

**Comparative Study**

## **A Comparative Study on Brain Dominance and Achievement Motivation in Homosexual and Heterosexual Young Adults**

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### **ABSTRACT**

The present study examines the relationship between brain dominance and achievement motivation of heterosexual and homosexual young adults. Sample of 200 college going students participated in the study (100 heterosexuals and 100 homosexuals). The research involved the use of two questionnaires; Alert Scale, which divides subjects based on hemispheric dominance and Achievement Motivation Inventory, which measures whether the motivation level of the subject is high or low. The results revealed that there is no significant difference in achievement motivation between heterosexual and homosexual young adults. Although there was a significant difference in achievement motivation between homosexual and heterosexual young adults based on their hemispheric lateralisation. Even within the heterosexual group and homosexual group based on the lateralisation there was a significant difference in their achievement motivation. Both the groups also varied based on the brain dominance. Most homosexual subjects lied in bilateral hemisphere category and least were in strongly right hemisphere category. While more heterosexual lied in moderately left hemisphere category and least in strongly left category. These findings suggest that the difference in lateralisation; hemisphere that is mostly dominant in the individuals, can influence the achievement motivation of people

**Keywords:** *Brain Dominance, Achievement Motivation, Homosexual and Heterosexual Young Adults*

### **The Brain**

After evolving for many years, human brain has overcome many complexities and adapted to our changing culture and growing technology. As compared to other mammals, human brain is the largest. It weighs around 3 pound and makes up 2 percent of the human body weight.

The human brain helps us to understand and interact with our surrounding, it takes the information from our sense organs, interprets the information or the message received and gives commands to our muscles.

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**Received: August 24, 2021; Revision Received: January 25, 2022; Accepted: February 28, 2022**

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The evolution of the brain has enabled us to carry out high cognitive functions like planning, problem solving, communication, memory etc.

### **The Central Nervous System**

The brain and spinal cord, together form the central nervous system (CNS). It is called 'central' because it gathers information from all the sources of the body and controls our muscles and glands. Both spinal cord and brain reside within triple protective layer called meninges. They control our movements, emotions, thoughts and feelings. It also controls some of our physiological functions including, heart rate, hormone secretion, breathing etc.

### **Anatomy of the Brain**

The human brain is divided into three sections:

- Forebrain
- Midbrain
- Hindbrain

### **Forebrain**

#### *Cerebrum*

Forebrain is mostly made up of cerebrum. It is further divided into two halves, called the left and the right hemispheres of the brain. The two hemispheres are connected by 'corpus callosum'. The role of the corpus callosum is to pass information from one hemisphere to another.

Cerebrum also includes cerebral cortex. The surface of cerebrum consists of billions of neurons and glia that form cerebral cortex. The cortex is greyish brown in colour and is known as 'gray matter' of the brain. Beneath the gray matter lies the 'white matter' made up of axons that are connecting the gray matter.

#### Four lobes:

- *Frontal lobe* :It involves cognitive skills like problem solving, memory, thinking, language, emotions, decision making and sexual behaviour.
- *Occipital lobe* :It involves visual processing.
- *Temporal lobe* :It involves auditory processing (sounds and language).
- *Parietal lobe* :Just above the temporal lobe and behind the frontal lobe, it has a role of collecting input from all the sense organs of the body and also helps in spatial orientation and direction.

#### *Hypothalamus*

It is the most important part of the brain and plays a crucial role like controlling and giving commands to the pituitary gland. It handles the information that comes from the autonomic nervous system. It also regulates eating, sexual behaviour, sleeping, body temperature, emotions and movements.

#### *Limbic System*

Limbic system controls our emotions and helps in formation of new memories. It has two parts; amygdala (production of aggressive behaviour) and hippocampus (building new memories).

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### *Thalamus*

It is the 'relay station' of the brain. All the information reaches thalamus and goes to the cortex. It regulates sleep, wakefulness and consciousness. It also relays sensory and memory signal.

### *Midbrain*

Midbrain is a part of brainstem which connects hindbrain and forebrain. One of the major functions of midbrain is to help in movement, visual and auditory processing. It is composed of two systems- reticular formation (involves sleeping, walking and other reflexes) and cluster of neurons having dopamine, serotonin and norepinephrine receptors.

### **Hindbrain**

The brain connects spinal cord to hindbrain. Hindbrain contains three parts:

- *Cerebellum*: It is located beneath occipital lobe. It helps in motor activities, maintaining posture, sense of balance, ability to perform rapid and receptive actions.
- *Medulla Oblongata*: Controls breathing, reflexes and posture.
- *Pons*: Connects midbrain with hindbrain. Responsible for sleep cycle, arousal and sensations (hearing, taste and balance).

### *Brainstem*

Brainstem connects the brain with the rest of the body. It connects brain with the spinal cord. There are 10 to 12 cranial nerves that originate from brain stem which helps in hearing, eye movement, facial sensation, taste, swallowing and movement of face, neck, shoulder and tongue.

