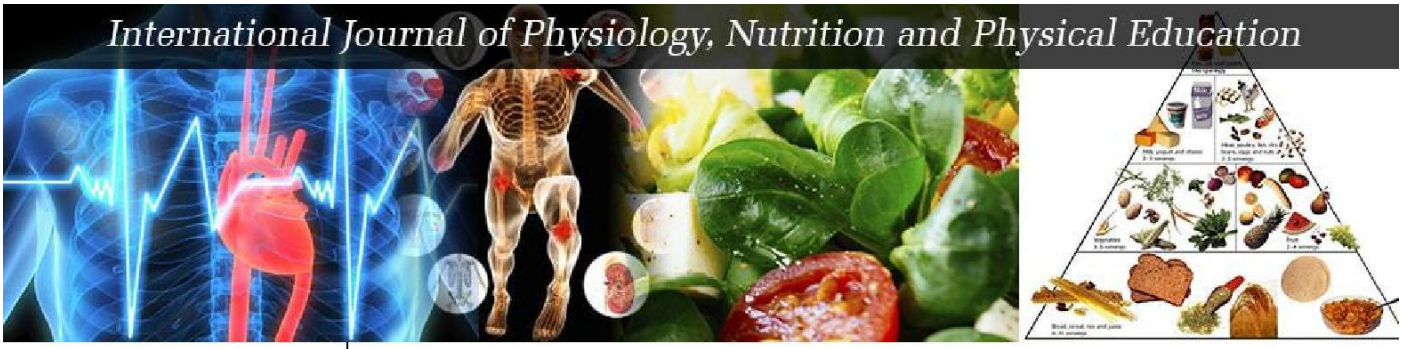


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**Dr. Anu Sharma**
Associate Professor, PGGCG, Chandigarh, India

**Harpreet Kaur**
Research Scholar, Shri Guru Granth Sahib World University Fatehgarh Sahib, Punjab, India,

**Correspondence**
**Dr. Anu Sharma**
Associate Professor, PGGCG, Chandigarh, India

# An analytical study of motor educability among inter-college and inter-university level foil and epee fencers

**Dr. Anu Sharma and Harpreet Kaur**

**Abstract**
The purpose of this study was to determine the difference of motor educability amonginter-university and inter-collegelevel foil and epee fencers. A group of 60 male inter-university and inter-college level fencers (mean age 21.81± 2.13 years) after having been informed about the objective and protocol of the study, gave their written consent and volunteered to participate in the study. The subjects were purposively assigned into 2 groups: foil fencers ($N_1$=30) and epee fencers ($N_2$=30). Student's t-test for independent data was used to assess the between-group differences. The level of $p \leq 0.05$ was considered significant. The investigational findings indicate thatthe computed value of t for all the foil and epee fencers were greater than the tabulated $t_{.05}$ (59) =2.197.Significant between group differences were found in case of motor educability amonginter-university and inter-college level foil and epee fencers.

**Keywords:** Motor educability, foil, epee, fencers

## Introduction
Fencing is an open-skilled combat sport that was admitted to the first modern Olympic Games in Athens (1896). It is mainly practiced indoors, with three different weapons: the foil, the sabre and the epee, each contested with different rules. Consequently, muscles strength and power are crucial for fencers to perform specific dynamic movements as steps and bounces at different direction and lunges in order to strike the opponent (Barth and Beck, 2007) [1]. Power related jumping tests are correlated to specific fencing tests, indicating that concentric explosive strength and fast stretch shortening cycle's qualities seem to be important in fencing performance (Tsolakis *et al*. 2010) [2, 10]. Fencing experience and physical fitness facilitate a person's ability to withhold action when necessary. The interactive nature of aerobic fitness and sport expertise on action inhibition suggests that cognitive control benefits most from the combination of physical and mental training compared to when each is administered singly. Skilful performance in combat and racquet sports consists of proficient technique accompanied with efficient information-processing while engaged in moderate to high physical effort. The physical demands of fencing competitions are high, involving the aerobic and anaerobic alactic and lactic.

Metabolisms, and are also affected by age, sex, level of training and technical and tactical models utilized in relation to the adversary. The anthropometrical characteristics of fencers show a typical asymmetry of the limbs as a result of the practice of an asymmetrical sport activity. Fencing produces typical functional asymmetries that emphasize the very high level of specific function, strength and control required in this sport. Fencers need to anticipate the opponent and to mask their true intentions with a game of feints and counter-feints, which must be supported by an adequate psycho-physical condition to prevent central and peripheral fatigue. However, limited research has examined these responses within fencing. The identification of physical characteristics in a sport modality contributes to its success and enables to spot differences among athletes of different modalities, which is of great interest for both sport coaches and scientists. Sports performance is based in a complex and intricate diversity of variables, which include physical (general and specific conditions), psychological (personality and motivation) anthropometrical (body morphology, anthropometry and body composition) and biomechanical factors. The motor educability is generally defined as "the ability to learn well different motor skills as quickly and easily".

