

ANTHROPOCENTRIC ASPECTS IN BIOMECHANICAL THEORY OF TRAINING A SPORTSMAN TO MAKE MOTIONAL ACTIONS

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The problem of nature and mechanisms of motional actions of man has widely been dealt with in theoretical and methodological works and also in the literature on biomechanics in coaching practice and coaching methods. As to the contents, conceptual vocabulary used and forms of description, various conceptions differ essentially from each other. Early investigations of the problem of motional action formation put special emphasis on the analysis of biomechanical characteristics of man's movements. This approach may be called mechanocentric. Due to the development of the programmed training theory, wide use made of technocentric approach where, figuratively speaking, "no address", "no people" technology prevailed. As a result, a "forgotten man" phenomenon appeared. The psychocentric competition is mainly used by psychologists and teachers. Its essence is that the quite, just idea of dependence of effectiveness of motional action formation on social-psychological factors is made absolute. Psychology of the man, its formation is considered to be the mastering by individual of the "ancestral experience" consisting of means and method of action and proves to be a mere reproduction of the structure of activity of the mankind. The anthropocentric conception of biomechanics considers the technology of projecting and forming motional actions a certain way of man's attitude (including a creative man) to an object, generated by practical orientation of his consciousness and transformation. The process of formation of motional actions of a sportsman cannot be confined in "Procrustean bed" of mechanistic and technocentric conceptions: "live motion" alongside with motor - executive (operational) mechanism includes cognitive, value - meaning and emotion - expressive components. Together with gnoseological (to cognize the world) and praxiological (in order to change it), motional actions belonging to the system of the activity of a man who masters and transforms the objective world have axiological aspects (for the sake of what values meanings it is necessary to cognize and change something).

Not less actual for the anthropocentric conception of biomechanics is the methodological reflexion which acts as a means of organization and regulation of any type of activity. In this context, means of activity imply material objects (oral and written speech, diagrams; figures) as well as ideal objects (images, knowledge, ways and methods of training). The traditional understanding of methodology as a theory of scientific and cognitive activity is insufficient (at least for motional action formation) and therefore it must be amplified with its interpretation as a theory of methods of rationalization and optimization of man's activity.

Considering value - meaning connections and relations in motional actions when coaching, we proceed from the concrete value system. It is the value system that determines the choice of the method of solving the motional problem. So, it is known that rational motional actions must comply with the laws of physics (law - conformity), biology (gene - conformity) and social environment (socio - conformity). At the same time they must be purposeful ("aimed at the target" reflecting reality in the form of future), target-conformable (which conform the means of achieving the targets), value-oriented (aimed at achieving some or other values - material or ideal). And at last, they must be meaning-organized, contain one or another personal meaning (meaning of the social for an individual) distinguishing the appreciative attitude and experience in it.

In the theory and coaching practice, wide use was made of the point of view that the internal activity of a sportsman (comprehension, understanding, interpretation) in forming movements systems is a derivate of the external activity (object-operational). The dominating is the theory of the by-stage formation of actions and concepts, stressing the reflective-oriented function of consciousness to the detriment of its operational-target and value - appreciative components. Motional actions are naturally mastered according to a ready-made samples, standards- "by reference points" in accordance with which invariability of basic and intermediate targets of an actions is, of course, foreseen. In this case, the term "target" is often replaced with the term "reference basis" when disclosing the contents of which the emphasis is put on registering the conditions but not the future results. Thus, the target, means and methods are assigned, a man from without. As a result, cognitive, targetforming and value-meaningful components are brought to nothing and a sportsman acts as a performer but not as a doer making a decision and working out means of achieving a motional result.

Unfortunately, the problems of target-formation and target- realization did not become a subject of great

attention in the literature on biomechanics. From the viewpoint of antropocentric conception of biomechanics, principles and means of target-formation in coaching to make motional actions should be developed taking into account three aspects: 1) object which makes it possible to determine what action is aimed at; 2) subject (an acting person); 3) method (mechanism) of an action. Thus, object, personal and functional sides of men's activity are integrated. It is only as a result of interaction of a subject and an object, and through the mechanism of active actions of the subject himself that the latter realizes his connections with the object and social world. Thus, in projecting and forming motional actions of a sportsman, one should distinguish such targets as: aims of an action (they characterize outer assigned requirements to the result); aims of the subject, these are the doer's actions (they are accomplished by a person); aims of the mission being solved by the subject (they are a means of achieving the subject's aims).

