Assessment of Psychomotor variables of Tribal's of Alirajpur and Jhabua Secondary School Boys

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Abstract

This study examined the comparative status between Tribal's of Alirajpur and Jhabua Secondary School Boys on selected psychomotor variables has selected to draw a conclusion on selected two groups. Basic statistics and "t" test were computed to sketch the results. Investigators found that barring reaction time, other psycho-motor factors i.e. kinesthetic and speed of movement did not differ significantly between tribal secondary boys from Alirajpur and Jhabua.

Madhya Pradesh often called the Heart of India, is a state in central India. Its capital and the largest city is Bhopal. Madhya Pradesh is the second largest state by area and with over 75 million inhabitants the sixth largest state in India by population. It borders the states of Uttar Pradesh to the northeast, Chhattisgarh to the southeast, Maharashtra to the south, Gujarat to the west, and Rajasthan to the northwest.

Madhya Pradesh has a substantial Tribal population. The differences in the tribal community, spread over in various parts of the state, is clearly seen not only on the basis of their heredity, lifestyle and cultural traditions, but also from their social, economic structure, religious beliefs and their language and speech. Due to the different linguistic, cultural and geographical environment, and its peculiar complications, the diverse tribal world of Madhya Pradesh has been largely cut-off from the mainstream of development.

The word "tribe" means a unit of social organization, especially among primitive people consisting of a group of people claiming a common ancestry usually sharing a common culture, they speak language of their own, and they have succeeded in preserving their social custom, artistic traditions and religious beliefs to a large extent. Tribals in general have not been able to get rid of their socio-economic backwardness in most part of India.

Tribal" is the word used in India to refer to inhabitants known elsewhere as "indigenous". British ethnographers classified tribals as "animists". As per the National Census, they are classified as "aboriginals" and listed according to the tribe. The Hindi word for tribal is adivasi , meaning "ancient inhabitants."

Alirajpur District of Madhya Pradesh:

Alirajpur is one of the 50 districts of Madhya Pradesh state in India. It was created from Alirajpur, Jobat and Bhabra tehsils of the former Jhabua district on 17 May 2008. Alirajpur is the administrative headquarters of the district. Thedistrict occupies an area of 2,165.24 square kilometres (836.00 sq mi), and at the 2011 census had a population of 728,677.

Percentage of tribal population in Alirajpur district is 88.8% and ranked number 1 as far as total population of scheduled tribes are concerned in the state of Madhya Pradesh. (Census of India, 2011)

(B) Jhabua District of Madhya Pradesh:

habua district lies in the western part of Madhya Pradesh. It is surrounded by Panchmahal and Baroda districts of Gujarat, Banswara district of Rajasthan, and Alirajpur, Dhar and Ratlam districts of Madhya Pradesh. It has an area of 3,782 km. The terrain is hilly and undulating. Average rainfall in the district is about 800 mm. The district is divided into five tehsils and six community development blocks.[Jhabua", District administration. Retrieved 2010-08-20]

Jhabua district was divided into two parts in May 2008, namely Alirajpur and Jhabua. Aliarajpur, Jobat, Udaigarh, Bhabra, Sondawa and Katthiwada are the 6 blocks of new district, Alirajpur. Jhabua district now consists of Habua, Meghnagar, Ranapur, Rama, Thandla and Petlawad blocks.

Scheduled tribes constitute 88.5% of the total population of this district and ranked second as far as population of scheduled tribes are concerned in Madhya Pradesh. (Census of India, 2011)

PSYCHOMOTOR ABILITIES:

Psychomotor abilities are skills such as hand-eye coordination, balance, and reaction time that arise from a unity of cognitive and physical functions.

Psychomotor variables act as the medium for the realization of cognitive and affective domains of learning and motor behavior. All these domains of learning are inseparable identities and work in perfect harmony and unison with one another. The psychomotor variables are primarily concerned with muscular contraction.

