

INTERFERENCE OF PSYCHOMOTOR AND SPATIO-TEMPORAL PARAMETERS ON THE EFFICIENCY OF MOTOR ACTIONS INVOLVED IN THE EASTERN SPECIES PHYSICAL CULTURE

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Annotation. *Purpose:* to identify interferences psychomotor abilities for consistency in the management of spatio-temporal parameters of procedural and final precision in the movements with complex motor structure. *Material:* the study involved 30 people occupying the eastern species physical culture (Wushu Qigong and Tai Chi Chuan). *Results:* It was found that the identified trusted connection as positive ($n = 59$, $r = 0.63$ to 0.92) and negative ($n = 21$, $r =$ from -0.63 to -0.89) confirm the influence of particular classes in the eastern system ability to coordinated control movements of different coordination complexity. *Conclusions:* the ability to control the internal forces, the ability to focus, alertness and mind control depend on three complementary levels - substance "Jing", "Qi" and "Shen", which directly affect the state of psychomotor sphere and target accuracy of spatio-temporal motion parameters.

Keywords: psychomotor, ability, task, procedural, final, precision, substance, oriental, health systems, spatio-temporal parameters.

Introduction

Creation of conditions for appearing and gradual condensation of fine forces' flows, of energy flows, which feed mind and vital body is a peculiarity of oriental health related systems. Training of ligament structures results in creation of holistic dense inner structure, along which energy flow can be directed. There happens combining of fine and dense, sift and hard and the state – soft body, capable to firmly directed forces, appears [Ошибка! Источник ссылки не найден.-4]. That is why, oriental system trains not only external forms of movement but also its internal structure (by constant flow "Tsi") in contrast to western health related systems, where only external form of movements dominates, without inner understanding of actions.

Oriental health related systems are based on three inter-influencing levels – body, energy (senses) and spirit (thought and consciousness) [5-7]. At first level there is realized control of inner forces (substance Tszin); at the second – ability to concentrate attention and control of energy flow (Tsi- energy vibrations); at third level – awakening of consciousness and control of consciousness (substance Shegn), with it external and internal actions were fulfilled under control of mind [8-10].

Just on the second stage interconnection with psycho-motor abilities is realized because energy "Tsi" is connected with senses and perception of vibrations' flows, which pass through body in all directions and curl around centers in special body positions and movements of different coordination.

Psycho motor sphere of a person is a complex functional system, consisting of sensor, motor and cognitive-mental sub-systems of control over complex motion functioning that is in compliance with structure of functional system, The structure of functional system includes five interconnected blocks: afferent synthesis; taking of decision; forming of program of action; fulfillment of action and receiving of result (acceptor of action's result); feedback (information about results of performed action) [11, 12]. That is why it is logical to assume that psycho-motor abilities are the core of motion-coordination abilities, positioning themselves as their cognitive-motor component, which includes sensor-motor, perceptive, intellectual and neuro-dynamic states, realizing both on arbitrary and on controlled levels of self control and self regulation of movements.

Studying of psycho-motor human abilities, which can influence on indicators of coordinated movements' accuracy is of great theoretical and applied importance. In this connection it is quite logical that researchers pay attention to searching of interconnections between heterogeneous (elementary and complex) indicators of psycho-motor act and accuracy indicators of space-time movements' parameters, which relate both to leading (C_1 , C_2 , D), and to background levels of movements' construction [13].

As a result of many years' experimental researches it was determined that between separate indicators of different motion (conditional and coordination) abilities and separate psycho-motor functions (sensor-motor, proprioceptive and perceptive-intellectual) there are no confident, positive correlations in great number of cases [14].

In opinion of V.I. Liakh, correlation structure of psycho-motor components is very specific and depends on many factors (age, profession, sport qualification, sex, environmental conditions and etc.) and with it, with age confidence of correlation links between indicators of psychic and motion abilities reduces [14].

Depending on the fact if there exists or not interconnection between separate components of holistic psychic and physical structure, selection of means for their development is top be realized. Presence of strong connections implies using of exercises of integrated influence and on the contrary: their absence implies searching of means of directed (address) influence.

As far as works of our predecessors showed that analysis of correlation interconnections in different age periods and in different contingents are far from being synonymous by their indicators of psycho-motor abilities and different special coordination abilities then the problem of researching of psycho motor sphere and its influence on

procedural and final accuracy of movements is rather urgent, meaning revelation of influence of oriental health related systems on the regarded abilities.

Purpose, tasks of the work, material and methods

The purpose of the work is studying of inter-influence of psycho-motor abilities on accordance in controlling of space-time parameters of procedural and final accuracy of movements with complex motion structure.

The tasks of the research were to determine correlation interconnection between psycho-motor abilities and space-time parameters of movements' procedural and final accuracy of oriental health related systems' trainees.

