

Mental Toughness

*and Relationships to Strategies
of Psychological Performance of*

TENNIS

Competitive Players

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Abstract

This research aims to know the differences between tennis competitive players in determinants of mental toughness and strategies of performance according to differences in age groups, knowing the differences between tennis competitive players, correlation between determinants of mental toughness and strategies of performance, the research was applied on a sample of (30) players as basic samples for the research, (10) players representing the age groups under 16 years- under 18 years- men, the test of attitudes toward sports competition that measure the mental toughness, translated to Arabic and codified on

the Egyptian environment by Mohammed Hassan Alawai and Ahmed Salah Al-Din (2008) was used, the test of strategies of performance of Alan Goldenberg which is modified and translated to the Egyptian environment by Osama Abd Al-Rahman and Magda Ismaiel (2007), the researchers used the suitable statistical methods, the most important results found by the researchers is that there is statistically significant differences in the determinants of mental toughness between tennis competitive players in the age groups under 16 years- under 18 years- men in favor of men, also there is statistically significant differences in strategies of performance between competitive players.

Research Objectives:

Knowing differences between tennis competitive players in determinants of mental toughness and strategies of performance according to the differences in age groups. Knowing the relationship between determinants of mental toughness and strategies of performance.

Research procedures:

Research methodology :

The researchers used the descriptive method that suit the nature of this research.

Research community and sample :

The research sample is represented in (42) players selected from represents the tennis competitive players for the age groups (under 16 years- under 18 years- men) participating in local championships organized by the Egyptian Tennis Federation, (ITF) and Future championships organized by International Federation during the sports year 2011-2012,, the researchers excluded (6) players from the three age groups, (2) from under 16 years, (2) from under 18 years and (2) from men, as they did not complete their research documents, so the sample become (30) player. Table No. (1) shows the control of the research community.

Table (1):

Description of research community and sample

n=30

<i>Sample</i>	<i>Basic sample</i>	<i>Excluded players</i>	<i>Real sample</i>	<i>Pilot study</i>
<i>Boys under 16 years</i>	<i>12</i>	<i>2</i>	<i>10</i>	<i>3</i>
<i>Boys under 18 years</i>	<i>12</i>	<i>2</i>	<i>10</i>	<i>3</i>
<i>Men</i>	<i>12</i>	<i>2</i>	<i>10</i>	<i>3</i>
<i>Total</i>	<i>36</i>	<i>6</i>	<i>30</i>	<i>9</i>

Data collection tools:

- Inventory of mental toughness.
- Test of strategies of performance.

Results:

Table (2):

Arithmetic mean, Standard deviation for tennis players (under 16 years, under 18 years, men) in determinants of mental toughness

(n1 = n2 = n3 = 10)

No	Age groups Determinants	Under 16 years		Under 18 years		Men	
		M	+S.D.	M	+S.D.	M	+S.D.
1	Ability to face pressures	11.20	1.40	12.40	1.37	13.30	0.74
2	Self confidence	7.20	1.32	9.80	1.03	11.40	0.84
3	Focus of attention	7.30	1.77	8.50	1.34	10.80	0.92
4	Speed of return to normal state	9.00	1.163	9.80	0.66	12.20	1.32
5	Motive of achievement	9.10	1.17	9.70	0.95	10.90	1.06
6	Total degree	43.80	4.00	50.2	3.56	58.60	11.65

Table (3):

Analysis of variance for the three age groups (under 16 years, under 18 years, men) of tennis players in determinants of mental toughness n = 10

No	Determinants	Source of data	Sum of squares	Degree of freedom	Average of squares	F value
1	Ability to face pressures	Between groups	5.40	2	2.70	1.65
		Inside groups	44.10	27	1.63	
2	Self confidence	Between groups	41.87	2	20.93	16.82*
		Inside groups	33.60	27	1.24	
3	Focus of attention	Between groups	0.07	2	0.03	8.12*
		Inside groups	54.60	27	20.02	
4	Speed of return to normal state	Between groups	40.07	2	20.03	9.11*
		Inside groups	59.40	27	2.20	
5	Motive of achievement	Between groups	0.87	2	0.43	0.44
		Inside groups	26.50	27	0.98	
6	Total degree	Between groups	152.47	2	76.23	6.68*
		Inside groups	308.20	27	11.41	

Table (F) value at level of significance 0.05 = 3.35

Table (4):

