



STUDY OF MENTAL TOUGHNESS WITH REFERENCE TO BRAIN HEMISPHERE AND LEVEL OF ACHIEVEMENT

Mandeep Gill¹ and Dr. Ashok Kumar Malik²

¹PhD Scholar, Choudhary Devilal University, Sirsa, Haryana.

²Assistant Professor, Choudhary Devilal University, Sirsa, Haryana.

ABSTRACT

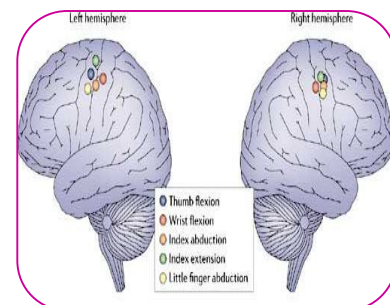
In the present study researcher aimed to investigate the mental toughness in connection with dominance of brain hemispheres and level of achievement. Total 100 boxer were selected after their informed consent randomly. The data was collected with the help of mental toughness questionnaire prepared by Dr. Sandeep Tiwari. The questionnaire consists of 48 statements which are categorized: under six variables namely – (SC) Self Confidence (8 statements), Motivation (10 statements), Attention Control (10 statements), (GS) Goal setting (8 statements), (VIC) Visual and Imagery Control (6 statements) & (ATC) Attitude control (6 statements). To assess the brain-dominance, brain dominance questionnaire (Catawba Vally) consist of 15 questions was used. The prevalence statistics, descriptive statistics, and Comparative (ANOVA) statistics was employed to draw meaningful conclusions. Results of the present study revealed that the boxing player were predominantly found to be left dominant players. Insignificant ($p>0.05$) difference was witnessed in all dimension of mental toughness between left and right brain dominant boxers. Similarly, Insignificant ($p>0.05$) difference was witnessed in all dimension of mental toughness amongst the different level of participation. Study on large sample is required to conclude the study.

KEYWORDS: Brain hemisphere, level of achievement, mental toughness, visual and attention control.

INTRODUCTION:

Sports performance at elite level is not only the result of action during the competition itself. The performance is built up over a long training period. High-performance in a sports demand united effort of both psychological and physiological components. Sports psychologists, coaches, sports commentators, sports fans, and athletes acknowledge the important of the mental toughness in sports performance. In early works (Loehr; 1986; Gould et al., 2002; Norris, 1999) felt that at least fifty percent of success is due to mental toughness. An ardent desire to achieve something makes possible to succeed in the field. An emotionally persistent person cannot resist pain or fatigue. He is incapable of mobilizing himself in a sports competition.

The left brain vs. right brain theory suggests that people have a dominant brain hemisphere, and that the dominant hemisphere influences one's learning and personality. Specifically, left brain dominant people are more logical and right brain dominant people are more creative. Each hemisphere has specific cognitive processes (Lilienfeld, Lynn, Ruscio, & Beyerstein, 2010). Searching online, one can find thousands of quizzes that help determine which side of the brain is dominant. Additionally, there are books, study aids, and curricula that are specific for right brain or left brain dominant learners. A recent study (Dekker, Lee, Howard-Jones, & Jolles, 2012) found that 91% of teachers surveyed in the UK believed the left brain right brain theory. However, the left brain right brain theory is incorrect and considered a myth



(Alferink & Farmer-Dougan, 2010; Dekker, Lee, Howard-Jones, & Jolles, 2012; Gazzaniga, 1985, 2002; Lindell & Kidd, 2011), as one hemisphere is not exclusively associated with specific tasks for example creativity is not limited to the right hemisphere of the brain (Dietrich & Kanso, 2010). Unfortunately, the left brain right brain theory is commonly believed in education, but given the evidence, it should not be used and considered invalid.

