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Digit ratio as a means of predicting pull ups in male students of Uttar Pradesh

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Abstract

Objective: To Predict the pulls in male using Digit Ratio in the students of Degree college in Deoria of Uttar Pradesh.

Methods: Digit Ratio and Pull up test were used on 600 boys from rural and urban area studying in aided college of Deoria. Further.

Results: No significant relationship was found between the Digit ratio of both hands on the prediction of Pull Ups.

Conclusions: Based on the present data, it was concluded that digit ratio do not predict pull ups.

Key words: Digit Ratio Pull ups etc.

Keywords: Digit ratio, oestrogen, testosterone, health related physical fitness

Introduction

Physical fitness is the ability to carry out daily tasks with vigour and alertness without undue fatigue and ample energy to enjoy leisure time pursuits and to meet unforeseen emergencies. This implies that fitness has necessary qualities for doing any work or physical activity. These qualities will vary in individuals and at the same time they vary from time to time in the same person. The continuously changing life process creates different needs and emphases for different individuals as they grow older (Leonard, 1951).

Manning (2002) [7] proposes that a low 2D: 4D digit ratio (the fourth finger longer than the second) acts as a marker for a uterine environment high in testosterone and low in oestrogen, and such a ratio is most often seen in males. Conversely a high 2D: 4D ratio may serve as a marker for a uterine environment low in testosterone and high in oestrogen, of which is most often found in females. Thus, digit ratio is sexually dimorphic.

It should be stipulated that measures of 2D: 4D may not be representative of absolute concentrations of prenatal hormones. Variation in digit ratio has also been attributed to differences in the distribution, frequency and sensitivity of androgen and oestrogen receptors (Tanner, 1990). Therefore 2D: 4D can be more specifically said to represent the body's sensitivity and thus capacity to utilize prenatal concentrations of testosterone and oestrogen. Theoretically, if an individual has a higher prenatal concentration of one of these sex hormones than is represented by their digit ratio, their body has only been receptive to utilize the prenatal concentration proportional to their digit ratio. As a result the validity of the 2D: 4D digit ratio as a physiological marker of prenatal testosterone and oestrogen remains and consequently no alterations need to be made to the design of this current investigation. Thus, in the present study attempt was made to find out the contribution of Digit Ratio on Pullups.

Methods

Selection of the subjects: 600 Boys were randomly selected for this study. For the true representation of the subjects the scholar selected the students only from the degree college only since in those colleges, maximum students of original native of that particular area and spanning the entire strata in terms of economic consideration. The age of the subjects was in the range of 16 to 23 years.

Selection of variables: Based on literary evidence, correspondence with the expert and the scholar's own understanding Digit Ratio and Pullups was selected for this study.

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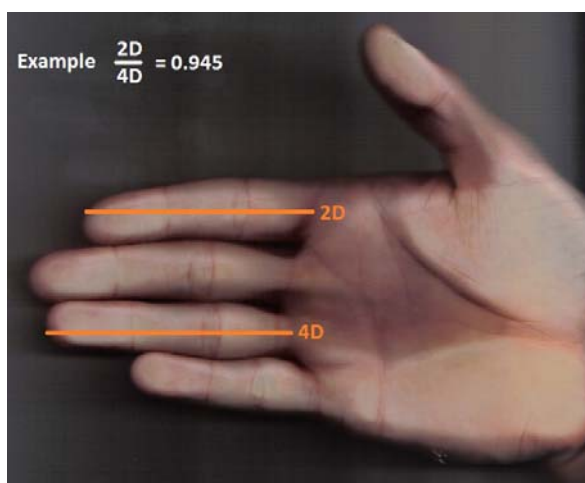
Criterion Measures: Digit ratio was measured using Digit Ratio Callipers and the score was recorded in centimeters and millimeters.

Procedure for administration of Test & collection of Data

For the collection of data the scholar first seeks the permission from the Principal of the college. The subjects were informed about the component and purpose of the study.

Digit ratio

The relationship between the ring finger and index finger length is called the 2D:4D ratio. The 2D:4D ratio is calculated by dividing the length of the index finger (2nd digit) by the length of the ring finger (4th digit). Researchers often measure the palm side, taking the distance from the crease nearest to the palm to the tip of the finger (see Figure 1). For most, this ratio is 1.0 (they are the same length). However, this ratio can range from about 1.05 (longer index finger) to 0.85 (longer ring finger).



Test:-Pull-up Test.

Equipment's required: - A horizontal bar positioned at a height that allows the student to hang without touching the ground.

Procedure:- The bar will be adjusted to a height that permitted the students to hang free from the floor from the hanging position with an overhand grip (palm forward), the body is pulled upward until the chin rests over the bar, and then lowered until the arms are straight. This movement will be repeated to exhaustion. The student will be not allowed to kick, jerk, or use a "kip" movement.

Scoring: The students score will be the number of correctly executed chins.