### ***Brain Hemispheric Dominance***

Human brain is divided into two hemispheres, each joined by bundle of nerves, called corpus callosum. Both the hemispheres are somewhat symmetrical but not completely alike. Each hemisphere has a separate function, it is known as lateralisation of brain. Even with separate functions, they interact with each other and work together to carry out an action.

While left hemisphere controls and receives information from right side of the body, the right hemisphere controls and process information from left side of the body. Having a dominant hemisphere doesn't mean that we don't utilise the other half, both have to work together. Lateralisation is the just one side more dominant in shaping our personality than the other.

### **HISTORY OF SPLIT-BRAIN HEMISPHERES**

For many centuries, it was speculated that two hemispheres of brain have specialised functions and can work independently. In 1860's Pierre Broca discovered lesions in left hemispheres (frontal lobe) in subjects with speech impairments. However, a systematic research on split brain began in 1960's, Roger Sperry with his colleagues conducted research on animals and humans. He formed that in animals hemispheres are not joined and have separate functions. Similarly, in humans, hemispheres have different functions.

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### ***Functions of Hemispheres***

#### ***LEFT HEMISPHERE***

Left hemisphere has following functions and controls:

- speech and language
- Arithmetic
- Logical thinking
- organised
- Systematic
- Attending to detail
- Reading and writing
- Sign language
- Pays attention to internal world

#### ***RIGHT HEMISPHERE***

Right hemisphere has following functions and controls:

- sensory input
- Auditory and visual processing
- Spatial skills
- Artistic ability
- Creativity
- Focus on patterns
- Follow intuition
- Flexible
- Emotions
- Attention to external world

### ***Whole Brain***

Whole brain maximises the potential which is undiscovered. It happened when an individual uses both halves equally.

### ***Need For Whole Brain***

According to today's education system, we are taught to follow instructions and act or behave according to them. We are rarely given a chance to think creatively or out of the box or to try something new. All of this includes traits of left brain i.e., following instructions, lack of creativity and lack of imaginations, calls for a change. As the child will leave school and college, he or she will realise that while working they require skills both controlled by right and left hemisphere. We have to use creativity and logical thinking together for optimum results.

### ***Motivation***

The word 'movere' means to 'move', it's from this Latin word, we got the word 'motivation'. Motivation is result of lack of need and want. It helps us to achieve our goals and fulfil our wants. The arousal from the lack of need, drives us to behave (goal-oriented behaviour) for the gratification of the need.

There are 3 components of motivation that helps us to achieve a goal:

- **ACTIVATION OR AROUSAL:** Helps to initiate goal directed behaviour

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- PERSISTENCE OR DRIVE: It keeps us moving and helps us to overcome the obstacles.
- INTENSITY OR SEVERITY: Attention and application that helps us to pursue a goal.

### ***Types of Motivation***

- *Intrinsic motivation*: When an individual is motivated from inside or through internal desires.
- *Extrinsic motivation*: When an individual is motivated through external desires.
- *Power based motivation*: This type of motivation arises out of a desire to gain control over people and things around him or her. These people want to make a change.
- *Affiliation motivation*: Affiliation means when we try to connect with others in order for support, care and love. People who are motivated through affiliation, like to be affiliated with people higher in position.
- *Competence motivation*: When we are competent, we achieve more success and able to deliver quality work. This type of motivation helps us to develop a skill, fight obstacles and move forward in life and certain areas of work.
- *Attitude motivation*: Attitudes are our beliefs and perceptions about someone and something. People high on this motivation are ready to change the way they feel and see things around them. It helps to achieve goals associated with self confidence and self awareness.
- *Fear based motivation*: When you are accountable to someone, there is a fear of failure. This fear helps you to overcome the obstacles. It prevents us from quitting.
- *Incentive based motivation*: Incentive is something that we get in return based on our behaviour and actions. If we are aware about the rewards that we will get after a task is completed, then incentive based or reward based motivation increase.

### ***Achievement Motivation***

There are some individuals who like to achieve a goal just for the reward associated with goal. Then there are some, who complete a task just for the sake of feeling of achievement that comes with it.

Achievement can be the position, titles or roles. It helps us to climb up the ladder of success. This type of motivation includes a sense of competence (effectiveness and ability).

David McClelland in his research said that regardless of gender and culture, there are 3 types of motives:

- ACHIEVEMENT
- AFFILIATION and
- INFLUENCE

According to him, achievement motivation means: solving problems, mastery of challenging and complex tasks, able to set goals and receive feedbacks.

Achievement motivation are of two types:

- *Need for achievement and*  
*Fear of failure*

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Need for achievement means tendency to experience success and fear of failure means tendency to experience failure and shame.

While need for achievement, helps in performance and competency; fear of failure leads to avoidance and incompetency.

Fear of failure motivation helps us to work hard and achieve goal in order to avoid shame.

### **REVIEW OF LITERATURE**

Amany (2019) studied relationship between brain hemispheric dominance and academic majors. 429 students were selected. It was found that literature, education, arts and communication majors students were more right brained, while science, commerce and engineering students were more left brained.

