



## INFLUENCE OF VARIOUS ENVIRONMENTAL TEMPERATURES IN A DAY ON AGILITY OF YOUNG BOYS

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### Abstract

The investigator made an effort to determine the influence of various environmental temperatures in a day on the agility of young boys. Fifteen young boys ( $n = 15$ ) students were selected as subjects and the age ranged between 17 and 21 years. Agility was selected as criterion variable and that was collected at three different temperatures (i.e. 24.7°C, 34.1°C, 27.3°C) in morning, afternoon and evening respectively from each subject. The collected data was statistically analysed by using analysis of variance (ANOVA) and Scheffe's test was applied as a post hoc test to determine the significant differences between the mean. The result of the study showed that the agility was better ( $p \leq 0.05$ ) in evening time i.e. 27.3°C rather than the morning and afternoon environmental temperature.

**Key Words:** Environmental temperature, young boys, agility.

### Introduction

Atmospheric temperature is a measure of temperature at different levels of the Earth's atmosphere. It is governed by many factors, including incoming solar radiation, humidity and altitude. Exercise in hot climate or hot environment causes a magnification of normal response to physical work, and increase in core, and skin temperature, metabolic heat production sweat rate, pulse rate and systolic blood pressure. That response assists the body in shedding excess heat by convection, radiation, conduction, and evaporation (David, 1986). This greater ratio helps to increase heat loss in moderate heat stress. But in cold or extreme heat, the larger area may provide too little protection from the ambient temperature. Tolerance to exercise in heat appears to be related to the degree of acclimation and conditioning. When the environmental temperature rises above the skin temperature, (normally around 34°C) the circulatory adjustments are not sufficient for heat dissipation by convection and negative gradient between the skin and environment (Benjamin, 1967). When external temperatures are greater than the skin temperature and a negative gradient appears, the body is actually gaining heat by radiation and convection. The temperature gradient from the inner core to heat outer shell is smaller for women; the physiological and physical cost of maintaining heat balance in hot weather is greater and hence seems to be more limited in terms of physical performance (Larry, 1981). The atmospheric or environment temperature, physical and physiological factors are very important for achieving the physical performance. Body temperature is usually at its lowest (about 36.1°C) in the early morning hours and at its

highest (about 37.4°C) in the late afternoon or early evening. The temperature regulation during exercises in hot climate involves vasodilatation and sweating as a function of anterior hypothalamus of the brain. Vasodilatation (expansion of blood vessels) increases skin blood flow, and thus enhances the transfer of metabolic heat from the deep core to the skin surface (Karpovich, 1973).

Agility is the ability to change the position entirely and accurately either in space or in the ground (Craig, 2004). So while agility can be simply defined as an ability to quickly stop and re-start motion, there is a high degree of complexity to this motor skill. It is a common term used in strength and conditioning and is often considered an essential element of many sports and activities. A boxer dodging a punch, a ballet dancer completing a pirouette, or a wrestler finishing a takedown could all be considered examples of agility. However, individuals involved in the development and improvement of sports performance often regard agility as a locomotor skill whereby an athlete changes direction (Plisk, 2000). This type of movement is frequently observed in most field and court sports such as soccer, basketball, football, and lacrosse. In this light agility is commonly defined as an effective and quick coupling of braking, changing directions and accelerating again while maintaining motor control in either a vertical or horizontal direction (Drabik, 1996 and Verstegen & Marcello, 2001). An athlete that displays good agility will most likely possess other qualities such as, dynamic balance, spatial awareness, rhythm, as well as visual processing (Ellis *et al.*, 2000).

### Methodology

The purpose of the study was to determine the influence of various environmental temperatures in a day on the agility of young boys. Fifteen young boys' students ( $n = 15$ ) studying in Bachelor of Physical Education, Department of Physical Education, Christ College Irinjalakkuda, Kerala, India were selected as subjects for this study. They were between 17 to 21 years of age group. The variables selected for this study was agility and it was measured by using Semo agility test (Johnson & Nelson, 1982). It was collected at three different temperatures (i.e. 24.7°C, 34.1°C, 27.3°C) in morning, afternoon and evening such as 6 am, 1 pm and 5.45 pm respectively from each subject of this study. The obtained data from the variable were statistically analysed with one-way analysis of variance (ANOVA). Whenever the  $F$  ratio was found to be significant, Scheffe's test was applied as a post hoc test to determine the mean differences. The level of confidence was set to priority at 0.05 levels.