Significance of differences between the three age groups (under 16 years, under 18 years, men) for tennis players in determinants of mental toughness n = 10

No	Determinants	Age group	Arithmetic mean	Differences of means			LSD
				Under 16 years	Under 18 years	Men	
1	Self confidence	Under 16 years	7.20		2.60*	1.60*	1.23*
		Under 18 years	9.80		3.20*		
		Men	11.40				
2	Focus of attention	Under 16 years	7.30		1.2	3.5*	1.92*
		Under 18 years	8.50		2.3*		
		Men	10.80				
3	Speed of return to normal state	Under 16 years	9.00		0.80	2.40*	1.64*
		Under 18 years	9.80		2.20		
		Men	12.20				
4	Total degree	Under 16 years	43.80		3.70	5.40*	3.74*
		Under 18 years	50.2		1.70		
		Men	58.60				

Table (5):

Arithmetic mean, Standard deviation for tennis players (under 16 years, under 18 years, men) in strategies of performance n1 = n2 = n3 = 10

No	Strategies	Age groups		Under 16 years		Under 18 years		Men	
		M	+S.D.	M	+S.D.	M	+S.D.		
1	Putting objective (training)	11.40	1.35	12.50	1.58	14.60	1.07		
2	Self talking (training)	11.60	1.51	13.40	1.65	17.40	0.97		
3	Relaxation (training)	9.50	1.08	11.90	0.88	13.70	0.95		
4	Mechanism (training)	9.90	0.88	11.90	0.88	12.90	1.20		
5	Activity (training)	9.95	1.07	11.60	1.07	12.70	1.32		
6	Emotional control (training)	10.60	0.97	12.95	0.97	13.90	1.27		
7	Imagination (training)	10.30	1.06	11.70	1.16	15.00	1.89		
8	Attention control (training)	8.70	1.06	10.50	0.85	12.90	1.37		
9	Putting objective (competitive)	10.80	1.32	11.20	1.32	14.20	0.79		
10	Self talking (competitive)	10.20	1.48	11.40	1.35	13.90	1.45		
11	Relaxation (competitive)	9.90	0.99	10.70	1.34	13.30	1.49		
12	Mechanism (competitive)	8.70	1.30	9.60	1.26	11.10	0.99		
13	Activity (competitive)	9.90	1.10	11.20	1.23	13.70	1.34		
14	Emotional control (competitive)	9.10	1.29	10.60	0.97	13.10	0.99		
15	Imagination (competitive)	9.20	1.48	10.80	1.32	14.90	1.20		
16	Attention control (competitive)	8.60	1.17	9.80	1.03	12.70	1.16		

Table (6):

Analysis of variance for the three age groups of tennis players under research in strategies of performance *n = 10*

No	Determinants	Source of data	Sum of squares	Degree of freedom	Average of squares	F value
1	Putting objective (training)	Between groups	42.87	2	21.43	8.90*
		Inside groups	65.00	27	2.41	
2	Self talking (training)	Between groups	54.60	2	27.30	10.28
		Inside groups	71.70	27	2.66	
3	Relaxation (training)	Between groups	31.40	2	15.70	15.47*
		Inside groups	27.40	27	1.01	
4	Mechanism (training)	Between groups	22.07	2	11.03	11.55*
		Inside groups	25.80	27	0.96	
5	Activity (training)	Between groups	24.27	2	12.13	8.53*
		Inside groups	38.40	27	1.42	
6	Emotional control (training)	Between groups	80.00	2	40.00	42.86*
		Inside groups	25.20	27	0.93	
7	Imagination (training)	Between groups	58.40	2	29.20	20.58*
		Inside groups	38.30	27	1.42	
8	Attention control (training)	Between groups	48.47	2	24.23	21.67*
		Inside groups	30.20	27	1.12	
9	Putting objective (competitive)	Between groups	58.40	2	29.20	16.85*
		Inside groups	46.80	27	1.73	
10	Self talking (competitive)	Between groups	52.27	2	26.13	13.47*
		Inside groups	52.40	27	1.94	
11	Relaxation (competitive)	Between groups	41.60	2	20.80	13.66*
		Inside groups	41.10	27	1.52	
12	Mechanism (competitive)	Between groups	34.87	2	17.43	12.86*
		Inside groups	36.60	27	1.36	
13	Activity (competitive)	Between groups	55.27	2	27.63	19.58*
		Inside groups	38.10	27	1.41	
14	Emotional control (competitive)	Between groups	61.67	2	30.83	26.26*
		Inside groups	31.70	27	1.17	
15	Imagination (competitive)	Between groups	61.40	2	30.70	16.16*
		Inside groups	51.30	27	1.90	
16	Attention control (competitive)	Between groups	39.47	2	19.73	16.44*
		Inside groups	32.40	27	1.20	