Brain dominance plays role in many ways in sports activity. The tactical aspect such as logical, rational and theoretical skills is driven by left hemisphere and spatial orientation and creativity by the right hemisphere of the brain (Geake, 2011). The inter individual as well gender differences in peculiarities of brain hemisphere have been seen (Cahill, 2005). Psychological developments in psychic disorder have been affected with brain hemisphere dominance. It has been seen that the explicit brain has associated with right hand dominant (right-handers) individuals than that of left-handers. The sharp changes of mood and unstable behaviour are characteristic for left-handers. They have found fanciful, more creative with fertile imagination, visual memory usually is dominant, spatial vision is well developed. Left-handers prefer multiform work with accuracy.

Predominantly left-hander's athletes were found at top in different sports. Survey showed the degree and winning ratios are higher in the left-handed in wrestling than in both right- and ambidextrous wrestlers among top international wrestlers (Zyagil et al., 2010). The shooting accuracy is seen higher in left-handers among basketball players as they have higher exactness of throws in the basket. Keeping in mind the above facts the researcher aimed to investigate the mental toughness of boxers in connection with dominance of brain hemispheres.

METHODOLOGY

In the present study total 100 male boxing players were selected as subject. All the male boxing players have represented their college or University at inter-collegiate, inter-university, state, and national level tournaments. Out of hundred boxing players twenty-five were from inter-collegiate level, twenty-five from interuniversity, twenty-five from state, and twenty-five were from national level boxing championship. The age ranged from 19 years to 27 years were selected randomly after their informed consent.

Tools used

To assess the mental toughness of subjects the mental toughness (Sandeep Tiwari, 2010) questionnaire was used. To see the brain-dominance (Catawba Vally 2009) questionnaire was used.

Collection of data

To assess the Mental toughness of subject's mental toughness questionnaire prepared by (Dr Sandip Tiwari) was used. The questionnaire consists of 48 statements which are categorized under six variables namely Self Confidence (8 statements), Motivation (10 statements), Attention Control (10 statements), Goal setting (8 statements), Visual and Imagery Control (6 statements), and Attitude control (6 statements). To assess the brain-dominance, brain dominance questionnaire (Catawba vally) consist of 15 questions was used to collect the data for the present study.

Administration of Test

First, the scholar met personally all the responded and explain the importance of work and seek cooperation from them. All the responded were asked to sit in the class room. The questionnaires were handed over to them and asked to return it after filling it up.

Scoring

Mental toughness: The scoring of the questionnaire was scored based on five-point Likert scale where the responses extent from strongly disagree to strongly agree the minimum score that can be obtained on the sub variable of Self Confidence is 8 and a maximum of 40, Motivation 10 minimum and 50,

Goal Setting minimum 8 and maximum 80. Visual & Imagery minimum 6 and maximum 30, Attitude Control minimum 6 and maximum 30. In order to identify the weakness and strong points of the sports person the 6 sub variables scored included in the Mental Toughness Questionnaire in sports were calculated. To assess the overall Mental Toughness of a sports person it is essential to total the score of all the six sub-scale. Thus, a minimum score of 48 and maximum score of 240 can be obtained by a respondent.

To assess the brain-dominance, brain dominance questionnaire (Catawba Vally) consist of 15 questions was used. The questionnaire has a, b, and c options. The number of "a" and "b" answers was calculated. Option "c" answers was not considered. The (-) minus sign in front of your "a" score and a (+) plus sign in front of your "b" score will be put. At last the algebraic sum of your "a" and "b" scores were performed.

Statistical technique used

The prevalence statistics, descriptive, comparative (ANOVA, post hoc LSD) statistics was employed to analyse the data.

Results

Showing the prevalence statistics for brain dominance (left and right) in boxing

Table 1: players

Level of Participation	Left Brain Dominant	Right Brain Dominant
District	15	10
State	17	8
National	19	6
All India	21	4
Total	72	28

Table 1 depicts the prevalence statistics of brain dominant of score, based upon sum of the scores, as function of brain dominance. Results indicate that out of 100 subjects, 72 (72%) were found left brain dominant and 28 (28%) were found right brain dominant based on the score in total subjects.