### Results and Discussion

Table – I

#### Analysis of Variance of the Environmental Temperature of Morning, Afternoon and Evening of Agility

Mean			SOV	Sum of Squares	df	Mean Squares	F Ratio
Morning	Afternoon	Evening					
11.36	11.06	10.55	Between	4.99	2	2.49	8.74*
			Within	11.99	42	0.29	

\* Significant  $F = (2, 42) (0.05) = 3.22$ ,  $p \leq 0.05$

From the table-I, the mean values of the agility of morning, afternoon and evening are 11.36, 11.06 and 10.55 respectively. The obtained  $F$  ratio of 8.74 is greater than the table value of 3.22 required for significant at 0.05 level of confidence.

The results of the study indicate that there is a significant difference between the mean of morning, afternoon and evening environmental temperature on agility. To determine which of the mean had a significant difference, Scheffe's test was applied as a pot-hoc test and the results are presented in table-II.

Table – II

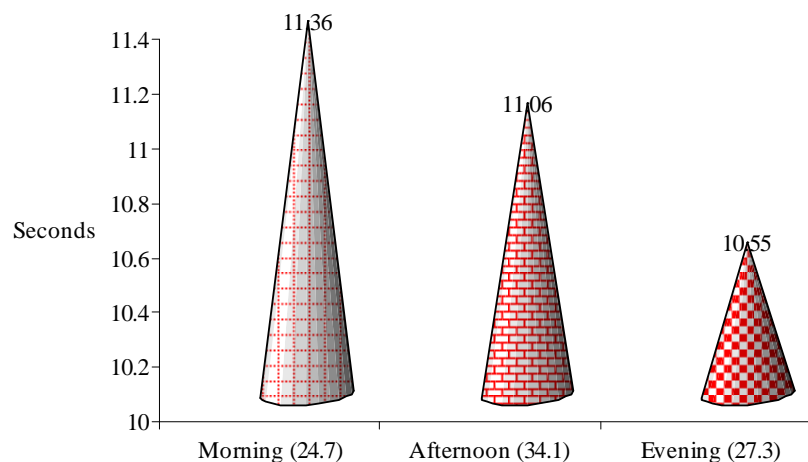
**Scheffe's Test for the Difference between the Mean of Environmental Temperature of Morning, Afternoon and Evening on Agility**

Mean			Mean Difference	Confidence Interval (C.I)
Morning	Afternoon	Evening		
11.36	11.06		0.30	0.50
11.36		10.55	0.81*	
	11.06	10.55	0.51*	

\* Significant,  $p \leq 0.05$

Table-II shows the mean difference in agility between morning and evening and afternoon and evening are 0.81 and 0.51 respectively. These values are higher than the required confidence interval value 0.50, which shows significant difference at the 0.05 level of confidence. However the mean difference in agility between morning and afternoon is 0.30. This value is lesser than the confidence interval value of 0.30, which shows there was no significant difference at 0.05 levels.

Agility is considered as the main determinant of sports performance. This improvement in agility is beneficial for athletes who require quick movements while performing their sport and support results from other studies. In a study of tennis players, the authors used test to determine speed and agility (Parsons and Jones, 1998). They found that the players became quicker and more agile; enabling them to get to more balls and be more effective tennis players. Neural adaptations usually occur when athletes respond or react as a result of improved coordination between the central nervous system (CNS) signal and proprioceptive feedback (Craig, 2004). Kleiber (1961) suggests that two types of human beings may be distinguished by the pattern of their temperature fluctuations during a day: the early risers and the late risers. The early risers have a relatively high blood in the morning and are barbarically cheerful before breakfast. The larger groups are those who have difficulty in getting up in the morning and have unfriendly dispositions, at least until after the first cup of tea. Their body temperature is low in the morning but high at night. Then they are wide awake while the early risers are tired and sleepy. In this study we can see the agility at different times in a day such as morning @  $24.7^{\circ}$  (6am), afternoon @  $34.1^{\circ}$  (1pm) and evening @  $27.3^{\circ}$  (5.45pm) respectively. The result showed that evening is the best time to test agility of young male students. The mean values of agility of different atmospheric temperature such as morning, afternoon and evening are graphically presented in figure 1.



**Figure 1: The mean values of agility at different temperatures in a day such as morning 6 am (24.7°), afternoon 1 pm (34.1°) and evening 5.45 pm (27.3°)**

### Conclusion

The improvement in agility is beneficial for athletes who require quick movements while performing their sport. It is very essential for all the sports activities. Agility at different temperature variations in a day such as morning 6 am (24.7°), afternoon 1 pm (34.1°) and evening 5.45 pm (27.3°) respectively. The result of the study concluded that there was a significant difference between the agility of morning and evening and afternoon and evening atmospheric temperature. However there was no significant difference between morning and afternoon atmospheric temperature. So that from the result we can say evening is the best time to test agility performance of young boys' students.

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