The Eidetic of Motor Action: Eidolon Maturity and Correctness Estimation

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Abstract— the aim of paper is to design an estimation methodology of motion eidolon maturity and correctness. Organization and research methods: to actual track and field coaches were proposed to draw skeletons (sticks models) of the ideal sprint running step. Skeleton was relied on three key frames: 1) the moment of repulsion completion; the moment when center of gravity above the supporting leg; 3) the moment of setting the leg. They used the Kinovea biomechanical software application. Coaches evaluated all skeletons rating them on a 10-point scale. Evaluation procedure was repeated after a month. Method of expert assessments was used for eidolon correctness estimations. The degree of eidolon maturity was estimated by similarity results first and second evaluations. Results: The paper revealed a different level of maturity and correctness of motion eidolons of coaches. We determined interdependence of these indicators. The correct eidolons are saved in the coaches’ memory long time. In another side, vice versa, the good eidetic memory conduces to a correctness of motion eidolon. Conclusion Gestalt-perception of motor action, the motion eidolon and eidetic memory are a triad of perceptual processes that occur during the evaluation of sports technique. The effectiveness and efficiency of qualitative biomechanical analysis depends on each component of this triad.

Keywords— motion technique, biomechanical analysis, perceptual process, eidolon, skeleton, eidetic, running.

I. INTRODUCTION

The researches of sport technique is rely on qualitative and quantitative biomechanical analysis [2, 12]. This approach is aimed at studying the motion in the material/physical/hylic world. At same time, in most cases the internal/ideal/eidetic eidolon of motion is completely ignored. It is assumed that the motion performed in the real world is a reflection of the inner world [13].

The athlete performing a motor action focuses on the eidolon of movement which is a reflection of reality in his mind [17]. Thus, the matured and correct eidolon will contribute to the correct execution of the motor action [7].

The coach’s inner world is rich in motion eidolons; however, it does not realize in real movement even during exercise demonstrations. Coaching eidolons materialize in the athlete motions through explanations of sports technique.

The eidolon and the practical movement based on it are in essence the nomenon and phenomenon of motor action. The eidolon of the motor action is the essence, while the real motion is only an external manifestation [9, 21].

The technique eidolons in practical implementation will differ according to the criteria of efficiency and rationality [8]. A coach with a mistaken eidolon in his mind will form the wrong technique. That technique is sometimes even impossible in the real world taking into account physical laws. At same times, a rigid materialistic position in motion analysis leads to misconception not only in the theory of physical education but also in the practice of sports [14].

At the present stage of the sports science including biomechanics and psychology there is not even a theory dedicated to the system of specific psychological processes of perception of sports technique. The factors that influence on eidolon have not been identified. The ways and possibilities of improvement these processes are unknown [1].

For the first time in psychology, the essence of eidolon (eidetic images) was described in 1907 by doctor V. Urbanchich. He used the term “subjective visual images” to designate them [19]. Outstanding Soviet psychologists L.S. Vygotsky, A.R. Luria, S.L. Rubinstein were interested by questions of eidetic. The objects of their study were the pathological manifestations of eidetism, manifestations of eidetism in children and the using of eidetism for educational purposes [3].

Among sport scientists emphasizing the paramount importance of eidolons in the technical perfection was V.B. Korenberg [6]. Offering the author’s classification of motor abilities in the form of the concept of motor-functional qualities, he called “eideticity” as one of the most important psychomotor qualities. He explained “eideticity” as an ability to effectively solve a motor task using imaginative thinking [13].

II. METHODS

A. Participant Characteristics

The study was performed at Lipetsk State Pedagogical P. Semenov-Tyan-Shansky University, LSPU. The research was conducted in February-March 2018. The study involved 14 experts who were actual track and field coaches. The coaches have job experience from 2 to 48 years (17.0 ± 16.9), including four coaches with highest coaching rank.

B. Sampling Procedures

Each of the 14 experts were proposed independently draw a skeleton of ideal sprint running step. Skeleton was relied on three key frames: 1) the moment of repulsion completion; the moment when center of gravity above the supporting leg; 3) the moment of setting the leg [4, 18].

Coaches used the Kinovea biomechanical software application where there is special tool for creation skeleton. Initially skeleton has position of the vertical standing with hands down [1, 16]. The expert’s task was to move the limbs
in order to create a pose corresponding to a key moments in running [10]. All frames of a running step were created on the one canvas. Models of skeletons in original proportions are presented in Fig.

C. Sample Size, Power, and Precision

Finally, 14 skeletons, each included 3 frames, were obtained. Skeletons from a computer application for coaches’ evaluation were printed on paper A4.

D. Research Design

Coaches evaluated eidolons on the day than they were created and a month later. Skeletons were shown randomly without identifying the author [11, 15, 20]. The task of experts was to give an assessment of sport technique on a 10 point scale [5]. So, we used the method of experts assessment.

As a criterion for the correctness of eidolon we considered the estimations given to the skeleton by other experts. As a criterion for maturity we considered a high estimation of their own skeleton during the initial and re-evaluation.

E. Experimental Manipulations or Interventions

During creating and evaluating skeletons coaches could not exchange opinions and help each other. Besides that it was strictly forbidden to use camera phones or other photo devices.

For evaluation of technique each expert received 14 sheets with skeletons and a protocol for filling. Subsequently all 14 coaching protocols were summarized in one common table.

III. RESULTS

The research showed that the eidolons of sports techniques is generally very vague and poorly retained in memory (table).

<table>
<thead>
<tr>
<th>Experts</th>
<th>Skeletons</th>
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</table>

* The estimates given by experts on a 10-point scale.

To determining the ranks, the points put up for their own skeleton was not taken into account.

Only a few coaches gave the highest score to their own skeletons during the initial and re-evaluation: #3, #5, #7, #8, #10, #12.

The Spearman correlation coefficient between his own score and the average score sets another experts was ρ = 0.38. Thus, the maturity of eidolon and its correctness have a weak but positive relationship. The correct eidolons are saved in the coaches’ memory long time. In another side, vice versa, the good eidetic memory conduces to a correctness of motion eidolon.
IV. CONCLUSION AND DISCUSSION

Psychological dictionaries contain the term “eidetism” - the ability of some individuals (eidetics) to preserve and reproduce an extremely vivid and detailed image of previously perceived objects and scenes [3]. Apparently, among the talented coaches, whose strength side is technique preparing, there is a large percentage of eidetics. The proposed method allows to identify the level of correctness and maturity of motion eidolon.

Gestalt-perception of motor action, the motion eidolon and eidetic memory are a triad of perceptual processes that occur during the evaluation of sports technique. The effectiveness and efficiency of qualitative biomechanical analysis depends on each component of this triad.

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