The methods and organization of the research. The researches were conducted by author's program with direct assistance of instructors of physical culture theory and methodic department of Byelorussia state pedagogic university, named after M. Tank in period from September to November 2013. The research covered persons (n=30), having experience in oriental health related systems (Tsi-gun, U-shu and Thai Tsi Tsuan).

In the process of the research we used the following methods: analysis and generalization of literature sources; testing of psycho-motor abilities with the help of complex computer psycho-diagnostic program «Effect on Studio 2007» [15]. The battery of tests included the following tests (with calculation of 15 indicators):

- **Sensor-motor responses:** *simple sensor-motor response* – response to quick change of color (10 attempts); *simple ideo-motor response* – response to sound irritator (10 attempts); *complex visual-motor response* – response to one color (yellow) from three variants; *response to moving object* – accuracy of sensor-motor response to moving object.

- **Psychic-cognitive processes:** *re-directing and distribution of attention “Red and black table”* - it is necessary to close 49 figures on screen for quickness (25 red in order of increasing and 24 black in order of recessing); *volume of attentions* – remembering of quantity and location of emerging objects and pointing at them just after emerging of clean card; *stability of sensor attention* – during 3 minutes concentrate attention on appearing of even and odd figures (with even figures press “arrow to the right”, with odd figures – “arrow to the left”); *stability of attention with deficit of time* – during 1 minute follow with mind 10 routes and determine their place at finish.

- **Functional state of nervous-muscular system:** *tapping-test* – valuation of quickness (maximal frequency of movements), stability of motion system and type of nervous system; *accuracy of time perceiving* – stopping of time interval with object's moving at equal speed.

For determination of procedural and final accuracy we used method of video-detecting and digital transposition of movements «S Motion» [16]. The battery of tasks included such tests as the following:

- **Procedural accuracy (PA)** was evaluated in complexly coordinated segment motions of right and left arms' right and left legs; body. *In initial position* – main stance (m.s.), electronic marker was fixed on every arm, leg and body of the tested; this marker could travel in frontal direction in respect to monitor with every movement of the tested. By signal the tested fulfilled movements with accurate copying of trajectory of cursor on monitor. In the process of movements it was necessary to correlate as close to the center as possible electronic marker with cursor. We calculated: PA min (mm) – mean minimal distance from electronic marker to center by cursor; PA max (mm) – mean maximal distance from electronic marker to cursor center; time of procedural accuracy (sec.) – was the time of electronic marker's being in circumference of moving cursor.

- **Final accuracy (FA)** was evaluated in complexly coordinated segment motions of right and left arms, right and left legs, body. *In initial position* – main stance (m.s.), electronic marker was fixed on every arm, leg and body of the tested; this marker could travel in frontal direction in respect to monitor with every movement of the tested. By signal the tested should quickly respond to sudden appearance of cursor on screen of monitor. In process of responding it was necessary to correlate (point electronic marker on suddenly appearing on monitor cursor) and hit in its center. We calculated: FA (n) – quantity of electronic marker's missing; time FA (sec) – time of test's fulfillment with hits in target of cursor.

