



MENTAL TOUGHNESS AS A DETERMINANT FACTOR OF PERFORMANCE IN TABLE TENNIS

Mohammad Ahsan¹,

Arif Mohammad²ⁱ

¹Assistant Professor,

Imam Abdulrahman bin Faisal University,

Damman, Saudi Arabia

²Assistant Professor,

Department of Teacher Training and Non-formal Education (IASE),

Jamia Millia Islamia, New Delhi, India

Abstract:

The purpose of this study was to investigate the effect of mental toughness on the performance score of table tennis players. To work on this purpose a total of 24 table tennis players (male and female) were selected as the subjects purposively. The Mental Toughness Questionnaire developed by Goldberg (1995) was used to measure the level of mental toughness of the players. ANOVA and independent t-test was computed to find out the significant relationship. Level of significance was set at 0.05. The results indicate that- there is significant relationship exists for the handling pressure a sub-category of mental toughness among table tennis female and male players, further it was found that there is no significant difference exists between table tennis female and male players in the variables of concentration, mental rebounding, and winning attitude and/or other sub-categories of mental toughness. The comparison between female and male in this study has not shown any significant difference but as a means, the male players have greater mental toughness than their counterpart.

Keywords: mental toughness, determinant factor, performance, table tennis

ⁱ Corresponding author: Dr. Arif Mohammad, Assistant Professor, Department of Teacher Training and Non-formal Education (IASE), Jamia Millia Islamia, New Delhi, India, email: amohammad3@jmi.ac.in

1. Introduction

In every sport various elements or factor are required to perform well. These factors could be skill, technical and tactical strategies, physical fitness, physiological functioning of organs and psychological makeup (Kuan & Roy, 2007; Singh, Valsaraj, & Mohammad, 2013). Specific training is adopted to improve each element. Psychological makeup has been significantly contributing on sport performances (Singh *et al.*, 2013). Many sport personnel, coaches, team managers, and sport persons benefit from the feedback given by sport psychologist. A lot of sport persons around the world have been utilizing psychological techniques to improve their performance at desired level (Adeyeye, Edward, Kehinde, & Afolabi, 2013).

Along with other sport in table tennis, the psychological factors also play a crucial role in performance determination (Crust & Azadi, 2010). Positive or negative psychological factors can lead a participant towards the high or low performance. Table tennis competition demands participants to perform at their best, under intense pressure and specific conditions. Remarkable amounts of training are required to perform well, and the success depends upon the physical and mental toughness (Ragab, 2015).

Mental toughness can be interpreted as a contributing element that leads to enhance performance in a competitive situation (Alhaki, 2016). Mental toughness demands to stay focused on progress, ignoring distraction and pushing through all challenging moments. Jones, Hanton and Connaughton (2002) describes mental toughness as one of the most overused but least understood terms in applied sports psychology. Kaiseler, Polman and Nicholls (2012) showed that a higher level of mental toughness was related to the experience of less stress and more control in the game situation. Jones, Hanton and Connaughton (2007) agreed that mental toughness include awareness, control of thoughts, staying focused, using long term goal as motivation source, pushing to overcome challenges, and having a strong confidence. William (1998) documented that mental toughness may have more to do with winning than physical attributes such as speed and power. Mental toughness enables a sport person to be mentally strong to cope with the challenges of sports (training, competition and life style) better than their opponents (Bull, Shambrook, James, & Brooks, 2005; Thelwell, Weston, & Greenlees, 2005).

The increased research interest of the role of mental toughness in sports competition was comprise over different individual and team sport (Jones *et al.*, 2002, 2007; Fourie & Potgieter 2001), although mental toughness explored in team sports like cricket (Bull *et al.*, 2005; Gucciardi & Gordon 2009) soccer (Thelwell *et al.*, 2005) and Australian Football (Gucciardi, Gordon, & Dimmock, 2008). Jones *et al.* (2007) reported

that super elite athletes might be able to articulate their thoughts on mental toughness than would elite athletes. Gould, Dieffenbach and Moffett (2002) identified that mental toughness acted as a significant contributor towards the enhancement of sports performance between Olympic champions. Crust and Azadi (2010) indicated that mental toughness and athletic coping skills are related to performance success. Mental toughness helps to create good imagery and coping strategies in sports performance (Omar-Fauze, Daud, Abdullah, & Rashid, 2009). Therefore, all athletes should try to master their physical, mental, technical and strategies of the games involved to sequentially overcome on the competition pressure (Hogg, 2002).

There are certain moments during table tennis competition, that appear to carry great psychological significance when the momentum starts to shift in one direction or another. These situations require athletes to remain completely focused and calm in the face of difficult circumstances. Tennis players talk of the 'big' points during a tight match, such as a fleeting chance to break serve. Thus, the purpose of this study was to investigate the effect of mental toughness on the performance of table tennis players, as well as use mental toughness for the prediction of sport person performance.

