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A study on correlation between 2D:4D with personality traits among young adult women

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Abstract

The digit ratio is the ratio of the lengths of different digits or fingers typically measured from the midpoint of bottom crease where the finger joins the hand to the tip of the finger [5]. The 2D:4D ratio is calculated by dividing the length of the index finger of the right hand by the length of the ring finger of the right hand. Personality is defined as the set of habitual behaviors, cognitions and emotional patterns that evolve from biological and environmental factors [1]. It is a characteristic way of thinking, feeling, and behaving. The main purpose of the study was to find out the relationship between digit ratio (2D:4D) with different personality traits among young adult women.

Methodology: A total of 73 young adult women college students having the age of 21 to 30 years were selected randomly as subjects for the present study. All the subjects were studying in college level. Criterion measure for this study were length of index finger (2D) and ring finger (4D) of right hand and personality traits. Instruments and tools used to collect data in this study were small sliding breadth caliper (Varner's scale) and the Cattell's Sixteen Personality Factor Questionnaire (16PF). Mean and standard deviation (SD) have been considered for descriptive statistics and correlation coefficient was calculated by Person Product Moment method. Only 0.05 levels has considered for the present study. All statistical calculations have been done by using standard statistical software.

Results: Results revealed that the personality factors of B, C, D, E, F, H, I, M, N, Q1 and Q2 have positive correlation with 2D:4D whereas personality factors of A, G, L, O, Q3 and Q4 had negative correlation with 2D:4D. Highest positive r-value was found for personality traits F (0.355) which was statistically significant whereas the highest native correlation was found for personality traits A, L and Q4.

Conclusions: From the result of the study it was concluded that digit ratio has significant positive correlation with Personality Trait-F i.e. Liveliness among young adult women. Except this factor there was no correlation between digit ratio with other personality traits among young adult women.

Keywords: Digit ratio, personality traits, correlation, young adult women

Introduction

The digit ratio is the ratio of the lengths of different digits or fingers typically measured from the midpoint of bottom crease where the finger joins the hand to the tip of the finger [5]. The 2D:4D ratio is calculated by dividing the length of the index finger of the right hand by the length of the ring finger of the right hand.

The 2D:4D digit ratio is sexually dimorphic while the second digit is typically shorter in both females and males; the difference between the lengths of the two digits is greater in males than in females. Study reported that for males, the index finger is generally about 96 percent of the length of the ring finger, which gives an average digit ratio for males of 0.96. Males generally have a digit ratio below 1.00 and they have what is termed a "low digit ratio." Women generally have a digit ratio of about 1.00 (the index and ring fingers are of about equal length) which is termed a "high digit ratio."

It was noted in the scientific literature several times through the late 1800s that the men have lower digit ratio (shorter index fingers than ring fingers) than do women [1, 2]. In 1930 it was proved with the statistically significant sex difference in a sample of 201 men and 109 women [3]. In 1983 Wilson conducted a study to examine the correlation between assertiveness in women and their digit ratio and that was the first study which conducted to reveal the correlation between digit ratio and a psychological trait within members of the same sex [4].

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Manning *et al.* (1998) conducted a study on digit ratio in children and reported that the sex difference in digit ratios was present in two-year-old children. They have also shown that 2D:4D ratios vary greatly between different ethnic groups [5, 6]. This variation is far larger than the differences between sexes; in Manning's words, "There's more difference between a Pole and a Finn, than a man and a woman." [7] Fink *et al.* (2004) found that men with low (indicating high testosterone) and women with high (indicating high estrogen) 2D:4D ratios express greater levels of facial symmetry [8]. Some authors suggest that digit ratio correlates with health, behavior, and even sexuality in later life. Below is a non-exhaustive list of some traits that have been either demonstrated or suggested to correlate with either high or low digit ratio. Among males with low digit ratio are more fertile, more aggressive and assertive. They have higher life time reproductive success, higher musical and sports aptitude etc. Males with high digit ratio have higher risk of early heart disease, Increased risk for depression [9], schizophrenia [10], Anxiety [11] and reduced performance in sports [12]. Female with high digit ratio have higher lifetime reproductive success and higher risk of breast cancer and female with low digit ratio are more aggressive and assertive in nature. Several study reported that Personality y traits are correlated with digit ratio, higher being more feminized [13-15].

