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**Dr. Arun Kumar Nayak**  
Sports Officer, RMD College of  
Agriculture & Research Station,  
Ambikapur (C.G.)

## Effect of hand-eye coordination on motor coordinative ability of tribal adolescents

**Arun Kumar Nayak**

### Abstract

Adolescence (lat *adolescere* = (to) grow) is a transitional stage of Physical and mental human development that occurs between childhood and adulthood. This transition involves biological (i.e. pubertal), social, and psychological changes, though the biological or physiological ones are the easiest to measure objectively. Childhood and adolescence are crucial periods of life, since dramatic physiological, psychological and cognitive changes take place at these ages. The cognitive changes along with perceptual development may affect their motor coordinative abilities as well specially in tribal adolescents, who belongs to altogether different socio cultural environment. Reaching for a pen, grasping a doorknob, driving, roller skating walking-etc. which are examples of few physical actions-all involve well- Eye-hand movements made with well-balanced postures. In fact, whenever we move the three basic functions of movement, balance, and coordination work in concert to produce graceful, purposeful motions of body parts. This is actually quite a feat, because moving is a complex process.

**Keywords:** Adolescent, Eye-hand, Hand-Eye

### 1. Introduction

Eye-hand coordination is defined as a perceptual-motor skill involving the integration and processing in the central nervous system of visual and tactile input so that a purposeful motor movement can be made. Eye-hand coordination is divided into 2 components. Probation (closed motor skill) and Reaction (open motor skill). Probation refers to action, which is initiated or controlled by the athlete. Reaction refers to movement that occurs in response to another action. Hand-eye coordination is the ability of the vision system to coordinate the information received through the eyes to control, guide, and mind direct the hands in the accomplishment of a given task, such as handwriting or catching a ball. Hand-eye coordination uses the eyes to direct attention and the hands to execute a task. Vision is the process of understanding what is seen by the eyes. It involves more than simple visual acuity (ability to distinguish fine details). Vision also involves fixation and eye movement abilities, accommodation (focusing), convergence (eye aiming), binocularity (eye teaming), and the control of and-eye coordination. Most hand movements require visual input to be carried out effectively. For example, when children are learning to draw, they follow the position of the hand holding the pencil visually as they make lines on the paper. Between four and 14 months of age, infants explore their world and develop hand-eye coordination, in conjunction with fine motor skills. Fine motor skills are involved in the control of small muscle movements, such as when an infant starts to use fingers with a purpose and in coordination with the eyes. Infants are eager to move their eyes, their mouths, and their bodies toward the people and objects that comfort and interest them. They practice skills that let them move closer to desired objects and also move desired objects closer to themselves. By six months of age, many infants begin reaching for objects quickly, without jerkiness, and may be able to feed themselves a cracker or similar food. Infants of this age try to get objects within their reach and objects out of their reach. Many infants are also able to look from hand to object, to hold one object while looking for a second object, and to follow the movements of their hands with their eyes. At this age, most infants begin to poke at objects with their index fingers. After six months, infants are usually able to manipulate a cup and hold it by the handle. Many infants at this age also begin to reach for objects with one arm instead of both. At about eight months of age, as dexterity improves, many infants can use a pincher movement to grasp small objects, and they can also

### Correspondence

**Dr. Arun Kumar Nayak**  
Sports Officer, RMD College of  
Agriculture & Research Station,  
Ambikapur (C.G.)

clap and wave their hands. They also begin to transfer objects from hand to hand, and bang objects together. Hand-eye coordination development milestones are as follows.

### Sample

A random sample is one in which each element in the universe has an equal opportunity of being selected.” (Henry, J. Montage, 1973) Sampling is taking any portion of a population or universe as representative of that population or universe. It is rather taking a portion of population and considering it to be the preventative. Random sampling is the method of drawing a portion (sample) of a population or a universe so that all possible samples of fixed size “n” have the same probability of being selected. (W. Feller, 1957) Definitions indicate that a sample taken for the study may be selected from any place of the given area, therefore, for the above Mentioned study, random sampling method has been selected. For the present study, 300 tribal adolescents (150 boys and 150 girls) residing in the State of Chhattisgarh, ranging from age group 12 to 17 years were selected. From each age group i.e. 12 years, 13 years, 14 years, 15 years, 16 years and 17 years respectively, 25 tribal boys and 25 tribal girls residing in the State of Chhattisgarh were selected randomly.