Saffron et al (2018) conducted a research to find neural relation between bisexual, homosexual and heterosexual females. 24 homosexual and 26 heterosexual and bisexual each, females were selected for the sample. It was found that homosexual females responded more for female stimuli while bisexual females has mixed responses and activations.

Gamey et al (2017) conducted a research to find correlation of academic achievement motivation and brain hemispheric dominance in nursery students. Sample of 151 student was selected. It was found that 61.6% of sample was right hemispheric dominant and there was a significant difference in GPA too.

Saberi & Nikam (2017) conducted a research study relation between foreign language learner's brain hemispheric dominance and vocabulary achievement. 50 students were selected for the study, 3 tests were conducted. According to the brain dominance test there were 46 % right brained, 36% left and 18 % whole brained subjects. In the end a vocabulary test was conducted based on that is was found that left brained individuals had highest scores while whole brained subjects had the lowest.

Rahman (2015) studied hemispheric dominance of facial expression in different sexualities. Sample of 30 heterosexual men and women each and 40 homosexual men were selected. They completed an IQ and tests on chimeric faces. It was found that straight men showed right hemispheric dominance when female faces were shown; whereas, heterosexual females and gay men showed left brain dominance. Gay men showed had more significant results with heterosexual females.

Kaur and Lal (2013) studied the relationship between style of thinking and learning in right hemisphere dominance and achievement in creativity, maths and handedness in school going children. It was found that there is a difference in low and high achievers based on learning and thinking in right hemisphere.

Alghraibah (2012) studied the relationship between handedness and brain dominance based on age and gender. 355 students were selected. There were more right handed students and right hemisphere was more prominent in 1st, 7th and 9th grade students.

Rahman and Anchassi (2012) conducted a research to study if there is any difference in how male and women process chimeric faces and display emotions. Sample of 50 male and female each were selected. It was found that men were more lateralised for emotions displaying alertness and threat as compared to women.

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Olson (2011) studied the influence of sexual orientation on brain hemispheric dominance. He mentioned in his book - *THE WHOLE BRAIN PATH TO PEACE*, that heterosexual male have left brain dominant while female have right brain. And if we reverse it, then homosexual male will also have right brain dominance and homosexual female have left brain dominance.

Rahman et al (2008) studied cerebral asymmetry in heterosexuals and lesbians. Sample was 27 heterosexual women and 24 men and 23 homosexual females. Dichotic listening ability test was administered and it was found that lesbians to some degree are masculine in cerebral asymmetry.

Slavic & Lindström (2008) studied cerebral asymmetry in homosexual and heterosexuals. 25 heterosexual and 20 homosexual men and women were selected for the study. 50 subjects underwent PET to assess connections from amygdala. It was found heterosexual men and homosexual women have more functional asymmetry and connections from left amygdala. While heterosexual female and homosexual male have symmetrical cerebral lateralisation and strong connections in right amygdala.

Wei et al (2008) studied sexual arousal and brain activation in homosexual and heterosexual male. 10 heterosexual and homosexual each were selected and they underwent fMRI, where they were shown 3 erotic movies. It was found that both the groups had different areas of brain activation, but there were some areas which were common in both.

Mullin et al (2008) conducted a research to find correlation between face processing and handedness in sexual orientation. It was found that homosexual men performed better than homosexual female and heterosexual male. Females were better than males in comprehending faces. Left handed heterosexuals were also better than heterosexuals (right handed) and homosexuals (left handed).

Zamboni et al (2008) studied correlation between sports motivation, self esteem, life satisfaction, femininity and masculinity and parental encouragement for athletic activities in gay and bisexual men. 195 gay and bisexual men were selected. It was found that gay and bisexual men might get into athletic activities to express masculinity and have achieve positive body image.

Witelson et al (2007) conducted a research on corpus callosum anatomy on right handed men. 12 homosexual and 10 heterosexual male were selected for the study, they underwent MRI. It was found that right handed homosexuals have less functional asymmetry than heterosexual male.

Conner et al (2006) conducted a study to find relationship between motivation for exercise and sexuality. 93 staff members participated in the study. They were asked to fill exercise motivation inventory. It was found that homosexual men and heterosexual female scored more on appearance motives and weight management. While they score less on enjoyment motives and competition motives than heterosexual men.

Pronerbio et al (2006) studied whether there is a difference in hemispheric asymmetry while processing faces in genders. Right handed subjects were selected for the study (n=40). The responses were measured around the occipital cortices. With a strong hemispheric

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dominance, men showed functional asymmetry when comprehending faces whereas women had more bilateral function.

Turner et al (2004) conducted a study on gender differences in lateralisation of amygdala. Men and women were selected for the study and they underwent fMRI while they were shown slides with faces with neutral emotions to arousing ones. After two weeks their memory of slides were assessed and it was found that for arousing slides men had activity for right hemisphere while women had for left hemisphere.