While it was seen as a function level of participation of subjects out of 72 subjects from left brain dominant subjects, 15 had participated in district level, 17 had participated in state level, 19 had participated in national level, and maximum 21 had participated in All India level. Similarly, in right brain dominant subjects, 10 had participated in district level, 8 had participated in state level, 6 had participated in national level, and least 4 had participated in All India level (detail in table 1). Above table clearly show that as the level of participation increased the left brain dominant increased and right brain dominant decreased (table 1).

Table 2: Showing the prevalence statistics for brain dominance in boxing players

Level of participation	Moderate Left	Slightly Left	Bilateral	Slightly Right	Moderate Right
District	4	11	0	9	1
State	2	15	0	7	1
National	5	14	0	4	2
All India	5	16	0	2	2
Total	16	56	0	22	6

Table 2 depicts the prevalence statistics of brain dominant of score, based upon sum of the scores, as function of brain dominance. Results indicate that out of 100 subjects, predominantly 56 were found slightly left brain dominant, 16 were found moderate left brain dominant, 22 were found slightly right brain

dominant, and few (6) were found moderate right brain dominant, and none was found bilateral (both left and right brain) dominant based on the score in total subjects (table 2).

Table 3: Showing the comparison (ANOVA) in the characteristics of mental toughness and its sub variable amongst the district, state, national, and all India level boxing players

	District	State	National	All India	ANOVA	
	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE	F-Value (df)	P-Value
Self Confidence	28.88 ± 0.61	28.36 ± 0.79	29.76 ± 0.80	29.56 ± 0.59	0.82 (3,96)	NS
Motivation	36.60 ± 1.19	36.16 ± 0.88	37.08 ± 0.59	38.20 ± 0.70	1.01 (3,96)	NS
Attention Control	37.36 ± 1.17	37.60 ± 1.05	37.72 ± 0.79	37.72 ± 0.95	(3,96)	NS
Goal Setting	28.72 ± 0.92 ^b	30.96 ± 0.69 ^a	31.68 ± 0.83 ^a	32.68 ± 0.75 ^a	4.37 (3,96)	p<0.05
Visual & Imagery Control	20.00 ± 0.58 ^b	22.76 ± 0.37 ^a	22.80 ± 0.36 ^a	23.08 ± 0.59 ^a	8.69 (3,96)	p<0.05
Attitude Control	22.08 ± 0.59	22.20 ± 0.47	22.20 ± 0.51	21.04 ± 0.66	0.98 (3,96)	NS
Mental Toughness	174.52 ± 4.52	180.32 ± 2.32	180.24 ± 2.68	180.12 ± 3.31	0.74 (3,96)	NS

NS – not significant; similar alphabet in super scrip showed similar value

Inter-individual differences as well as group difference amongst the studied groups were not observed all most in all (except goal setting and visual & imagery control) variables in mental toughness and its sub variables. The means of mental toughness and its sub variables are shown in Tables 3.

Results of comparative statistics (ANOVA) indicate statistically significant (p<0.05) difference in goal setting and visual & imagery control (Table 3), the all India, national, and state level boxing players showed significantly higher average as compare to that of district level boxing players. In contrast, self-confidence, motivation, attention control, attitude control, and the mental toughness revealed insignificant difference amongst the studied groups.

Table 4: Showing the comparison (ANOVA) in the characteristics of mental toughness and its sub variable amongst the moderate left brain, slightly left brain, slightly right brain, and moderate right brain dominant boxing players

	MLB	SLB	SRB	MRB	ANOVA	
	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE	F-Value (df)	P-Value
Self Confidence	29.13 ± 0.96	29.12 ± 0.47	29.45 ± 0.71	28.17 ± 1.62	0.205 (3,96)	NS
Motivation	37.81 ± 0.92	36.89 ± 0.66	37.14 ± 0.60	35.50 ± 2.23	0.432 (3,96)	NS
Attention Control	37.31 ± 1.27	38.02 ± 0.57	36.68 ± 1.32	37.83 ± 2.54	0.402 (3,96)	NS
Goal Setting	31.81 ± 0.89	30.89 ± 0.54	31.00 ± 0.94	30.00 ± 2.81	0.314 (3,96)	NS
Visual & Imagery Control	22.81 ± 0.49	22.12 ± 0.39	21.54 ± 0.52	23.00 ± 1.52	0.869 (3,96)	NS
Attitude Control	21.81 ± 0.83	22.25 ± 0.33	21.14 ± 0.72	21.33 ± 1.05	0.896 (3,96)	NS
Mental Toughness	180.69 ± 3.81	179.30 ± 2.16	176.95 ± 3.56	178.80 ± 1.65	0.237 (3,96)	NS