Personality is defined as the set of habitual behaviors, cognitions and emotional patterns that evolve from biological and environmental factors [1]. It is a characteristic way of thinking, feeling, and behaving. Personality embraces moods, attitudes, and opinions and is most clearly expressed in interactions with other people. It includes behavioral characteristics, both inherent and acquired, that distinguish one person from another and that can be observed in people's relations to the environment and to the social group [16].

The term personality has been defined in many ways, but as a psychological concept two main meanings have evolved. The first pertains to the consistent differences that exist between people: in this sense, the study of personality focuses on classifying and explaining relatively stable human psychological characteristics. The second meaning emphasizes those qualities that make all people alike and that distinguish psychological man from other species; it directs the personality theorist to search for those regularities among all people that define the nature of man as well as the factors that influence the course of lives. This duality may help explain the two directions that personality studies have taken: on the one hand, the study of ever more specific qualities in people, and, on the other, the search for the organized totality of psychological functions that emphasizes the interplay between organic and psychological events within people and those social and biological events that surround them. The dual definition of personality emphasized, however, that no definition of personality has found universal acceptance within the field [16].

The main purpose of the study was to find out the relationship between digit ratio (2D:4D) with different personality traits among young adult women. The main personality traits used to relate with 2D:4D are Introversion/Extroversion, Low Anxiety/High Anxiety, Receptivity/Tough-Mindedness, Accommodation/Independence and Lack of Restraint/Self-Control.

The study was further delimited to the following aspects.

1. Socioeconomic status of the subjects was not the same.
2. Heredity also might have influence in this aspect which

was also a delimitation factor for this study.

3. Subjects had different traditions, rituals and cultural, thus influence of these social factors on personality was also considered delimitations in this study.

Methodology

The Subjects

A total of 73 young adult women college students having the age of 21 to 30 years were selected randomly as subjects for the present study. All the subjects were studying in college level.

Criterion measure

Following criterion was considered in this study:

1. Length of index finger (2D) and ring finger (4D) of right hand.
2. Personality traits

Instruments and tools used

Following Instruments and tools were used to collect data in this study:

1. Small sliding breadth caliper (Varner's scale)
2. The Cattell's Sixteen Personality Factor Questionnaire (16PF) [17].

Design of the study and Statistical Procedures adopted

Anthropometric data of digit ratio have been collected directly by measuring the subject's right hand fingers and personality was assessed by the Cattell's Sixteen Personality Factor Questionnaire (16PF). Mean and stander deviation (SD) have been considered for descriptive statistics and correlation coefficient was calculated by Person Product Moment method. Only 0.05 levels has considered for the present study. All statistical calculations have been done by using standard statistical software (Excel 2010).

Results and Discussion

The mean values and SD of 2D:4D and different traits of personality of the subject have presented in Table-1 and graphically in Figure-1. Mean value of different sixteen personality traits have also presented graphically in Figure-2. Figure-2 has shown that second digit (2D) was shorter than the fourth digit (4D). The relationship between digit ratio with sixteen different personality traits in female subjects were calculated by Pearson Product-Moment method and the results have presented in Table-2 and have presented graphically in Figure-3.

Table-2 shown that correlation coefficient between digit ratio and personality traits-A ($r = -0.068$) was negative but low and it was far below of its critical ratio (CR) at 0.05 level. So the r-value was not significant. Coefficient of correlation between digit ratio and personality traits-B, C and E were 0.129, 0.163 and 0.05 respectively which were positive in nature but also below from the critical value (CR) of r at 0.05 level. Therefore, all these r-values were not significant statistically. The Correlation coefficient between digit ratio and personality traits-F ($r = 0.355$) was positive and higher than the critical ratio of r at 0.05 level. This r-value found statistically significant. The coefficient of correlation between digit ratio and other personality traits-G, H, I, L, M, N and O were -0.019, 0.146, 0.159, -0.068, 0.096, 0.107 and -0.054 respectively. Table-2 indicated that all these r-values were not significant statistically. However, the r-value between digit ratio and Personality trait-G and L were found negative in nature. From Table-2 it was also found that remaining four

personality traits-Q1, Q2, Q3 and Q4 had insignificant correlation with digit ratio (2D:4D). The correlation of 2D:4D with personality traits Q1 and Q2 were positive in nature whereas the correlation of 2D:4D with personality traits Q3 and Q4 were negative though the computed r-values were below the table value of r at 0.05 level of confidence.