Table (F) value at level of significance 0.05 = 3.35

Table (7):

Significance of differences between the three age groups (under 16 years, under 18 years, men) for tennis players in strategies of performance (training) n = 10

No	Determinants	Age group	Arithmetic mean	Differences of means			LSD
				Under 16 years	Under 18 years	Men	
1	Putting objective (training)	Under 16 years	10.40		1.10	2.90*	1.72
		Under 18 years	11.50		1.80*		
		Men	13.30				
2	Self talking (training)	Under 16 years	10.60		1.80*	3.30*	1.80
		Under 18 years	12.40		1.50		
		Men	13.90				
3	Relaxation (training)	Under 16 years	9.50		1.40*	2.50*	1.11
		Under 18 years	10.90		1.10		
		Men	12.00				
4	Mechanism (training)	Under 16 years	9.90		1.00	2.10*	1.08
		Under 18 years	10.90		1.10		
		Men	12.00				
5	Activity (training)	Under 16 years	9.60		1.00	2.20*	1.32
		Under 18 years	10.60		1.20		
		Men	11.80				
6	Emotional control (training)	Under 16 years	10.60		2.00*	4.00*	1.07
		Under 18 years	12.60		2.00*		
		Men	14.60				
7	Imagination (training)	Under 16 years	10.30		1.40*	3.40*	1.32
		Under 18 years	11.70		2.00*		
		Men	13.70				
8	Attention control (training)	Under 16 years	8.70		1.80*	3.10*	1.17
		Under 18 years	10.50		1.30*		
		Men	11.80				

Table (8):

Significance of differences between the three age groups (under 16 years, under 18 years, men) for tennis players in strategies of performance (competition) n = 10

No	Determinants	Age group	Arithmetic mean	Differences of means			LSD
				Under 16 years	Under 18 years	Men	
9	Putting objective (competitive)	Under 16 years	9.80		1.40	3.40*	1.46
		Under 18 years	11.20			2.00*	
		Men	1.30				
10	Self talking (competitive)	Under 16 years	10.20		1.20	3.30*	1.54
		Under 18 years	11.40			2.00*	
		Men	13.40				
11	Relaxation (competitive)	Under 16 years	8.90		0.80	2.80*	1.29
		Under 18 years	9.70			2.00*	
		Men	11.70				
12	Mechanism (competitive)	Under 16 years	7.70		0.90	2.60*	1.31
		Under 18 years	8.60			1.70*	
		Men	10.30				
13	Activity (competitive)	Under 16 years	9.90		1.30*	3.30*	1.31
		Under 18 years	11.20			2.00*	
		Men	13.20				
14	Emotional control (competitive)	Under 16 years	9.10		1.50*	3.50*	1.20
		Under 18 years	10.60			2.00*	
		Men	12.60				
15	Imagination (competitive)	Under 16 years	9.20		1.60*	3.50*	1.52
		Under 18 years	10.80			1.90*	
		Men	12.70				
13	Attention control (competitive)	Under 16 years	8.60		1.20	2.80*	1.21
		Under 18 years	9.80			1.60*	
		Men	11.40				

Table (9):

Correlation coefficient between basic determinants of mental toughness and domains of strategies of performance for tennis players (under 16 years- under 18 years- men)
n = 50