### Nature of Variables

#### Motor Coordinative Abilities

Coordination is the quality, which enables the person to integrate all the powers, and capacities he has into the effective doing of an act. It is the ability to move and organize oneself around his/her own physical body. Coordinative abilities differ from technical skills in that they exist as prerequisites for subsequent motor actions. Seven coordinative abilities can be differentiated by their characteristics, and while all seven are fundamental as a whole they may appear in quite different values in each person. These abilities are: Comminatory ability, orientation, differential ability, agility, balance, reactive ability, adaptive ability, rhythmic sense and balance. Out of these seven coordinative abilities agility has been chosen as motor coordinative ability in the present study and it acted as dependent Variable in the present study. In the present study motor learning / educability is used as independent as well as dependent variable since the design of the study is a mixed one.

#### Hand Eye Coordination

Hand-eye coordination is the ability of the vision system to coordinate the information received through the eyes to control, guide, and direct the hands in the accomplishment of a given task, such as handwriting or catching a ball. Hand-eye coordination uses the eyes to direct attention and the hands to execute a task. Since the research design is patched up in nature, hand eye coordination is used as dependent as well as independent variable in the present study.

#### Tribal Population

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, they have succeeded in preserving their social custom, artistic traditions and religious beliefs to a large extent. Tribal’s in general have not been able to get rid of their socio-economic backwardness in most part of India. Tribes are privileged as per the government policies. In the present study, boys and girls of selected age group acted as independent variable in the present study.

### Tools

#### Motor Coordinative Ability

To assess agility of the tribal adolescents Cooper’s JCR test (1963) was used. This is the modified, well-known JCR test for school boys and girls. The agility of the selected subjects was assessed by shuttle run item of this test. This test is highly reliable and valid. The motor coordinative ability scores of subjects was ascertained by their shuttle run timings; hence lower the timing, higher the motor coordinative ability formula is used.

#### Hand-Eye Coordination

Hand eye coordination of the subjects was assessed by mirror

**Drawing test.** In this test, error while drawing is recorded and fewer errors indicate good hand eye coordination.

### Summary

Adolescence (lat *adolescere* = (to) grow) is a transitional stage of physical and mental human development that occurs between childhood and adulthood. This transition involves biological (i.e. pubertal), social, and psychological changes, though the biological or physiological ones are the easiest to measure objectively.

Childhood and adolescence are crucial periods of life, since dramatic physiological, psychological and cognitive changes take place at these ages. The cognitive changes along with perceptual development may effect their motor coordinative abilities as well specially in tribal adolescents, who belongs to altogether different socio cultural environment. Reaching for a pen, grasping a doorknob, driving, roller skating walking—etc. which are examples of few physical actions—all involve well-coordinated movements made with well-balanced postures. In fact, whenever we move the three basic functions of movement, balance, and coordination work in concert to produce graceful, purposeful motions of body parts. This is actually quite a feat, because moving is a complex process. The problem was to observe effect of Hand eye coordination on motor coordinative ability among tribal adolescents (age 12-17 years), it was decided to use Cooper’s JCR test (1963) to assess motor coordinative ability i.e. subjects through shuttle run test used. Hand eye coordination of the subjects was assessed by mirror drawing test used.

### Results

1. Ageing has positive impact upon hand eye coordination of tribal adolescent boys between 12 to 17 years of age i.e. as age of subject increases; the hand eye coordination increases.
2. Ageing has positive impact upon motor coordinative ability of tribal adolescent boys between 12 to 17 years of age i.e. as age of subject increases; the motor coordinative ability increases.
3. Ageing has positive impact upon hand eye coordination of tribal adolescent girls between 12 to 17 years of age barring few exceptions i.e. as age of subject creases; the hand eye coordination also increases.
4. Ageing has positive impact upon motor coordinative ability of tribal adolescent girls between 12 to 17 years of age i.e. as age of subject increases; the motor coordinative ability also increases.
5. Tribal adolescent girls exhibited superior hand eye coordination as compared to tribal adolescent boys.

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