Qazi et al (2003) studied relationship between sexual orientation and verbal fluency. 60 homosexual and heterosexual men and women each were selected. They had to give 3 tests. Gay subjects performed better in letter fluency and synonym fluency. Gay and heterosexual females performed better in category fluency.

Rahman & Wilson (2003) studied effects of sexual orientation on judgement and mental rotation. 60 homosexual and heterosexual men and women each were selected. Heterosexual men performed better in JLO (judgment of line orientation) and mental rotation (MR) than homosexual men. Homosexual women performed better than heterosexual females in MR.

Rahman et al (2003) studied relation between spatial memory and sexual orientation. 240 right handed heterosexuals and homosexuals were selected for the study. In object recall, females performed better than males, while there was no difference in object recognition. In spatial memory, gay men and heterosexual females performed better. Also, heterosexual male and lesbians follow the same process of encoding, storing and retrieving the information.

Deppe et al (2000) studied relationship between right handed subjects and language lateralisation. 188 subjects were selected. Results revealed that men and women have equal amount of lateralisation and lateralisation of right hemisphere was found in 7.5% subjects. This reveals atypical dominance for language.

### ***Rationale***

Based on the researches conducted, it's been supported that achievement in varied sectors of life will differ counting on the hemispheric lateralisation and sexuality of a person. People who choose subjects like literature, arts or communication have right hemisphere dominant, while people with subjects science, commerce and engineering have left brain dominant. Similarly, individuals with left brain dominant are good with vocabulary whereas whole brained individuals are the weakest. Even the way we think and learn can vary too. If we compare brain dominance on the basis of sexuality; heterosexual males and homosexual females process information likewise and heterosexual females and homosexual males does it in same fashion too. Heterosexual males and homosexual females have left brain more lateralised while heterosexual females and homosexuals have right hemisphere dominant." This research is conducted to study relation between achievement motivation and brain dominance from Indian perspective, as most of the researches were conducted from international perspective.

## **METHODOLOGY**

***Aim:*** The aim of present research is to compare brain dominance among homosexual and heterosexual young adults and to find its relationship with achievement motivation.



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### ***Objective***

Based on the above-mentioned rationale, following objectives are formulated:

- To explore the difference between subjects with left, right and bilateral hemisphere and their achievement motivation.
- To explore the difference between heterosexuals with left, right and bilateral hemisphere and their achievement motivation
- To explore difference between homosexual with left, right and bilateral hemisphere and their achievement motivation
- To find difference between achievement motivation of heterosexual and homosexual subjects
- To find difference between homosexual and heterosexual brain dominance

### ***Hypothesis***

Based on the objectives, following hypotheses are proposed:

- There will be a significant difference between achievement motivation of subjects with different dominant hemispheres.
- There will be a significant difference between achievement motivation of heterosexuals with different dominant hemispheres.
- There will be a significant difference between achievement motivation of homosexuals with different dominant hemispheres.
- There will be a significant difference between achievement motivation of heterosexual and homosexual subjects.
- There will be significant difference between brain dominance of homosexual and heterosexual subjects.

**Sampling & Sample Size:** 200; Purposive sampling method

HETEROSEXUALS: 100

- FEMALES: 50
- MALES : 50

HOMOSEXUALS

- GIRLS: 50
- BOYS: 50

### ***Research Variables***

Independent variable - Sexuality

Dependent variable - Achievement motivation and Brain dominance

**Research Design:** Two group correlation research design.

### ***Tools***

Two tools were selected for this study, Alert Scare by Loren D. Crane and Achievement Motivation inventory by Muthee and Thomas.

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### **Alert Scale**

Alert scale by Laura Crane is a 20 item scale. It is a forced scale. The subject has to choose between two options; A and B. Out of 20 items, 9 items are marked or underlined. Items 4,5,6,10,11,12,16,17 and 18 are marked, we will count the number of A responses for these items. For every A response we will 1 mark, if the subject has responded B for these items we will give a score of 0. Items which are not marked or underlined, for those items we will count the number of B responses, 1 mark for all the B responses and 0 for all the A responses.

After we score all the item, we will find the total. Based one the total score, we will be able identify the category in which the subject lies.

Categories are as follows:

- Score of 0-4 means strongly left dominant
- Score of 5-8 means moderately left dominant
- Score of 9-11 means bilateral
- Score of 12-15 means moderately right dominant
- Score of 16-20 means strongly right dominant

It takes usually 10-15 minutes to complete the test.

Reliability of alert scale was measured using test- retest. The reliability was 0.796. Validity was found using content validity.

### **Achievement Motivation Inventory**

Achievement motivation by Muthee and Thomas is a 32 item scale based on 5 likert point scale. There are positive items and negative items. Scoring of positive items is 5,4,3,2,1 and for negative items is 1,2,3,4,5. Positive items are: 3,4,5,6,11,13,14,16,17,20,23,24,26,28,29,30,31 and 32. The 5 points are: completely agree, mostly agree, agree to some extent, mostly disagree and completely disagree. After scoring, find the total. Higher the score, higher will be the achievement motivation and lower score means low motivation.