2. Methods and Materials

The research design adopted in this study was descriptive survey method. The study was conducted in Delhi, India.

2.1 Participants

The present study was conducted on 24 male and female table tennis players of Delhi, India. The age of the selected subjects ranged from 17 to 24 years. The average training age of the subjects was 6.5 years. The lowest participation level of selected participants was state level. Written informed consent was obtained from each participant before their participation in the study. It was also assured that they did not suffer any major injury within 1 year on the day of data collection.

2.2 Tools

The Mental Toughness Questionnaire was used to measure the level of mental toughness of the players. The questionnaire developed in 1995 by Goldberg, consist of four categories namely: Handling Pressure (20 statements), Winning Attitude (9 statements), Concentration (17 statements), and Mental Rebounding (14 statements). The Mental Toughness Questionnaire consists of sixty items; every statement has two possible responses i.e. True or False. The test retest reliability of the questionnaire was reported as 0.79.

2.3 Procedure

The questionnaire on mental toughness was administrated on the subjects. After explaining the objective of the study, the questionnaires were distributed among the subjects. The instructions on how to respond on the statements were also explained to the players. There was no time limit for the completion of the questionnaire but participants were directed to don't take much time for any statement and respond to all items in the questionnaire. The subjects responded to each question according to how they generally feel in regard to table tennis. All the questionnaires were recollected and processed for further analysis.

2.4 Statistical Analysis

For data analysis responses were recorded as mean score and standard deviation. Independent *t*-test was also computed to find out the significant difference among total mean score of mental toughness and its sub factors. The level of significance was set at 0.05. All statistical function was performed by using SPSS (v.23) software.

3. Results

Table 1: Descriptive statistic of sub-categories of mental toughness of male and female table tennis players

		N	Mean	SD	Minimum	Maximum
Handling Pressure	Female	12	13.41	2.71	9.00	17.00
	Male	12	15.66	1.92	12.00	18.00
	Total	24	14.54	2.57	9.00	18.00
Concentration	Female	12	13.00	1.20	11.00	15.00
	Male	12	12.66	1.37	11.00	15.00
	Total	24	12.83	1.27	11.00	15.00
Mental Rebounding	Female	12	11.66	1.15	10.00	14.00
	Male	12	11.00	1.04	9.00	13.00
	Total	24	11.33	1.12	9.00	14.00
Winning Attitude	Female	12	7.00	1.12	5.00	9.00
	Male	12	6.50	0.79	5.00	8.00
	Total	24	6.75	0.98	5.00	9.00

The means and standard deviation is presented in the above cited Table 1. Table 1 indicates that the mean of handling pressure of table tennis female and male players have been reported 13.45, 15.67 and standard deviation 2.71, 1.92, respectively. The means of concentration of table tennis female and male players have been found 13.00, 12.67 and standard deviation 1.21, 1.37, respectively. Further, the mean of mental rebounding between table tennis female and male players have been reported 11.67,

11.00 and standard deviation 1.15, 1.04, respectively, the winning attitude between table tennis female and male players have been reported 7.00, 6.50 and standard deviation 1.13, 0.99, respectively.

Table 2: Test of homogeneity of variances

	Levene Statistic	df1	df2	Sig.
Handling Pressure	2.002	1	22	0.171
Concentration	0.440	1	22	0.514
Mental Rebounding	0.550	1	22	0.466
Winning Attitude	0.500	1	22	0.487

The test of homogeneity of variances is calculated and it showed that there is no significant difference amongst the four sub categories of mental toughness.

Table 3: ANOVA showing the difference of sub-categories of mental toughness between male and female table tennis players

		Sum of Squares	df	Mean Square	F	Sig.
Handling Pressure	Between Groups	30.37	1	30.37	5.49*	0.028
	Within Groups	121.58	22	5.52		
	Total	151.95	23			
Concentration	Between Groups	0.66	1	0.66	0.40	0.534
	Within Groups	36.66	22	1.66		
	Total	37.33	23			
Mental Rebounding	Between Groups	2.66	1	2.66	2.20	0.152
	Within Groups	26.66	22	1.21		
	Total	29.33	23			
Winning Attitude	Between Groups	1.50	1	1.50	1.57	0.223
	Within Groups	21.00	22	0.95		
	Total	22.50	23			

*Significant

Tab= 2.94

In order to test the objective of the study analysis of variance was applied amongst the sub categories of mental toughness. The result indicates that the obtained 'F' value for the handling pressure has been reported 5.38 which is more than the tabulated value. This reveals that there is significant difference exist between this sub-categories of mental toughness among table tennis female and male players. The result presented in the table further indicates that the obtained 'F' value for the concentration, mental rebounding, and winning attitude between table tennis female and male players have been reported 0.40, 2.20, and 1.57 which are lower than the tabulated value. This reveals that there is no significant difference found between these three sub-categories of mental toughness among table tennis female and male players at 0.05 level of significance.

