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A Mixed Method Analysis of Mental Toughness in Elite and Sub-elite Male and Female Tennis Players In Pakistan

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ABSTRACT

The study examines the potential relationship between mental toughness and performance among elite and sub-elite tennis players in Pakistan. Participants (N=118) were selected through purposive sampling. The qualitative data was collected by adapting the scale "Athletes "how tough are you", Enders, Pamela Lynn (2007) and was used in three sessions: i) individual semi- structured interviews of the 3 seasoned performers and ii) a focus group comprised of 8 elite and7 sub-elite players, and iii) an unstructured interview with the Senior Vice-President of Sindh Tennis Association. Psychological Performance Inventory- Alternative (Golby et al., 2007) was employed as a quantitative measure of mental toughness of 115 participants. Findings for qualitative data revealed that 3 seasoned performers considered "ability to deal with pressure", ability to deal with adversity", "focus", "visualization", "Confidence", "ability to deal with negative talk", "motivation" and "consistency" as crucial factors for tennis. Elite players regarded "focus", and "fear of losing" to be critical aspects in comparison to sub-elite players who attributed "motivation" and "routine practice" to be more crucial factors for tennis. Interview with the vice-president considered "titles" and "monetary rewards" to play decisive role pertaining to the success of tennis players. Quantitative analysis comprised of Cornbach Alpha reliability was measured =.852 for 14 items (PPI-A, 2007). Independent sample t tests were significant t =7.864, p=<.000, df =113 and t =6.622p=<.000, df =113 for the difference between elite and sub-elite players and males and females on the measures of MT respectively. Stepwise multiple regression analyses on the components of mental toughness also indicated a significant difference among elite and non-elite tennis players on Self-Belief, and Determination (B-=.086, t= 4.701, p<.000) and (B=.066, t=3.162, p<.000) respectively. On the basis of these results it can be deduced that properties of MT can be linked to predicting success in tennis.

Key Words: Mixed Method Approach; Mental toughness; seasoned players; Elite Players; Sub-elite players

INTRODUCTION

Mental toughness (MT) has gained considerable popularity in the recent decades and has spurred research in the field of sports Psychology. Mental toughness is considered to be an integral part of any sport (Weinberg, Butt, & Culp, 2011). Mental toughness is "an unshakeable perseverance and conviction towards some goal despite pressure or adversity" (Middleton, Marsh, Martin, Richards, Savis, & Perry, 2004, p. 6). Mental toughness is also regarded as "the ability to be more consistent and better than one's opponent by being determined, focused, confident, and in control under pressure" (Madrigal, L., Hamill, S. & Gill, D.L., 2013). Furthermore, there is also a general agreement that psychological skills are essential for developing and maintaining mental toughness, (Connaughton, Wadey, Hanton, &

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Jones, 2008). Contrary to these studies, Crust (2008) demonstrated that treating MT as absolute terms undermines other contextual differences which can also explain the performance of players.

Review of the related Literature:

Despite being recognized as the most crucial part of any sport success, there has been no consolidated agreement to specific properties of MT. Despite absence of consensus related to the properties it is consistently most referred to attribute with regards to sports. Related literature review identifies some of the frequently documented properties of MT including capability to deal with adversity, and resilience (Crust, 2008; Shread, 2010). Loher (1986) identifies seven components of MT: self-confidence, negative energy control, attention control, visualization and imagery, motivation, positive energy and attitude control. According to Loher, athletes who acquire these attributes can achieve at least 50% success which can be credited to MT. Despite being the pioneer for acknowledging MT Loher's findings lack statistical evidence. Gucciardi and colleagues (2008) regard MT as the decisive factor in determining the success of players.). Middleton et al. (2004) proposed that adversity in life plays a crucial role in achieving victory: It is a player's ability to use the power of their mind to turn the tables around to their advantage. In spite of the ambiguity between consensus about the properties of MT and conceptual definitions of the construct, MT is well entrenched in mainstream research and is accepted by the wider community (Jones, Hanton, & Connaughton 2007).