Aims of a motional action as means of obtaining the result (with the help of algorithms) are abstracted from the concrete individual and are determined by an object (by laws of nature and society). Here, the principal object of control of an acting man is the result, and the method of action is a by-side product.

The technocentrist direction of biomechanics considers an aim as just a factor of activity and not its bearer person realizing this activity.

Aims of the subject, solving a motional task, are determined by his value-necessity system, personally oriented at cognition, evaluation and transformation of the object world and himself. The process of "person fitting" of the aim, its final determination, adoption and appropriation (or working out) by the subject, i.e. person target formation proper always takes place here. The object of control is mainly target formation and appropriate evaluation components of the process of achieving a motional result.

Aims of the motional task are searching for and working out a method (means) of an optimum decision. They are determined by the subject of "situation reflection" of the reality (by knowledge of mechanisms and technology of action formation under concrete conditions of the task situation). The object of control is mostly a method of action (an executive part of a motional action) and a result is a by-side product. It is necessary to point out that we consider the aim of the motional task as the function of the subject in coordination with the object (or the function of one subject in coordination with another subject). In this case, both "subordination" of abilities of a man to aims, means and methods of normative activity and individualization of the method of motional actions in accordance with the abilities of a sportsman take place.

Let us note that, depending on gifts, knowledge and preceding experience of a sportsman, one and the same situation of the motional task may be presented in one or another form of target-formation. The degree of realization of objective conditions and subjective aspirations determine the success of man's action, just transition to the desired reality. A man reflects the world not only in his consciousness but also he reflects it in tools and means of influence on this world, in methods of purposeful activity. Why does a sportsman have a lot of aims and assignments, including opposite ones, in the situation of the task? Undoubtedly, one of the reasons is a variety of motives, requirements and values of a man, which are frequently contradictory.

Presented below is the system of target-forming activity of a man on the example of perfecting motional actions of a shot - putter. We do not set ourselves a task to make an exhaustive list of propable aims, it is more important for us here to call attention to their variety and diversified nature: from ideal aspirations ("the image of the desired future") to the concrete aims - results formed in terms of the final products. The terms used by us are rather conventional and are working definitions.

The concealed aim ("latent aim"): "Put the shot one and more dozens for time being". Here we minimize the concrete aim which has diffused, indefinite (in sense of reflection in consciousness and verbalization) character. When there are strict criteria in setting aims and evaluating results obtained, we sometimes "do what we do not know".

The aim-wish: "It would be good to speed up acceleration of the shot at the final stage of putting the shot". Here, the aim is objectively recognized motive, expression of "activity of consciousness": it is, to some extent, a dream unprovided with means of achievement (the aim remains a good wish, "hangs poised in mid air"). The pedagogical practice witnesses situations when a sportsman states: "I always know what I want therefore I always have aims". Anyhow, "to want" does not mean to have an aim yet. The aim must socially be "worked up" and person meaningful when understanding in such a way, "I want" approaches "I must".

The aim-necessity: "The final stage needs greater power impulse in the direction of putting the shot". The aim in this formulation is a method of fixing the necessity /requirement/ in one or another readjustment of a sportsman's movements system. Anyhow, the formulation of the aim-necessity lacks the means of achieving the future.

The aim-imitation: "Do as I do". Here, the future result is presented at the level of the perceptive

image. The afferent model of the result is an initial stage in developing the motional action on the basis of the image of visual modality. The aim pointed out must proceed from a competent source. In this case, the motivational basis must be already prepared.

The aim - reproduction: "Do like the last time". The aim is formed on the basis of the accumulated motional experience. Let us note that there are sportsmen who entirely rely on the experience of their own and bondlessly trust it. But there are individuals who always rely on the assistance of the others, even when objectively they do not need it.

The aim - test /gnostic/: "Try and accomplish "rowing" placing of the left leg in rolling ... Let us see what will happen". Here, target - formation starts with afferent synthesis which then transits to the stage of making one or another decision. The aim is supposed to be formed in accordance with new motion experience.