MLB -moderate left brain, SLB – slightly left brain, SRB – slightly right brain, MRB – moderate right brain. NS – not significant

Inter-individual differences as well as group difference amongst the studied groups i.e. moderate left brain, slightly left brain, slightly right brain, and moderate right brain groups were not observed in all variables of the mental toughness and its sub variables. The means of mental toughness and its sub variables are shown in Tables 4.

Results of comparative statistics (ANOVA) indicate statistically insignificant ($p>0.05$) difference in all studied variables (Table 4), the moderate left brain dominant and slightly left brain dominant boxing players showed insignificantly higher average as compare to that of moderate right brain dominant and slightly right dominant boxing players.

CONCLUSION

In the present study, result showed that the insignificant relationship between mental toughness and level of achievements. Goal setting and visual & imagery control showed meaningful relationship with level of achievement. The brain hemisphere of boxing players does not affect the mental toughness of boxing players in the present study. Predominantly boxing players were found to be left brain dominant.

REFERENCES

1. Alferink, L. A., & Farmer-Dougan, V. (2010). Brain-(not) based education: Dangers of misunderstanding and misapplication of neuroscience research. *Exceptionality*, 18(1), 42-52.
2. Cahill, L., (2005). His Brain, Her Brain. *Scientific American*. Volume 292, Issue 5, 40-47.
3. Dekker, S., Lee, N. C., Howard-Jones, P., & Jolles, J. (2012). Neuromyths in education: Prevalence and predictors of misconceptions among teachers. *Frontiers in Psychology*, 3(429).
4. Dietrich, A., & Kanso, R. (2010). A review of EEG, ERP, and neuroimaging studies of creativity and insight. *Psychological Bulletin*, 136(5), 822-848.
5. Gazzaniga, M. S. (1985) *The social brain*. New York, NY: Basic Books.
6. Gazzaniga, M. S. (2002). The split brain revisited. *Scientific American*, 279(1), 27-321.
7. Geake (2011). Position Statement on Motivations, Methodologies, and Practical Implications of Educational Neuroscience Research: fMRI studies of the neural correlates of creative intelligence. *Education Philosophy and Theory*, Volume 43, Issue 1, 43-47. DOI: 10.1111/j.1469-5812.2010.00706.x.
8. Gould, D., Dieffenbach, K., and Moffett, A. (2002). Comparative study of mental toughness amongst player of Team games, Psychological characteristics and their development in Olympic champions, *Journal of Applied Sport Psychology*, Volume 14, pp 172-204.
9. Lilienfeld, S. O., Lynn, S. J., Ruscio, J., & Beyerstein, B. L. (2010). Some people are left-brained, others are right-brained. *50 great myths of popular psychology: Shattering widespread misconceptions about human behavior* (pp. 25-28). Malden, MA: Wiley-Blackwell.
10. Lindell, A. K., & Kidd, E. (2011). Why right-brain teaching is half-witted: A critique of the misapplication of neuroscience to education. *Mind Brain and Education*, 5(3), 121-127. Blackwell Publishing.
11. Loher J E, Comparative study of mental toughness amongst player of Team games, mental toughness training for sports: achieving athletic Excellence, (Lexington, MA: Stepen Greene press, 1986)
12. Zyagil, .A., Gursoy, R., Dane, S., Yuksel, R. (2010). Left-handed wrestlers are more successfull. *Perceptual and Motor Skills*, 112:2, 440-450. DOI:10.2466/04.05.19.25.PMS.111.4.65-70.