Table 3: Regression Analysis to determine the contribution of Digit Ratio (2D:4D) on Pull ups of male students of Uttar Pradesh

Variables		R	R ²	F(Sig.)	Equation	% Variance
Independent Variables (Z score)	Dependent Variables (Z score)					
Left Hand Digit Ratio (LHDR)	Pull ups	.034	.001	.679(.410)	-	0.1
Right Hand Digit Ratio (LHDR)		.053	.003	1.666(1.97)	-	.3

Simple regression was conducted to investigate how well left hand digit ratio (LHDR) in male degree college students of Uttar Pradesh predicts Pull ups.

The result was not statistically significant in case of pull ups and left hand digit ratio and Right hand Digit Ratio at obtaining the value of .6579 (Sig. 410) and 1.666 (Sig. 1.97).

Statistical Tests

To Predict the Pull ups based on Digit Ratio regression Analysis was used.

Results

Table 1: Descriptive Statistics of Digit Ratio (N=600)

		Mean	Std. Deviation	Minimum	Maximum
L2D (Left t Index Finger)	Cm	7.2123	.44491	6.20	8.30
L4D(Left Ring Finger)	Cm	7.4810	.43311	6.40	8.70
R2D (Right Index Finger)	Cm	7.4022	.45397	6.30	8.40
R4D (Right Ring Finger)	Cm	7.4202	.42088	5.70	8.50
DIGIT Left		.9648	.04194	.87	1.12
DIGIT Right		.9983	.04543	.88	1.28
Both Hand Digit Ratio		.9816	.03286	.89	1.17

The mean and standard deviation of Right hand and Left hand male students of Uttar Pradesh were as follows: Left Index Finger (cm) (7.2123±.444), Left Ring Finger (cm) (7.48±.433). Left Hand Ratio was (.9648±.041). The mean, standard deviation of Right Index Finger (cm) (7.40±7.42), Right Ring Finger (cm) (7.42±.42) and Right Ratio (.9983±.045).

The mean, standard deviation for the combination of both hand Digit Ratio (2D:4D) male students of Uttar Pradesh were (.9816±.032) respectively.

The minimum & maximum value of Right index finger & Right ring finger were 6.30 to 8.40 & 5.70 to 8.50 respectively, Right Hand Ratio was .88 to 1.28 respectively. Secondly, left index finger & left ring finger were 6.20 to 8.30 & 6.40 to 8.70 respectively, left Hand Ratio was .87 to 1.12 respectively.

The minimum & maximum value for the combination of both hand Digit Ratio (2D:4D) was .89 to 1.17.

Table 2: Mean and Standard Deviation of Pull ups

	Mean	Std. Deviation	Minimum	Maximum
Pullups	5.0183	5.07486	.00	15.00

The descriptive statistics of Pull ups was (5.01±5.07) respectively. The minimum & maximum value of Pull ups between 0to 15.

To determine the *Regression equation* of Digit ratio with the Health Related Physical Fitness component, the data collected was analyzed using Linear Regression (Method = Enter) SPSS version=20 and data pertaining to that have been presented in table

Discussion of Findings

Cristina Cadenas-Sánchez and *et al.* (2015) [3] reported that screening, physical fitness levels in overweight/obese preschool children could be an important tool in order to design an efficacy physical activity programme. S. Pongprapai and *et al.* Examined (1994) 259 primary school children (average age 9.2 years) and concluded that there is no definite

explanation as to why increase in weight results in no difference of physical fitness between sexes. Lifestyle, physical skills, and genetic determinants should be considered for interpretation of physical fitness.

Genetic determinants are one of the biggest factors contributing in any psychological physiological make up. Thus, it was justified to take digit ratio as a variable in the present study. Further, Manning, J. T. (2002) ^[7] reported that the overall picture of the expression of 2D:4D ratio as follows: (a) There is some evidence that a significant proportion of the variance in 2D:4D is determined in utero (probably by week 13 or 14); (b) it is sexually dimorphic (males have lower 2D:4D than females within the same population); and (c) there are substantial population and ethnic differences in 2D:4D that are of greater magnitude than the within-population sex differences. He also reported that The 2D:4D ratio could prove useful in providing evidence that implicates prenatal testosterone in the etiology of sex-dependent traits and behaviors such as autism, dyslexia, difficulties in language acquisition, stammering, migraine, schizophrenia, risk taking, and drug-related behavior. Psychopathy is one such trait that may be related to low 2D:4D ratio. Psychopaths are more often men than women, and they show manipulative, impulsive, and callous behavior. He gave Evidence from the pattern of male 2D:4D in a symphony orchestra compared to population controls, and within the orchestra in relation to perceived musical ability, is supportive of the notion of music as a male display trait. Low 2D:4D may correlate with both musical ability and fertility.

