Changes of Future Actors ECG Parameters During Different Genre Roles

E. Sendžikaitė[1], R. Joffe[2*], A. Vainoras[2], V. Grabstaite[3], R. Balevičiūtė[4], T. Telksnys[5]

[1]*Institute of Sports, Lithuanian University of Health Sciences, Lithuania*
[2]*Health Research Institute, Lithuanian University of Health Sciences, Lithuania*
[3]*Department of Art History and Theory, Lithuanian Music and Theatre Academy, Lithuania*
[4]*Department of Dance and Movement, Lithuanian Music and Theatre Academy, Lithuania*
[5]*Mathematical Analysis of Dynamic Systems Research Group, Kaunas University of Technology, Lithuania*
[*]*E-mail: joffero@gmail.com*

Introduction. Nowadays most of the time actors are perceived not as merely theatrical text interpreters, but as creators, relying on their imagination, improvisation and kinaesthetic perception. Actor's body is especially sensitive to external factors, gradually becoming a reflection of real life experiences, which evoke different intensive emotions. Emotional contexts inevitably cause different internal tensions. There are many research works which emphasize the unity of the body functions [1] and prove informative advantages of complex and integrated assessments [2]. Therefore, it is becoming more and more important to take into account complex research on actors' physical and mental health parameters interfaces, and to integrate those research findings into the educating system when preparing future actors, as well as to search for optimal intervention ways.

The aim of the study was to assess dynamic characteristics of Lithuanian Academy of Music and Theatre students' electrocardiograph parameters, depending on the subjects' psychoemotional status during different genre roles.

Methods. *Subjects* consisted of 21 3^{d}-year students (9 females, 12 males) at Lithuanian Academy of Music and Theatre (average age – 21±1.9 years).

Research protocol. It took 25 minutes to test each participant of the research. ECG monitoring protocol was divided into 5 stages, each lasting 5 minutes: first stage – 0-5 min. (rest, post-isometric muscle relaxation), second stage – 5-10 min. (drama role), third stage – 10-15 min. (comedy role), fourth stage – 15-20 min. (tragedy role), fifth stage – 20-25 min. (rest, autogenic training). For these three different roles all participants had to interpret the same dialogue from W. Shakespeare's *Macbeth.*

ECG registration methods. The computerized electrocardiograph analysis system "Kaunas-Load", developed at the Institute of Cardiology of Lithuanian University of Health Sciences, was used for ECG parameters registration, initial data processing, noise filtering and ECG complexes recognizing.

Survey. Zung Self-Rating Depression Scale [3] was used to screen for depression among the participants. The scale is a self-administered survey and consists of 20 items, each of which is scored on a scale of 1-4, with higher scores corresponding to more frequent symptoms [4].

Mathematical methods. An algebraic scheme for the measurement of interrelations between two different physiological parameters was used [5, 6].

Suppose that sequences (x_j;j=0,1,...,n) and (y_j;j=0,1,...,n) represent synchronous measurements of ECG parameters taken at discrete time intervals. The Lagrangian difference matrix is defined as in formula (1):

$$L_k := \begin{bmatrix} x_k & x_{k+1} - y_{k+1} \\ x_{k-1} - y_{k-1} & y_k \end{bmatrix}; k = 1,2,\dots,n-1. \quad (1)$$

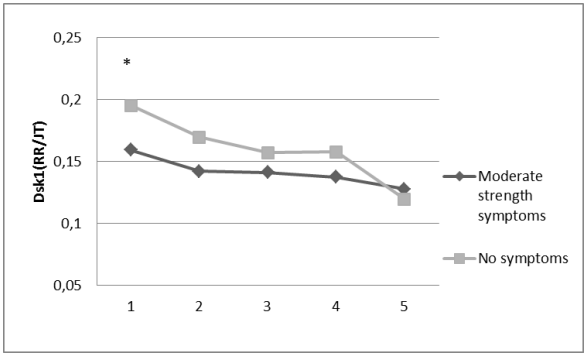
The scalar characteristics of matrix L_k provide insight into the algebraic interrelation between sequences (x_j;j=0,1,...,n) and (y_j;j=0,1,...,n).