No	Toughness determinants / Strategies of performance	Ability to face pressures	Self confidence	Focus of attention	Speed of return to normal state	Motive of achievement
1	Putting objective (training)	0.732*	0.687*	0.425*	0.282	0.039
2	Self talking (training)	0.750*	0.642*	0.521*	0.119	0.054
3	Relaxation (training)	-0.544*	-0.595*	-0.379*	-0.170	-0.153
4	Mechanism (training)	0.510*	0.421*	0.409*	0.009	0.053
5	Activity (training)	0.764*	0.540*	0.431*	0.166	0.158
6	Emotional control (training)	0.571*	0.546*	0.339*	0.147	0.151
7	Imagination (training)	0.597*	0.443*	0.485*	0.002	0.055
8	Attention control (training)	0.797*	0.444*	0.605*	0.199	0.166
9	Putting objective (competitive)	0.649*	0.673*	0.437*	0.566*	0.462*
10	Self talking (competitive)	0.509*	0.638*	0.431*	0.687*	0.045
11	Relaxation (competitive)	-0.392*	-0.483*	-0.391*	-0.230*	-0.104
12	Mechanism (competitive)	0.520*	0.595	0.394*	-0.059	0.059
13	Activity (competitive)	0.482*	0.660*	0.522*	-0.016	0.194
14	Emotional control (competitive)	0.705*	0.654*	0.505*	0.732*	0.122
15	Imagination (competitive)	0.723*	0.713*	0.494*	0.244	0.125
16	Attention control (competitive)	-0.571*	-0.524*	-0.425*	-0.013	-0.032

Table (r) value at level of significance 0.05 = 0.577

Discussion:

It is shown from Tables No. (3), (4), (5) the presence of statistically significant differences at level of (0.05) between tennis competition players in the age groups under 16 years, under 18 years, and men in determinant of self confidence in the three age groups and the men achieved the highest level of self confidence in comparison to both groups under 16 years and under 18 years, the researchers attributed this to that the player in men team has more training experience and more participation in competitions and from exposure to many situations in which they make mistakes or failure which make them acquire certain level of self confidence characterizing them from the lower age groups.

In this respect, scientists ensured that one of the most important characteristics of the sports player who is characterized by mental toughness is owning a level of confidence that is not changed as a result of failure or mistakes, through competition pressures in the low confidence that do not serve quality of performance, while the high confidence will participate in helping the sports player on training and exerting the maximum effort in competition. (4)

The researchers attributed the shown differences in this determinant to that focus of attention in tennis is done by player ability to focus his attention

on suitable symbols in the environment of tennis which is the ball that is one of the most important symbols in tennis and following it accurately, although that we found that most of players mostly of lower ages observe generally without care to the issue of accuracy, also there are other symbols of importance which is observation of the movements of the opponent, the direction of movement of the racquet before striking the ball to expect the speed and direction and place of drop of the ball, also the differences that appeared between the three age group under research returned to that some players focus their attention on some non related symbols, the results of the current research are in agreement with the results of other researchers that there are many symbols in tennis environment that not related and must not focus upon including the shouts of the audience, the previous bad strikes, the behavior of the opponent, the current result, the events of the day before the match, wrong declaration of ball drop outside the court, and any other thing that distract thinking and attention. (10)

The results of the current research is in agreement with what the researchers mentioned that the problems of focus of attention in sports juniors include their busyness with thinking in their future from the expected results for certain actions that could occur which affect negatively concentration. (11)

The results of scientists study ensured the most important of which

are the results that coaches considered concentration is one of the most important components of the mental toughness. (9)

The same tables (3), (4), (5) showed that there is not statistically significant differences at level of (0.05) in the determinant to speed of return to normal state between the three age groups and the group of men is higher in the level of speed of return to normal state than the lower age groups. The researchers attributed that to the speed of return to normal state in tennis is a mental skill that depends on the player ability to forget mistake committed like making mistakes in serve or mistake in return of serve which push the player to struggle to face these mistakes during competition, this depends on the previous experts of the players from participation in competitions through which he is exposed to like these situations which make him more patient and persistent which is shown by differences between the three groups in determinant of speed of return to normal state which the researchers attributed to experts of men players in competitive participation to pass this more than the lower age groups which showed the significant difference in their favor and this is ensured by scientists. (4)

From the previous presentation of the determinants of mental toughness for tennis competition players shown in results of this research, we found that the results of this research in determinants of the mental toughness agrees

with what is mentioned in results of studies (9), (3), (12), (5) which shown that there is differences in mental toughness between sports players according to the difference in type of practiced sports activity.

It is shown from Tables (6), (7), (8), (9) the presence of statistically significant differences at level of significance 0.05 between tennis competition players of the three phases (under 16 years- under 18 years- men) in means of dimensions of strategies of performance and men achieved higher level in dimensions of strategies of performance for training and dimensions of strategies of performance for competition represented in putting objective (training), putting objective (competition) between players (under 18 years- under 16 years) in favor of the players under 18 years and between men and players under 18 years in favor of the men players due to the training experiences and number of years of practice and participation in competitions more effectively than the lower age groups, the researchers sees that putting objective is one of the most important factors that must care to when design programs for psychological skills as the level of objectives varies for players according to experiences and number of years of practice and ensure also on important of approximation of objectives to achieve the required interaction.

