emotional responses may derive from *attention*: First, listeners from different cultures may be attracted by elements with different emotional implications (e.g., specific uses and functions). Second, once listeners' know which emotions to expect from different musical experiences, they may spend more or less time attending to them. Third, different cultures might value the same event in different ways (Scherer, 1997).

Similar effects seem to exist with episodic memories and music, so that when remembering a negative event, members of one culture may focus on the negative aspects of the memory to a larger extent than another culture (Grossmann & Kross, 2010). When reflecting on the past with music, collectivistic societies recalled negative events more often (Study II and III). These cultural differences may represent adherence to cultural values - emotions that are treasured in particular cultures (Robinson & Clore, 2002b).

When it comes to the functions and uses of music related to specific emotions and mechanisms, Study II suggests that listening motives are more "country-specific". This means that cultures can be examined on multiple levels. For example, even within western culture there are many subcultures. Each subculture, in turn, reflects distinct individual and cultural needs (e.g., Cross, 2012).

Study III offer a range of results that should be further tested in follow-up experimental studies: regarding emotions, future studies may be aimed at exploring specific uses and functions of nostalgia in other cultures. Interpreting the arousal of mixed emotions such as nostalgia across cultures is a great challenge for music psychology. Experimental studies on *musical nostalgia* across cultures are yet to be conducted.

Additionally, Study III presents several examples of combinations of the music, the listener, and the context, which are worth exploring in future studies. Combinations of *music-listener* involved partly distinct functions related to wellbeing: for example, visual imagery overlapped with episodic memories, mediating sadness and nostalgia, allowing some participants to counter their loneliness, relax and reflect. Other combinations of *context-listener* involved emotion regulation and wellbeing. For most participants, the *atmosphere*, the *interaction proximity* between listener and performer, or a sense of *community strength* and *bonding* helped participants overcome particular past events, mediated by episodic/autobiographical memories.

When it comes to the study of lyrics cross-culturally, future research could aim at replicating the finding of Study IV with a wider range of musical stimuli deriving from other countries/subcultures. Studies should also consider a wider spectrum of genres and lyrics. The lyrics "message" could give insights on cultural products that reflect the individualist mindset. These contrasts with Study IV enable more general conclusions on why and when mechanisms are influenced by the presence of lyrics.

Considering that speech prosody shares important acoustic attributes with music (Juslin & Laukka, 2003), it might be also beneficial to combine music and the vocal qualities of sung lyrics, when studying musical emotions. The role of singers' vocals for emotion arousal remains poorly studied. Thus, it would be interesting to present vocals and music separately, with and without lyrics, to find out whether for instance the voice pitch is of any consequence for the aroused emotion. In this context, it would also be intriguing to see how vocal qualities of sung lyrics might affect the proposed psychological mechanisms, namely contagion.

Final Considerations

In summary, this thesis suggests that an account of cross-cultural differences between mechanisms must entail three levels of analysis that hierarchically depend on each other. Primarily, and as suggested in Study II, we need to take into account a biological explanation – all mechanisms are important musical emotion mediators, independently of the cross-cultural differences involved in arousing them.

At an intermediate level, and as suggested in Studies II and III, we need to consider the uses and functions those mechanisms may serve in context for specific societies and specific genres. Finally, at a higher level, studies must take into consideration individual experiences with music that are influenced by the first two analysis levels, and also by individual uses of music based on personality traits, preferences, personal experiences with music, history, cultural background etc.

An example of this level is found in Study III, where in a single culture, when exploring a specific genre and sample of listeners, different types of information resulted in specific individual uses of music. This study revealed, for instance, that fado-inspired crying, a function related to individual episodic memories evoked by the music, was both an adaptive and maladaptive outcome. Moreover, this function certainly occurred due to melody, lyrics or a combination of both.

The complexity of musical experiences in everyday live situations demands that future studies should increase its focus on studying how different cultures use aroused musical emotions on their behalf. This thesis widens prior knowledge of how music arouses emotions in listeners by demonstrating that emotional reactions to music can be successfully predicted based on theoretical manipulations of various psychological mechanisms, even when using ecologically valid pieces. Moreover, it highlights the role of these emotions for enhancing listeners' subjective wellbeing in specific listening contexts. Arguably, by exploring the specific nuances, details and complexities of each culture around the world, we will be able to better explain the trigger of specific mechanisms, and the multiple functions that musical emotions may serve cross-culturally.

Resumo em Português

Uma abordagem transcultural aos mecanismos psicológicos subjacentes às reações emocionais à música

A música desempenha um papel essencial na vida cotidiana, ao permiter aos ouvintes a procura de experiências emocionais únicas e pessoais. É assim fundamental compreender o processo psicológico subjacente à mediação entre as caraterísticas superficiais da música e as emoções despertadas no ouvinte. Em teoria, diferentes mecanismos psicológicos podem mediar diferentes emoções e funções associadas ao bem-estar subjetivo dos ouvintes. Esta mediação poderá servir funções distintas em culturas coletivistas quando comparadas com culturas individualistas.

Sumariamente, nove mecanismos propostos por Juslin (2013), estão na base da mediação entre a música e as emoções induzidas no ouvinte: (1) *Reflexo do tronco cerebral*, uma reação a caraterísticas acústicas extremas; (2) *Isocronismo rítmico*, o ajuste de um ritmo interno (e.g., o batimento cardíaco) com o ritmo da música; (3) *Condicionamento avaliativo*, o processo pelo qual uma emoção é induzida devido ao emparelhamento anterior de um estímulo musical com outros estímulos positivos ou negativos; (4) *Contágio*, um processo onde a expressão emocional da música é interiorizada pelo ouvinte; (5) *Imagens visuais*, um processo em que o mapeamento metafórico da estrutura musical conduz a imagens emocionais internas; (6) *Memória episódica*, a indução de uma memória autobiográfica devido a uma música em particular; (7) *Expetativa musical*, uma violação ou confirmação das expetativas dos ouvintes sobre o desdobramento gradual da estrutura musical; (8) *Julgamento estético*, uma avaliação subjetiva do valor estético de uma música, baseada num conjunto individual de critérios ponderados; e (9) *Avaliação cognitiva*, a estimativa multidimensional de como uma música pode influenciar objetivos ou planos na vida do ouvinte.

