

MOTOR INTELLIGENCE AND ANTICIPATORY CAPACITY IN ACHIEVEMENT PERFORMANCE IN FENCING

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<https://doi.org/10.52846/jskm/43.2024.1.8>

Abstract: Fencing as a sport requires a combination of physical fitness, mental acuity, and strategic anticipation. This study explores the role of motor intelligence and anticipatory ability in the achievement of excellence in fencing performances. Motor intelligence includes the ability to process sensory information quickly, adapt movements to suitably, and execute precise actions. Anticipation involves the ability to predict the actions of opponents and effectively react. By analyzing the interaction between motor intelligence and anticipatory ability, we elucidated the mechanisms underlying high-level fencing performance. Perspectives from cognitive neuroscience, biomechanics, and sport psychology are integrated to comprehensively understand the cognitive-motor processes involved in fencing. Practical implications for training programs and coaching methodologies are discussed, highlighting the importance of developing motor intelligence and anticipatory skills to optimize fencing competition performance.

Keywords: anticipatory capacity, fencing, mental acuity, motor intelligence, processes cognitive.

Introduction

Fencing is as much a mind game as a physical test. Although you face each other through the mask viewfinder, the duel with your opponents occurs face-to-face, involving all the mental pressure that comes with that confrontation. (Kingston, 2001)

Fencing offers multiple physical and mental health benefits. Physically, it helps improve cardiovascular health; and increase muscle strength and overall fitness. Fencing also improves coordination, balance, and bone density, thereby reducing the risk of injury and osteoporosis. (Wade & Swanston, 2002). Mentally, fencing boosts cognitive skills such as problem-solving and concentration, while also acting as a stress-reducer and improves mood. Socially, fencing promotes bonding and camaraderie within clubs and teams. Improving fencing skills also increases self-confidence and resilience, contributing to a positive mindset and overall mental health. (Miller, 2000)

Scientific research has become essential to societies' evolution, especially in the field of sport, and modern theories are used to achieve optimal results. The rapid advances in physical education have opened new directions for researchers, particularly in disciplines such as fencing, allowing the exploration of innovative approaches to the acquisition and refinement of skills and knowledge. Researchers such as Sabr (2005) and Alyan (2000) emphasize the importance of integrating recent sports-related findings.

The main purpose of modern sports preparation is to positively influence the variables of sports performance through conscious actions, based on scientific methodology. The level reached by the fencers at this stage of their training represents the certainty of achieving maximum performance in the future. As its primary training objective is the improvement of technical-tactical actions, the training process of fencing athletes seeks to benefit from the progress made by fundamental scientific research, which influences the orientation, models, and means used in athlete training. The high stage at which performance fencing currently takes place, in terms of developing psychomotor capacity variables, as well as technical-tactical ones, in an adequate motivational context requires careful capitalization of performance factors. It is increasingly obvious that in the context of equalizing values from a technical and tactical perspective, intellectual capacity is a key factor in performance. (Epuran & Stănescu, 2011)

Recent sports results support the statement that sports performance has reached a high level in the XXI century, and specialists tend to constantly find new means and methods for selecting and preparing athletes to enhance their performances. The rigors of competitions and training can only be met by athletes who have accumulated a high score in the efficiency of technical-tactical actions and have developed superior biopsychomotor potential, being able to manifest motor intelligence in training, especially in competitions. The complexity of effort is given on the one hand by the number of motor actions performed

simultaneously during an activity (gymnastics) and on the other hand by the unpredictability of the appearance of a new element (sports games, combat sports). (Dragnea, 2006).

The research topic chosen for this article started from the consideration of the treatment of investigations regarding superior nervous activity" especially the one related to the relationship between general intelligence, motor intelligence, and anticipatory capacity.

The substantiation and reconsideration of the methodology of selection and training of athletes can only be done based on interdisciplinary research through which more efficient horizons and operational strategies can be made available for practice. Following discussions with coaches who train athletes in fencing, most were in favor of their athletes not thinking about the important situation on the board and being unable to take advantage of the technical and tactical knowledge acquired at optimum efficiency. (Fleishman 1968)

From a psychological perspective, mental actions (internal) and motor actions (external) are delineated as simple actions consisting of transformations with various relationships between different phases. (Golu, 1971).