The scale intends to measures the achievement motivation of the subjects.

Reliability of achievement motivation was measured using Cronbach's alpha and came out to be 0.749. Validity was found using systematic methodology and standardisation of test.

### **Procedure**

Sample of 200 heterosexual and homosexual young adults were asked to fill the questionnaire. All the subjects were 18 years or above.

Rapport was formed with each subject to make them feel comfortable and they were assured about the confidentiality of their results. They were first asked to fill the demographic details (name, age, gender and sexuality) and sign the informed consent.

Two questionnaires were given to them: Alert scale by Laura Crane and Achievement motivation by Muthee and Thomas. Instructions to fill questionnaire were given to the subjects. It took about 15-20 minutes to fill the entire questionnaire.

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Once the questionnaires were filled, responses were calculated and interpreted based on the instructions mentioned in the respective manuals.

### *Method of data analysis*

Data analysis for this research consists of quantise data using IBM SPSS 20.0 (statistical package for social sciences). For the purpose of validation of hypothesis statistical techniques like ANOVA and independent sample t-test were used.

## ANALYSIS OF RESULT

### *The objectives of this study are:*

- To explore the relation between subjects with left, right and bilateral hemisphere and their achievement motivation.
- To explore the relation between heterosexuals with left, right and bilateral hemisphere and their achievement motivation
- To explore relation between homosexual with left, right and bilateral hemisphere and their achievement motivation
- To find relation between achievement motivation of heterosexual and homosexual subjects
- To find Relation between homosexual and heterosexual brain dominance.

### *Descriptive statistics for depicting mean and standard deviation for achievement motivation and brain dominance for homosexual and heterosexual young adults.*

**Table 01**

	N	Minimum	Maximum	Mean	Std. Deviation
A_T	200	64.00	136.00	103.8150	13.43702
B_T	200	1.00	20.00	9.2950	3.25437

- *To explore the relation between subjects with left, right and bilateral hemisphere and their achievement motivation.*
- *Descriptive statistics for depicting mean of achievement motivation of subjects with different hemispheric lateralisation.*
- *A one-way analysis (ANOVA) was used to show difference in achievement motivation on 2 groups: heterosexual and homosexual subjects with different lateralisation [strongly left, moderately left, bilateral, moderately right and strongly right]*

**Table 02**

Lateralisation		N	Mean
Strongly left	A_T	11	111.1818
Moderately left	A_T	73	110.8356
Bilateral	A_T	63	99.3175
Moderately right	A_T	49	98.1837
Strongly right	A_T	4	95.2500

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**TABLE 03**

<b>Lateralisation</b>	<b>Sexuality</b>		<b>N</b>	<b>Mean</b>
Strongly left	Homosexual	A_T	6	114.1167
	Heterosexual	A_T	5	107.6000
Moderately left	Homosexual	A_T	28	110.8214
	Heterosexual	A_T	45	110.8444
Bilateral	Homosexual	A_T	36	99.2778
	Heterosexual	A_T	27	99.3704
Moderately right	Homosexual	A_T	27	97.8889
	Heterosexual	A_T	22	98.5455
Strongly right	Homosexual	A_T	3	93.0000
	Heterosexual	A_T	1	102.0000

**TABLE 04**

**A\_T**

	<b>df</b>	<b>Mean of square</b>	<b>F</b>	<b>Sig.</b>
Between groups	4	182.186	12.466	0.000
Within groups	195	146.735		
Total	199			

*There was a significant difference in mean achievement motivation of 2 groups at  $p < 0.05$  [ $F(4,195) = 12.466, p = 0.000$ ].*

*To explore the relation between heterosexuals with left, right and bilateral hemisphere and their achievement motivation*

**TABLE 05**

**A\_T**

		<b>df</b>	<b>Mean of squares</b>	<b>F</b>	<b>Sig.</b>
	Between groups	4	836.932	5.965	0.000
Heterosexuals	Within groups	95	140.304		
	Total	99			

*A one way analysis (ANOVA) was used to compare achievement motivation on heterosexual subjects with different dominant hemispheres [strongly left, moderately left, bilateral, moderately right and strongly right]*

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*There was a significant amount of difference in mean achievement motivation of all heterosexual subjects categorised under different groups based on their hemispheric dominance at  $p < 0.05$  [ $F(4,95) = 5.965, p = 0.000$ ].*

*To explore relation between homosexual with left, right and bilateral hemisphere and their achievement motivation.*

**TABLE 06**

**A\_T**

		df	Mean of square	F	Sig.
	Between groups	4	990.653	6.232	0.000
Homosexuals	Within groups	95	158.950		
	Total	99			

- *A one way analysis (ANOVA) was used to compare achievement motivation on homosexual subjects with different dominant hemispheres [strongly left, moderately left, bilateral, moderately right and strongly right].*
- *There was a significant amount of difference in mean achievement motivation of all homosexual subjects categorised under different groups based on their hemispheric dominance at  $p < 0.05$  [ $F(4,95) = 6.232, p = 0.000$ ].*

