© Archives of Budo, 2008; 4: 106-109

Received: 2008.09.15
Accepted: 2008.11.17
Published: 2008.12.09

From "physical fitness" through "motor competence" to the "possibility of action"

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Summary

Conscious physical activity of person is a topic of study many detailed scientific disciplines. The purpose of this study is a general review model for possibility of action. Model based on praxeology criteria and concerns external actions (requiring muscle work). Defined motives underlie each physical work includes mental elements (internal operations). Based on tens tests we have ascertained that near 10% persons (among athletes and no athletes) were maximum motivated to make all motor tasks that required precision of action (e.g. to hit the basket from distance with a fixed number of balls). Tasks put into practice before, after warm up and after multiple, intensive physical exercises. The results of recommended tests: physical fitness, motor competence etc. do not take into consideration motivation factor. Forecasting based on success in suitable activity (e.g. during sport fight) is burdened high error. Model of estimate for possibility of action of person takes into consideration: a) flexible feasibility measurement (motor simulation of the elements in suitable activity and level of motivation for this activity), b) estimation of situational feasibility, c) decision if subject has full possibility of action, d) correction of the level "a" & "b".

Key words: **flexible feasibility • situational feasibility – the full (complete) possibility of action**

Full-text PDF: http://www.archbudo.com/fulltxt.php?ICID=873998

Word count: 2371
Tables: –
Figures: –
References: 11

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Background

The key points of the conception described in this article of new approach for measuring the motor potential (in fact psychomotor) of human we introduced during 5th International Scientific Conference on Kinesiology (September 10–14, 2008 Zagreb, Croatia) in the session „Research Methodology" [1]. In our opinion, this conception opens much wider abilities of diagnosing the predisposition of people to the given category of physical work. What is more, it shows logically cohesive and methodologically correct perspective of correcting training effects and associating them with effects of practical activity (professional, sports, recreational etc).

Conscious physical activity of the man – from career (incl. professional sport) to motor recreation and everyday motor actions – is an object of studying many detailed scientific disciplines (adapted physical activity, antropomotoric, biomemechanics, kinatropometry, kinesiology, motor learning and control, science on human movement, sport and exercise physiology, sport and exercise psychology, etc). Common element for the part of these sciences is a widely understood diagnosis of the biological potential of the man (more precisely meaning – energy potential). Numerous methods and tests like *Eurofit, Fleishman's"Basic Fitness Test", YMCA* are exactly a simple consequence of examining the same phenomenon from a perspective of different detailed sciences. However part of sciences concerning physical activity of the man which is listing by International Council of Sport Science and Physical Education [2], distinguish aspects of the physical activity that is impossible to examine similar methods. On the contrary, applying the methods peculiar to the given learning is necessary. For example, for sport and exercise physiology specialists the main topic of test is biological basis of the muscle work (the fundamental assumptions and interpretation of examinations concerns functional anatomy, biochemistry, and physiology of effort etc.). For sport and exercise psychology specialists the base are motives and purposes of the physical work (muscle) and context of the situation, because the topic of research of psychology are also involuntary behaviors are the subject of the (unconscious or not completely conscious).

However, a praxeology is a learning, which is dealing with exclusively conscious action of the man. The praxeology is formulating statements on such a level of the generality, which on the joint of different theories enables analysis of concerning phenomena of both physical work (muscle), as well as intellectual work. Statements of the praxeology just through their high level of the generality have a universal character. A set of concepts of the praxeology enables analysis of action of the man (intentional behaviors) either exclusively of the physical work perspective or exclusively in the aspect of intellectual action, but moreover taking into consideration both factors including – intellectual and physical (muscle).

However, when dominating factor is muscle effort, we will not distinguish any effect of action of the man without participation of the mind (in the broader understanding that does not activate the mental sphere). Therefore, unique value of praxeological analysis is distinction of term "possibility of action" and related terms [3], which do not omit this important element of each physical work.

A general model of measuring possibility of action of the man is a purpose of this research.

Material and Methods

The model put forward is based on criteria of the praxeology (theory of efficient action) and concerns outside actions, i.e. requiring mainly muscle work. Creating this model, we based on general criteria of the design methodology [4]. Basic assumption designing this model is a statement that each physical work includes intellectual elements and at each bases of action underlies defined motives of agent – person or persons that are carrying given action out [3].

Other word this assumption has to aware that solving – in the future – any motor task can be finding as the practical situation. Solving any practical situation requiring the physical work (muscle) mean that the man must have biological and intellectual potential. First of all it should be created logical and methodologically correct measuring criteria these factors which are the most essential for making all conscious muscle efforts of the man. Measuring factors that determines effective realizing the given category of muscle efforts – to influence through the training on their modification – is a secondary step.

