

8. CONCLUSION AND FUTURE SCOPE OF RESEARCH

8.1 Conclusion

Sex differences in cognition are widely established in the current scientific literature, while some of these differences are small their effects across humanity can be substantial and with clinical and societal implications. In the present scenario in India the sex differences are fast disappearing because of educational opportunities for women have improved. In this study there were differences in WM and Selective attention with female advantage but not in Sustained attention. Many of these observed differences may not necessarily have a genetic or biological basis and are likely to be shaped by cultural expectations or opportunities and environmental influences. Studying the interplay of cognitive abilities supported by the interaction of neuromodulators provides a method to understand the neurological basis of sex differences in WM and attention. It is more likely that our findings result from the indirect association between genes and cognition. The specific cognitive phenotypes may result, from a confluence of multiple genetic and environmental factors. Accordingly, the effect of a specific gene on Cognition is likely to be smaller and less direct. In this study we were able to detect COMT sex-specific effects only when analyzed in combination with DAT1, which indicates that the effect size is very small. In this sense, the study of quantitative traits in larger population samples may help increase power.

There is growing evidence that genetic variability beyond DNA sequence variations may play a role in individual differences in cognition and brain function. Specifically, epigenetic modifications that do not concern DNA sequence variations but instead the molecular mechanisms of gene expression have recently become the

focus of research (Nikolova& Hariri, 2015). Thus there are many avenues in which sexual dimorphism in brain function may manifest in human, which will have therapeutic benefits of various brain related disorders and also it may help us adopt different teaching modalities accordingly.

8.2 Future Scope of Study

The brain has been the subject of scientific inquiry for thousands of years. The potential scope of studies on brain is practically endless as it is so crucial in an incalculable number of physiological functions. Neuroscience provides insights into and anatomical substrates of processes such as cognition, sensation, movement, awareness, perception, emotion, instincts, and communication.

This doctoral project has laid a foundation upon which future studies on interactive effect of genes and epigenetics that have to be conducted to explore and unravel the mystery of brain difference. Going beyond the genome and elucidating the role of epigenetic modifications on these and other associations' represents a next frontier. Association studies between peripherally assessed DNA methylation, varying experiential and environmental factors, and brain function using fMRI and EEG has the ability to reveal extra insight on the molecular mechanisms of risk and pave new roads for not only distinguishing vulnerable subjects but also providing them with precision medicine.

8.3 Limitations of the Study

- In this study random sampling method was adopted and the external validity, i.e., referring to the ability to generalize the results to a larger population, is limited. The results may not reflect the “true” skills of the participant.
- To assess brain function fMRI and EEG could not be done due to the cost involved and the participants were hesitant.
- The hormonal assay with respect to estrogen and testosterone could not be done as drawing blood for serum analysis of the hormone was not possible all days as it will be significant only if it is done on the day the subjects take the CNB assessment.