*To find relation between achievement motivation of heterosexual and homosexual subjects.*

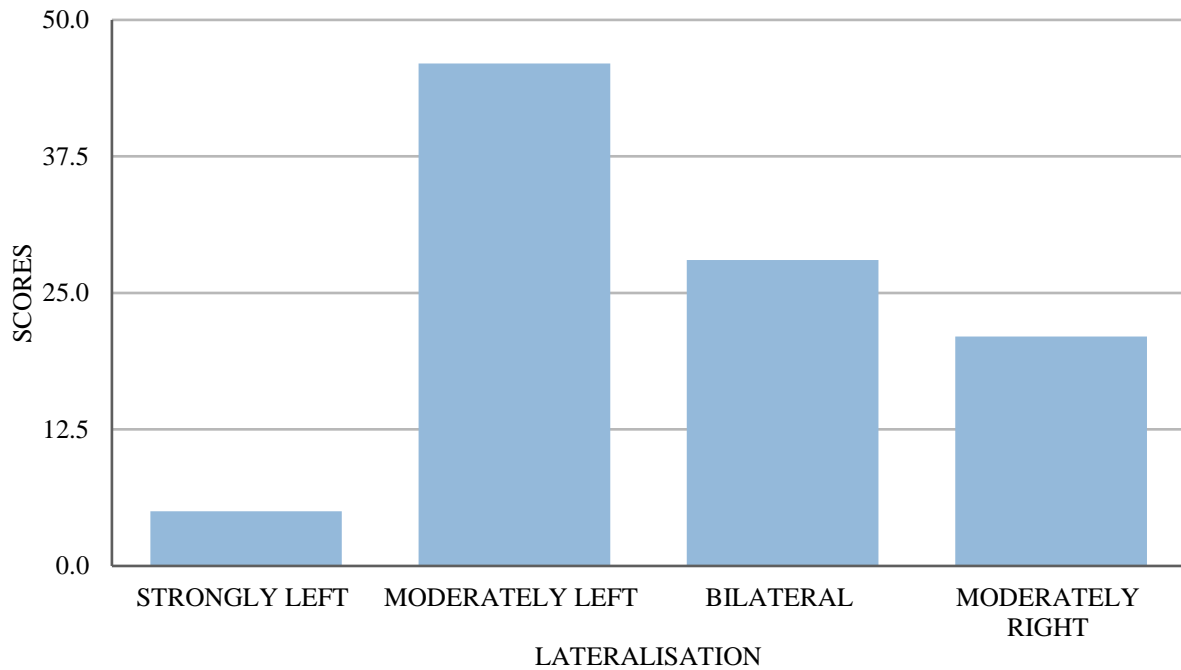
**TABLE 07**

	Sexuality	N	Mean	Std. Deviation	Std. error Mean	Sig.	t
Achievement	Heterosexual	100	104.7900	12.97884	1.29788	0.227	1.026
	Homosexual	100	102.8400	13.87660	1.38766		1.026

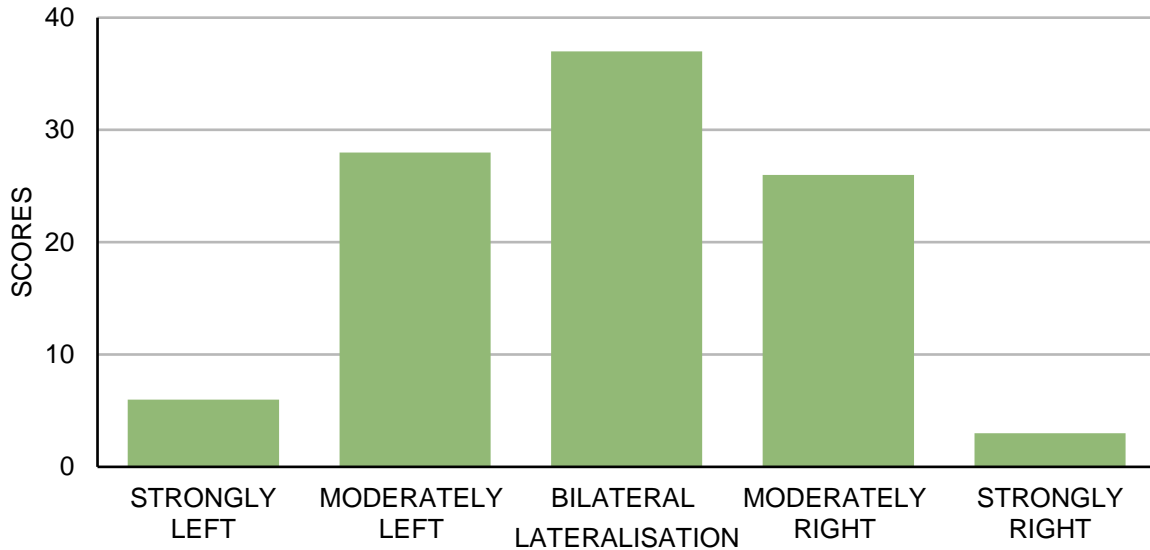
*An independent sample t-test was was conducted to compare the achievement of heterosexual and homosexual subjects. It was found that the difference between the groups is not significant [ $t = 1.026, p = 0.227$ ].*