Esta tese teve como objetivo geral investigar estes processos psicológicos, tendo por base uma perspectiva transcultural. No primeiro estudo, quatro experiências manipularam quatro destes mecanismos através da escolha de músicas ecologicamente válidas (ou seja, músicas pré-existentes) com informação considerada relevante para a ativação de cada mecanismo. Este estudo teve como objetivo prever com sucesso as reações emocionais dos ouvintes a determinado estímulo musical. Os resultados demonstraram que é possível fazer esta previsão com base em manipulações teóricas dos vários mecanismos. As características musicais não são

significativas por si mesmas. Os nossos mecanismos psicológicos são os responsáveis por esse significado emocional: a diferença entre som e significado. No entanto, este estudo contou apenas com uma pequena amostra de ouvintes, na sua maioria ocidentais, negligenciando o possível papel de fatores contextuais e individuais de outras culturas (Study I).

Tendo em conta que o primeiro estudo contou apenas com uma pequena amostra de ouvintes proveniente de uma cultura individualista (Suécia), o segundo estudo investigou a prevalência de reações emocionais à música, os vários mecanismos psicológicos identificados e os motivos pelos quais diferentes culturas recorrem à música no seu quotidiano. Este estudo teve como base uma amostra transcultural de ouvintes, com foco em diferenças individuais e traços de personalidade. Foram recolhidos dados de três culturas coletivistas (Brazil, Quénia e Portugal) e três culturas individualistas (Austrália, Estados Unidos da América e Suécia). Os resultados indicaram que os padrões de prevalência de emoções e mecanismos são bastante semelhantes entre culturas, evidenciando que estes mecanismos psicológicos têm base biológica. No entanto, as culturas coletivistas, entre as quais a Portuguesa, relataram uma maior prevalência de *nostalgia-saudade*, *amor-ternura* e *espiritualidade-transcendência*. Estas culturas atribuiram maior importância à nostalgia musical, relatando uma maior prevalência do mecanismo *memória episódica*. Os resultados demostraram ainda que os motivos pelos quais diferentes culturas recorrem à música não dependem da dimensão individualismo-coletivismo. Estes motivos parecem ser específicos de cada país ou subcultura. Uma discussão detalhada pode ser encontrada em anexo (Study II).

O terceiro estudo explorou como se manifestam estes mecanismos psicológicos dentro de um contexto cultural específico com grande potencial para a indução de emoções profundas: o fado em contexto de *casa de fado*, *tasca* ou *serenata*. Este estudo fornece informações detalhadas sobre como o contexto cultural pode moldar as reações emocionais à música e os motivos subjacentes à escuta. Os resultados sugerem que os ouvintes de fado procuram experiências musicais que despertem emoções valorizadas culturalmente, tais como a saudade, a nostalgia e a tristeza. Tais emoções musicais serviram de base à *reflexão*, inspiraram o *sublimar* de experiências, a *reinterpretação* de acontecimentos passados e o reforço de uma identidade própria (*eu*) em relação com os outros. *Imagens visuais* evocadas por este género musical permitiram ainda aos ouvintes *contrariar a solidão*, *relaxar* e *refletir*. Os ouvintes tiveram em consideração fatores musicais, mas também contextuais, considerando que estes mesmos fatores são fundamentais para experiências emocionais profundas, contribuindo para uma forte sensação de bem-estar. Os poemas associados ao fado foram considerados um dos fatores fundamentais, assim como as memórias autobiográficas associadas. Sendo este um estudo com base qualitativa, sugiro a leitura do terceiro estudo para maior detalhe (Study III).

Um quarto estudo testou a influência das letras musicais nas emoções induzidas por peças musicais culturalmente revelantes para Portugueses e Suecos. Os resultados revelaram diferenças culturais significiativas no modo como as letras musicais ativaram diferentes mecanismos psicológicos. As letras musicais influenciaram de forma especial os Portugueses, independentemente da origem Sueca ou Portuguesa da peça musical. Esta influência ocorreu através dos mecanismos de *memória episódica*, *condicionamento avaliativo, contágio e imagens visuais*. Foi identificada uma diferença significativa entre as peças instrumentais e as peças contendo letra nas seguintes emoções: *tristeza-melancolia*, *interesse-expetativa* e *nostalgia-saudade*. As letras musicais apenas induziram *surpresa-espanto* aos ouvintes Suecos, revelando que esta caraterística da música (letra) não ativou qualquer mecanismo psicológico associado. Este resultado sugere que as letras musicais não têm o mesmo efeito emocional em todas as culturas. Sugere ainda que determinados temas associados às letras musicais são mais ou menos relevantes em diferentes culturas, tendo em conta a base cultural subjacente à população em estudo (coletivista ou individualista).

Em suma, esta tese reflete diferenças transculturais entre os mecanismos psicológicos propostos, implicando três níveis de análise que estão interligados hierarquicamente. Em primeira análise, e como sugerido no segundo estudo, é necessário ter em conta uma explicação biológica e cognitiva - todos os mecanismos são importantes mediadores de emoções musicais, independentemente das diferenças transculturais envolvidas. Em segunda análise, e como sugerido no segundo e terceiro estudos, é necessário considerar os usos e funções que esses mecanismos podem servir em diferentes contextos, tendo em conta a sociedade em questão e os géneros musicais específicos. Finalmente, é necessário ter em consideração as experiências musicais individuais. Estas são influenciadas pelos dois primeiros níveis de análise, e também por usos individuais com base em traços de personalidade, preferências, experiências musicais pessoais, herança cultural e histórica, etc.

Um exemplo deste último nível de análise é identificado no terceiro estudo. Numa única cultura, ao explorar um género e uma amostra de ouvintes específica, diferentes tipos de informação resultaram em usos individuais. Este estudo revelou, por exemplo, que o choro induzido pelo fado, uma função relacionada com as memórias episódicas individuais evocadas pela música, é tanto um resultado adaptativo como um resultado desajustado.

A complexidade das experiências musicais em situações da vida cotidiana exige estudos aprofundados. Esta tese amplia o conhecimento prévio acerca dos mecanismos subjacentes ao despertar de emoções musicais, destacando ainda o papel dessas mesmas emoções na melhoria do bem-estar subjetivo dos ouvintes em contextos de escuta específicos. No entanto, são ainda complexas as estratégias usadas por diferentes culturas no que diz respeito à

relação entre a procura de experiências emocionais profundas, o estímulo musical escolhido e o bem-estar subjetivo do ouvinte. Apenas explorando as nuances, os detalhes e as complexidades transculturais, poderemos vir a compreender melhor o gatilho de mecanismos específicos e as múltiplas funções que as emoções musicais podem servir para diferentes ouvintes em todo o mundo.

Acknowledgments

Four years have passed so quickly and there is a satisfying feeling of “Mission Accomplished”. No words can describe such an enriching experience. First, I would like to express my deepest thanks to all the wonderful people who were always by my side, sharing all the best moments, but also times of struggle. I am very grateful to a number of people who played a fundamental part in bringing this thesis to completion. Without you, this PhD would not be a reality today.