KINESTHETIC PERCEPTION:

The term kinesthesia refers to the perception of limb movement and position, and is often broadly defined to include the perception of force as well. These sensory perceptions originate primarily from the activity of mechanoreceptors in muscles, which provides the central nervous system with information about the static length of muscles, the rate at which muscle length changes, and the forces muscles generate. From these signals comes our awareness of where our limbs are in space, when our limbs have moved, and the mechanical properties of objects (e.g. weight, compliance) with which they interact. Sensory information about changes in limb position and movement also arises from other sources, namely receptors in the skin and joints. These inputs appear to be particularly important for kinesthesia in the hand, as both joint (Clark et al., 1989) and cutaneous anesthesia (Clark et al., 1986) impairs the ability to detect finger movements and perceive finger positions. For more proximal joints, such as the knee, joint and (or) skin anesthesia does not have a significant influence on the perception of limb position (Clark et al., 1979). It appears that for the hand, cutaneous receptors provide an important facilitatory input to the central nervous system that is used to interpret position and movement signals arising from other sources. Cutaneous receptors in the hairy skin on the dorsum of the hand are capable, however, of encoding joint movement very precisely via their responses to stretch of the skin overlying the active joint (Collins & Prochazka, 1996; Edin, 1992). The importance of cutaneous sensory feedback to the perception of finger movements and positions is not surprising in view of the high innervation density of cutaneous mechanoreceptors in the hand, and its specialization for tactile exploration and manipulation. This feedback may also be more important for kinesthesia in the hand than for other parts of the body because of the complex anatomical arrangement of muscles, with most muscles acting over several finger joints, which would result in a considerable ambiguity of muscle spindle receptor discharges. In addition to these peripherally originating signals, there is evidence that central (cortical) feedback

pathways provide information that is used to decode muscle afferent signals and in the perception of force.

When we move our arms or legs we are aware that the position of the limb has changed, and so there is a perception of both limb movement and limb position. It has been possible to separate these two aspects of perception experimentally by imposing extremely slow movements on a joint (i.e. 1-4°/min) that result in a change in the position of the joint in the absence of any awareness that a movement has occurred. Using this procedure, it has been shown that people can make independent judgments of the position and movement of a limb (Clark et al., 1985). In contrast to the sense of limb movement, the ability to detect a change in the position of a limb is not affected by the angular velocity of the movement, but does depend on the absolute position of the limb and on the specific joint moved. Taylor and McCloskey (1990) reported that the threshold for detecting a change in the position of the joints of the hand ranges from 4.4° for the metacarpophalangeal joint, to 6.8° for the proximal interphalangeal joint.

SPEED OF MOVEMENT

Speed is the ability of an individual in pushing forward or moving the whole or a part of body in the space in the shortest possible time, such as: the speed of a wrestler in pushing the hand forward in order to perform a wrestling technique; the movement of hand by a weight thrower; the movement of legs by a swimmer; and the movement of hands by a karate champion. In daily life driving a vehicle with precise hand eye movement, catching something etc. also requires speed of movement.

Though it's quite difficult to dissociate the speed of movement from the reaction time, these two factors are not necessarily present in one individual. These two factors might be sometimes assessed separately and the acquired results might be compared and there might be a low correlation coefficient between the scores obtained in the test; however, it is not possible to separate these two factors from each other, in performing one movement.

Response time consists of two components: reaction time and movement time. Reaction time is the time required for the assessment of the stimuli, choosing and launching the response; however, movement time is the time required for the performance of the motor response. A combination of these two factors of reaction time and movement time is called response time.

Speed of movement response, as a measure of the speed of perceptual system, is the time necessary for assessment, perception, and commencing a response to the stimulus. In a speed of movement response task the player has to respond as soon and accurately as possible while there are different stimuli requiring different responses (Magil, 1999).

Movement time is the interval between the initiation and completion of the movement. Mannie K. (2011) supposed that response time is the cumulative effect of reaction time as well as movement time. It is the total time between the onset of a stimulus and completion of the action.

REACTION TIME:

Reaction time is the elapsed time between the presentation of a sensory stimulus and the subsequent behavioral response. In psychometric psychology it is considered to be an index of speed of processing Hemphill, D. (2000). Reaction time indicates how fast the thinker can execute the mental operations needed by the task at hand. In turn, speed of processing is considered an index of processing efficiency. The behavioral response is typically a button press but can also be an eye movement, a vocal response, or some other observable behavior.

Reaction is the second component of eye-hand coordination measurement. Reaction is a movement that occurs in response to another action initiated by another person, for example catching a pass from a team-mate (Hemphill, 2000).