A similar study was conducted by J. H. G. Williams (2003) ^[16] K. D. Greenhalgh J. T. Manning, who suggested that during early brain development androgens increase the probability of hyperactivity and poor social cognition in girls. Early oestrogens increase the probability of emotional problems in boys. J. T. Manning M. Peters (2009) ^[9] reported that the left 2D:4D was significantly larger than the right 2D:4D in male and female, left-handed writers, and the right hand 2D:4D was significantly larger than the left hand 2D:4D in male and female right-handed writers. J. T. Manning M. R. Hill (2009) ^[8] reported that the effect sizes for relationships between 2D:4D and sport and target traits in general, and identify areas of strength and weakness in the digit ratio research. J. T. Manning S. Wood E. Vang J. Walton P. E. Bundred C. van Heyningen D. I. Lewis-Jones (2004) concluded that associations between 2D:4D and fertility-associated traits probably arise from early organisational effects of testosterone rather than from activation effects of current testosterone. J. T. Manning A. Stewart P. E. Bundred R. L. Trivers (2004) ^[11] concluded that there was no overall association between 2D:4D and age and height suggesting that the sex and ethnic differences in 2D:4D appear early and do not show appreciable change with growth. J. T. Manning R. L. Trivers R. Thornhill D. Singh (2000) ^[12] suggested that the 2D:4D ratio may be associated with the expression of other sexually dimorphic behavioural traits. Johannes Hönekopp John T Manning Constanze Müller (2006) 2D:4D is negatively related to physical fitness in both men and women. In Study II, there was evidence that the relationship between physical fitness and 2D:4D in men was mediated through an association with exercise frequency. Thus, 2D:4D in males may be a negative correlate of frequent exercise which then relates to achievement in sports and athletics. John T. Manning Bernhard Fink Nick Neave Noreen Caswell (2005) ^[10] concluded that there are differences in digit ratios obtained from photocopies and direct measurements, and these

differences arise from length differences recorded from the different protocols. Therefore, 2D:4D ratios obtained from photocopies and direct measurements should not be combined within one study, nor should they be used together in comparative studies. They suggested that finger length differences between the two techniques could result from the shapes of fat-pads on the tips of the fingers and these may be dependent on sex and sexual orientation.

L. Albores-Gallo A. Fernández-Guasti L. Hernández-Guzmán C. List-Hilton (2009) ^[11] an important role for testosterone in language development (vocabulary) and a possible influence on articulation problems, probably through higher testosterone levels. Leszek Pokrywka Dominik Rachoń Krystyna Suhecka-Rachoń

Larysa Bitel (2005) ^[14] speculated that low 2D:4D ratio may be a positive correlate of sports potential in females. Liam P. Kilduff Renato N. Hopp Christian J. Cook Blair T. Crewther John T. Manning (2013) ^[5] concluded that 2D:4D moderates the impact of an aggressive stimulus on aggression, such that an increase in testosterone resulting from a "challenge" is associated with a negative correlation between 2D:4D and aggression. M. Bennett J. T. Manning C. J. Cook L. P. Kilduff (2010) ^[2] concluded that low right 2D:4D and low right - left 2D:4D difference are predictors of high rugby performance.

Manning *et al.* (1998) showed that it is largely determined prenatally and is correlated with adult concentrations of sex steroids, negatively related to prenatal testosterone and positively associated with prenatal oestrogen. Forstmeier *et al.* (2010) have shown that digit ratio can be an indicator function of oestrogen pathway. At molecular level studies have shown that development of gonads and fingers are brought about by the same Hox gene family particularly Hox and Hox d Kondo T *et al.* (1997) and digit ratio is influenced by allelic variation in androgen receptor sensitivity Manning *et al.* (2003) ^[16]. Digit ratio, thus acts as a marker of the levels of testosterone and oestrogen to which the developing foetus is exposed.

Prenatal hormones act on distinct population of neurons in the brain due to the presence of specific receptors, which is the primary target for action. Lateralization of brain has been widely studied and linked to sex steroid exposure in utero. Various theories have been put forward to account for the same. 'GBG' hypothesis claimed that high levels of foetal testosterone may compromise development of the left cerebral hemisphere and enhance development of the right hemisphere (Manning and Taylor, 2000) ^[12]. However, the findings relating to spatial ability are highly variable and appear to be task and sex dependent. Kelley (1993) hypothesized that testosterone inhibits ontogenetic cell death in the left hemisphere, though with prolonged exposure both hemispheres are affected, leading to anatomical asymmetry and handedness. High levels of testosterone and other androgen that are present early in development are shown to facilitate development of male-typical characters.

Luxen, M. F *et al.* (2005) ^[6] found a positive correlation between right 2D:4D and verbal intelligence, a negative correlation between right 2D:4D and numerical intelligence, and positive correlation between right 2D:4D and Agreeableness. These results make sense in the light of the effects of prenatal testosterone that masculinises the brain: high testosterone exposure (low 2D:4D) makes people perform better with regard to numerical operations, perform worse regarding verbal items and makes them less agreeable, a typically male pattern. Prenatal testosterone exposure makes people less agreeable, which is understandable because testosterone exposure is related to dominance and

competitiveness.

In the present study it was found that digit ratio do not predict the pull up level in the boys.

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