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The Orderliness of Music from the Perspective of Complex Information Systems †

Shan Zhang

School of Humanities and Social Sciences, Xi'an Jiaotong University, Xi'an 710049, China; rwbg@mail.xjtu.edu.cn; Tel.: +86-1510-293-2892

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Abstract: By applying the concept of natural science to the study of music, on the one hand, we can understand the structure of music macroscopically, on the other, we can reflect on the history of music to a certain extent. Throughout the history of western music, from the classical period to the 20th century, music seems to have gone from order to disorder, but it is still orderly if analyzed carefully. Using the concept of complex information systems can give a good answer in the essence.

Keywords: entropy; musical structure; self-organization; holography

1. Introduction

Some concepts from natural science can be used for reference on the study of music theory, such as "entropy", which is derived from the second law of thermodynamics proposed by the physicist Clausius in 1865: "entropy increase principle" [1]. By abstractly philosophizing the concept of entropy in natural science into the analysis of music system, we can not only grasp the structure of music more macroscopically and microcosmically, but also reflect on the history, present situation and future of music to a certain extent.

2. Entropy Increases in Music

In general, the more disordered the system is, the greater the entropy is, which is entropy increase. The more organized the system is, the less entropy it has, which is entropy decrease. In the 1980s, Mr. Luo Yifeng wrote an article on the phenomenon of increasing entropy in music, which applied the concept of entropy to the field of music for the first time. It focused on the collapse of the 20th century's central tonality. The element of chance arises in music that moves it from organization to disintegration. The disintegrating tonal scale indicates the disorder in music, which is entropy increase.

3. Self-Organization and Holography in Music

Is music really developing into disorder? We can look at the ontology of music from the perspective of information philosophy. It divides existence into direct existence and indirect existence [2]. The nature of music is very special, it can be seen as an invisible, intangible indirect information. After a musical work is created, its value can only be demonstrated through the process of performance. Music is represented by sound, and sound is represented in time. Musical works, whether performed or appreciated, are recreations according to the understanding of the subject, which can be regarded as the unity of in-itself information, self-generated information and regenerative information.

In the dynamic sense, "organization" is divided into self-organization and other-organization [3]. Self-organization is spontaneous formation and internal order. Other-organization is the direct

introduction of pattern information from outside systems. Music is the unity of self-organization and other-organization.

Music has a holographic feature, which contains three contents: history relation evolution, present relation evolution and future relation evolution. The peculiarity of music is that it disappears as soon as it appears. In terms of listening, we always hear the present and we rely on "memory" to connect history with the present. The upcoming part depends on "anticipation" to connect the future with the present, As Leonard Mayer said, "there can be no musical experience without the memory of thinking" [4].

4. The Digestion and Creation of Music

Under the influence of the decentralization of structuralism in the 20th century, the modes, tonality, harmony, rhythm, orchestration, melody and form in the traditional sense of western music were broken. In terms of tonality, it pursues all kinds of tonality of scales (all kinds of keys of artificial scale). Instead of traditional macro and minor tunes of music, the previously stable tonality is replaced by multi-tonality, atonal and free twelve notes. The orchestration has weakened the full, grand and brilliant acoustics of the classical romantic period.

Twentieth-century expressionism exaggerates or even distorts people's subjective feelings. This is the negation of impressionist music and it is another deconstruction of the old model, its main feature is atonal. No note has the status of a tonal center. The sense of hearing is sharp, grotesque, dissonant. Finally, the bottom line tonality of carrying the beauty of music has been completely dissolved. The entropy does go up here, it's more disordered than it was before. However, this disorder is not an absolute equilibrium state, there are still some rules between the parts. Twelve-tone music is still organized and regular.

The creation of the twelve tone technique has strict rules. The sequence consists of 12 semitones in an octave, each sound can only be used once, if you want to use it for the second time, you need to wait for all of them to be used once, this sequence has four forms: original form, retrograde form, reflection, reflection retrograde.

The old model disintegrates, a new model is created, and the new model is a new rule, a new agreement, a new order for the old model. From this level, entropy in music is decreasing, and the pace of orderly development is still not stopped.

5. Conclusions

The new "music" presents a set of basic characteristics of the original music on which it is based. This is exactly a kind of order brought by holography. The beauty of music is often orderly. The development of music should consider the existence of beauty and proceed according to the principle of decreased entropy. In other words, the history of music should be an orderly process.

References

1. Wu, K. *Basic Theory of Complex Information System*; Xi'an Jiaotong University Press: Xi'an, China, 2010; p. 90.
2. Wu, K. *Basic Theory of Complex Information System*; Xi'an Jiaotong University Press: Xi'an, China, 2010; p. 105.
3. Wu, K. *Basic Theory of Complex Information System*; Xi'an Jiaotong University Press: Xi'an, China, 2010; p. 211.
4. Meyer, L. *Emotion and Meaning in Music*; He, Q., Translation; Peking University Press: Peking, China, 1992.