Far away from tropical Madeira, this PhD opened the door to a new world of experiences, challenges and fantastic moments, where I learned to be more “lagom” in everything I do in life. Thank you Sweden for all the Mid Summers, all the “fikas”, and for welcoming me so warmly.

My first words of gratitude go to my supervisor Patrik Juslin. It was a privilege working with you in Uppsala, nearly five years after defending my master's thesis, and trying my first “semla”, at this department. Thank you for your support, patience, knowledge and guidance throughout this long and exciting journey. You were always there for me, supporting my projects – thank you for all the wonderful travel experiences and collaboration opportunities abroad. They broadened my horizons as a researcher, and made me grow as a person. It was such a great pleasure to be part of your team. My appreciation extends also to my second supervisor, Terry Hartig, who believed in my ideas and supported my research project.

I would also like to express my sincere appreciation to all other past and present collaborators of the Music Psychology group - Petri Laukka, Tanja Bänziger, Simon Liljeström, Ingrid Lagerlöf, Laura Sakka, Laszlo Harmat, Melissa Ovsiannikow, Marie Djerf, and Alf Gabrielsson. Thank you all for your words of encouragement, discussions, support, and friendship. Laura, it was so great sharing an office with you. Thank you for our countless “brainstorms”, insights, laughs, parties and collaboration during these last couple of years. My deepest gratitude also goes to my external co-authors, Tuomas Eerola, John Limmo, and Bill Thompson. It was a pleasure to work with such talented researchers.

Furthermore, I would like to thank Martyna Galazka, Benjamin Koch, Janna Gottwald, and Will Jones for your contribution to the thesis by putting forward constructive comments. I sincerely thank Ana Correia and Rita Nunes for your comments on my Portuguese summary. Tomas Furmark and Håkan Nilsson, for your expertise, invaluable feedback, and recommenda-

tions during my mid and final seminars. Karin Brocki, for your practical advice and support. Annika Landgren, Cecilia Sundberg, Hanna Skagerström, and all the department administration, for making everything so much easier for someone who comes from abroad. Also, special thanks go to all my teachers at this department, who inspired me with their knowledge and scientific thinking.

My friends and colleagues at the department, Laura, Martyna, Benjamin, Janna, Eva, Marta, Kirsti, Andrea, Tommie, Therese, Claudia, Andreas, Kahl, Joshua, Johan, Emilia, Viktor, Pernilla, Therese, Johanna, Pernilla, Freddie, Emma, Dorota, Mona, Thomas, Ulrika, Sara, Britt, Dorota, Sheila, Elin, Wiebke, Maria, Johannes, Andreas (If you are looking for your name here, it means you are also in this line! ☺), for making me feel at home right from the start. For making me laugh, breaking the routine, a simple "fika", or a smile in the corridor. Thank you all!

My friends in Sweden, corridor and flat mates, Andrés, Niklas, Vinh, Mário, Anna, Elif, Erik, the "football gang", Bozhidar, Emil, Sofia, Tim, Janina, for doing your best in keeping me from working too much. All the parties, the dinners, the travel experiences… I will keep everything in my memory forever. I would also like to thank all my friends in Portugal who gave me strength to continue pursuing my dreams – Renato, Catarina, Fábio, Sara, Marina, Duarte, Carlos, Nuno, and all of you who cared for me despite the distance.

I would also like to recognize the support of my previous colleagues at the Commission for the Protection of Youth and Children in Madeira. Carolina, thank you for your lessons on humanism, companionship and leadership. Daniela, thank you for believing that I still had other important paths to tread. Lília, Sónia S., Sónia B., Celso, Alexandre, Zulay, Iola, Tânia, Fátima, Isabel… well, all the CPCJ team, thank you for all the nice words, for encouraging me to take this important step in my life, and especially for your friendship.

I also express my gratitude to Professor Sílvio Fernandes - Vice Chancellor, and Dr. Paulo Rodrigues - President of the Arts and Humanities Competence Center, Madeira University, Portugal, for authorizing the recruitment of participants, and the use of facilities for Study IV. I also express my gratitude to all companies and anonymous people who contributed to my field study in Portugal, Study III.

Finally, my deepest appreciation belongs to my family. Dad, I know you are so proud of me wherever you are. Thank you for your wise words: "Knowledge never takes too much space in life." It took time to understand them, but now they feel so right. Mum, I dedicate this thesis first to you. Thank you for your love, support, confidence, pride, dedication, and everlasting presence despite the distance. Eu te amo muito! Thank you for taking care of everyone with your enormous heart and making me believe that nothing happens by chance in life. Claúdio (meu querido irmão), thank you

for being such a great brother! Eduarda, thank for always being there, for always supporting me, for "keeping me updated" with all the family news. With your serenity, you were the most precious link between all of us. Grandma, my beloved avó Zita, you are my warrior. Sorry not to have attended your 91st birthday. I want you to know that you are always in my heart (can't wait to take you to "Monte" again). Anne Luise, Danny, Manuela, Orlando, Betsanys, Duarte, Angel, and Adriana, thank you for all that love coming from the UK. Cousin Eduarda, thank for your big heart <3.

I would like to finish with my sense of gratitude to one and all who I might have forgotten to mention, and directly or indirectly, have lent their helping hand in this wonderful experience.

Gonçalo T. Barradas, Uppsala, February 5th, 2017

References

Ali, O. S., & Peynircioğlu, Z. F. (2006). Songs and emotions: are lyrics and melodies equal partners? *Psychology of Music, 34,* 511-534.

Allen, R. E. (Ed.). (1992). *The concise Oxford English dictionary*. Oxford, UK: Clarendon Press.

Allik, J., & Realo, A. (2004). Individualism-collectivism and social capital. *Journal of Cross-Cultural Psychology, 35,* 29–49.

Andreassi, J. L. (2007). *Psychophysiology: Human behaviour & physiological response* (5th ed.). Hillsdale, NJ: Erlbaum.

Balkwill, L.-L., & Thompson, W. F. (1999). A cross-cultural investigation of the perception of emotion in music: Psychophysical and cultural cues. *Music Perception, 17,* 43–64.

Baltes, F. R., Avram, J., Miclea, M., & Miu, A. C. (2011). Emotions induced by operatic music: Psychophysiological effects of music, plot, and acting. A scientist's tribute to Maria Callas. *Brain and Cognition, 76,* 146-157.

Barret, F. S., Grimm, K. J., Robins, R. W., Wildschut, T., Sedekides, C., & Janata, P. (2010). Music-evoked nostalgia: affect, memory and personality. *Emotion, 10,* 390-403.