Tennis as a sport:

The history of this sport can be traced as far back as French handball game commonly known as "Paume" (palm). The game has gradually gained popularity starting from the European monks, in the 12th century, who played it for recreational purpose during ceremonial occasions till Roger Federer who earned the maximum prize money worth $81,245,913 by June, 2014. A new era in the history of tennis is marked with players writing their success stories beginning from Don Budge in the year 1938 when he won four grand slam titles in the same year to Rafeal Nadal who won Roland Garros for the 9th time in 2014 while enjoying his position for being world number one for 360 days till the time Novak Djokovic secured the title of world number one once again by upgrading his points to 13,130 after winning Wimbledon, 2014.

In the current era due to immense popularity sports generate commercial activities which are worth billions of pounds (Robinson, 2003). This results in enormous amount of pressure for players and the coaches. They have constantly deal with the advances made in the sport and improvise their game accordingly. For example, John McEnroe and Steffi Graf used racquets weighing 12.5 in 1980. Gradually the weight of the racquets has decreased to 10ounces with some being as light as 7ounces with the advent of piezoelectric technology (introduced by Head). In the wake of commercial enterprises human machinery (body, mind and strategy) of the players is also required to rigorously evolve and make adjustments to meet the current standards.

According to coaches growing demands are proving to be stressful for players and until and unless they do not possess MT their success in any sport cannot be guaranteed especially when it is concerned with individual sports. An interesting contrast between team sports and individual sports can reveal that sports like tennis (singles) can be a test of immense endurance for single players in which matches can continue for several hours against harsh weather conditions as well. The longest match in the history of tennis has been played between John Isner and Nicholas Mahut that lasted 11 hours and 5 minutes in 2010. These demands of such matches not only encompass physical, emotional, psychological and

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technical domains of the sport but also pose a challenge to the mental wellbeing of the players. Due to the likelihood of such matches to take place in future, genuine concern among coaches and tennis performers seems to be justified and it is not surprising that among all of these attributes MT is regarded as the most crucial one to offer an answer to this problem.

Tennis is recognized as a sport that encompasses physical, psychological and emotional domains of a player's personality. The implication of MT in tennis has been admitted even by world's number one players. For example, Rafeal Nadal remarks in his book, "Tennis is, more than most sports, a sport of the mind; it is the player who has those good sensations on the most days, who manages to isolate himself best from his fears and from the ups and downs in morale a match inevitably brings, who ends up being world number one". Other professional players relate to MT from a complete diverse angle when instead of endogenous characteristics exogenous factors like social influence may propel a player to achieve excellence. For example, in the year 2013 after securing the grand slam at Wimbledon, Andy Murray credited the high expectations of his entire nation that helped him win the match.

Bull, Sham brook, James, & Brooks, (2005) propose that the construct of MT needs to be studied with a particular reference to the sport under consideration. On the basis of this proposition by Bull et al. (2005) it can be implied that properties of MT might be significantly different from other sports. If MT needs to be defined in the context of tennis then what exactly is it? Tennis Strategy Encyclopedia helps tennis players assess their mental skills by answering a few questions: "Are you mentally tough enough to hit a good shot under pressure? Can you withstand that pressure? Can you direct your mind to the "here and now" where you find relief from pressure? Where you forget about it? Are you able to either accept your mistakes or quickly calm down if they upset you?", (Mencinger 2014 p. 85). According to Mencinger, "tennis strategy is based on statistics and on the mental and emotional characteristics of certain players". Tennis players, who want to achieve success and sustain it for a longer span, are thus supposed to focus on mental and emotional domains of the sport as well.

Objectives of the Study

1. To examine the properties of mental toughness among tennis players in Pakistan
2. To assess the difference of mental toughness between elite and sub-elite players
3. To examine the impact of the four components of MT on male and female tennis players in Pakistan
4. To assess the extent of difference between males and females on MT in Pakistan.

Research Questions:

The research questions have been formulated based on the related literature on MT as follows:

1. To what extent seasoned performers recognize the essential properties of mental toughness?
2. How far elite and sub-elite players relate to the properties of mental toughness?
3. To what extent male and female players relate to similar themes of mental toughness?

Hypotheses:

1. There is no significant difference of mental toughness between elite and sub-elite players.
2. There is no significant difference of mental toughness in male and female tennis players.
3. There is no association between the properties of MT and tennis players.