Also evident from the previous tables that there are statistically signifi-

cant differences at level of 0.05 in the dimension of self talking (training) and (competition) and the men achieved the highest level of self talking than the lower age groups under 16 years and under 18 years, and the age group under 18 years is higher in the dimension of self talking than the age group under 16 years, the scientists ensured that the positive self talking is positively correlate with matches results and added that self talking reflects clearly the level of self efficiency which is first I could perform (15), the researchers sees that self talking is one of the requirements of tennis as self talking is vital in the fields of training and competition. The player ability to recruit positive self talking is a decisive factor that affects directly the performance of different sports skills.

Also the tables showed that there are statistically significant differences at level of 0.05 in dimension of relaxation (training) and relaxation (competition) with differences in favor of the men in the dimension of relaxation, also there are differences in favor of the player under 18 years than players under 16 years, the researchers explained that relaxation leads to reduction in effect of response under nervous pressure and help to reach the optimal level of tension and prevent accumulation of nervous pressure by working to reach lower level of baseline tension and reaching degree of deep relaxation in which tension is lower than the baseline level. (13)

Also the previous tables showed the presence of significant differences at level of 0.05 in the dimension of activity (training) and (competition) in favor of the men players than the lower age groups under 16 years and under 18 years. The researchers attributed these differences in favor of men that the players in men group show activity and arousal during training due to the aggression in them to participate in one of the important sports competition which could help them to improve their order on the local level or on the international level as the activity is related to what the player tries to achieve of objectives put through training.

The tables showed the presence of statistically significant differences at level of 0.05 for the dimension of emotional control (training) and (competition) in favor of the players in the three age groups and the higher level in favor of players under 18 years than players under 16 years and for men players than players under 18 years. In this respect, the researcher mentioned that the player who is characterized by more emotion appears in a level less than his real level. (11)

From the tables it is showed that there are statistically significant differences at level of 0.05 in favor of the players in the three age groups in the dimension of imagination (training) and (competition). The researchers attributed the presence of significant differences between players in the dimensions of imagination that the player trained on

skills of imagination that depends on formation of image about performance or imagination of performance of his competitor in certain match or imagination of his performance of certain skill successfully or a match then recall these information to use in competitive situation based on previous experiences that could be training or competitive experiences.

The researcher mentioned that kinetic imagination like (imagination of sequence of serve) is a result of perception of the serve of the other or also of his serve, and storing these sensory perceptions in brain with frequent description of them with term and this psychological and imaginary fixation for these kinetic- sensory perceptions is considered an important condition in mastering capture of picture and rehearsal of its content with deep thinking and using it in studied actions. (14)

From the tables also it is evident the presence of statistically significant differences at level of 0.05 in the dimension of control of attention (training) and (competition) in favor of the three age groups with significant differences in favor of the men. The researchers attributed this to that control of attention is the feeling of player that there is situations that control him and is outside of his control including degree of winds, court floor, lines, direction of sun and its reflection on player's eye, bad weather, wrong judge decisions, all these circumstances could not be controlled by the player but he could con-

trol the level of anxiety and emotional states as they are psychological skills that could be learnt and as the men players has passed educational and training experiences for many years so they are able to control attention more clearly so showed differences in their favor in this dimension.

The results of this research is in agreement with studies (8), (3), (7), (12), (5) which proved the presence of significant differences in strategies of performance according to different types of sports activities and age groups.

It is shown in Table No. (1) that there are (42) positive correlation, (9) negative correlation between determinants of mental toughness and determinants of test of strategies of performance and these correlation ranged between (-0.379) and (0.797), these positive trends appeared as follows: putting objective, self talking, mechanism, activity, emotional control, imagination, control of attention (training), ability to face pressures, self confidence, focus of attention, putting objective, self talking, mechanism, activity, emotional control, imagination, control of attention (competitive), ability to face pressures, self confidence, focus of attention, speed of return to normal state, motive of achievement, negative correlation as follows: relaxation (training), relaxation (competition), control of attention (competition), ability to face pressures, self confidence, focus of attention.

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