Batcho, K. I. (2007). Nostalgia and the emotional tone and content of song lyrics. *The American Journal of Psychology, 120,* 361-381.

Baumann, J., & DeSteno, D. (2010.) Emotion guided threat detection: Expecting guns where there are none. *Journal of Personality and Social Psychology, 99,* 595-610.

Baumgartner, H. (1992). Remembrance of things past: Music, autobiographical memory, and emotion. *Advances in Consumer Research, 19,* 613-620.

Becker, J. (2001). Anthropological perspectives on music and emotion. In P. N. Juslin & J. A. Sloboda (Eds.), *Music and emotion: Theory and research* (pp. 135-160). Oxford: Oxford University Press.

Becker, J. (2004). *Deep listeners: Music, emotion, and trancing.* Bloomington, IN: Indiana University Press.

Becker, J. (2010). Exploring the habitus of listening: Anthropological perspectives. In P. N. Juslin & J. A. Sloboda (Eds.), *Handbook of music and emotion: Theory, research, applications* (pp. 127-157). Oxford: Oxford University Press.

Beedie, C. J., Terry, P. C., & Lane, A. M. (2005). Distinctions between emotion and mood. *Cognition & Emotion, 19,* 847-878.

Berry, J. W., Poortinga, Y. H., Breugelmans, S. M., Chasiotis, A., & Sam, D. (2011). *Cross-cultural psychology: Theory and applications* (3rd ed.). Cambridge: Cambridge University Press.

Berry, J. W., Poortinga, Y. H., Segall, M. H., & Dasen, P. R. (2002). *Cross-cultural psychology: Research and applications* (2nd ed.). New York: Cambridge University Press.

Bharucha, J. J., Curtis, M., & Paroo, K. (2006). Varieties of musical experience. *Cognition, 100,* 131-172.

Bluck, S., & Li, K. Z. H. (2001). Predicting memory completeness and accuracy: Emotion and exposure in repeated autobiographical recall. *Applied Cognitive Psychology, 15,* 145-158.

Boer, D., & Fischer, R. (2012). Towards a holistic model of functions of music listening across cultures: A culturally decentered qualitative approach. *Psychology of Music, 40,* 179-200.

Boer, D., Fischer, R., Tekman, H. G., Abubakar, A., Njenga, J., & Zenger, M. (2012). Young people's topography of musical functions: Personal, social and cultural experiences with music across genders and six societies. *International Journal of Psychology, 47,* 355-369.

Bower, G. H. (1981). Mood and memory. *American Psychologist, 36,* 129-148.

Brandão, M. L., Melo, L. L., & Cardoso, S. H. (1993). Mechanisms of defense in the inferior colliculus. *Behavioral Brain Research, 58,* 49-55.

Brattico, E., Alluri, V., Bogert, B., Jacobsen, T., Vartiainen, N., Nieminen, S., & Tervaniemi, M. (2011). A functional MRI study of happy and sad emotions in music with and without lyrics. *Frontiers in Psychology, 2,* 1–16.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3,* 77-101.

Brewer, M. B., & Chen, Y. R. (2007). Where (who) are collectives in collectivism? Toward conceptual clarification of individualism and collectivism. *Psychological Review, 114,* 133-151.

Brown, S., Martinez, M. J., & Parsons, L. M. (2004). Passive music listening spontaneously engages limbic and paralimbic systems. *Neuroreport, 15,* 2033-2037.

Byar, D. P., Herzberg, A., M., & Tan, W. (1992). Incomplete factorial designs for randomized clinical trials. *Statistics in Medicine, 12,* 1629-1641.

Cassia, P. S. (2000). Exoticizing discoveries and extraordinary experiences: 'Traditional' music, modernity, and nostalgia in Malta and other mediterranean societies. *Ethnomusicology, 44,* 281-301.

Chanda, M. L., & Levitin, D. J. (2013). The neurochemistry of music. *Trends in Cognitive Sciences, 17,* 179-193.

Chin, T., & Rickard, N. S. (2013). Emotion regulation strategy mediates both positive and negative relationships between music uses and well-being. *Psychology of Music, 42,* 692-713.

Cho, I. H., & Lee, K. J. (2006). Automatic affect recognition using natural language processing techniques and manually built affect lexicon. *IEICE - Transactions on Information and Systems, E89-D*, 2964-2971.

Clayton, M. (2009). The social and personal functions of music in cross-cultural perspective. In S. Hallam, I. Cross, & M. Thaut (Eds.), *The Oxford handbook of music psychology* (pp. 35-44). Oxford: Oxford University Press.

Clayton, M. (2016). The social and personal functions of music in cross-cultural perspective. In S. Hallam, I. Cross, & M. Thaut (Eds.), *The Oxford handbook of music psychology* (2nd ed., pp. 47-59). Oxford, United Kingdom: Oxford University Press.

Clayton, M., Sager, R., & Will, U. (2005). In time with the music: the concept of entrainment and its significance for ethnomusicology. *European Meetings in Ethnomusicology, 11,* 3-75.

Clore, G. L., & Huntsinger, J. R. (2007). How emotions inform judgments and regulate thought. *Trends in Cognitive Sciences, 11,* 393-399.

Clore, G. L., & Palmer, J. (2009). Affective guidance of intelligent agents: How emotion controls cognition. *Cognitive Systems Research, 10,* 21-30.

