外国語要約

学位論文題目 Relationship between kinematic and perceptual characteristics in ballet movement: focusing on aesthetics

氏　　名 Yui Kawano

The aesthetics of movement are factors that move people's minds beyond language and cultural differences. It has been pointed out that aesthetics perception is influenced by the kinematic characteristics of the performer and the perception characteristics of the viewer (Calvo-Merino et al., 2008; Torrents et al., 2013). The kinematics of the performer have been studied extensively, especially in ballet movements (e.g., Bronner, 2012; Kawano et al., 2017), however their aesthetics have not been considered. On the other hand, there are reports of kinematic characteristics that affect aesthetics in dance that allow free body expression (e.g., Torrents et al., 2013). However, since these are not movements that emphasize aesthetics, it is difficult to interpret them as aesthetics common to all dance movements. Studies on perceptual characteristics of viewers have reported that viewers' experiences (e.g., Calvo-Merino et al., 2010) and performance content (e.g., Bronner and Shippen, 2015) affect the perception of aesthetics. However, the relationship between viewer's perceptual and kinematic characteristics that affect the aesthetics of movements has not been clarified. These are considered major problems when evaluating the quality of movement that cannot be determined only by quantitative indices such as distance, speed, and force. Therefore, the purpose of this study was to acquire knowledge to make hypotheses of kinematic and perceptual characteristics that affect aesthetics of movement to quantify the aesthetics of ballet movements based on the performer's kinematic characteristics and viewer's perceived characteristics.

Ballet comprises movements that require characteristic expressions and basic techniques. First, for the upper limb movements that express a flapping swan (characteristic expression), we examined correlations between kinematic and impression characteristics of ballet movements with different aesthetics. For this, 34 female ballet dancers participated as viewers; they used 21 adjectives related to aesthetics and qualitative impressions of movements and evaluated upper limb movements of 12 female dancers with different skill levels. Then, the score of "beautiful-ugly" among impressions was averaged for each video, and two groups of the top 30% and the bottom 30% (7 videos each) were extracted and compared. In addition, factor analysis was performed on kinematic indices and impressions that showed significant differences, and the relationship between them was investigated thereafter. Results indicated that kinematic characteristics affecting aesthetic perception were "spatial characteristics of the vertical direction in the distal part of the upper limb", "spatial and temporal characteristics of shoulder joint rotation", "spatial characteristics of the medial/lateral direction in the upper limb", "temporal characteristics of the vertical direction during the downward phase", and "temporal characteristics during the upward phase". Further, the impression characteristics affecting the perception of aesthetic were "weight and time", "space", and "viewer's preference". In addition,

examining the relationship between kinematic and perceptual characteristics, it was found that “spatial and temporal characteristics of shoulder joint rotation” contributed to the perception of “viewer’s preference”; “spatial characteristics of the medial/lateral direction in the upper limb” and “temporal characteristics of vertical direction during the downward phase” contributed to the perception of “space”; and “temporal characteristics of the vertical direction during the downward phase” and “temporal characteristics during the upward phase” contributed to the perception of “weight and time”.

Next, for “arabesque,” the movement that lifts lower limbs and requires basic techniques, we examined correlations between kinematic and impression characteristics of ballet movements with different aesthetics. For this, 61 female ballet dancers participated as viewers; they used 20 adjectives related to aesthetics and qualitative impressions of movements and evaluated lower limb movements of 14 female dancers with different skill levels. Then, implementing the same procedure as the study of characteristic expression, two groups (8 videos each) were extracted and compared based on the score of “beautiful-ugly”, and relationships between kinematic and impressions characteristics were investigated. Results indicated that kinematic characteristics affecting aesthetic perception were “spatial and temporal characteristics of the torso”, “spatial characteristics as posture when lifting the lower limb”, “spatial characteristics from the trunk to the left upper limb”, and “spatial characteristics for maintaining balance”. Impression characteristics affecting aesthetic perception were impression characteristics regarding “weight and time”, and “viewer’s preference and space”. Examining the relationship between kinematic and perceptual characteristics revealed that “spatial and temporal characteristics of the torso” and “spatial characteristics for maintaining balance” contributed to the perception of “viewer’s preference and space”; “spatial characteristics from the trunk to the left upper limb” and “spatial characteristics for maintaining balance” contributed to the perception of “weight and time”.

Kinematic characteristics common to these results were amplitude and speed of movement and rotation of the joint. Impression characteristics common to these results are impressions of “like”, “good”, “strong”, “high”, “dynamic”, “rhythmic”, “accelerated”, “well balanced”, and “changing”. In addition, rotation of the upper limb joint was involved in the change impression of the regarding viewer’s preference, weight, and time. These kinematic and perceptual characteristics are likely to be factors that move the human mind, suggesting that the common objectivity given to viewers is included.

These findings are expected to contribute to the construction of a framework for evaluating the quality of movement that cannot be determined only by quantitative indices of movement. As this is considered to be applicable to aesthetic sports, it provides knowledge useful for elucidating the mechanism of non-verbal communication—that transcends ballet movements—between performers and viewers who go beyond ballet movements.