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To find Relation between homosexual and heterosexual brain do minance  
*fig..1 HETEROSEXUAL*



*fig. 2 HOMOSEXUAL*



### DISCUSSION

Brain dominance means lateralisation of one cerebral hemisphere. In simple words, when we prefer to use one side of the hemisphere over the other. Achievement motivation, also known as 'need for achievement' is a desire that an individual develops when he/she wants to excel in a task, knowing that it will be evaluated related to some level of excellence.

The present study aims to find how achievement motivation differs based on brain dominance in heterosexual and homosexual young adults. All the subjects were

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college/university going students, aware about their sexuality. The statistical techniques used for this study are one way of analysis (ANOVA) and independent sample t-test.

### **Hypothesis 01: There will be a significant difference between achievement motivation of subjects with different dominant hemispheres.**

Table 01,02 and 03, depicts the achievement motivation levels of homosexual and heterosexual subjects with different hemispheric lateralisation. According to the results, “there is a significant difference between achievement motivation on groups with different lateralisation at level 0.05 significance.” As per the results, individuals with different hemispheric dominance [strongly left, moderately left, bilateral, moderately right, strongly right] have difference in their level of achievement motivation i.e some might be highly motivated or have very low levels of motivation. Homosexuals with strongly left hemisphere dominance have the highest level of motivation (M= 107.6000) and homosexuals with strong right hemispheric dominance have lowest achievement motivation (M=93.000). Strongly left dominant subjects have the highest achievement motivation. These people are good with instructions, follow systematic procedures, use logics, make plans and objectives etc. Therefore, on the basis of the results hypothesis “There will be a significant difference between achievement motivation of subjects with different dominant hemispheres” [H1] is accepted.

### **Hypothesis 02: There will be a significant difference between achievement motivation of heterosexuals with different dominant hemispheres.**

Table 02 and 05 depicts the difference in level of motivation in heterosexual subjects with different brain hemispheric dominance [strongly left, moderately left, bilateral, moderately right, strongly right]. It depicts that the difference between two sets is significant at level 0.05 significance. As per the results, heterosexual subjects with different hemispheric lateralisation (left, whole or right) vary in levels of motivation. Heterosexual individuals, whose right hemisphere is moderately dominant have lowest levels of achievement motivation (M= 98.5455) while subjects with left brain moderately dominant have the highest levels (M=110.8214). On the basis of the findings, hypothesis “There will be a significant difference between achievement motivation of heterosexuals with different dominant hemispheres” is accepted.

### **Hypothesis 03: There will be a significant difference between achievement motivation of homosexuals with different dominant hemispheres.**

Table 02 and 06 depicts the difference in level of achievement motivation in homosexual subjects with different brain dominance [ strongly left, moderately left, bilateral, moderately right, strongly right]. Based on the statistical findings, “the difference between groups is significant at level 0.05 significance”.As per the results, homosexual subjects with different hemispheric lateralisation (left, whole or right) vary in levels of motivation. Homosexuals who have left brain strongly dominant have the highest achievement motivation (M=114.1167) while strongly right brain dominant have the lowest levels (M=93.000). According to the findings, hypothesis “There will be a significant difference between achievement motivation of homosexuals with different dominant hemispheres” is accepted.

### **Hypothesis 04: There will be a significant difference between achievement motivation of heterosexual and homosexual subjects.**

Table 07 depicts difference in achievement motivation between homosexual and heterosexual individuals. It shows that there is no significant difference between the two sets

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at level 0.05 significance". As per the results, two groups; homosexual and heterosexuals, do not have much difference in their achievement motivational levels. Based on the findings, hypothesis "There will be a significant difference between achievement motivation of heterosexual and homosexual subjects" is not accepted.

### **Hypothesis 05: There will be significant difference between brain dominance of homosexual and heterosexual subjects.**

In fig. 1, the graph has different lateralisation on x axis (strongly left, moderately left, bilateral, moderately right and strongly right) and scores of heterosexual subjects on y axis. It tells us about the distribution of heterosexual subjects across different groups of lateralisation based on their results calculated through alert scale questionnaire. Most heterosexuals lie in moderately left hemisphere category (n=46) and least lie in strongly left hemisphere category (n=5). Maximum score of heterosexual subjects is 16 and lowest is 2.

In fig. 1, the graph has different lateralisation on x axis (strongly left, moderately left, bilateral, moderately right and strongly right) and scores of homosexual subjects on y axis. It tells us about the distribution of homosexual subjects across different groups of lateralisation based on their results calculated through alert scale questionnaire. Most homosexuals lie in bilateral hemisphere category (n=37) and least lie in strongly right hemisphere category (n=3). Maximum score of homosexual subjects is 20 and lowest is 1.