Cole, M. (1996). *Cultural psychology: A once and future discipline.* Cambridge, MA: Harvard University Press.
Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York, NY: National History Press.
Conover, W. J. (1999). *Practical non-parametric statistics* (3rd ed.). New York, NY: Wiley.
Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO PI-R) and NEO Five-factor Inventory (NEO-FFI): Professional manual*. Odessa, FL: Psychological Assessment Resources.
Coutinho, E., & Cangelosi, A. (2011). Musical emotions: predicting second-by-second subjective feelings of emotion from low-level psychoacoustic features and physiological measurements. *Emotion, 7,* 921-937.
Cross, I. (2012). Cognitive science and the cultural nature of music. *Topics in Cognitive Science, 4,* 668-677.
DaSilva, F. B., & Faught, J. (1982). Nostalgia: A sphere and process of contemporary ideology. *Qualitative Sociology, 5,* 47-61.
De Houwer, J., Thomas, S., & Baeyens, F. (2001). Associative learning of likes and dislikes: A review of 25 years of research on human evaluative conditioning. *Psychological Bulletin, 127,* 853-869.
DeNora, T. (2000). *Music in everyday life.* Cambridge: Cambridge University Press.
DeNora, T. (2013). "Time after time": A quali-T method for assessing music's impact on wellbeing. *International Journal of Qualitative Studies on Health and Well-being, 8*.
DeWall, C. N., Campbell, W. K., & Twenge, J. M. (2011). Tuning in to psychological change: Linguistic markers of psychological traits and emotions over time in popular U.S. song lyrics. *Psychology of Aesthetics, Creativity, and the Arts, 5,* 200-207.
Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment, 49,* 71-75.
Eggebrecht, R. (1983). *Sprachmelodie und musikalische Forschungen im Kulturvergleich.* Doctoral dissertation, University of Munich, Germany.
Eich, E., & Macaulay, D. (2000). Fundamental factors in mood-dependent memory. In. J. Forgas (Ed.), *Feeling and thinking: The role of affect in social cognition* (pp. 109-130). New York, NY: Cambridge University Press.
Ellsworth, P. C. (1994). Levels of thought and levels of emotion. In P. Ekman & R. J. Davidson (Eds.), *The nature of emotion: Fundamental questions* (pp. 192-196). Oxford: Oxford University Press.
Ekman, P. (1992). An argument for basic emotions. *Cognition & Emotion, 6,* 169-200.
Elliot, R. (2010). *Fado and the place of longing: Loss, memory and the city.* Surrey, UK: Ashgate Publishing Limited.
Ferguson, C. J. (2009). An effect size primer: A guide for clinicians and researchers. *Professional Psychology: Research and Practice, 40,* 532-538.
Ford, J. F., Addis, D. R., & Giovanello, K. S. (2012). Differential effects of arousal in positive and negative autobiographical memories. *Memory, 20,* 771-778.
Fried, R., & Berkowitz, L. (1979). Music that charms… and can influence helpfulness. *Journal of Applied Social Psychology, 9,* 199-208.
Frijda, N. H., & Scherer, K. R. (2009). Affect (psychological perspectives). In D. Sander & K. R. Scherer (Eds.), *Oxford companion to emotion and the affective sciences* (p. 10). Oxford: Oxford University Press.

Fritz, T., Jentschke, S., Gosselin, N., Sammler, D., Peretz, I., Turner, R., Friederici, A. D., & Koelsch, S. (2009). Universal recognition of three basic emotions in music. *Current Biology, 19,* 1-4.

Gabrielsson, A. (2001). Emotions in strong experiences with music. In P. N. Juslin & J. A. Sloboda (Eds.), *Music and emotion: Theory and research* (pp. 431-449). Oxford: Oxford University Press.

Gabrielsson, A. (2002). Perceived emotion and felt emotion: same or different? *Musicae Scientiae, 6,* 123-148.

Gabrielsson, A., & Juslin, P. N. (2003). Emotional expression in music. In R. J. Davidson, K. R. Scherer & H. H. Goldsmith (Eds.), *Handbook of affective sciences* (pp. 503–534). New York: Oxford University Press.

Gabrielsson, A., & Lindström, E. (2001). The influence of musical structure on emotional expression. In P. N. Juslin & J. A. Sloboda (Eds.), *Music and emotion: Theory and research* (pp. 223-248). Oxford: Oxford University Press.

Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston, MA: Houghton Mifflin.

Gibson, R., Aust, C. F., & Zillmann, D. (2000). Loneliness of adolescents and their choices and enjoyment of love-celebrating versus love-lamenting popular music. *Empirical Studies of the Arts, 18,* 43-48.

Gomez, P., & Danuser, B. (2007). Relationships between musical structure and psychophysiological measures of emotion. *Emotion*, *7*, 377-387.

Gray, L. E. (2007). Memories of empire, mythologies of soul: Fado performance and the shaping of saudade. *Ethnomusicology, 51,* 106-129.

Gregory, A. H., & Varney. N. (1996). Cross-cultural comparisons in the affective response to music. *Psychology of Music, 24,* 47-52.

Grossman, I., & Kross, E. (2010). The impact of culture on adaptive versus maladaptive self-reflection. *Psychological Science, 21,* 1150-1157.

Gundlach, R. H. (1932). A quantitative analysis of Indian music. *American Journal of Psychology, 44,* 133-145.

Gundlach, R. H. (1935). Factors determining the characterization of musical phrases. *American Journal of Psychology, 47,* 624-643.

Hannon, E. E., & Trainor, L. J. (2007). Music acquisition: Effects of enculturation and formal training on development. *Trends in Cognitive Sciences, 11,* 466-472.

Hanser, S. (2010). Music, health, and well-being. In P. N. Juslin & J. A. Sloboda (Eds.), *Handbook of music and emotion: Theory, research, applications* (pp. 849-877). Oxford: Oxford University Press.

Hargreaves, D. J., Miell, D., & MacDonald, R. A. R. (2002). *Musical identities.* New York: Oxford University Press.

Health, C., Bell, C., & Sternberg, E. (2001). Emotional selection in memes: The case of urban legends. *Journal of Personality and Social Psychology, 30,* 326-350.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations* (2nd ed.). Thousand Oaks, CA: Sage.

Izard, C. E. (1977). *Human emotions*. New York: Plenum Press.

James, W. (1884). What is an emotion? *Mind, 9,* 188-205.

Janata, P. (2009). The neural architecture of music-evoked autobiographical memories. *Cerebral Cortex, 19,* 2579-2594.

Janata, P., Tomic, S. T., & Rakowski, S. K. (2007). Characterization of music-evoked autobiographical memories. *Memory, 15,* 845-860.

Josselson, R. (2013). *Interviewing for qualitative inquiry: A relational approach.* New York: The Guilford Press.

Juslin, P. N. (2000). Cue utilization in communication of emotion in music performance: Relating performance to perception. *Journal of Experimental Psychology: Human Perception and Performance, 26,* 1797-1813.

Juslin, P. N. (2005). From mimesis to catharsis: Expression, perception, and induction of emotion in music. In D. Miell, R. MacDonald & D. J. Hargreaves (Eds.), *Musical communication* (pp. 85-115). Oxford, UK: Oxford University Press.

Juslin, P. N. (2011). Music and emotion: Seven questions, seven answers. In I. Deliège & J. Davidson (Eds.), *Music and the mind: Essays in honour of John Sloboda* (pp. 113-135). Oxford: Oxford University Press.

Juslin, P. N. (2012). Are musical emotions invariant across cultures? *Emotion Review, 4,* 283-284.

Juslin, P. N. (2013). From everyday emotions to aesthetic emotions: Toward a unified theory of musical emotions. *Physics of Life Reviews, 10,* 235-266.

Juslin, P. N., Harmat, L., & Eerola, T. (2014). What makes music emotionally significant? Exploring the underlying mechanisms. *Psychology of Music, 42,* 599-623.