We are bringing projection the practical situation to two aspects that are tying themselves with the answer to questions: (1) if identification of the potential of the man for carrying out all conscious muscle efforts is the suitable? (2) whether the measuring methods (estimation) of this potential are appropriate in the general sense and with reference to given category of the muscle efforts? Because of conceptual character of this article we are appealing to the open form of the content accuracy (logical). We expect on critical utterances of different experts.

Formulating the hypothesis of manner for overcoming the practical situation, which essence is conscious realizing the given category of physical efforts (solving the given task or motor tasks) we base on the so-called idealizing basis, named also designing [4,p.16]. The hypothesis is being formulated from a perspective of the modifier, in this case by scientists creating the general model of overcoming this category of the practical situations in universal meaning, rather than from a perspective of specific man or team solving given motor task.

Regardless of presenting the conception into the very general way, the base of critical analysis recommended evaluation methods of the biological potential (motor) we have taken over arbitrarily two books: Heyward [5] and Hagg et al. [6].

Results

Aspect (1). The potential of the man for realizing all forms of the physical activity – in the general sense – being identified with the term physical fitness "is the ability to perform occupational, recreational, and daily activities without becoming unduly fatigue" [5p.36]. Heyward distinguished four components of physical fitness: cardiorespiratory endurance, musculoskeletal fitness (muscular strength, muscular endurance, bone strength), body weight and body com-

position, flexibility. In the global scale, this conception can be considered as a dominating in the theory and the practice the physical activity of the man.

In the evaluation of views on this topic, appeared *motor competence* conception [6] – the first edition of the Heyward work took place in 1984, long time before publishing conception of the Haaga et al [6].

Authors of the conception, similarly to Heyward, stand out in the general sense three types of activities within a 24 hours routine in human life: *everyday routine activities, work activities* (in this professional sport), *leisure-time activities.* They emphasize that "Today, most of the work procedures require a combination of physical, intellectual, psychological and social competences. The requirements in regard to the motor (psychomotor) domain have shifted mostly from gross-motor to fine-motor activities. This is also due developments characterized by the phenomena of automation, technology, and computers" [6p.34]. Consequence of this attempt is distinguishing four elements structure of *motor competence*: ***sensory abilities*** *(visual-, auditive-, tactile-, kinaesthetic abilities),* ***motor abilities – condition*** *(endurance, flexibility, strength, speed),* ***motor abilities – coordination*** *(balance, motor combination, skill, reaction speed),* ***body experience*** *(body scheme: orientation, size estimation, knowledge; body image: consciousness, boundary, attitude).*

Aspect (2). Independently of the conception: either physical fitness, or the motor competence, measuring the biological potential (motor) of man is based on above all on analytical methods. Distinguished motor abilities are subject to an assessment, i.e. the Test of Physical Fitness developed by the International Committee on the Standardisation of Physical Fitness Tests contains eight tests [7]. Recommended by Heyward a complete battery of physical fitness tests in a single session [8] takes into consideration: resting blood pressure and heart rate, body composition, cardiorespiratory endurance, muscular fitness, flexibility. Heyward recommends moreover many single tests to measure individual components of physical fitness (i.e. 1.0 Mile Jogging Test, Back Scratch Test).

In our opinion, the most versatile proposal of the measurement of the biological (motor) potential of man is a Kiel-Motor-Competence-Test (Kiel-MC-Test) by Hagga et al. [6]. Authors distinguished 16 categories for the concept of "Motor Competence" (assigning after 4 to each of 4 elements: Perception, Condition, Coordination, the Experience Body) and 26 Tests-Items. Two tests have synthetic character – 18 (Coordination Course – Test) and 19 (Figure Eight Run – Test).

Hypothesis of the way of overcoming the practical situation, for which essence of matter is conscious realizing the given category of physical efforts we base on assumption that there is a greater likelihood solving given task or motor tasks, if the man is well adapted to the surroundings. For facilitating forecasting the effectiveness of muscle efforts of the man in the context of the necessity (in certain circumstances – the possibility) of overcoming the given practical situation we distinguish three levels of the adaptation of the man: minimal, optimal, and maximal.

