



Factor structure of manifestation of success in the formation of choreographic skills in young dancers

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Abstract

The aim: to study the factor structure of success in the formation of choreographic skills in young athletes.

Material and methods. The study involved 32 qualified dancers (16 couples) aged 14-15 years. According to the success criteria, athletes were divided into two groups: with a high and reduced level of success. Psychophysiological characteristics were studied using neurodynamics functions, as well as verbal and non-verbal intelligence.

Results. The analysis revealed the presence of two factors that determine success in the formation of complex coordination and choreographic skills of young dancers: neurodynamics and verbal. It was established that the success and effectiveness of mastering complex choreographic skills in young dancers is determined by individual typological properties - perception, information processing and verbal intelligence. The presence of the verbal intelligence factor is associated with the peculiarities of sports dance. Among young dancers who have a reduced level of success, the factor structure has two factors: psychophysiological and verbal-speed.

Conclusions. The results can be used to differentiate the training process to improve the level of success in the formation of complex choreographic skills in young dancers.

Keywords: young dancers; choreographic skills neurodynamic characteristics, verbal intelligence, factor structure

Анотація

Коробейников Г.В., Мишко В.В., Коробейнікова Л.Г. Факторна структура прояву успішності при формуванні хореографічних навичок у юних танцюристів

Мета роботи: вивчити факторну структуру успішності у формуванні хореографічних навичок юними спортсменами.

Матеріал і методи У дослідженні прийняли участь 32 кваліфікованих танцюристів (16 пар), віком 14-15 років. Спортсменів за критеріям успішності було розподілено на дві групи: із високим та зниженим рівнем успішності. Досліджувались психофізіологічні властивості за нейродинамічними функціями та вербальним і невербальним інтелектом.

Результати. Проведений аналіз виявив наявність двох факторів, що визначають успішність у формуванні складнокоординаційних та хореографічних навичок юних танцюристів: нейродинамічного та вербального. Встановлено, що успішність та ефективність засвоєння складних хореографічних навичок у юних танцюристів визначається індивідуально-типологічними властивостями – сприйняттям, переробкою інформації та вербальним інтелектом. Наявність фактору вербального інтелекту пов'язано із особливістю спортивного танцю. Серед юних танцюристів які мають знижений рівень успішності факторна структура виявляє два фактори: психофізіологічний та вербально-швидкісний.

Висновки. Отримані результати можуть бути використані у диференціюванні тренувального процесу для покращення рівня успішності у формуванні складних хореографічних навичок у юних танцюристів.

Ключові слова: юні танцюристи; хореографічні навички; нейродинамічні характеристики; вербальний інтелект; факторна структура

Анотация

Коробейников Г.В., Мишко В.В., Коробейникова Л.Г. Факторная структура проявления успешности при формировании хореографических навыков у юных танцоров

Цель работы: изучить факторную структуру успешности при формировании хореографических навыков у юных спортсменов.

Материал и методы. В исследовании приняли участие 32 квалифицированных танцоров (16 пар) в возрасте 14-15 лет. По критериям успешности спортсмены были разделены на две группы: с высоким и сниженным уровнем успешности. Исследовались психофизиологические характеристики с помощью нейродинамических функций, а также вербального и невербального интеллекта.

Результаты. Проведенный анализ выявил наличие двух факторов, определяющих успешность в формировании сложно-координационных и хореографических навыков юных танцоров: нейродинамического и вербального. Установлено, что успешность и эффективность усвоения сложных хореографических навыков у юных танцоров определяется индивидуально-типологическими свойствами - восприятием, переработкой информации и вербальным интеллектом. Наличие фактора вербального интеллекта связано с особенностью спортивного танца. Среди юных танцоров, которые имеют сниженный уровень успешности, факторная структура имеет два фактора: психофизиологический и вербально-скоростной.

Выводы. Полученные результаты могут быть использованы при дифференцировании тренировочного процесса для улучшения уровня успешности в формировании сложных хореографических навыков у юных танцоров.

Ключевые слова: юные танцоры; хореографические навыки; нейродинамических характеристики; вербальный интеллект факторная структура



Introduction

At the present stage of sports dance development, it is possible to observe a common trend - the search for individual approaches to improving the result of competitive activities [1, 2]. Existing traditional approaches to the system of training in sports dances do not always take into account the individual and age characteristics of athletes [3, 4].

The process of training skilled athletes in almost all Olympic and non-Olympic sports is carried out at the level of excessive physical and mental efforts [5, 6]. This circumstance leads to the search for new approaches to the implementation of in-depth scientific research of psychophysiological mechanisms of improving the functional reserves of the body of athletes in adaptation processes. It is fundamentally important that in qualifying athletes optimal adaptation to the most strenuous work is possible taking into account the level of manifestation of genetically determined functions [7, 8, 9].