Based on the findings, hypothesis "There will be significant difference between brain dominance of homosexual and heterosexual subjects" is accepted.

## **CONCLUSION**

The aim of the present research is to study brain dominance in difference sexualities (homosexual and heterosexual) and how they have different achievement motivation levels.

The evolution of human brain has helped us to carry out a lot of functions that we were unable to do it before. A vital and a complex organ of the body, carries out crucial functions like controlling muscles, processing inputs from sense organs, secretion of hormones, cognitive functions etc.

The brain is divided into two parts : left and right hemisphere. Each with separate functions but work interdependently. While left brain focuses on speech, language, logical thinking; the right brain works on emotions, spatial skills, abstract and creativity. Some people are whole brained, who use both the halves equally. The earliest work on hemispheric lateralisation was carried out in 1860's but it was not until 1960's when significant discoveries were made.

Motivation is a push from inside to achieve something or to satisfy a need. There are various types of motivation: Intrinsic (desire from inside), Extrinsic (desire from environment), Power based (to control others and things), Affiliation (need for support and love), Competence (to achieve something through quality work), Attitude (beliefs about people and things), Fear (to avoid failure), and Incentive (to complete a task for the reward in exchange). The other type is Achievement Motivation, it is the need to complete a task to gain the sense the achievement and enjoy the rewards and positions that are associated with the task. Achievement motivation is made up of two factors: need of achievement (to experience success) and fear of failure.



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There are many researches on brain dominance in heterosexual and homosexual. According to the researches heterosexual males and homosexual females have similar qualities and abilities. Both have left hemisphere dominant. Heterosexual females and homosexual males are similar too, they use their right hemisphere more. We can even see difference between the groups based on amygdala and cerebral asymmetry. Heterosexual males and homosexual females use left amygdala and have cerebral asymmetry and heterosexual females and homosexual males use right amygdala and have cerebral symmetry. There is also a difference between the achievement motivation of homosexual and heterosexual subjects. Type of course people choose can also signify which hemisphere is dominant for eg, arts, language have right hemisphere more dominant and people who choose commerce, science and engineers use left hemisphere more. Vocabulary fluency and thinking and learning are also functions of different hemispheres.

A sample of 200 subjects were chosen (100 homosexual and heterosexual each), who we asked to fill out two questionnaires; alert scale by Loren Crane and achievement motivation inventory by Muthee and Thomas. To calculate the results, statistical analysis techniques like one way of analysis (ANOVA) and t-test independent sampling test.

The results revealed that:

1. Based on the brain dominance in homosexual and heterosexual subjects, these two groups have a significant difference in their achievement motivation levels. Strongly left dominant homosexuals have the highest achievement motivation levels.
2. Within the heterosexual subjects who were divided into different categories of brain dominance based on their scores, have different achievement motivation levels. Individual with left moderate hemisphere dominant have the highest achievement motivation.
3. Within the homosexual subjects who were divided into different categories of brain dominance based on their scores, have different achievement motivation levels. Individual with strong left hemisphere dominant have the highest achievement motivation.
4. If we look at the achievement motivation of homosexuals and heterosexuals subjects as a whole, there is no significant difference between their motivation levels.
5. Graphs depicts the distribution of homosexuals and heterosexual in different brain dominant categories based on their scores. While most homosexual lie in bilateral hemisphere and most heterosexual lie in moderately left hemisphere.

### ***Limitations of the study***

- The sample size was limited to 200 young adults only.
- Reliability and validity of the study was not calculated.
- Cultural bias.

### ***Implication of the study***

1. Learning about employees achievement motivation is very important and it can be useful for job recruitment too. Managers, Hrs or instructors should study their workers motivation levels so that can come up with strategies to boost their levels keeping in mind the individual differences. Along with motivation levels, management should also study brain dominance of workers. People with different lateralisation deal with work differently. So, the strategies and tasks should be assigned accordingly.

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2. Along with work place, achievement motivation of students should also be measured. Every child is different in respect to their aptitude, interests and personality. Due to which, their motivation towards academics and other co-curricular activities could also differ. Teachers can work along with educational counsellor and parents and come up with plans to increase the motivation levels of the child. Similarly, kids with different hemispheric lateralisation have different interests and ways to look at problems. We can a lot about child's nature and ability through brain dominance testing.
3. Studying of brain dominance of people can also help us to come up with ways to energise the less dominant side so that the person can use both halves.

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### ***Acknowledgement***

The author(s) appreciates all those who participated in the study and helped to facilitate the research process.

### ***Conflict of Interest***

The author(s) declared no conflict of interest.

***How to cite this article:*** Sahni H. & Magan A. (2022). A Comparative Study on Brain Dominance and Achievement Motivation in Homosexual and Heterosexual Young Adults. *International Journal of Indian Psychology*, 10(1), 253-272. DIP:18.01.023.20221001, DOI:10.25215/1001.023