Concrete actions determine a child's development. Wallon (1941), especially through the work "From Act to Through " and Piaget (1973), in most of his works and especially in "The Birth of Intelligence in the Child and Child Psychology," demonstrated the mechanism of cognitive development in future adults. (Piaget & Inhelder, 1966) Motor actions are systems of motor acts that respond to solving an immediate motor task. They constitute the content of the activity and are grouped, dosed, and modified according to the concrete situations in which the individual finds himself. (Epuran, 2011).

Motor actions are the field of study of "technique" special pedagogy in our field (didactics of physical education and sport) and biomechanics. Knowledge of the mechanisms of actions, their structure, and dynamics leads to the learning process and development of motor gestures. The organization and management of motor actions are most often conceived as an orderly process, to which we can distinguish at least three stages: planning, programming, and execution. Among the many applications of action theory to bodily activities, we will note the problem of the structure of action.

Paillard (1994) stated that: "By articulating representations, the organism acquires the power to act, and not only simply to react, driving its

motor instruments in a predictive manner. "(page 926)

Owing to its possibilities of anticipating or extrapolating in the short term, a body can develop action projects and plan their execution according to the foreseeable consequences of their effectual realization in acts.

The main attributes of motor intelligence are operativeness in choosing the appropriate motor program for the situation and intention; the speed of comparison of alternatives; the possibility of developing the motor program in the time crunch; the ability to process a large amount of sensory information in a short time and to separate from a sensory complex the relevant information necessary for the motor reaction; the ability to decode and use proprioceptive information ("obscure sense"); the ability to understand motor tasks; ease of transfer; motor creativity; anticipation-coincidence. (Giboin et al., 2019)

Method

Hypothesis

Social research on interventions in the development of more intelligence and the development of anticipatory capacity in the process of fencing training.

By planning specific training in fencing, aimed at improving motor intelligence and prediction skills, we will improve both the quality of learning and the conscious and active participation of athletes, thus determining creative activity through discovery, which has a direct impact on the evolution of long-term technical-tactical training to maximize specific efficiency.

Methodology

Participation and procedure

Objectives

- Development of training programs.
- Plan activities by drawing up planning documents for the entire study period.
- Implementation of specific programs in the development of motor intelligence and predictive ability
- Empirical evidence relating to the effectiveness of specific training programs.
- Communication of the result obtainers

Procedure

The application of specific work programs, based on the overall method of implementing technical-tactical procedures, as well as programs designed to act in advance on the opponent's movements, can successfully contribute to the development of motor intelligence. To study the role of motor intelligence and prediction in maximizing sports performance, we believe it is necessary to analyze the needs of coaches to help them achieve the

proposed objectives. To identify the needs of coaches, we used the questionnaire as a research tool, which provided us with precise data on the method of action in fencing. We asked the interviewees for honesty and the questions concerned the use of motor intelligence components in the training of athletes, the type of training, and the methods used so far. Working methods for the development of creative thinking and behavior. The sample used represents 50 coaches from the Romanian Fencing Federation and several private clubs in the country, who train athletes in the specialty of fencing. The collection,

concentration, and analysis of the results obtained from the questionnaire highlighted the opinions of Romanian coaches regarding the training of fencers. The *QUESTIONNAIRE* was formulated with 13 items plus socio-demographic data, with the request to know the opinions of the coaches regarding their needs to improve the coach-athlete relationship and the working methods they approach in training with athletes, mostly development of motor skills, intelligence, and anticipatory skills to improve fencing performance.

Results

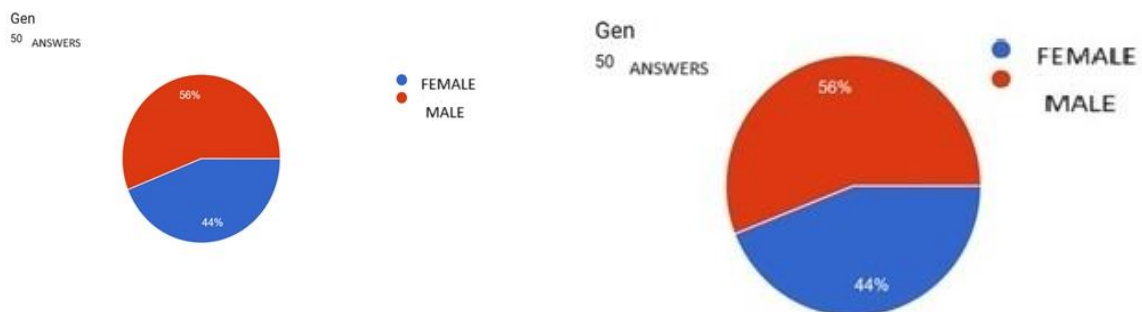


Figure 1. Gen of respondents

According to Figure 1. Of the 50 respondents, 56% were male and the remaining 44% female.