The human body in the course of evolution has formed the mechanisms of the nervous system that provide the optimal choice of personality for a certain type of activity. These include individual-typological features, which are largely inherited, and at the same time are influenced by social and professional, and in most, sports influence [10, 11, 12].

Existing research has little or no data available regarding the consideration of issues related to the level of manifestation of genetically determined factors of different origins on the athlete's feasibility. It is especially interesting to study the relationship of individual-typological, psychophysiological characteristics with success in sports dancing.

In addition, although there are sufficient facts to address issues related to sports activity, we have not found a study of the manifestation of psychophysiological characteristics in sports dancing. In our previous works, the creative component and peculiarities of competition evaluation were taken into account, which forced us to use those methods that objectively assessed the state of manifestation of mental processes and psychophysiological properties [13, 14].

However, the lack of quantitative criteria for the success of mastering choreographic skills in sports dancing does not contribute to the controllability of the training process. Therefore, there was a need to study the factor structure of success and indicators of psychophysiological

functions in the formation of choreographic skills of young athletes. This fact made it possible to actualize the problems of technical, tactical and psychological training.

The aim: to study the factor structure of success in the formation of choreographic skills in young athletes.

Material and methods

Participants

The study involved 32 qualified athletes (16 couples) engaged in dance sports, aged 14-15 years, qualifications from 1 category to candidates for masters of sports in Ukraine. The dancers were previously evaluated on five submitted performance criteria (a ten-point system for each criterion), to be further divided into groups of more or less successful athletes. The first group - athletes with high level of success - 12 people (> 71 points), the second group - athletes with low level of success - 20 people (<70 points).

Procedure

Psychophysiological properties were investigated by the following methods: research of indicators of neurodynamic functions responsible for the perception and speed of information processing: latent time of simple visual-motor reaction, balance and functional mobility of nervous processes, indicators of ting-test, as well as tests for determination of verbal test regularities "and the perception, processing of information and decision making regarding non-verbal stimuli -" number comparison ". These indicators were used to assess the level of success in groups of more or less successful athletes.

All athletes consented to scientific research and the use of research results for scientific purposes, as recommended by ethics committees on biomedical research [15]. The mathematical processing of the results of the study was performed using computer software packages MS Excel and Statistica 6.0.

Results

In the table. 1 presents the results of factor analysis among more successful young dancers. The analysis of the table. 1 revealed the presence of two factors that determine the success of mastering choreographic skills among young dancers.



Table 1

Factor analysis results among more successful young dancers (n=12)

The first factor	
Indicators	Coefficients
Latency of simple visual motor response (ms)	0,93
Stability of simple reaction (c.u.)	0,93
Accuracy (balance of nerve processes) (c.u.)	0,93
Stability (balance of nerve processes) (c.u.)	0,93
Excitement (balance of nervous processes) (c.u.)	0,93
Dynamics (functional mobility of nerve processes) (c.u.)	0,93
Visual Analyzer Bandwidth (Functional Mobility of Nervous Processes) (c.u.)	0,93
Limit time of information processing (functional mobility of nerve processes) (c.u.)	0,72
Tapping frequency (tep-test) (quantity for 1 s)	0,93
Lability (tep-test) (c.u.)	0,93
Mindfulness (tep-test) (c.u.)	0,92
Stability (topping test) (c.u.)	0,93
Effectiveness (non-verbal test) (c.u.)	0,93
Solution latency (non-verbal test) (c.u.)	0,93
Accuracy (non-verbal test) (c.u.)	0,94
Stability (non-verbal test) (c.u.)	0,93
The second factor	
Performance (verbal test) (c.u.)	0,95
Accuracy (verbal test) (c.u.)	0,96
Effectiveness (verbal test) (c.u.)	0,86

The first factor consists of indicators of neurodynamic functions responsible for the perception and speed of information processing: latent time of visual-motor response, balance, functional mobility of nervous processes, indicators of the non-verbal intelligence tep-test (Table 1). In fact, the first factor is neurodynamic, which is responsible for the speed and quality of the perception and processing of information.

The second factor consists of test indicators, which determines the peculiarities of the manifestation of verbal intelligence "establishment of laws": productivity, accuracy and efficiency (Table 1). The pattern-setting test is characterized by verbal tasks aimed at finding a coded word. This test establishes the cognitive properties of a verbal character: speed of perception, prompt, logical thinking and attention.

Thus, the second factor can be called verbal, because, as our previous studies have shown, it is the cognitive verbal sphere that is aimed at compensating for the decline in academic achievement and the formation of choreographic skills in young dancers.

Table 2 presents the results of factor analysis among less successful young dancers.

Analysis of the results of Table 2 showed that less successful dancers also find two factors that determine the success of mastering difficult coordination skills among young dancers. However, the structure of these factors is somewhat different compared to the group of successful dancers.