Table 4: The t-test showing the difference of mental toughness between male and female table tennis players

Type of School	Mental Toughness			Level of significance
	M	SD	t-value	
Female N =12	45.08	3.50	0.57	p>0.05
Male N=12	45.83	2.91		

To test the mental toughness level between female and male table tennis players the ‘t’ test was applied. The above Table 4 indicates that the obtained ‘t’ value for mental toughness irrespective of gender have been reported 0.57 which is lower than the tabulated value. Thus, it reveals that there is no significant difference between table tennis female and male players at 0.05 level of significance.

4. Discussion

The purpose of this research was to investigate the mental toughness one of the psychological factor that effect the performance of table tennis players, and to assess the significant difference between female and male table tennis players. The situation where female players feels in a balance condition with respect to their counterparts, there is no negative feedback. In regards to handling the pressure, females might feel higher level of pressure than male players (Grossman & Wood, 1993). It is confirmed with the result that there is significant difference between female and male players with the handling pressure. Pashabadi, Shahbazi, Hosseini, Mokaberian, Kashani and Heidari (2011) showed that elite players had better concentration and mental skills than non-elite players but there is no significant difference between both genders. Ahsan (2015) found that there is no significant difference between female and male physical education students but the mean score of male was higher than female students in regards to winning attitude. The psychological differences are overlooked between female and male players. Might be the cause for this is which game a female player chooses to play.

The results of the present study suggest that mental toughness does not have a significant difference irrespective of genders for table tennis players. Commitment was found to load most frequently against performance strategies (Crust & Azadi, 2010). Many studies conducted by contemporary researchers are having similar results, and they support findings of this study. The most recent findings of the research conducted by Rahmati and Naimikia (2015) showed that there is no significant difference between female and male students athletes by means of mental toughness. Clough and

Strycharczyk (2012) also found in their study that the differences between both sex in regards to mental toughness are rare. Contradictory to this other researchers like Nicholls, Polman, Levy and Backhouse (2009) found the male athletes have more mental toughness than female athletes on challenges, control emotions, control life and confidence ability. Katsikas, Argeitaki and Smirniotou (2009) found that male athletes reported higher level of emotion control than their female counter part. Adeyeye *et al.*, (2013) also found that male athletes score more than female athletes on confidence and control. Malouff, McGee, Halford and Rooke (2008) demonstrate that positive mental preparation before the competition may lead to stronger performance which corroborate the finding.

5. Conclusion

The comparison between female and male in this study has not shown any significant difference but as a means, the male players have greater mental toughness than their counterpart. There is a psychological need for the improvement of sports performance, psychological training should be given equal importance with others training methodologies, especially that would be directly or indirectly related with performance and affect through mental toughness. Regarding the consistency, it can be said that many psychological variables have been identified so far, which have had effects on athletes' performance.

References

1. Adeyeye, M., Edward, H., Kehinde, A., & Afolabi, F. (2013). Effects of mental-skills training on the performance of table tennis players of national institute for sport, Lagos. *IOSR Journal of Research & Method in Education*, 2(3), 22-27.
2. Ahsan, M., (2015). *An analysis of physical education students perception on winning attitude, new thought*. Channai: Ambadi Publishers.
3. Alhaki, V. (2016). Determining the relationship between mental toughness with sporting success in elite male badminton players in Iran. *International Journal of Humanities and Cultural Studies*, 3, 1884-1895.
4. Bull, S.J., Shambrook, C.J., James, W., & Brooks, J.E. (2005). Towards an understanding of mental toughness in elite English cricket. *Journal of Applied Sport Psychology*, 17, 209-227.