The aim - filter: "Concentrate on "revolving" unbending of the right leg". "Do not pay attention to spectators' reaction". As a result, the narrowing of the "field of conscience" or alienation from the environment takes place. In this case, filtration of unnecessary - for - the - moment information entering the organism in the form of various kinds of excitations stipulated by both inner state of organism and influence of the environment is going on.

The aim - emotion: Long live the record. Put the shot over the horizon." These terms fix emotional activation of target - formation and target - realization. Here, the experienced situation, direction of conscience at something desired as at the result /formation and adoption of intention/ are expressed clearly enough. The type of aim under consideration is presented to conscience in the form of emotional experience and motive to activity.

The aim - metaphor: "At the stage of final actions, imagine yourself a volcano erupting lava and stones". Here, the aim is presented in an image - metaphor way. The aim - metaphor expresses a purposeful assignment "not rigidly" since it allows different interpretations, various meaning shades and associations. The main function of such aims is to create an emotional - expressive effect. In this respect, it is close to the aims - emotions. But unlike the latter, the aim - metaphor has explanatory and heuristic functions as well. Image bearing metaphors are an effective method of meaning shading by means of indication to the analogy (structural, functional) between "sensibly unexpressive" contents of a motional action and an object selected for comparison. Let us note that pedagogical creation is inconceivable without use of the aims - metaphors in the capacity of "transition bridges" from intuitive, "not obvious knowledge" to individual - personal knowledge (analogous verbalization of meaning).

The aim - assignment: " Try and accelerate the shot by the left leg and right shoulder". Here, the sportsman's attention in the image - bearing form is fixed at cooperation of two most important elements of the movements system in creating a horizontal power impulse. Due to the purposeful assignment, a zone of searching for a motional decision becomes narrower, operational sense of the aim becomes more concrete and, consequently, the principles and methods of achieving the result are determined to a greater degree.

The aim - requirement: " To create rigidity of the system of links of the supporting motor apparatus when transferring efforts of lower extremities to the shot". The aim in this formulation fulfils the function of general requirements ("slogan" that must be concretized). The purposeful requirements may be stimulating (impelling to concrete activity), limiting (restricting it) and forbidding.

The aim - project: " Deliver the shot at an angle of 42° in relation to the horizon at an initial velocity of 14 m/s at the height of release equal to 2.1 m". This formulation expresses "the forestalling idea", fixes imagination (anticipation) of the desired result without indication of means to achieve it.

The aim - plan: " In the beginning, we shall work on perfecting the rolling stage in order to quickly "grasp" the support by the left leg and then to master "the whip" by the hand". This formulation indicates the plan - pre - planned procedure, sequence of realizing one or another work.

The aim - means: " Increase the time of double support coordination of legs in accelerating the shot at the expense of decreasing the duration of "rolling" and "grasping" the support by the left leg; realize mechanism of turn-straightening movement of the right leg". Here, realizing means are given in the most general way. From the viewpoint of the coaching process (position of a teacher - coach), the aims under consideration are means of organization of activity of a sportsman and supervision over its course. From the point of view of the mastering process (position of a sportsman), they are a reference basis of activity and a means of practical mastering of a motional action.

The aim - programme: " Accomplish an up-down "rowing" movement when placing the left leg on the support; active "revolving" of the right leg; simultaneous unbending, turn and " twisting" of the body; accentuated release of the shot by the shoulder and whip by hand ". In this case, actions of a sportsman are described in

terms of operational aims (purposeful programme where aims and means of their achievement are united). The programme is a specifically operational (procedure - algorithm) assignment of transition of a certain object from some states to other states (it does not deny consideration of the programme as expression of transition processes). The use of the special purpose programme recorded on external bearers (e.g. on technological diagrams) makes it possible to solve the notional task more effectively ("do it with the greatest ease").

The aim - result: "Achieve the shot flight range of not less than 21 m". Here, the aim is formulated in terms of final product of a notional action (reflect material realization of "forestalling idea"). In this case, the aim is considered in the cybernetics aspect as formal description of the final situation set to any system.