Juslin, P. N., & Laukka, P. (2003). Communication of emotions in vocal emotion and music performance: Different channels, same code? *Psychological Bulletin, 129,* 770-814.

Juslin, P. N., & Laukka, P. (2004). Expression, perception, and induction of musical emotion: A review and a questionnaire study of everyday listening. *Journal of New Music Research, 33,* 217-238.

Juslin, P. N., Liljeström, S., Västfjäll, D., Barradas, G., & Silva, A. (2008). An experience sampling study of emotional reactions to music: Listener, music, and situation. *Emotion, 8,* 668-683.

Juslin, P. N., Liljeström, S., Västfjäll, D., & Lundqvist, L.-O. (2010). How does music evoke emotions? Exploring the underlying mechanisms. In P. N. Juslin & J. A. Sloboda (Eds.), *Handbook of music and emotion: Theory, research, applications* (pp. 605-642). Oxford: Oxford University Press.

Juslin, P. N., Liljeström, S., Laukka, P., Västfjäll, D., & Lundqvist, L.-O. (2011). Emotional reactions to music in a nationally representative sample of Swedish adults: Prevalence and causal influences. *Musicae Scientiae, 15,* 174-207. (Special Issue on Music and Emotion)

Juslin, P. N., & Madison, G. (1999). The role of timing patterns in recognition of emotional expression from musical performance. *Music Perception, 17,* 197-221.

Juslin, P. N., Sakka, L., Barradas, G., & Liljeström, S. (2016a). No accounting for taste? Idiographic models of aesthetic judgment in music. *Psychology of Aesthetics, Creativity, and the Arts*, *10,* 157-170.

Juslin, P. N., Sakka, L., Barradas, G., & Liljeström, S. (2016b). *An idiographic approach to modeling emotional reactions to music*. Manuscript submitted for publication.

Juslin, P. N., & Scherer, K. R. (2005). Vocal expression of affect. In J. A. Harrigan, R. Eosenhal, & K. R. Scherer (Eds.), *The new handbook of methods in nonverbal behavior research* (pp. 65-135). Oxford, England: Oxford University Press.

Juslin, P. N., & Sloboda, J. A. (Eds.). (2010). *Handbook of music and emotion: Theory, research, applications.* Oxford: Oxford University Press.

Juslin, P. N., & Västfjäll, D. (2008). Emotional responses to music: The need to consider underlying mechanisms. *Behavioral and Brain Sciences, 31,* 559-575.

Keltner, D., Oatley, K., & Jenkins, J. M. (2014). *Understanding emotions* (3rd ed.). Hoboken, NJ: Wiley.
Kitayama, S., Mesquita, B., & Karasawa, M. (2006). Cultural affordances and emotional experience: Socially engaging and disengaging emotions in Japan and the United States. *Journal of Personality and Social Psychology, 91,* 890-903.
Kivy, P. (1990). *Music alone: Philosophical reflections on the purely musical experience.* Ithaca, NY: Cornell University Press.
Koelsch, S., Fritz, T., von Cramon, D. Y., Müller, K., & Friederici, A. D. (2006). Investigating emotion with music: An fMRI study. *Human Brain Mapping, 27,* 239-50.
Krumhansl, C. L. (1997). An exploratory study of musical emotions and psychophysiology. *Canadian Journal of Experimental Psychology, 51,* 336-352.
Kleinen, G. (1994). Musikalischer Ausdruck und ästhetische Wertung als interkulturelle Qualität und Differenz. *Musikpsychologie. Jahrbuch de Deutschen Gesellschaft für Musikpsychologie, 11,* 76-111.
Konečni, V. J. (2003). Review of *Music and emotion: Theory and research*, edited by P. N. Juslin & J. A. Sloboda. *Music Perception, 20,* 332-341.
Lang, P. J., Greenwald, M. K., Bradley, M. M., & Hamm, A. O. (1993). Looking at pictures: Affective, facial, visceral, and behavior reactions. *Psychophysiology, 30,* 261-273.
Laukka, P., Eerola, T., Thingujam, N. S., Yamasaki, T., & Beller, G. (2013). Universal and culture-specific factors in the recognition and performance of musical affect expressions. *Emotion, 13,* 434-449.
LeBlanc, A. (1980). Outline of a proposed model of sources of variation in musical taste. *Bulletin of the Council for Research in Music Education, 61,* 29-34.
Leboe, J. P., & Ansons, T. A. (2006). On misattributing good remembering to a happy past: An investigation into the cognitive roots of nostalgia. *Emotion, 6,* 596-610.
Lehman, D. R., Chiu, C.-Y., & Schaller, M. (2004). Psychology and culture. *Annual Review of Psychology, 55,* 689-714.
Levitin, D. (2006). *This is your brain on music: The science of a human obsession.* New York, NY: Dutton.
Liljeström, S., Juslin, P. N., & Västfjäll, D. (2013). Experimental evidence of the roles of music choice, social context, and listener personality in emotional reactions to music. *Psychology of Music, 41,* 577-597.
Livingstone, S., & Brown, A. (2005). Dynamic response: Real-time adaptation for music emotion. *Australasian Conference on Interactive Entertainment, 2,* 105-111.
Lomax, A. (1962). Song structure and social structure. *Ethnology, 1,* 425-451.
Lundqvist, L-O., Carlsoon, F., Hilmersson, P., & Juslin, P. N. (2009). Emotional responses to music: Experience, expression, and physiology. *Psychology of Music, 37,* 61-90.
Lyric. (2016). In OxfordDictionaries.com. Retrieved from http://oxforddictionaries.com/definition/english/lyric
Markus, R. H., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review, 98,* 224-253.
MacDonald, R., Hargreaves, D., & Miell, D. (2002). *Musical Identities.* Oxford: Oxford University Press.
MacDonald, R. A. R., Kreutz, G., & Mitchell, L. A. (Eds.). (2012). *Music, health and wellbeing.* Oxford: Oxford University Press.
Merriam, A. P. (1964). *The anthropology of music.* Evanston, IL: Northwestern University Press.