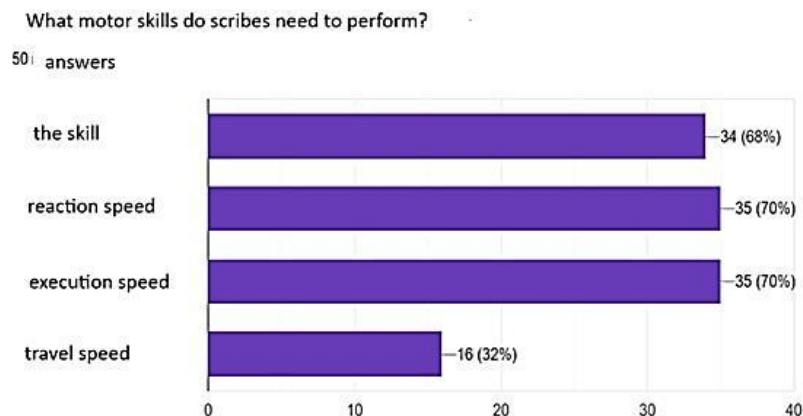


Figure 2. Key motor skills essential for top fencing performance.

The figure above (figure 2) shows a graph illustrating the responses to the question "What motor skills do fencers need to perform?". The survey has 50 responses, distributed in four categories:

- The skill: 34 people (68%)
- Reaction speed: 35 people (70%)
- Execution speed: 35 people (70%)

- Travel speed: 16 persons (32%)

Interpretation of these results shows that reaction speed and execution speed are considered the most important motor skills for fencers, with 70% of respondents each indicating these skills. 'Ability' is also important, with 68% of respondents selecting this category. 'Moving

speed' is considered less important, with only 32% of respondents indicating it.

These results suggest that for scribes, the ability to react and execute tasks quickly is essential, while speed of movement is less critical.

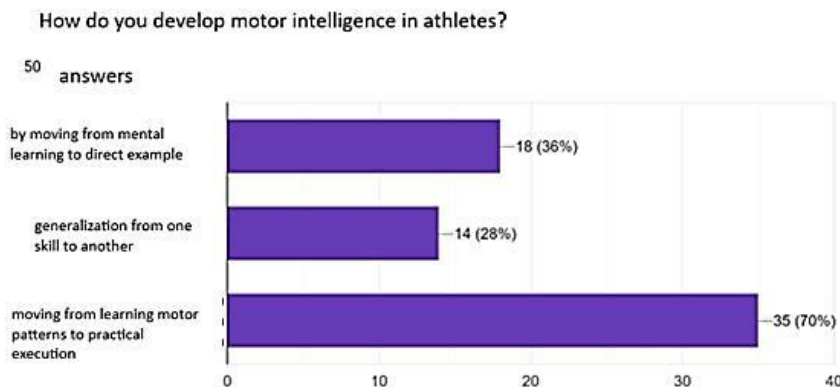


Figure 3. It illustrates the different methods used to develop motor intelligence in athletes.

From the statistical analysis of the results of the questionnaire, it can be seen that the method used by fencing coaches to develop motor intelligence is as follows (as demonstrated by the answers in Figure 3):

- 70% used the method "Moving from learning motor patterns to practical execution";
- 36% used the method "Moving from mental learning to direct example";
- 28% used the generalizing method from one skill to another';

These percentages indicate coaches' preferences in approaching the development of athletes' motor skills. The majority of coaches (70%) opt for the method that involves moving from theoretical learning of motor patterns to practical application, suggesting that this approach is considered the most effective for developing motor intelligence in the context of fencing. On the other hand, 36% of coaches consider the direct example learning method to be effective, while a minority of 28% prefer generalization of skills.

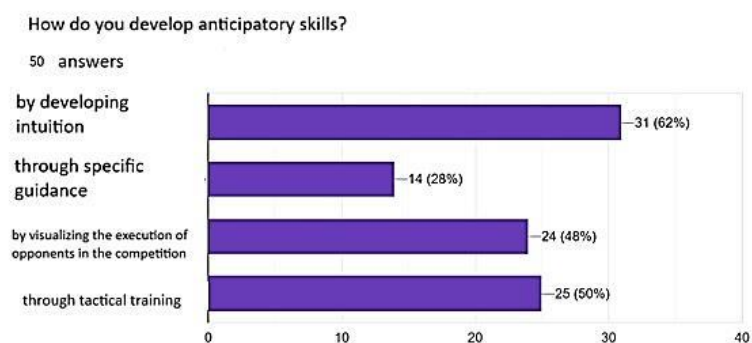


Figure 4. Details the different methods used to develop anticipatory skills.