The motive - aim: "Today you are ready to show the record you were striving for many years. Believe in your power and abilities, because "yourself" and put the shot to a maximum result. It is known that the image of the future result by itself does not form the aim yet, it becomes the aim if only it is connected with the motive. Various attitudes of "motives" to "aims" and "aims" to "motives" may appear in sports activity. In this case, the process of target - formation is realized from the motive to aims and situation meanings. The prevailing motive is like a selector that determines the choice of aims and meanings of activity.

The aim - motive: "Put the shot to a maximum result - your state of fitness allows you to become a champion and join the group of leading sportsman". Here, the aim determines, "chooses for itself" a motive, i.e. forms the meaning/acquires the meaning in the light of motive/, becomes "the aim for the subject"

The aim - anti motive: "You must show the maximum result in the last attempt in spite of the spine trauma. Do not pay attention to the trauma - neck or nothing". In this case, the target - formation is realized in the situation of the conflict of two opposite requirements. The conflict meaning of the notional action of a sportsman is formed in case availability of not only external "barriers" /sports traumas/ but also internal obstacles - contradicting motives, wishes and feelings. As a result of changes in requirement - motivation sphere of a sportsman, there appear opportunities of arising the so-called aims - anti motives /aimed against actual requirements/.

The aim - anti aim: "To eliminate a small technical mistake it is necessary to exaggerate it - to make it larger". More flagrant error makes it possible for a sportsman to better feel it and then to understand and eliminate it (a small mistake is often not apprehended by a man since the afferent analysis and synthesis of irritants the process of reception does not always achieve the differential level of sensation). Here, "like cures like" intentionally exaggerating the so-called "anti aim" process. As a result, matching mechanisms "sound the alarm", evaluation is being given to the mismatching of real sensations and planned sensations, a "correction relay" actuates (certain corrections are input) which provide adaptation and readjustment of notional programmes.

The aim - meaningfulness: "At the stage of acceleration, the left leg swing should be started after the beginning of the body "falling" into the circle and until the beginning of active efforts of the right leg on support". One and the same aim, depending on "subjective preferences" connected with it, partial attitude of a person to one of another contents of its conscience (curiosity, emotional attitude, requirements of new sensations, etc.), acquires different meaningfulness, personal understanding and interpretation. Thus, the process of sensitive reflection of notional actions is realized by a sportsman through the "prisms" of individualized sensor motor and category schemes and depends, to a great extent, on the so-called "aim - meaningfulness".

The aim - meaningfulness may express both general meaning (or group) socialized meanings (at the verbal level they are fixed, for example, in professional jargon) and "intimately meaningful" (individual - unique, frequently irrational) components. The gnosiological role such aims is contradictory: in some cases they can distort the image of a notional action (false purposes, affects, illusions, etc.), in other cases they may correct it, increase the degree of adequacy (a concing example - constancy of perception of a notional action in different conditions of solving a problem). It is known that human perception connected to social memory "sees deeper" and notices considerably more than "resolution" capabilities of its sensor systems allow to do.

The pseudo aim: "Try to see the shot at the moment of its leaving" (it is a false aim which does not promote higher effectiveness of solving a notional task). The aim may have a form of the so-called quasaim. For example, : "When creating final efforts, accentuate attention on the "bent bow" mechanism. This aim is inadequate to the notional task. Understanding the shot-putting mechanism as energy discharge of the "bent bow" is not quite exact. Discharging of energy of muscle tensions is exercised by links (from support to "bearing" apparatus) but not instantly like the energy of the bent bow. Figuratively speaking, shot-putting is not "an explosion" but "a wave" going through the links of the body ("whip clap" mechanism).

In conclusion, let us point out that at present the tendency of drawing nearer all cognitive - evaluation processes appeared in anthropocentric biomechanics. Introduction of sensitive - imaginative components into thinking and, vice versa, of understanding operations into the processes of sensitive reflection (sensor, perceptive and others) testifies to conditionality of distinguishing various forms of cognitive processes in the common cognitive structure of conscience of a sportsman. The analysis made shows that determination by the necessity, realization by cognitive attitude (stock of knowledge) and operational - transforming attitude of a man to the world (totality of skills), its value - evaluation system "became entangled" in the mechanism of regulation of motional actions. Of course, we have succeeded only in indicating a certain approach to working out the main principles and means of anthropological biomechanics not pretending to the final solving of problems under consideration.