The first factor consists of indicators of neurodynamic functions responsible for the perception and speed of information processing: latent time of visual-motor response, balance and functional mobility of nervous processes, indicators of the tep-test and indicators of cognitive functions: verbal and non-verbal thinking (2). Based on the above, the first factor can be called psychophysiological.

The second factor consists of indicators of functional mobility of nervous processes and accuracy of the verbal test. It may be noted that the second factor reflects the ability to reproduce verbal tasks with high quality and speed. This factor can be called verbal-velocity. Thus, the structure of successful formation of complex coordination and choreographic skills in young dancers is characterized by two main factors: the psychophysiological factor and the verbal-speed.

These factors are related to individual typological characteristics that determine the ability of young dancers to perceive and process information of different modality. Consideration of the factor structure of successful formation of complex coordination and choreographic skills in young dancers who have a higher level of success showed the presence of two factors. The first factor - neurodynamic, indicates the property of the speed and quality of perception and processing of information.



Table 2

Factor analysis results among less successful young dancers (n = 20)

The first factor	
Indicators	Coefficients
Latency of simple visual motor response (ms)	-0,99
Stability of simple reaction (c.u.)	-0,99
Accuracy (balance of nerve processes) (c.u.)	-0,99
Stability (balance of nerve processes) (c.u.)	-0,83
Dynamics (functional mobility of nerve processes) (c.u.)	-0,99
Tapping frequency (tep-test) (quantity for 1 s)	-0,99
Lability (tep-test) (c.u.)	-0,99
Mindfulness (tep-test) (c.u.)	-0,99
Stability (topping test) (c.u.)	-0,99
Effectiveness (non-verbal test) (c.u.)	-0,92
Effectiveness (verbal test) (c.u.)	-0,99
Solution latency (verbal test) (c.u.)	-0,99
Stability (verbal test) (c.u.)	-0,99
The second factor	
Visual Analyzer Bandwidth (Functional Mobility of Nervous Processes) (c.u.)	0,72
Limit time of information processing (functional mobility of nerve processes) (c.u.)	0,74
Accuracy (verbal test) (c.u.)	-0,75

The second factor is verbal, connected with the possibility of assimilation (perception) of verbal information in the conditions of training and competitive activity of young dancers.

It can be testified that the success and efficiency of mastering complex choreographic skills in young dancers is determined by the individual-typological properties of perception and processing of information and the ability to verbally comprehend relevant information. This circumstance is related to the peculiarity of sports dance, as a sport that combines both sports and artistic components.

Given that sports dances do not actually have situational conditions with a time limit, such as in gaming, it is a system-forming characteristic, namely, verbal intelligence.

Discussion

Identifying the level of ability and inclination of young athletes to master complex choreographic skills is an urgent problem of modern sports dancing. Among the existing ways of improving the training process, the most important are the concept of individualization of sports training [15, 16, 17, 18].

The conducted researches were devoted to determination of criteria of success of mastering of choreographic skills in sports dancing among young athletes taking into account psychophysiological

characteristics. To develop quantitative criteria, it was necessary to study the factor structure of successful formation of complex coordination and choreographic skills in young dancers. The analysis of the factor structure of successful formation of complex coordination and choreographic skills in young dancers who have a higher level of success showed the presence of two factors: neurodynamic and verbal.

It is established that the success and effectiveness of mastering difficult choreographic skills in young dancers is determined by the individual-typological properties - perception, processing of information and verbal intelligence. The presence of the factor of verbal intelligence is connected with the peculiarity of sports dance, as a sport combining both sports and artistic components. After all, verbal intelligence enables the dancer to combine motor activity with musical accompaniment and rhythmic component [19, 20, 21].

Among young dancers with reduced levels of success, factor structure also has two factors: psychophysiological and verbal-speed.

It is verbal intelligence that enables the dancer to correctly assess the situation, simultaneously synchronize movements with the musical accompaniment, make optimal decisions for successful implementation of the result of the activity.

The first factor indicates the presence in the group of less successful dancers the inclusion of



more elements of the functional system responsible for the success in the formation of choreographic skills.

This fact points to less sophisticated technical training in this group of dancers.

The second factor characterizes the inclusion of qualitative properties of the cognitive sphere for the actualization of verbal intelligence. This fact points to a possible way to improve the level of technical training and increase the success in mastering the choreographic skills of young dancers through the actualization, namely, opportunities for the development of verbal intelligence.

Conclusions

1. The structure of successful formation of complex coordination and choreographic skills in

young dancers is characterized by two main factors: psycho-physiological factor and verbal-speed.

2. The presence of the factor of verbal intelligence is related to the feature of sports dance, as a sport that combines both sports and artistic components.

3. The results obtained can be used to differentiate the training process to improve the level of success in the formation of complex choreographic skills in young dancers.

Conflict of interest

Authors state that there is no conflict of interest.

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