Mesquita, B. (2001). Emotions in collectivist and individualist contexts. *Journal of Personality and Social Psychology, 80,* 68-74.
Mesquita, B., Vissers, N., & De Leersnyder, J. (2015). Culture and emotion. In J. Wright & J. Berry (Eds.), *International encyclopedia of social and behavioral sciences* (2nd ed., pp. 542-549). Oxford: Elsevier.
Meyer, L. B. (1956). *Emotion and meaning in music.* Chicago: Chicago University Press.
Mineka, S., Rafeali, E., & Yovel, I. (2003). Cognitive biases in emotional disorders: Information processing and social-cognitive perspectives. In R. J. Davidson, K. R. Scherer, & H. H. Goldsmith (Eds.), *Handbook of affective sciences* (pp. 976-1009). New York, NY: Oxford University Press.
Mithen, S. (2006). *The singing Neanderthals: The origins of music, language, mind, and body.* Cambridge, Massachusetts: Harvard University Press.
Moors, A. (2009). Theories of emotion causation: A review. *Cognition and Emotion, 23,* 625-662.
Mori, K., & Iwanaga, M. (2013). Pleasure generated by sadness: Effect of sad lyrics on the emotions induced by happy music. *Psychology of Music, 42*, 643-652.
Morling, B., & Lamoreaux, M. (2008). Measuring culture outside the head: A meta-analyses of individualism-collectivism in cultural products. *Personality and Social Psychology Review, 12,* 199-221.
Nielson, C., Soares, A., & Machado, C. (2009). The cultural metaphor revised: Exploring dimensions, complexities and paradoxes through the Portuguese fado. *International Journal of Cross Cultural Management, 9,* 289-308.
North, A. C., Hargreaves, D. J., & Hargreaves, J. J. (2004). Uses of music in everyday life. *Music Perception, 22,* 41-77.
North, A., & Hargreaves, D. (2008). *The social and applied psychology of music*. Oxford: Oxford University Press.
Oatley, K., & Johnson-Laird, P. N. (2011). Basic emotions in social relationships, reasoning, and psychological illnesses. *Emotion Review, 3,* 424-433.
Oatley, K., Keltner, D., & Jenkins, J. M. (2006). *Understanding emotions* (2nd ed.). Oxford, United Kingdom: Blackwell.
Osborne, J. W. (1980). The mapping of thoughts, emotions, sensations, and images as responses to music. *Journal of Mental Imagery, 5,* 133-136.
Patel, A. D., & Demorest, S. (2013). Comparative music cognition: Cross-species and cross-cultural studies. In D. Deutsch (Ed.), *The psychology of music* (3rd ed., pp. 647-681). San Diego, CA: Academic Press.
Parrot, W. G., & Spackman, M. P. (2000). Emotion and memory. In M. Lewis & J. Haviland-Jones (Eds.), *Handbook of emotions* (2nd ed., pp. 476-490). New York, NY: Guilford.
Pearsall, J., & Hanks, P. (Eds.). (1998). *The new Oxford dictionary of English*. Oxford, UK: Oxford University Press.
Pike, A. (1972). A phenomenological analysis of emotional experiences in music. *Journal of Research in Music Education, 20,* 262-267.
Plutchik, R. (1994). *The psychology and biology of emotion.* New York, NY: HarperCollins.
Rasmussen, A. S., & Berntsen, D. (2009). Emotional valence and the functions of autobiographical memories: Positive and negative memories serve different functions. *Memory and Cognition, 37,* 477-492.
Rentfrow, P. J., & Gosling, S. D. (2003). The do re mi's of everyday life: The structure and personality correlates of music preferences. *Journal of Personality and Social Psychology, 84,* 1236-1256.

Rentfrow, P. J., & Gosling, S. D. (2006). Message in a ballad: The role of music preferences in interpersonal perception. *Psychological Science, 17,* 236–242.
Rizzolatti, G., & Craighero, L. (2004). The mirror-neuron system. *Annual Review of Neuroscience, 27,* 169-192.
Robinson, M. D., & Clore, G. L. (2002a). Episodic and semantic knowledge in emotional self-report: Evidence for two judgment processes. *Journal of Personality and Social Psychology, 83,* 198-215.
Robinson, M. D., & Clore, G. L. (2002b). Belief and feeling: Evidence for an accessibility model of emotional self-report. *Psychological Bulletin, 28,* 1040-1050.
Rothbaum, F., & Tsang, B. Y. (1998). Love songs in the United States and China: On the nature of romantic love*, Journal of Cross-Cultural Psychology, 29,* 306-319.
Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology, 39,* 1161-1178.
Saarikallio, S. (2012). Cross-cultural approaches to music and health. In R. MacDonald, G. Kreutz, & L. Mitchell (Eds.), *Music, health, and well-being* (pp. 477-490). Oxford: Oxford University Press.
Saarikallio, S. (2008). Cross-cultural investigations of adolescent's use of music for mood regulation. In *Proceedings of the 10th International Conference on Music Perception and Cognition*, 25-29 August. Sapporo, Japan.
Saarikallio, S., & Erkkilä, J. (2007). The role of music in adolescent's mood regulation. *Psychology of music, 35,* 88-109.
Salimpoor, V. N., Benovoy, M., Larcher, K., Dagher, A., & Zatorre, R. J. (2011). Anatomically distinct dopamine release during anticipation and experience of peak emotion to music. *Nature Neuroscience, 14,* 257– 262.
Scherer, K. R. (1997). The role of culture in emotion-antecedent appraisal. *Journal of Personality and Social Psychology, 73,* 902-922.
Scherer, K. R. (1999). Appraisal theories. In T. Dalgleish, & M. Power (Eds.), *Handbook of cognition and emotion* (pp. 637–663). Chichester: Wiley.
Scherer, K. R. (2003). Why music does not produce basic emotions: A plea for a new approach to measuring emotional effects of music. In R. Bresin (Ed.), *Proceedings of the Stockholm Music Acoustics Conference 2003* (pp. 25 – 28). Royal Institute of Technology.
Schlegel, A. (1999). The global spread of adolescence culture. In L. J. Crockett & R. K. Silbereisen (Eds.), *Negotiating adolescence in times of social change* (pp. 71-88). New York: Cambridge Universitet Press.
Schubert, E. (1999). Measuring emotion continuously: Validity and reliability of the two-dimensional emotion space. *Australian Journal of Psychology, 51,* 487-500.
Schäfer, T., Tipandjan, A., & Sedlmeier, P. (2012). The functions of music and their relationship to music preference in India and Germany. *International Journal of Psychology, 47,* 370- 380.
Sedikides, C., Wildschut, T., Arndt, J., & Routledge, C. (2008). Nostalgia: Past, present, and future. *Current Directions in Psychological Science, 17,* 304-307.
Shaw, C., & Chase, M. (Eds.). (1989). *The imagined past: History and nostalgia.* Manchester: Manchester University Press.
Shiraev, E. B., & Levy, D. (2010). *Cross-cultural psychology: Critical thinking and contemporary applications.* Boston, MA: Allyn & Bacon.
Singelis, M. T., & Sharkey, F. W. (1995). Culture, self-construal, and embarrassability. *Journal of Cross-Cultural Psychology, 26,* 622-644.