In other words, motor educability refers to ones level of ease with which one learns new motor skills. As is intelligence testing in education, so is motor educability testing (motor intelligence) in physical education. Although, the validity of motor educability tests and their ability to predict motor skill learning has not been established, yet a large number of motor educability test batteries have been published (brace, 1927; Metheny, 1938; carpenter, 1942; McCoy & Young 1954). Earlier, in1958 Franklin henrys' memory drum theory of neuromuscular reaction advocated that motor learning ability is task specific rather than general to various motor skills. Henrys' claims supported by many studies where a very low (0.46 or less) value of correlation between different types of motor educability tests has been reported (Gire & Espenschade, 1942; Cooper, 1945; Gross *et al*. 1956). Thus, the aim of the present study investigates the difference of motor educability among inter-college and inter-university level foil and epee fencers.

## Methods

### Subjects

A group of 60 maleinter-university and inter-college level fencers (mean age 21.81± 2.13 years) after having been informed about the objective and protocol of the study, gave their written consent and volunteered to participate in the study. The subjects were Purposively Assigned into 2 groups:

1. Foil fencers ($N_1$=30; 15 inter-university and 15 inter-college)
2. Epee fencers ($N_2$=30; 15 inter-university and 15 inter-college

### Methodology

### Metheny-Johnson motor Educability Test

The test battery consists of the following four motor stunts; (Front roll, Back roll, Jumping half-turns, Jumping full-turns).

**Test Area:** A canvas measuring 15 feet in length and 2 feet wide is marked as show in figure 1. The 15 feet length is divided into ten section of each 18" inch each. The width of the transverse lines is ¾ inch and 3 inch alternatively as show in figure 1. So that centre of lines remains 18" inch apart. Another ¾ inch wide line is marked lengthwise in the middle of the canvas length. This properly marked piece of canvas is placed over a gymnasium mat with the sides and ends properly tucked to the mat so that the canvas remains properly stretched. Alternatively, the above area may be directly painted or marked on the gymnasium mat without using the canvas.

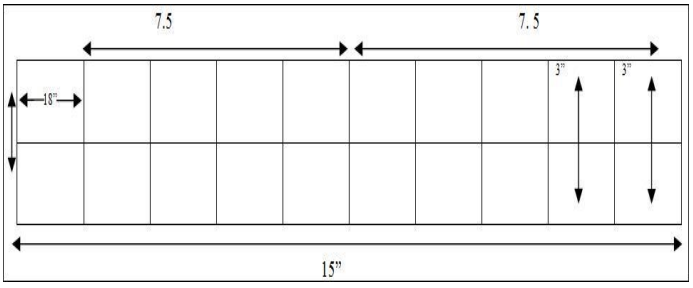


**Fig 1:** Testing area of Metheny-Johnson motor educability test battery

### Test item

1. **Front roll**: Ignoring the long middle dividing line, the subject is asked to start outside the marked area and perform two front rolls, one up to 7.5' i.e. 3" wide center line and the other in the second half of 7.5'. The subject is to perform the rolls without touching the limits or over reaching the zone mentioned above.
   **Scoring**: Each correct roll gets 5 points, hence maximum of 10 points. Two points are deducted for overreaching side line, right or left for each roll; one point is deducted for over reaching the end limit on each roll and full five points are deducted when the subject fails to perform a true front roll.
2. **Back roll:** The test is similar to front roll both in performing and scoring. The subject is to start outside the marked chart area and is to perform two back rolls in the 2 feet lane area, one up to first half and the second back roll in the second half.
3. **Jumping Half- turns:** The subject is asked to start with feet on first 3inch line, jump with both feet to second 3inch wide line, executing a half turn either right or left, jump third 3inch line executing half turn in opposite direction to first half-turn and then to $4^{th}$ and $5^{th}$ 3inch wide lines executing half turns right and left alternatively.
   **Scoring:** Perfect execution of four jumps is worth ten points**.** Only 2 points are deducted for each wrong jump when the subject either dose not land with both feet on the 3inch line or turns the wrong way or both.
4. **Jumping Full-Turns:** The subject is asked to start with feet out side marked area at about the center of the lane. She/he is required to jump with feet together to second rectangular space, executing a full turn with the body either right or left; continue jumping to alternate rectangular spaces across the marked mat executing full turns, rotating body in same direction, landing on both feet every time.
   **Scoring:** Perfect execution of five jumps is worth ten points**.** Two points are deducted, if the subject fails to keep balance on landing on both feet: turns too far or oversteps the squares.

