Abstract

This paper provides an overview of current thinking in music cognition regarding the perception of emotion in music. A componential view of emotion is adopted, and a variety of routes by which music expresses emotion are presented. Two main questions for future research are identified: first, the extent to which perception and induction of emotion through music is shared cross-culturally, and second, identification of the factors that contribute to the cross-cultural perception of emotion in music. By drawing upon a biologically and ecologically informed perspective this paper aims to identify routes for future research that would enable music cognition research to shed light on the socio-historical variability of emotion perception through music.

1. Introduction

Research in the anthropology, sociology and history of emotion argues that constructions of emotion vary across cultures. It has been argued that the very idea of what an emotion is, and of the kinds of emotions which are said to exist, has differed at different historical periods, and in different geographical locations (see, for example, Lutz and White [1]). In relation to music, the historian Reddy [2] outlines a change in emotional thinking and display in France between 1750 and 1850. This was also manifested in changed conceptions and experiences of music’s affective character, as described in Johnson’s account of listening practices in French opera [3]. These, and other musicological studies in the cultural history of emotion understand emotions as historically contingent, and of music (and musical discourse and behaviour) as one of the ways in which emotional displays and experience are produced by culture.

In contrast to work in anthropology, history and musicology, research in music cognition has tended to focus on musical mono-cultures (primarily Western classical music), using them to identify musical structures associated with particular dimensions or categories of emotion. Interestingly, the few comparative studies that have been conducted indicate some degree of universality in the expression and perception of emotion in music (Balkwill and Thompson [4], Balkwill et al. [5] and Gregory and Varney [6]). For example, a recent study by Fritz et al. [7] showed that the emotion categories of extracts of Western and Mafa music chosen to represent three basic emotions were correctly recognized by naïve listeners from the other culture, and that the perceived unpleasantness of the music was influenced by the degree of roughness. This study, and the other comparative studies mentioned above, suggest that at least some elements of musical structure are associated cross-culturally with certain emotion categories. This evidence for the universality of some aspects of emotion expression and perception has parallels with universals found in speech prosody (Juslin and Laukka [8]) and facial expression (Ekman et al [9]).

Evidence for cross-culturally shared aspects of emotion expression and perception in music suggests the need to understand their character as well as their extent. From a broader perspective, understanding universality in emotion expression through music may shed light on the evolutionary origins of music and its role as an affective medium, and on shared mechanisms that give rise to affective experience in a variety of domains.

2. Background

This paper adopts a component-view of emotion. In other words, an emotion is conceived here as an event of relatively brief duration, with simultaneous changes in multiple modalities, including feeling state, physiology, appraisal, motor expression, and action tendencies. Furthermore, a multiple-route perspective forms the basis for the ideas presented here. It is assumed that emotional responses to music are elicited via a number of different routes, which include evaluative conditioning (Juslin [10]), episodic memories (e.g. emotion associated with a previous occasion on which the music was heard) (Juslin [10]), semantic memories (meanings of musical material shared by members of a particular culture) (Koelsch [11]), structural expectations (Huron [12]), and emotion contagion (Juslin [10]). The variety of routes by which emotion is perceived, and/or induced, accounts for some of the difficulties which researchers have faced when trying to formulate a comprehensive theory of emotion and music.

This paper is concerned with understanding the role of musical structure in affective experience of music, with a particular focus on musical expectations.
3. Musical structure and cross-cultural perception of emotion

3.1. Higher level attributes

The two sources of emotional response to musical structure which are the focus here are those due to semantic memory, and emotional responses formed from expectations about musical structure. The semantic aspect of musical structure has been most theorized in the branch of musicology known as semiotics, and has received a small amount of empirical attention (Koelsch [11], Krumhansl [13]). Empirical work on this topic is so sparse that it is difficult to draw firm conclusions, but there does seem to be some evidence for the perception of musical materials in terms of culturally specific meanings. In this case, then, the universality of musical material would seem to be limited.

Theories of musical expectation propose that emotional response to music arises at least in part from expectations about musical continuation (Huron [12]). Empirical evidence for the affective character of such expectations comes from self-reports (Sloboda [14]) and experimental studies. For example, Sloboda found evidence for associations between particular kinds of musical structure in Western classical music and strong emotional-physical experiences. A more recent unpublished experimental study by Witek and Dibben indicates that similar expectations operate in groove-based musics and are associated with physiological changes: these include the entry and temporary removal of textural layers, high pitch vocal events, instrumental breaks, harmonic deviation in what is otherwise repetitive harmonic progression, and metrical dissonance and displacement. While such expectations are based in part on general gestalt processing mechanisms, others are dependent upon learning the statistical regularities of musical styles through exposure. Here again the extent to which universality of response is possible is constrained. One further source of strong emotional responses to structural expectations revealed by these studies is the role of what might be called ‘lower level’ acoustic attributes. Therefore it is to these that I turn next.

3.2. ‘Lower level’ attributes

From an ecological perspective certain ‘lower level’ sonic features are expected to elicit affective responses cross-culturally [1]. Such features include: loudness (as a specification of the size and proximity of the sound source), and the dynamics of loudness (such as auditory looming), presence of pitch trembling (as an indicator of states of arousal), pitch range (e.g. high pitch and ascending contours tend to be associated with anger and fear), and timbral spectra (rich timbres tend to be associated with anger and fear). In addition, consonance and dissonance have been found to influence musical liking across cultures.

How might these sources of emotion differ in their effect across cultures? In this case the eliciting sound would be expected to initiate an emotional response, although this would be mediated by the interpretation placed upon the sound in that particular context. In other words, we might expect the appraisal component of the emotion to differ according to the perceiver, and his or her needs and preoccupations. Indeed, evidence for the role of acoustic characteristics in emotional-physiological responses to music has been found by Coutinho and Cangelosi [15], whose neural network model of emotional response to music takes as its input ‘lower level’ attributes of musical structure, and accurately predicts (enculturated) listeners’ dynamic emotional responses to music.

4. Conclusions

Understanding the extent to which emotional responses to music are shared across cultures has the potential to shed light on the sources of emotion with music, and the extent to which these share general processing and affective mechanisms. However, as David Huron [16] has argued, the time for comparative research is now, while there are still some cultures that have not been influenced by Western and other musics—something which is increasingly rare due to globalization.

A further route for research is to examine affect in music and speech. For example, an empirical study investigating the extent to which computational models predict both emotional reactions to music and to affective voices (in terms of subjective feelings and physiological arousal) from psychoacoustic features of sound is due to be carried out by Coutinho and Dibben. The aim of the study is to test the extent to which these same psychoacoustic features capture features of affect in speech prosody and music. The goal is to show whether the perception of emotion uses mechanisms common to both music and speech. This would contribute to knowledge of mechanisms of emotion induction, and to theories that they share emotion-inducing properties because they come from the same evolutionary route (Juslin & Laukka [8]).

Ultimately, the research outlined in this paper addresses an issue of primary relevance not just for scholars of affect, musicologists, psychologists and computational scientists, but for the wider public, for many of whom music plays an important role in their lives. Understanding the affective power of music, and it’s potential origins, has wide relevance and appeal.

References