

Exploring the Organizational Effect of Prenatal Testosterone Upon the Sporting Brain

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ABSTRACT

The 2D:4D ratio is a putative marker for prenatal testosterone and has the potential to explain variations in sport performance. To date there has been little research into the association between sporting performance, digit ratio and psychological variables. This study examined the relationship between 2D:4D and mental toughness, optimism, goal orientations, aggression, coping style and their association with sporting achievement. A post facto design was adopted. Participants consisted of an opportunity sample of 122 sports people: male ($n = 60$) and female ($n = 62$) from a university in North East England. Following informed consent, a Vernier Caliper was used to measure digit ratio hand scans. Participants completed self-reports measures including, the Alternative Psychological Performance Inventory (Golby et al., 2008), Sport Mental Toughness Questionnaire (Sheard et al., 2009), Life Orientation Test-Revised (Scheier et al., 1994), Buss-Perry aggression (Buss-Perry, 1992) and 30 item coping style questionnaire (Joseph et al., 1995). MANOVA revealed significant gender differences in 2D:4D with males demonstrating lower ratios (Manning, 2002). The 2D:4D was found to differentiate eleven of the seventeen measured variables, including mental toughness scores ($p < 0.001$) and varying levels of sporting achievement i.e. international/national, regional and school levels ($p < 0.001$). Specifically, this difference was significant when comparing the highest (international/national) and lowest (leisure/school) groups. Perhaps there is a threshold for prenatal testosterone's influence upon sporting ability. Further research is necessary to examine the subtle differences between competitors involved in different achievement levels. It is proposed that high prenatal levels of testosterone may contribute to the development of increased mental toughness, optimism, ego/task goal

orientations in individuals, and hence aptitude towards sport. Findings lend support for the tentative claim that mental toughness may be partially biologically predetermined. Theoretical and practical implications are considered, along with limitations of the current study.

Key words: Digit ratio, sport performance, mental toughness, coping style, aggression.

Key Points

- Increased prenatal testosterone exposure was associated with successful sport performance. There is a need to further consider psychological aspects related to sport performance and their potential relationship with 2D:4D.
- Mental toughness variables, optimism, goal orientation, hostility and coping style are related to levels of 2:4D.
- Perhaps with further substantiation, 2D:4D could provide a supporting objective measure, to complement existing psychometric instruments.

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