Table 1: Descriptive statistics of 2D:4D and different traits of personality of the subjects

Parameters	Maximum value	Minimum value	Mean	SD
Digit Ratio (2D:4D)	1.095	0.838	0.957	0.036
Personality trait-A	9	1	5.4	1.4
Personality trait-B	8	2	5.2	1.7
Personality trait-C	10	1	6.0	1.9
Personality trait-E	9	1	5.8	1.8
Personality trait-F	10	3	6.3	1.7
Personality trait-G	10	2	6.9	1.7
Personality trait-H	11	1	4.9	2.1
Personality trait-I	10	3	6.6	1.8
Personality trait-L	10	2	6.2	1.8
Personality trait-M	10	3	5.9	1.6
Personality trait-N	10	3	6.7	1.7
Personality trait-O	9	2	5.6	1.6
Personality trait-Q1	9	2	5.9	1.6
Personality trait-Q2	10	3	6.89	1.65
Personality trait-Q3	10	2	7.85	1.62
Personality trait-Q4	10	2	5.75	2.08

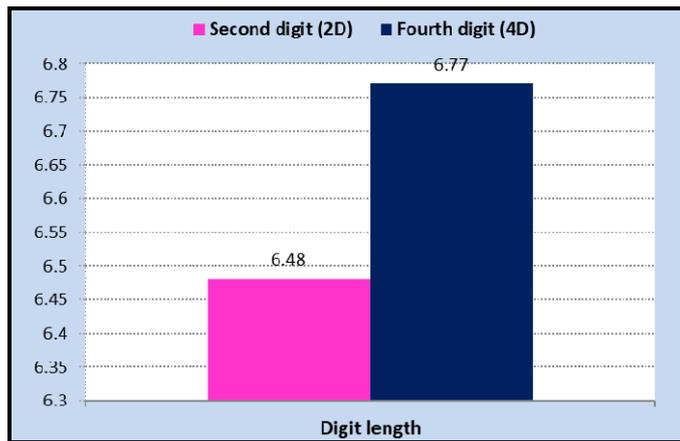


Fig 1: Second (2D) and fourth digit (4D) length (Mean value) of the subjects

Table 2: Coefficient of Correlation (r-value) between 2d:4d with different sixteen personality traits for female subjects

Parameters	2D:4D	Remarks
Personality trait-A	-0.068	Not significant
Personality trait-B	0.129	Not significant
Personality trait-C	0.163	Not significant
Personality trait-E	0.05	Not significant
Personality trait-F	0.355	Significant
Personality trait-G	-0.019	Not significant
Personality trait-H	0.146	Not significant
Personality trait-I	0.159	Not significant
Personality trait-L	-0.068	Not significant
Personality trait-M	0.096	Not significant
Personality trait-N	0.107	Not significant
Personality trait-O	-0.054	Not significant
Personality trait-Q1	0.099	Not significant
Personality trait-Q2	0.027	Not significant
Personality trait-Q3	-0.065	Not significant
Personality trait-Q4	-0.068	Not significant

#Not significant at 0.05 levels as CR to be significant was 0.273.

From the Figure-4 it has been revealed that the personality factors of B, C, D, E, F, H, I, M, N, Q1 and Q2 have positive correlation with 2D:4D whereas personality factors of A, G, L, O, Q3 and Q4 had negative correlation with 2D:4D. Highest positive r-value was found for personality traits F whereas the highest native correlation was found for personality traits A, L and Q4.