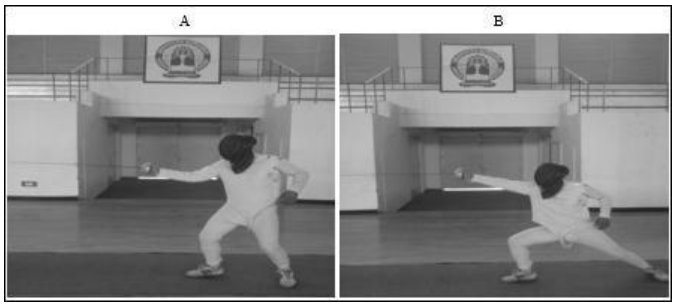


**Fig 2:** (a) Initial Position of Stance (b) Ending Position of Lounge

### Statistical Analyses

Statistical ® 7.0 software was used in data analysis. Student's t-test for independent data was used to assess the between-group differences. The level of $p \leq 0.05$ was considered significant.

## Results

As follow from data presented in table 1& 2 that the mean of inter-university and inter-college foil fencers was 28.93 and 26.26 respectively, whereas the standard deviation of inter-university and inter-college foil fencers was 4.44 and 3.01 respectively. Since calculated t is greater than tab $t_{.05}$, $H_0$ may be rejected at .o5 level of significance. Thus data provide sufficient evidence to ensure that the mean of motor educability is significantly higher for inter-university fencer

in comparison to inter-college fencer at 0.5 level of significance. On the other hand, the mean of inter-university and inter-college epee fencers was 28.73 and 27.13 respectively, whereas the standard deviation of inter-university and inter-college epee fencers was 3.01 and 2.61 respectively. Since calculated t is greater than tab $t_{.05}$, $H_0$ may be rejected at .o5 level of signifincae. Thus data provide sufficient evidence to ensure that the mean of motor educability is significantly higher for inter-university fencer in comparison to inter-college fencer at 0.5 level of significance.

**Table 1:** Mean Values (±SD), Standard Error of the Mean and Test Statistic t of Metheny-Johnson motor educability test in Inter-university (N = 15) andinter-college (N = 15) foil fencers

| | Foil fencers | |
|---|---|---|
| | **Inter-university** | **Inter-college** |
| Sample size | 15 | 15 |
| Arithmetic mean | 28.93 | 26.26 |
| 95% CI for the mean | 26.47 to 31.3 | 24.52 to 27.93 |
| Variance | 19.78 | 9.06 |
| Standard deviation | 4.44 | 3.01 |
| Standard error of the mean | 1.14 | 0.77 |
| Mean difference | 15 | 2.66 |
| Standard deviation | | 2.43 |
| 95% CI | | 4.01 to 1.31 |
| Test statistic t | | 4.23* |
| Degrees of Freedom (DF) | | 14 |
| Two-tailed probability | | P = 0.0008 |

**Table 2:** Mean Values (±SD), Standard Error of the Mean and Test Statistic t of Metheny-Johnson motor educability test in Inter-university (N = 15) andinter-college (N = 15) epee fencers

| | Epee fencers | |
|---|---|---|
| | **Inter-university** | **Inter-college** |
| Sample size | 15 | 15 |
| Arithmetic mean | 28.73 | 27.13 |
| 95% CI for the mean | 27.06 to 30.40 | 25.68 to 28.58 |
| Variance | 9.06 | 6.83 |
| Standard deviation | 3.01 | 2.61 |
| Standard error of the mean | 0.77 | 0.67 |
| Mean difference | | 1.60 |
| Standard deviation | | 1.72 |
| 95% CI | | 2.55 to 0.64 |
| Test statistic t | | 3.59* |
| Degrees of Freedom (DF) | | 14 |
| Two-tailed probability | | P = 0.0029 |

## Discussion

Fencing experience and physical fitness facilitate a person's ability to withhold action when necessary. The interactive nature of aerobic fitness and sport expertise on action inhibition suggests that cognitive control benefits most from the combination of physical and mental training compared to when each is administered singly. Skilful performance in combat and racquet sports consists of proficient technique accompanied with efficient information-processing while engaged in moderate to high physical effort. Modern competitive fencing, consisting of the three disciplines of foil, epee, and sabre, has experienced a rapid growth in participation across all age groups in the USA in the past decade. Unfortunately, because of media sensationalism and a lack of well-designed epidemiological studies, there are significant misconceptions regarding both the incidence and types of injuries presented in fencing. The experimental findings indicate thatthe significant between group differences were found in case of motor educability amongInter-universityand Inter-collegelevel foil and epee fencers.

## Conclusion

In conclusion, the present study suggests that a motor educability is significantly higher for Inter-university fencer in comparison to Inter-college fencer. We may, therefore, conclude that the difference in motor educability amongInter-university and Inter-college foil and epee fencers is significant and is just a matter of chance.

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