We are combining the minimal adaptation with the necessity to survive (basic everyday activities, multiday the isolation, overcoming illness, etc.). Optimal adaptation with preparation for the specific profession and with the readiness for taking struggle for survival (self-defense, tasks during peace-keeping missions etc.). Maximum adaptation with the sports fight and the extreme physical activity (especially professional sport, a lonely expedition to the North Pole etc). In a term, adaptation includes not only conscious physical activity but also the unaware activity (e.g. moves of the body during sleep) and many other factors. Nevertheless entitled is motor competence analysis of man from a perspective of the level of his adaptation. Well-trained man is not able to reconstruct even basic elements of the situation that in an optimal way solved (i.e. effectively prevent the unexpected attack by the aggressor).

Such analysis of the biological potential (psychomotor) facilitates praxeological conception possibility of action, because distinguishes three derivative key terms – *flexible feasibility, situational feasibility, the full (complete) possibility of action. Flexible feasibility* – power, intellectual or manipulative proficiency and knowledge (ability) and sufficient willingness to carry out given action; *Situational feasibility* carrying out given action in determined circumstances is not prevented by this circumstances. Somebody has full (completed) flexible and situational possibility of action, i.e. has sufficient power, knowledge, and efficiency (intellectual or manipulative) in order to carry the given action out in the moment *t*, possibility of the non-performance of it and has possibility of putting off until later moment of carrying the given act out [9p.124].

Power from the praxeological perspective is understood very widely as the physical strength, as moral, psychological power. In wide meaning, it is possible to combine the physical strength with term *physical fitness.* Holding on conception of motor competence physical strength with motor abilities (condition and coordination), intellectual efficiency and partly knowledge around sensors abilities, however manual efficiency (independently from motor abilities coordination) from the experience body. From the experience body partial linking, also knowledge, and abilities are justified.

Sufficient willingness to carry given action out does not have replication even in the conception *physical fitness* or in the conception *motor competence.* The lack of such a element is giving rise above all to consequences on the level conceptualization of examining the potential of the man for possibility of effective realizing the given category of muscle efforts (solving the given task or motor tasks). A demand of creating accurate diagnostic tests is most essential. Results of recommended tests physical fitness, motor competences etc. do not taking motivation factor into consideration. Forecasting the success on their base in real activity (e.g. during the sports fight) is burdened with the high risk of the mistake.

Suggested model of the measurement possibility of action the man is taking into consideration four elements procedure: (a) flexible feasibility measurement (motor simulation of the elements in suitable activity and level of motivation for this activity), (b) estimation of situational feasibility, (c) decision if subject has full possibility of action, (d) correction of the level "a" & "b".

Discussion

Emphasizing that the *Kiel-MC-Test* is the most versatile proposal of the measurement of the biological potential (motor) does not exempt the man from the criticism. For example, it is hard to recognize *Perception* test 1 (Throw Target Test) as accurate measure, since missing into given circle can be an effect of disorders of the coordination rather than incorrect perceiving. The *Kiel-MC-Test* conception contains many creative elements. Excellently into the block of *Body Experience* enter a new line of researches above motor competence of athletes concerning feeling – i.e. "opponent feeling" [10].

Prudent must be a criticism of measuring all recommended conceptions of physical fitness. Heyward already in chapter 3 "Principles of Assessment, Prescription, and Exercise Program Adherence" of his excellent book is emphasizing, that the specialist is responsible for „motivating your clients to improve their adherence to exercise" [5p.35]. Obeying this principle is a condition of revealing at least sub maximal motor possibilities by tested persons.

In our opinion much greater abilities of accurate diagnosing biological potential – in fact psychomotor – opening measurements conception possibility of action. Based on tens tests we have ascertained that near 10% persons (among athletes and no athletes) were maximum motivated to make all motor tasks that required precision of action (e.g. to hit the basket from distance with a fixed number of balls). Tasks put into practice before, after warm up and after multiple, intensive physical exercises.

Results of these tests were not published yet. Associating results of that kind of tests (not necessarily standardized and normalized) with results of estimation *situational feasibility* i.e. effectiveness's of action of the basketball player during the match can help to find answer to the question, whether the failure should be combine with the motor sphere or rather around mental sphere? Measurements conception possibility of action concerns all areas of conscious physical activity of the man and can be applicable in every professional using physical exercises (motor rehabilitation, sport, the physical education, military training etc.). Knowledge about possibility of action very often serves more accurately planning plans and training tasks, more than even meticulous results of analytical motor tests, psychological tests etc. This direction of researches is corresponding among others with the conception training of psychomotor adaptation [11] verified in practice.

Conclusions

Suggested model of the measurement possibility of action the man is formulated on the high level of the generality and because of that possible to adapt in every directed physical activity. Conception possibility of action is opened enough, that enables to use different theories worked out by specialists of measuring methods sure about aspects of the potential of the biological and intellectual of the man.

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