The figure 4 shows a graph illustrating the responses to the question "How do you develop anticipatory skills?". The survey has 50 answers, distributed in four categories:

- By developing intuition: 31 people (62%)
- Through specific guidance: 14 people (28%)

- By visualizing your opponents' execution in competition: 24 people (48%)
- Through tactical coaching: 25 people (50%)

Interpretation of these results shows that the most popular method for developing anticipatory skills is 'developing intuition', with 62% of respondents preferring this method. 'Tactical training' and

'visualizing opponents' execution' are also popular methods, with 50% and 48% of responses respectively. 'Specific coaching' is the least used method, with only 28% of respondents choosing this approach.

These results suggest that coaches consider intuition and tactical coaching as crucial for developing anticipatory skills, while specific guidance is considered less effective.

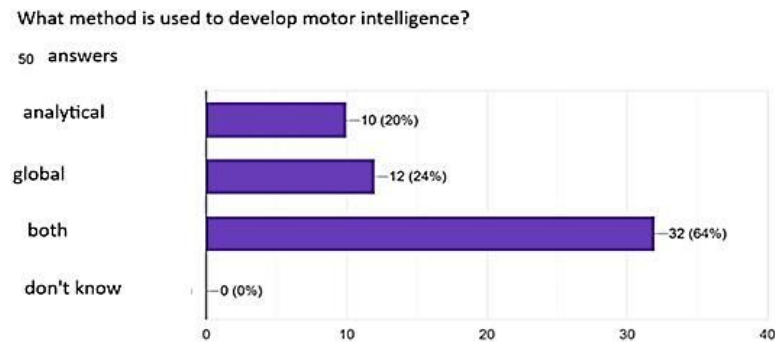


Figure 5. Illustrates the method used to develop motor intelligence in athletes.

The figure 5 shows a graph illustrating the answers to the question "What method is used to develop motor intelligence?" The survey has 50 responses, distributed in four categories:

- Analytical: 10 people (20%)
- Global: 12 people (24%)
- Both: 32 people (64%)
- Don't know: 0 people (0%)

Interpretation of these results shows that the majority of respondents (64%) believe that a combined approach, using both analytical and global methods, is the most effective approach for developing motor intelligence. A smaller number of respondents prefer individual analytical (20%) or global (24%) methods. No respondents indicated that they did not know which method was being used.

These results suggest that an integrated approach, combining both analytic and global methods, is considered the most effective approach for developing motor intelligence.

From the statistical analysis of the results of the questionnaire, the methods used by fencing coaches for developing motor skills and motor intelligence are as follows:

1. Development of motor skills:
 - 70% used the method "Moving from learning motor patterns to practical execution"; (see figure 3)
 - 36% use the method "moving from mental learning to direct example"; (see figure 3)
 - 28% used the generalizing method from

one skill to another'; (see figure 3)

2. Developing anticipatory skills:
 - 62% use the 'Developing intuition' method; (see Figure 4)
 - 14% use the method "Visualizing opponents in competition"; (see figure 4)
 - 12% use the "Tactical coaching" method; (see figure 4)

These data suggest that the majority of fencing coaches prefer to develop motor skills through a hands-on approach, moving from theoretical learning to practical execution, and to develop anticipatory skills by developing athletes' intuition. Other methods such as learning by direct example and tactical training are also used, but to a lesser extent.

Conclusions

It is essential to implement training programs that include sport-specific exercises to improve essential physical attributes, such as the kinetic response, which plays a crucial role in honing fencing skills. In particular, the emphasis on developing reaction speed and the ability to anticipate sword arm movements is particularly important for elite fencing athletes.

In addition, further exploration through similar studies with different sample sizes and proficiency levels is needed. Such efforts could deepen our understanding of the interplay between training interventions and skill improvement, ultimately contributing to the advancement of fencing practice and pedagogy.

Motor intelligence can be viewed through the lens

of the aptitude model of the intellect, which ensures a good level of achievement of motor learning as well as sports performance. It is certain that each type of sport expresses different demands on the intellectual operational structures and that, all together, it exerts a stimulating influence on the mental act.

It equally concerns the selection, capture, and treatment of information coming from outside and inside the body to develop appropriate motor responses.

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