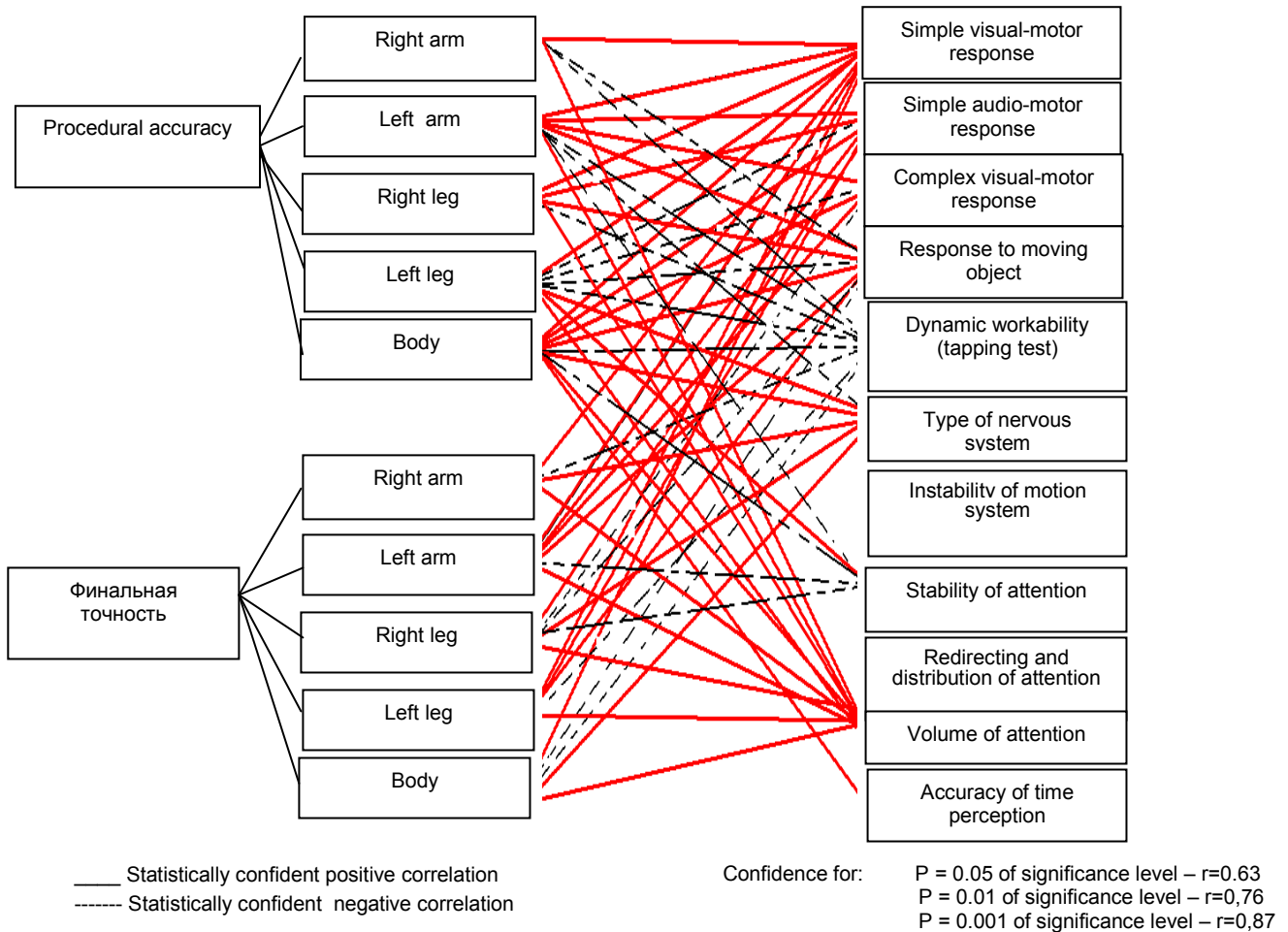


Fig.1. Correlation structure of psycho-motor abilities and space-time parameters of procedural and final accuracy of experiment's participants

Results of the researches

The conducted correlation analysis of psycho-motor abilities' indicators and space-time parameters of procedural and final accuracy resulted in determination that from 375 of calculated correlations between 40 tested indicators there were found 80 confident connections (positive n=59 (15.7%) (r= from 0.63 to 0.92) and negative n=21 (5.6%) (r= from -0.63 to -0.89)) that makes 21.3% from all studied connections (see fig.1).

Analysis of correlation inter-connections between tested indicators permitted to determine significant quantity of confident connections between tested indicators as well as consolidation of interconnections between heterogeneous components. Main leading integrators from the side of psycho-motor sphere were simple visual-motor and ideo-motor responses, response to moving object, type of nervous system, volume of attention. From the side of participant, accordingly procedural accuracy (body, left arm, right and left legs) and final accuracy (left and right arms, left and right legs, body).

In this connection it is logic to assume that with controlling of complexly coordinated accurate movements, persons, practicing oriental health related systems of physical culture have activated mechanisms of CNS, influencing on psycho-motor processes and permitting to control of "Tsi" energy, which is connected with sensing and perceiving of vibrations' flows, passing through body in all directions. However, we did not find any connections between ability to redirect and distribute attention and instability of motion system. This fact permits to affirm that in the process of fulfillment of exercises' complex, used in oriental health related systems one shall have constant stability and concentration of attention at substance – Shegn that permits not to spread energy "Tsi" but to direct it in required direction for controlling of internal forces (Tszin).

Conclusions

1. Generalizing the above presented analysis it should be noted that correlation structure of the tested indicators of oriental health related systems has some peculiarities, both in structural and content components. The determined confident connections (positive $n = 59$, with $r =$ from 0.63 to 0.92 and negative $n = 21$, with $r =$ from -0.63 to -0.89) prove peculiarities of influence of trainings by oriental system on ability to coordinated control of differently coordinated movements at the cost of three inter-influencing levels – substance “Tszin”, “Ttsdi” and “Shegn”. Just high level of ability to demonstrate internal efforts, ability to concentrate attention and direct energy flow and mind, influence on level of psycho-motor sphere’s development and targeted accuracy of movements’ space-time parameters.

2. Specific features of correlation structure of psycho motor abilities and parameters of movements accuracy of persons, who practice oriental health related systems shall permit to purposefully select means and methods of combined influence on different homogeneous and heterogeneous abilities on scientific base that will rise the level of accumulated external and internal human potential, which determine effectiveness of controlling of highly accurate complexly coordinated movements.

The further researches imply determination of structural-content component of psycho-physical potential in bio-mechanical structure of movements of persons, who practice oriental health related physical culture systems.

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