Types of Reaction Time

Three different kinds of reaction time have received attention by researchers (Luce, 1986):

1. **Simple reaction time :** There is only one stimulus and one possible response.
2. **Recognition reaction time :** There are certain stimuli that are required to be responded to and others that require no response from an individual. The two stimuli are commonly known as the memory set and the distractor set respectively. The task still requires only one correct response.
3. **Choice reaction time :** The individual participating in a choice reaction time task must give a response that corresponds to the stimulus.

Any of these different kinds of reaction time can be labelled visual reaction time if the stimuli that trigger the motor performance are visual. Konsinksi (2008)[1] summarised that simple reaction time is shorter than a recognition reaction time, which is shorter than choice reaction time because of the progressive complexity of information processing when options or choices are present. If a motor response is the last part of the chain of events, the situation is more accurately labelled VMRT. In a study by Miller and Low (2001)[2], it was determined that the motor preparation time (tensing muscles), and motor response time (depressing a space bar), was the same for all three types of reaction/response times. This implies that the differences in response times are then due to processing time in the centres of the brain (Konsinski, 2008). This conclusion is compatible with the results of other research.

Factors affecting reaction time

1. Stimulus intensity. Visual stimuli that are longer in duration produce faster reaction times. The weaker the stimulus, such as the intensity of a light cue, the slower the reaction times.
2. Arousal. A state of optimal arousal produces the fastest reaction times as compared to slower reaction times when individuals are under or over aroused.
3. Central vs. peripheral vision. The fastest reaction time comes from stimuli presented to the direct visual field (or central visual field) as compared to the peripheral visual field.
4. Physiological and Mental Fatigue. When subjects are physically fatigued, such as through participation in physical activity, reaction time is affected negatively. Mental fatigue such as sleepiness, and for instance exam stress, also has a great affect on reaction times in subjects.
5. Distraction. Distractions that inhibit information processing can negatively affect reaction time. Distractions can include unexpected, loud stimuli such as people taking in the background, or loud music for instance. There can be any other types of distractions not mentioned here.
6. Warnings of impending stimuli. Reaction times are improved when subjects have been warned that a stimulus will arrive soon (as long as the warning was longer than 0.2 seconds).

[1]Kosinksi, R.J. (2008). “A literature review on reaction time.” Clemson University. 10 April.

[2]Miller, J.O. & Low, K. (2001). Motor processes in simple, go/no-go, and choice reaction time tasks: apsycho physiological analysis. Journal of Experimental Psychology: Human Perception and Performance,27:266.

METHODOLOGY

For present study, 700 secondary school boys were selected as sample. Out of these, 350 tribal boys were selected from Alirajpur and rest i.e. another set of 350 tribal boys were selected from Jhabua. The entire study area of the present research comes under Madhya Pradesh. The sample was collected through convenience sampling method.

ADMINISTRATIONS OF THE TESTS

To conduct the study following tools were used :-

(A) PSYCHOMOTOR VARIABLES:-

(i) Kinesthetic Obstacle Test for kinesthetic perception

Purpose : To access the ability of the subjects to predict position during movement.

Equipment: The test requires material for blind-folding, chalk markers, twelve chairs and measuring taps.

Area: An area of 40x5 mts. were marked on the floor and twelve chairs is arranged as obstacles in accordance with floor pattern as per the requirements.

Procedure : Each subject was allowed one practice trial of walking through the course without being blind folded. Then the subject walk through the course blind folded for the test.

Scoring :

1. The subject scored 10 points for each station the successfully cleared without touching the obstacles there was 10 stations for a maximum score of 100 points.
2. There was a 10 points penalty for touching any part of the body against an object. After such penalty the subject was directed to the centre line and one step ahead of that particular station.
3. There was five points penalty for each occurrence of getting outside the marked area. Upon such occurrence the subject was directed back into the centre line at the nearest point from which she went astray.
4. The final score was recorded to represent the kinesthetic perception of subjects.

(ii) Nelson Speed of Movement Test for speed of movement

Purpose : The purpose of the test is to measure response time of the hands and arms.

Equipment : A metric scale, table, chair and chalk.

Description : Nelson speed of movement test was used to measure speed of movement. Before measuring speed of movement, all the details of the test were clearly explained to the subjects and each was given fen trials for practice. The subjects were asked to remain still after the command ‘ready’ was given. In case the subject failed to catch the stick dropped, it was not recorded.