Present study has found positive correlation between 2D:4D with personality traits B, C, E, F, H, I, M, N, Q1 and Q2 but observed negative correlation with personality trait A, G, L, O, Q3 and Q4. However, all the r-values were found statistically not significant except personality traits- F which found had a significant positive correlation with digit ratio (2D:4D). Therefore the findings indicated that personality trait-F which represented the Liveliness-Seriousness had positive significant correlation with digit ratio among young adult women. High scorer in this factor indicated the tendency to be high-energy, fun-loving, and carefree, and to spontaneously move towards others in an animated, stimulating manner. Low-scorers tend to be more serious and self-restrained, and to be cautious, unrushed, and judicious.

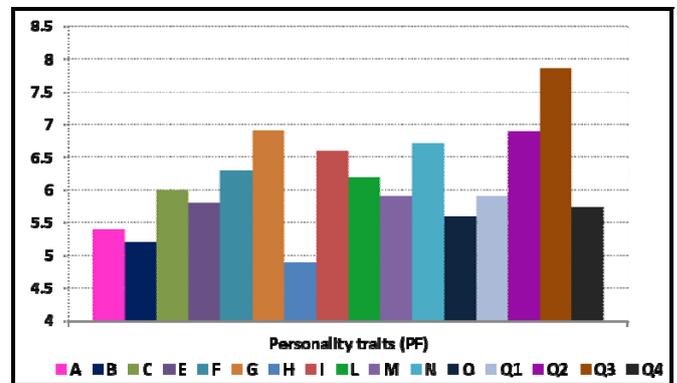


Fig 2: Mean value of different sixteen personality traits (16PF) of the subjects

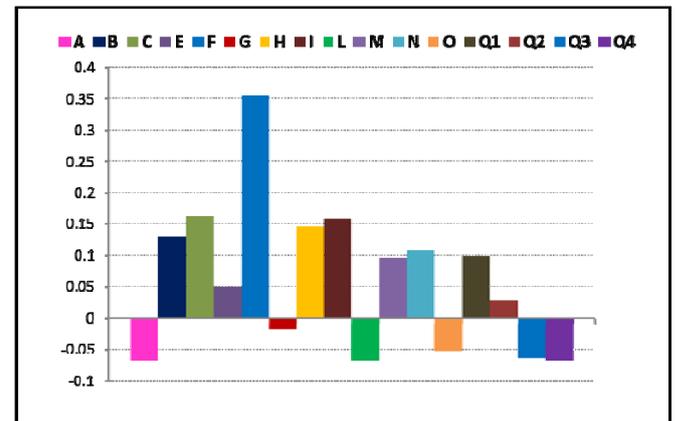


Fig 3: coefficient of correlation (r-value) between 2D:4D with different sixteen personality traits (16PF)

Some studies reported about significant correlation between digit ratio (2D:4D) with personality traits. In 1983 Wilson conducted a study to examine the correlation between assertiveness in women and their digit ratio and that was the first study which conducted to reveal the correlation between digit ratio and a psychological trait within members of the same sex. [4] Fink *et al.* (2006), Austin, *et al.* (2002), and Luxen and Buunk (2005) found significant correlation between digit ratio and personality traits in men and indicated higher digit ratio was more relation being feminized [15, 16, 18,

19].

Studies reported among males with low digit ratio are more aggressive and assertive. Males with high digit ratio have increased risk for depression [9], schizophrenia [10] Anxiety. [11] Female with high digit ratio have higher lifetime reproductive success and higher risk of breast cancer and female with low digit ratio are more aggressive and assertive in nature. Few studies reported that Personality y traits are correlated with digit ratio, higher being more feminized [13-15].

Others study in this field reported no relation between digit ratio and health and bio-motor abilities among middle aged people [20].

Present study found significant positive correlation with personality traits –F only. Except that no other personality trait had significant correlation with digit ratio. This result as researchers opined might be due to the number of fewer samples taken for consideration in this present study. Further study is required for taking concrete inference about the relation between the digit ratio (2D:4D) with other traits or factors of the personality.

Conclusions

Within the limitations of the present investigations following conclusions were drawn on the basis of the obtained results:

1. Digit ratio has significant positive correlation with personality trait-F i.e. liveliness among young adult women.
2. There was no correlation between digit ratio and other selected personality traits among young adult women.

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