

Agreeableness and Schizotypal Personality Differences between High- and Low- Digit Ratio Extreme Groups among Women

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ABSTRACT

Second to fourth digit (2D:4D) ratio is biomarker of prenatal sex hormones level, which may be related with personality and disorders. In the present study agreeableness and schizotypal personality differences were studied between high and low digit ratio (2D:4D) groups *a priori* identified from digit length measurements of 138 right-handed undergraduate girl students (mean age 21.73 years, $SD = 4.06$). Results show that high digit ratio participants ($n = 24$) were more agreeable than low digit ratio participants ($n = 21$), whereas there was no difference in schizotypal personality scores of two groups. Thus, prenatal sex hormones may be determining agreeableness but not schizotypal personality.

Key Words : Schizophrenia, Digit ratio, Lateralization

INTRODUCTION

The 2D: 4D ratio is a marker of prenatal sex hormones level (Lutchmaya *et al.*, 2004; Manning *et al.*, 1998), which has an important role in cerebral organization (Geschwind and Galaburda, 1985). Atypical cerebral organization is a determinant of schizophrenia (Dragovic and Hammond, 2008). Csatho *et al.* (2003) have shown that 2D: 4D ratio varies with masculine and feminine sex roles among woman. Likewise, men with lower 2D: 4D ratios are perceived more masculine and dominant by women observers (Neave *et al.*, 2003). Because prenatal hormone disturbances have an impact on personality traits (Reinisch, 1977), it is expected that finger length ratios are likely to be related with personality traits. Recently, studies have reported that 2D: 4D ratio is related with depression (Bailey and Hurd, 2005), schizophrenia (Collinson *et al.*, 2010), schizotypal personality (Walder *et al.*, 2006) as well as with 'Big Five' personality factors (Fink *et al.*, 2004). Furthermore, relationship between personality and the finger ratios seems to occur more strongly in either men or women (Austin *et al.*, 2002; Bailey and Hurd, 2005; Fink *et al.*, 2006; Walder *et al.*, 2006).

Women are relatively more agreeable (Costa *et al.*, 2001) and have higher 2D:4D ratio than men (Manning *et al.*, 1998). Moreover, studies have reported that agreeableness is related with higher 2D: 4D ratio (Luxen and Buunk, 2005). However, dissimilarly, men are relatively more schizotypal (Fossati *et al.*, 2003) and have lower 2D:4D ratio but schizotypal personality is related with higher 2D:4D ratio (Collinson *et al.*, 2010). Therefore a study on relationship of agreeableness and schizotypal personality with digit ratios that reflect extreme prenatal sex hormones status may

be fruitful in clarifying the pattern of effect of prenatal sex hormones level on personality.

Because right hand 2D: 4D ratio is a marker of prenatal testosterone level (Lutchmaya et al., 2004), extreme groups of high and low digit ratios might represent the high and low prenatal testosterone level groups. In the present study, we were able to generate *a priori* high and low 2D:4D ratio extreme groups among female subjects, and therefore compared the agreeableness and schizotypal personality in these groups.

METHODOLOGY

Digital vernier calipers measuring to the accuracy of 0.01mm was used to measure ventral finger 2 and ventral finger 4. The measurement procedure and calculation of the ratio between finger 2 and finger 4 is the same as followed by Manning *et al.* (1998). High and low digit ratio groups were identified out of the right hand 2D:4D ratio ($M = 0.975$, $SD = .039$) of 138 right-handed girl students (mean age = 21.73 years, $SD = 4.06$) of undergraduate classes studying psychology in D.A.V. College, Muzaffarnagar, India. The 2D:4D ratio greater than $1.01(M + 1SD)$ formed the high digit ratio group ($n = 24$) whereas participants having 2D:4D ratio less than $0.94(M - 1SD)$ formed low digit ratio group ($n = 21$). The participants in two groups were re-measured to ensure that they are not placed in the groups due to measurement errors. The high and low digit ratio groups were administered a 12-items agreeableness subscale of Five-Factor inventory developed by Costa and McCrae (Costa and McCrae, 1992) and a 74-items Schizotypal Personality Questionnaire (SPQ) developed by Adraine Raine (1991). The responses on agreeableness scale were drawn on seven-point format, so that, participants total score may vary from 12 to 84. The Hindi translation along with English version was presented side by side on the same page. For schizotypal personality, a Hindi translated version of SPQ, already in use in our laboratory, with high internal consistency ($\alpha = .90$) and a forced-choice response format of 'yes' or 'no' was used.

RESULTS AND DISCUSSION

The independent sample t test ($t = 2.3$, $df = 43$, $p = .024$) shows that high-digit ratio group ($M = 64.88$, $SD = 7.46$) was more agreeable than low-digit ratio group ($M = 59.7$, $SD = 7.74$), whereas high- ($M = 27.4$, $SD = 5.1$) and low- ($M = 26.6$, $SD = 4.7$) digit ratio groups were not different on schizotypal personality scores ($t = 0.93$, $df = 43$, $p = .81$).

Discussion :

The results of present study show that high digit ratio is related with more agreeableness. Prior studies have also reported similar relationship (Luxen and Buunk, 2005). Because digit ratios are markers of prenatal testosterone level (Lutchmaya *et al.*, 2004), latter seems to determine the differences in agreeableness between high and low digit ratio groups.

However, the failure to find differences in schizotypal personality in same groups indicates that in the former the determinants are different from agreeableness. Earlier studies have reported relationship between schizotypal personality and 2D:4D ratio (Walder *et al.*, 2006). Because large variations in 2D:4D ratio is genetically determined (Gobrogge *et al.*, 2008) and schizophrenia is also genetically determined (Crow, 1989), it is possible that a genetic mechanism mediates relationship between schizotypal personality and 2D:4D ratio.

Thus, the present study highlights the likelihood that multiple mechanisms determine the relationship between digit ratios and personality.

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