Procedure: The subject was seated in a chair, facing the table, with his hands resting over the edge of the table. The palms were kept facing each other with the inside border of the little fingers resting along two lines which were marked on the edge of the table 12 inches apart. The research scholar held the stick near the top so that it hanged midway between the subjects palms with the “base line” of the stick positioned evenly with the upper edge

of the subject index fingers and the subject looked on the concentration zone. After a preparatory command "ready" was given, the stick was dropped and the subject stopped it as quickly as possible with an inward horizontal movements of arms.

Scoring:

5 trials were given to each subject and the distance the scale fell through the hands before it was stopped every time was recorded. The average of the 5 trials was taken as the distance score. This distance score was then converted to time score by applying the following formula.

$$\text{Time} = \sqrt{\frac{2 \text{ x distance the scale falls}}{\text{Acceleration due to gravity}}}$$

(iii) Reaction time

Purpose: To measure the reaction time

Equipment: Nelson reaction time scale

Procedure: The tester were asked a subject to sit in the chair with his/ her fore-arm and hand resting on the table (or desk top) in such a way that the tips of thumb and index finger held on a ready to pinch position, about 3 or 4 inches beyond the edge of the table. The tester assured that the upper edge of the thumb and index finger are in a horizontal position. Now the tester holds the stick of the timer from its top edge in such a way that the lower edge of the stick timer hangs between the subject's thumb and index finger so that the marked base line (not the edge) of the stick timer was in a same horizontal position in which is the upper surface of the subject's thumb and forefingers. The tester has to assured that the subject does not touch the hanging stick timer. Now he/she asked the subjects to look at the concentration zone that is the black shaded area between the 0.120 and 0.130 seconds lines. The subject was instructed to catch the stick by pinching together his/her thumb and index finger as soon as the stick timer were released by the tester. The subject is also to be instructed strictly neither to look at the tester's hand nor to move his/her hand up or down-while attempting to catch the falling stick timer. Before leaving the stick, the tester gives a preparatory command of "Ready". Each subject were given 20 trials.

Scoring: Out of the 20 trials, results of five fastest and five slowest trials, were discarded and the average of the middle 10 trials gives the score of this test.

Following formula were used to calculate the reaction time of subjects:

$$\text{R.T} = \frac{2\times \text{ Distance the stick (timer) fall (in ft.)}}{32 \text{ (Acceleration gravitational constant)}}$$

RESULTS:

Statistical Properties of Variables in a Group of Selected Tribal Boys from Alirajpur and Jhabua Secondary Schools (N=700)

Variables	Mean	S.D.	Skewness	Kurtosis
Kinesthetic Perception	76.63	19.39	-1.137	1.273
Speed of Movement	15.75	1.56	0.316	-0.429
Reaction Time	0.16	0.02	1.194	3.957

Comparison of Overall Psycho-Motor variabale of Tribal Boys Studying in Secondary Schools of Alirajpur and Jhabua District

Groups	Psycho-Motor Abilities		Mean Diff.	't'
	Mean	S.D.		
Tribal Boys from Alirajpur District (N=350)	89.80	25.13	0.01	0.009 (p>.05)
Tribal Boys from Jhabua District (N=350)	89.78	26.77		

t (df=698) at .05 = 1.96

DISCUSSION:

The present study examined psychomotor, physical fitness and physiological variables of ethnically/genetically similar population subgroups in regard to their place of habitat. In the present study tribal boys from Alirajpur and Jhabua studying in secondary schools were chosen as subjects. It is to be mentioned here that tribals are similar in their geographic, socio econmic, environmental and other issues such as illiteracy, social backwardness etc. This is due to the fact the Alirajpur has been carved out in 2008 from Jhabua district and made a district.

The results reveal that kinesthetic perception and speed of movement did not differ significantly between selected tribal boys studying in secondary schools of Alirajpur and Jhabua district but reaction time of tribal boys from Alirajpur was found to be significantly faster as compared to tribal boys from Jhabua. The results are quite surprising because general health status, muscular tension, fatigue, response to visual stimuli is factors which influence psycho motor abilities (Johnson and Nelson, 1986)Apart from this vision is also key factor as far as execution of psychomotor abilities is concerned. Hence results pertaining to psychomotor ability of tribal boys need to be examined more carefully in the light of abovementioned variables.

CONCLUSION :

- Barring reaction time, other psycho-motor factors i.e. kinesthetic and speed of movement did not differ significantly between tribal secondary boys from Alirajpur and Jhabua.

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