Singhi, A., & Brown, D. A. (2014, October). On cultural, textual and experiential aspects of music mood. In *ISMIR '14*. Paper presented at the Proceedings of the 15th International Society for Music Information Retrieval Conference (Taiwan), Taipei (pp. 3-8).
Sloboda, J. A. (1992). Empirical studies of emotional response to music. In M. Riess-Jones & S. Holleran (Eds.), *Cognitive bases of musical communication* (pp. 33-46). Washington, DC: American Psychological Association.
Sloboda, J. A. (1996). Emotional responses to music: A review. In K. Riederer, & T. Lahti (Eds.), *Proceedings of the Nordic Acoustical Meeting* (pp. 385-392). Helsinki: The Acoustical Society of Finland.
Sloboda, J. A., O'Neill, S. A., & Ivaldi, A. (2001). Functions of music in everyday life: An exploratory study using the Experience Sampling Method. *Musicae Scientiae, 5,* 9-32.
Sousou, S. D. (1997). Effects of melody and lyrics on mood and memory. *Perceptual and Motor Skills, 85,* 31–40.
Steinbeis, N., Koelsch, S., & Sloboda, J. A. (2006). The role of harmonic expectancy violations in musical emotions: Evidence from subjective, physiological, and neural responses. *Journal of Cognitive Neuroscience, 18,* 1380-1393.
Stratton, V. N., & Zalanowski, A. H. (1994). Affective impact of music vs. lyrics. *Empirical Studies of the Arts, 12,* 173–84.
Stein, N. L., Trabasso, T., & Liwag, M. (1994). The Rashomon phenomenon: Personal frames and future-oriented appraisals in memory for emotional events. In M. M. Haith, J. B. Benson, R. J. Roberts, & B. F. Pennington (Eds.), *Future oriented processes.* Chicago, IL: University of Chicago Press.
Striedter, G. F. (2004). *Principles of brain evolution.* Sunderland, MA: Sinauer Associates.
Talarico, J. M., Berntsen, D., & Rubin, D. C. (2009). Positive emotions enhance recall of peripheral details. *Cognition & Emotion, 23,* 380-398.
Thompson, W. F., & Balkwill, L-L. (2010). Cross-cultural similarities and differences. In P. N. Juslin & J. A. Sloboda (Eds.), *Handbook of music and emotion: Theory, research, applications* (pp. 755-788). Oxford: Oxford University Press.
Tourangeau, R., Conrad, F. G., & Couper, M. P. (2013). *The Science of web surveys.* Oxford: Oxford University Press.
Trapnell, P. D., & Campbell, J. D. (1999). Private self-consciousness and the five-factor model of personality: Distinguishing rumination from reflection. *Journal of Personality and Social Psychology, 76,* 284-304.
Triandis, H. C. (1994). *Culture and social behavior*. New York: McGraw-Hill.
Triandis, H. C. (1995). *Individualism and collectivism*. Boulder, CO: Westview.
Triandis, H. C. (2001). Individualism-Collectivism and personality. *Journal of Personality, 69,* 907-924.
Tsai, J. L. (2007). Ideal affect: Cultural causes and behavioral consequences. *Perspectives on Psychological Science, 2,* 242-259.
Västfjäll, D., Juslin, P. N., & Hartig, T. (2012). Music, subjective wellbeing, and health: The role of everyday emotions. In R. MacDonald, G. Kreutz, & L. Mitchell (Eds.), *Music, health, and well-being* (pp. 405-423). Oxford: Oxford University Press.
Vernon, P. (1998). *A history of the Portuguese fado.* Brookfield, WI: Ashgate.
Visser, P. S., Krosnick, J. A., & Lavrakas, P. J. (2000). Survey research. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 223-252). New York: Cambridge University Press.
Wagenaar, W. A. (1986). My memory: A study of autobiographical memory over six years. *Cognitive Psychology, 19,* 225-252.

Waterman, M. (1996). Emotional responses to music: Implicit and explicit effects in listeners and performers. *Psychology of Music, 24,* 53-67.

Waugh, C. E., & Fredrickson, B. L. (2006). Nice to know you: Positive emotions, self-other overlap, and complex understanding in the formation of a new relationship. *Journal of Positive Psychology, 1,* 93-106.

Wells, A., & Hakanen, E. A. (1991). The emotional uses of popular music by adolescents. *Journalism Quarterly, 68,* 445-454.

Wildschut, T., Sedikides, C., Arndt, J., & Routledge, C. (2006). Nostalgia: Content, triggers, functions. *Journal of Personality and Social Psychology, 91,* 975-993.

Willig, C. (2001). *Introducing qualitative research in psychology: adventures in theory and method*. Buckingham, UK: Open University Press.

Willig, C., & Stainton-Rogers, W. (Eds.). (2013). *The SAGE handbook of qualitative research.* Thousand Oaks, California: Sage.

Witvliet, C. V., & Vrana, S. R. (2007). Play it again Sam: Repeated exposure to emotionally evocative music polarizes liking and smiling responses, and influences other affective reports, facial EMG, and heart rate. *Cognition & Emotion, 21,* 3-25.

Zauberman, G., Ratner, R. K., & Kim, B. K. (2009). Memories as assets: Strategic memory protection in choice over time. *Journal of Consumer Research, 35,* 715-728.

Zentner, M. R., & Eerola, T. (2010). Self-report measures and models. In P. N. Juslin & J. A. Sloboda (Eds.), *Handbook of music and emotion: Theory, research, applications* (pp. 187-221). Oxford: Oxford University Press.

Zentner, M. R., Grandjean, D., & Scherer, K. R. (2008). Emotions evoked by the sound of music: Characterization, classification, and measurement. *Emotion, 8,* 494-521.

Zhou, X., Sedikides, C., Wildschut, T, & Gao, D.-G. (2008). Counteracting loneliness: On the restorative function of nostalgia. *Psychological Science, 19,* 1023-1029.

Acta Universitatis Upsaliensis

Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Social Sciences 137

Editor: The Dean of the Faculty of Social Sciences

A doctoral dissertation from the Faculty of Social Sciences, Uppsala University, is usually a summary of a number of papers. A few copies of the complete dissertation are kept at major Swedish research libraries, while the summary alone is distributed internationally through the series Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Social Sciences. (Prior to January, 2005, the series was published under the title "Comprehensive Summaries of Uppsala Dissertations from the Faculty of Social Sciences".)

Distribution: publications.uu.se
urn:nbn:se:uu:diva-314870

ACTA
UNIVERSITATIS
UPSALIENSIS
UPPSALA
2017