Large discriminant values correspond to low interrelation, small discriminant values correspond to high interrelation between the discussed parameters [7].

Discriminants can be averaged in a chosen time interval, yielding a summary measure of interrelation for that interval. For example, in this study we took the average values of the discriminant (Dsk1) during different stages.

The following ECG parameters were addressed: RR interval, JT interval. Interfaces amongst these parameters were evaluated by using the Dsk1(RR;JT) matrix analysis discriminant. Comparison of the discriminant characteristics for different subsets of the sample was performed using the Mann-Whitney U test [8].

Results. Dsk1(RR/JT) reflects the relationship between the regulatory and supplying systems. Results of the study showed that the dynamics of Dsk1(RR/JT) were decreasing through research stages from 1 to 5 (Fig. 1).



Note. 1st stage - rest, post-isometric muscle relaxation, 2d stage – drama role, 3 d stage – comedy role, 4th stage – tragedy role, 5th stage – rest, autogenic training.

Fig. 1. Changes of Dsk1(RR/JT)

Evaluating the results according to the participants' psychoemotional state, it was established that average Dsk1(RR/JT) values differ significantly only during the first stage - post-isometric muscle relaxation ($p<0,05$). Both – during different genre roles and autogenic training – statistically significant differences were not found ($p \geq 0,05$).

Discussion. The aim of the study was to assess dynamic characteristics of Lithuanian Academy of Music and Theatre students' ECG parameters during different genre roles. Results of the study revealed that Dsk1(RR/JT) was decreasing through research stages from 1 to 5. There are very few research works that discuss artists' health status relation to their performances, however, researcher F. Reynolds [9] states that emotions and visualization during art performances are strongly connected to body reactions. In her study, F. Reynolds [9] found out that artistic activities can lead towards positive physical and emotional changes if those activities evoke positive thoughts, associations, images. It can, therefore, be assumed that negative imaginary experiences, on the contrary, would more likely lead towards negative health status outcomes (anxiety, depression, inactivity, etc.). Scientific evidence that due to their distinctive life style and tendency of self-treatment many artists are at risk of engaging into drug consumption [10], encourages to study what causes their prolonged negative mental state and what intervention tools are applicable.

Our study has limitations, with regard to a small sample size, which prevented from evaluating more precise mental status, level of fitness, etc.

The conducted research opens new opportunities for practical application of complex systems theory in order to improve actors' awareness of their dynamic health processes during different artistic performances and suggest possible ways of intervention.

Conclusion. Analysis of future actors ECG parameters dynamics revealed that the relationship between the regulatory and supplying systems becomes stronger during the the performances of different genres and autogenic training. During the post-isometric muscle relaxation it was found that the relationship between the regulatory and supplying systems among students with more expressed symptoms of depression was significantly stronger than among studens with no symptoms.

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[3]Department of Art History and Theory, Lithuanian Music and Theatre Academy, Lithuania

[4]Department of Dance and Movement, Lithuanian Music and Theatre Academy, Lithuania

[5]Mathematical Analysis of Dynamic Systems Research Group, Kaunas University of Technology, Lithuania

Future actors – current art students – are an overlooked minority population, whose dynamic health processes have not been studied enough. Therefore, the aim of the study was to assess dynamic characteristics of Lithuanian Academy of Music and Theatre students' ECG parameters during different genre roles. Results of the study revealed that the discriminant of the regulatory and supplying systems was decreasing through different stages of the research. Also, the results showed that average discriminant values were significantly different only during the first stage - post-isometric muscle relaxation ($p < 0, 05$). Both – during different genre roles and autogenic training – statistically significant differences were not found ($p \geq 0,05$).