

ENVIRONMENTAL SOUND AND ITS RELATION TO HUMAN EMOTION

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1 Introduction

Speech, music and environmental sound refer to three specialized areas of acoustic communication and its study, and these areas can be regarded as forming a continuum of human aural experience [7]. Although they have traditionally been studied separately, there are many factors today pointing to their overlap and interaction. Most obviously, contemporary audio technology has blurred their distinctions by making reproduced speech and music into common environmental sounds, often structured by media and individuals as accompaniment environments [1]. The widespread contemporary presence of music-as-environment in public and personal usage can be understood as an extension of the programmed use of music as a background and more recently, foreground presence in both public and commercial spaces. Of the many purposes such music serves, one function is to transfer the emotional aspects of the music onto the environment where it is heard, just as music in audio advertising becomes ‘attached’ to a specific product. Although the relatively intense affective responses that we regard as the expressions of emotions through speech and music have been studied extensively, but often separately, any equivalent role of environmental sounds has been largely ignored. We can therefore ask how environmental sounds, with or without a speech and music component, and with or without human causality, can affect and effect human emotions.

Recent advances in brain functioning have begun to suggest that there are underlying mechanisms, related to specific parts of the brain, which can be linked to known psychological responses to both music and speech. One important clue to their relationship is that the emotional (and other) aspects of speech are conveyed by paralanguage (i.e. the nonverbal aspects of vocalization), the parameters for which are closely related to the musical parameters of melody, such as patterns of pitch inflection, rhythm (including tempo and patterns of stress), loudness and dynamic contours, timbre, and silence. Although it is beyond the scope of this paper, one could argue that the structure of musical melody developed historically as an extension of spoken dialogue, both in singing and instrumental performance. It is significant that both paralanguage and musical structure act as continuous, analog phenomena, basically ‘how’ the speech or music is communicated, rather than the more discrete content of words and notes [10]. Can similar structures be found with environmental sounds?

2 Environmental Sounds and Emotion

This paper wishes to extend this current line of research to the neglected area of environmental sound as it is perceived by individuals in context, namely as the soundscape. Soundscape competence, it is argued, co-evolved with the specialized areas of speech and music, and today with the widespread phenomenon of music-as-environment, as well as other media practices, it is useful to re-connect old arguments about music and emotion with contemporary soundscape experience. To do this, we will draw on the extensive literature summary by Patrik Juslin and Daniel Västfjäll concerning the underlying psychological mechanisms that are involved in the musical induction of emotions [5]. They identify the following six types of mechanisms.

2.1 Brain Stem Reflex

This reflex refers to the autonomic responses to certain acoustical characteristics that can be found in both music and the soundscape, namely loud, sudden, noisy sounds, those with very low or high frequency, or those that are dissonant (i.e. with spectral components less than a critical bandwidth apart). Such sounds are associated with arousal, potentially signifying danger. In the case of environmental sound, psychological reactions to noise are often based on these qualities, and in the converse situation, loud percussive sounds are often an organized part of public celebrations, sports events and entertainment intended to generate excitement and pleasure.

2.2 Evaluative Conditioning

When music is repeatedly paired with another event that is valenced positively or negatively, it can produce a conditioned emotional response when experienced later on its own. There is no reason why an environmental sound might not produce a similar conditioning. For instance, an ‘earwitness account’ that was recorded by the World Soundscape Project in its Vancouver study described the experience of hearing local foghorns late at night or early in the morning. She said that ‘despite the fact that they were mournful, we seem to remember them as somehow comforting’ [7, p. 20]. This is clearly a situation where the thick low-pitched sound of the foghorn, with its drooping pitch bend at the end, reflecting the paralanguage of mourning, provoked an emotional reaction of comfort. Moreover, this habitual response was still vivid 50 years later during the

interview. In other interviews, sounds from nature, particularly when heard frequently or on special occasions, became associated with particular life events. Given the power of such personal associations, it is not surprising that advertisers attempt to use such sound effects to associate particular qualities to their products.

2.3 Episodic Memory

Similar to evaluative conditioning, episodic memory refers to music (and presumably environmental sounds) evoking the memory of a particular event in someone's life. Music is well known to contribute to self-identity, particularly in one's youth, and to nostalgia later in life [2]. Although most people do not recall environmental sounds as readily as music, the practice of soundwalking has been extended to 'memory walks' where the subject is taken back to a significant locale in their life. Even if considerable change has occurred, being back in the original context seems to provoke sound memories quite effectively [4].

2.4 Emotional contagion

Emotional contagion refers to the induction of an emotion in a listener that is similar to that perceived in music (or expressed by another person), perhaps because of the similarity to vocal expression, i.e. its paralanguage, in a kind of mirror function. Bull [1] and others point to the deliberate use of media to control or stimulate one's emotions and 'control inner chaos'. People often report anecdotally about the 'soothing' effect of environmental sounds such as waves on a beach, or birds singing, as well as the excitement of, for instance, a windstorm, bells or fireworks. It is also common to attribute human emotions to natural sounds (e.g. an angry storm, a sighing wind, joyful birds, etc.).

2.5 Visual imagery

Justin and Västfjäll [5] also discuss emotion induced in a listener who conjures up visual imagery while listening to music, even if this phenomenon varies widely with different individuals. Given that environmental sounds are linked to actual visual contexts, there is a close connection between them when the listener imagines the source of the sound, with perhaps an emotional reaction. Such pairings are the basic language of film sound where the mood of an image or action is supported by the accompanying sound effects, as well as music.

2.6 Musical expectancy

One classic theory about emotion and music [3, 6] is that [10] certain syntactical features of music induce expectations that may be disrupted but then resolved in a satisfactory manner. Such reactions clearly depend on learning the language of a particular musical style, i.e. developing

musical competence. Similarly, the pattern of a sequence of environmental sounds (e.g. footsteps on a stair leading to a door) may generate a similar sense of expectation that might be fulfilled (e.g. a knock on the door) or disrupted (e.g. a package being delivered) with similar emotional effect.

3 Conclusion

Justin and Västfjäll regard brain function 'mechanisms as information-processing devices at various levels of the brain that use various means to track significant aspects of the environment, and that may produce conflicting outputs' (568-9). They provide an extensive list of mechanisms with their associated survival value, information focus, ontogenetic development, key brain regions involved and other aspects. Although designed specifically for sorting out the mechanisms involved with emotion and music, their approach seems equally valid for researching the affective and emotional response to soundscapes, particularly at a time when qualitative approaches to soundscape design are being developed, and composers are treating environment as music in soundscape composition [8-9].

References

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