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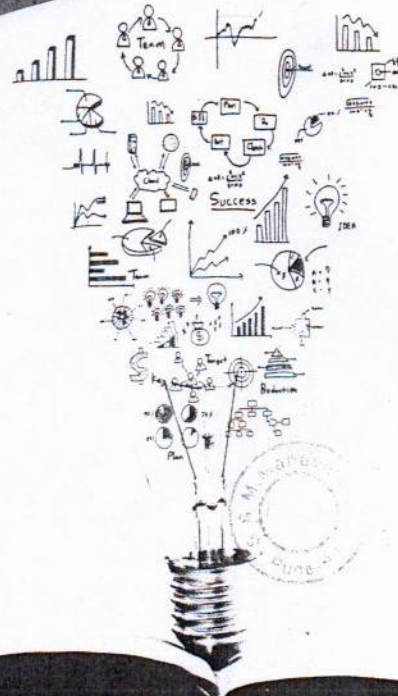
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Psychological review on sex differences in brain and its cognitive impact in day to day human behavior

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Abstract:

The present study aimed at comparing the gender differences in brain structure and its impact on the individual behavior. The study focused on anatomical differences in brains of men and women. The literature review suggested neural differences in brain wiring, resulted in different working styles, different emotions and social behavior.

With the help of MRI Scan reports and investigations, brain functioning differs as gender differences. There is a slight change in structure, size and chemical factors in the brain of men and women, with the help of which we can predict how brain works. With unique structure in brain, female use both the hemispheres and they are maser in social skills and more anxious. Due to structural change in men brain, men are aggressive, having high spatial sills and they have long distance tunnel vision.

Introduction:

Men and women have evolved differently as their bodies and brain evolved in completely different manner. Over millions of years, the brain structures of men and women think and behave differently as the way their brains work. These differences may be attributed to various genetic as well as hormonal and environmental factors. Men and women use different parts of the brain to encode memories, to recognize faces or to make decisions. So, sex differences in brain structure need to be studied as to study the functional working of brains in men and women. Neurologist and Psychiatrist proved that men and women have slightly different brains and different biological wirings which regulates their behavior.

Aims:

The present study is focused on the questions such as why men and women behave differently as their brain structure differ? What kind of sex differences in brain structure determine the behavioral differences as working styles, emotional experiences and social behavior. Main objective of this study is to find out why men and women think differently and behave accordingly.

Methodology:

Secondary data is used for this purpose. Mainly medical researches were reviewed. Hypothesis-proved research articles related to gender differences in brain were studied to extract additional relevant information supportive to the study.

Observations based on literature review:

Differences in male and female brain structure:

1. Differences in size and volume:

D. Kimura, (2000) found that there is a difference in the size of male and female brains. Men have slightly bigger brains than women. Total volume is also higher in men brain than that of women. Regions of Temporal and frontal lobes are larger in women, which are responsible for problem solving, regulating emotions, decision making etc. On the other hand the parietal cortex which is involved in space perception, sexual and social behavior is larger in men.

2. Gray and white matters in brain:

Men have approx. 6.5% more gray matter compared to women. Women possess 10-times greater white matter than men. Men think with Gray matter which is full of active neurons. Women think with white matter which consists more connections between neurons. In her study, Kelly & Levin (2001) found that neurons in women brain were densely crowded, which catches signals detects, may be the result why women tend to score high in tests involved language and communication. Men have 4% more neurons than women and 100gms more brain tissues. Female brains have larger deep limbic system including larger hippocampus than male brains, which results in acute sense of smell, touch etc. Dr. Stein's research (2012) shows that due to greater activity in hippocampus, women are good at recalling words, pictures, everyday events. Men are likely to remember how to find his way out of woods etc.

3. **Multi-tasking ability of women brains:**

A women's brain has 10% thicker connecting cord between left and a right lobe, that's how she can walk, talk and apply lipstick at the same time looking into a mirror. On the other hand, men brains are compared metalized in structure that's why they can only concentrate on one thing at a time, either he will read a newspaper or listen, but can't do both at a time. With this mono tracked ability in men, sometimes they are completely dazed and confused by multi-tasking ability of women brains.

4. **Vision and spacial ability:**

Women have peripheral vision and a typical brain structure which allows her clear vision from both sides. Research suggests that men have a long distance tunnel vision, that's why when they look at another object; they have to turn their heads. Men brains are called searching brains for localizing the closer objects like finding keys, socks etc.

Spacial ability is the strongest ability located in men's right hemisphere. Scan reports shows that men are for more able to see third dimension of an object giving depth, direction and locations. Scan reports suggest the women have limited spacial ability which involves dimensions, navigating, reading maps and understanding where you are etc.

5. **Functional differences and behavior:**

Thinking style - It is clear from the previous researches that men use gray matter and women use white matter, when thinking. The largest brain imaging study was conducted by DanialShen, M.D. (2016), in which he analysed 26,000 scan reports. For the tasks given, male relied on just small area on the left side and majority of women used areas in both sides of brain. Also, women showed increased blood flow during thinking. It was observed that Men's brain showed greater activity in regions associated with visual perception, tracking objects and form recognitions.

Comparative chart showing gender differences and changes in cognitive behavior

Sr.No.	Men & women differ by	Difference M=male F=female M > F	Measurable value/percentage	Impact on cognitive behavior/functional differences
1	Brain area/size	M > F	In male 1250 cm ³ In female 1130 cm ³	-
	Weight	M > F	Male-1380gms app. Female-1250gms app.	-
2	White matter	M > F	12-20% larger than women	Male use white matter in thinking
3	Gray matter	F > M	10 times more than man	Women think with the gray matter, high gray value results in high motor skills.
4	Hippocampus	F > M	Larger and active in females	Due to large Hippocampus women are estrogen sensitive & dominant in left side. It is the relay station of processing memories. Due to it, women use verbal strategies in cognitive reasoning.
5	Amygdala	M > F	It is large in men	Due to large Amygdala, in men, emotional processing is influenced by hormones which produce fear, triggers aggression and action and greater sex drive.
6	Prefrontal cortex, frontal and temporal area	F > M	Larger in women than men.	Enables women to look for a solution to conflict, negotiations, compromises
7	Anterior cingulate cortex	F > M	Relatively larger in women	Women are labeled as worrywart as a result, anxiety is four times more than men.
8	Brain tissues	M > F	100 gms more in men	-
9	Corpus colosum	F > M	Thicker in women	Enables her to use both hemisphere for verbal and nonverbal processing
10	Hormones Estrogen	F > M	Found greater in female brain	Helps master in social and communication skills, protects physical health or wellbeing.
	Testosterone	M > F	Found 10 times more in male brain	A fast acting hormone enables sex drive, game winning, strength and gaining power in men.

Findings:

1. Sex differences exist in every brain lobe including many cognitive regions.

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2. Extensive evidence reveals that male and female brains show anatomical, functional and bio-chemical differences.
3. There is a significant difference in brain size, volume and structure of men and women brains, which changes their thinking style and behavior.
4. Neurological differences in functioning of men and women brains show change in abilities they perceive e.g. special ability, sensory ability, multi-tasking etc.
5. The development of MRT, PET SCAN, SPECT-MRI SCANS has been proved effective to evaluate sex difference in brain morphology.

Conclusion:

1. Men and women brains show differences in structure and anatomy, which result in different behavior pattern.
2. Gender differences have implications for how brain works.
3. Functional working of brain depends upon the neural structure or pattern of men and women brain.

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