5. Clough, P.J. & Strycharczyk, D. (2012). *Developing mental toughness: improving performance, wellbeing and positive behaviour in others*. London: Kogan Page Limited.
6. Crust, L. & Azadi, K. (2010). Mental toughness and athletes' use of psychological strategies. *European Journal of Sports Sciences*, 10(1), 43-51.
7. Fourie, S. & Potgieter, J.R., (2001). The nature of mental toughness in sport. *South African Journal for Research in Sport, Physical Education and Recreation*, 23, 36-72.
8. Goldberg, A. (1995). The mental toughness test. *Psychological Research Foundation*, 2, 1, 19-22.
9. Gould, D., Dieffenbach, K., & Moffett, A. (2002). Psychological characteristics and their development in Olympic champions. *Journal of Applied Sport Psychology*, 14, 172-204.
10. Grossman, M., & Wood, W. (1993). Sex differences in intensity of emotional experience: A social role interpretation. *Journal of Personality and Social Psychology*, 65(5), 1010-1022.
11. Gucciardi, D.F. & Gordon, S. (2009). Development and preliminary validation of the Cricket Mental Toughness Inventory. *Journal of Sports Sciences*, 27, 1293-1310.
12. Gucciardi, D.F., Gordon, S., & Dimmock, J.A. (2008). Towards an understanding of mental toughness in Australian football. *Journal of Applied Sport Psychology*, 20, 261-281.
13. Hogg, J.M. (2002). *The application of psychological skills to sport and physical activity*. Canada: Sport Excel Publishing.
14. Jones, G., Hanton, S., & Connaughton, D. (2002). What is this thing called mental toughness? An investigation of elite sport performers. *Journal of Applied Sport Psychology*, 14, 205-218.
15. Jones, G., Hanton, S., & Connaughton, D. (2007). A framework of mental toughness in the world's best performers. *Sport Psychologist*, 21(22), 326-332.
16. Kaiseler, M., Polman, R. C. J., & Nicholls, A. R. (2012). Effects of the Big Five personality dimensions on appraisal coping, and coping effectiveness in sport. *European Journal of Sport Science*, 12(1), 62-72.
17. Katsikas, C., Argeitaki, P., & Smirniotou, A. (2009). Performance strategies of Greek track and field athletes: Gender and level differences. *Biology of Exercise*, 5(1), 10.
18. Kuan, G., & Roy, J. (2007). Goal profiles, mental toughness and its influence on performance outcomes among wushu athletes. *Journal of Sports Science & Medicine*, 6(CSSI-2), 28-33.

19. Malouff, J.M., McGee, J.A., Halford, H.T., & Rooke, S.E. (2008). Effects of pre-competition positive imagery and self-instructions on accuracy of serving in tennis. *Journal of Sport Behavior* 31(3), 264-275.
20. Nicholls, A.R., Polman, R.J., Levy, A.R., & Backhouse, S.H. (2009). Mental toughness in sport: Achievement level, gender, age, experience, and sport type differences. *Personality and Individual Differences*, 47(1), 29-38.
21. Omar-Fauzee, M.S., Daud, W.R.B., Abdullah, R., & Rashid, S. (2009). The effectiveness of imagery and coping strategies in sport performance. *European Journal of Social Sciences*, 9(1), 97-108.
22. Pashabadi, A., Shahbazi, M., Hosseini, S.M., Mokaberian, M., Kashani, V., & Heidari, A. (2011). The comparison of mental skills between elite and non-elite male and female volleyball players. *Journal of Behavioral and Social Sciences*, 30, 1538-1540.
23. Ragab, M. (2015). The effects of mental toughness training on athletic coping skills and shooting effectiveness for national handball players. *Science, Movement and Health*, 15(2, Suppl.), 431-435.
24. Rahmati, F.N. & Maliheh (2014). Relation between mental stability with emotional intelligence and comparing them by working on athlete and non-athlete students. *Sports Management and Physical Behavior Research*, 11(22), 141-148.
25. Sheard, M., Golby, J., & van Wersch, A (2009). Progress toward construct validation of the Sports Mental Toughness Questionnaire (SMTQ). *European Journal of Psychological Assessment*, 25(3), 186-193.
26. Singh, A.K., Valsarak, K.M., & Mohammad, A. (2013). Mental health between male physical education and non-physical education students: A comparative study. *Academic Sports Scholar*, 2(6).
27. Thelwell, R., Weston, N., & Greenlees, I. (2005). Defining and understanding mental toughness within soccer. *Journal of Applied Sport Psychology*, 17, 326-332.
28. Williams, M.H. (1998). *The ergogenics edge: Pushing the limits of sports performance*. Champaign, IL: Human Kinetics.

Creative Commons licensing terms

Authors will retain the copyright of their published articles agreeing that a Creative Commons Attribution 4.0 International License (CC BY 4.0) terms will be applied to their work. Under the terms of this license, no permission is required from the author(s) or publisher for members of the community to copy, distribute, transmit or adapt the article content, providing a proper, prominent and unambiguous attribution to the authors in a manner that makes clear that the materials are being reused under permission of a Creative Commons License. Views, opinions and conclusions expressed in this research article are views, opinions and conclusions of the author(s). Open Access Publishing Group and European Journal of Physical Education and Sport Science shall not be responsible or answerable for any loss, damage or liability caused in relation to/arising out of conflict of interests, copyright violations and inappropriate or inaccurate use of any kind content related or integrated on the research work. All the published works are meeting the Open Access Publishing requirements and can be freely accessed, shared, modified, distributed and used in educational, commercial and non-commercial purposes under a [Creative Commons attribution 4.0 International License \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/).