Significance and scope of the Study:

Due to the increasing popularity of the tennis world-wide, there has been a substantial increase in the number of players choosing this sport as their preferred career option. The current study focuses on the extent to which MT influences tennis players. The study is unique in offering both qualitative and quantitative measures for analyzing the construct of MT in the context of Pakistani tennis players. The current study also provides a much needed link between qualitative and quantitative approaches to understand the construct of MT in tennis. The researcher aims to investigate the impact of MT on both male and female tennis players.

The study compares elite and sub-elite male and female players with regards to their performance in tennis. The related literature review provides some insight into the attributes of the elite players but little comparison has been drawn between elite and sub-elite players with regards to tennis. An attempt has been made to compare the findings of quantitative data with qualitative data to establish consensus about the subcomponents of MT. Tennis as a sport is played as singles and doubles so more focused research in future between these two forms of tennis -singles and doubles- can offer better possibility of finding more reliable underlying properties of MT with special reference to tennis as an individual sport.

METHODOLOGY

Design:

In the quantitative method, the study does not manipulate any independent variable so "expo facto design/predictive design", is used by the researcher. A survey is conducted to generate and explore data regarding the naturally occurring phenomenon (Mental toughness) without any intervention by the researcher. The study also intends to supplement the findings obtained by expo facto design by gathering data through semi-structured interviews and focus group.

Instruments of the study:

Research Instruments are divided on account of qualitative and quantitative data:

1) The scale "Athletes "how tough are you", designed by Enders, Pamela Lynn (2007) was adapted, after gaining permission, to serve as a structured interview. Originally it contains 30 items with two forced choices of "true" and "false". The scale was adapted in such a way that it gave more freedom to the participants to explore their affective domain and generate relevant questions that were crucial in the selection of an inventory that measured the properties of MT. For example, "Do you perform better in practice than you do when it really counts the most?" and "Do you think too much about what could go wrong right before and during performance?". This instrument will initially serve as an instrument for data collection by seasoned performers and after making necessary modification (based on the course and identification of properties of MT), will be employed on the focus group.

2) Psychological Performance Inventory- Alternative (2007) was designed by Golby et al. by conducting an exploration of the factor structure of the Psychological Performance Inventory (PPI-A). PPI was originally designed by Loher in 1986. The original version had 48 items and the confirmatory factor analysis reveals a factor structure with Cornbach Alpha reliability.9. Compared with this original inventory PPI=A has 14 items and a 5-point Likert scale. It has four subcomponents: Determination: For example, "the goals I've set for myself as a player keep me working hard"; "I'm willing to give whatever it takes to reach my full potential as a player". Self-belief: For example, I lose my confidence very quickly". Positive-Cognition: For example, "I can change negative moods into positive ones by controlling my thinking". Visualization: For example, "Thinking in pictures about my sport comes easy for me" and "I visualize working through tough situations prior to competition".

Items were reverse scored as well to reduce response bias. For example, "I can keep strong positive emotion flowing during competition" and "My self-talk during competition is negative". Previous finding have satisfactory internal consistency for all four sub-components of PPI-A.

Sample:

Participants were recruited through purposive sampling technique to match the requirement of the study. N=118. The sample of the study was comprised of three different groups of players. The first group was comprised of three seasoned performers who agreed to take part in this study. Consistent in Jones et al (2007) these players have earned international honors and have represented the country on several occasions. In order to distinguish between players with International and national honors these players are referred to as seasoned players.

The second group of the study included elite players, 62 players who have performed at national level. 40% of these players had also represented their country, but that variable was not measured separately for this group. These players were selected from different cities of Pakistan. In order to make the participation of elite players possible the study was conducted at a time when Sindh Tennis Association (STA) was hosting two national level championships in Karachi and tennis players from all over Pakistan took part in these events. Permission to conduct the study was obtained by the vice-president of STA.

The third group comprised of 50 sub-elite players who were selected from different clubs of Karachi. Most of these players were recreational players at the time of study. Lastly, the vice-president of STA was interviewed in relation to all three questions of the study.

All participants signed informed consent. Participants were informed about the nature of the study and were asked to read the instructions which assigned them the right to withdraw from the study if they wished to do so. Participants of the focus group were also informed that the researcher would tape record the session and would take notes during the interview.

Procedure:

A mixed method approach was used to collect data which is comprised of qualitative and quantitative methodologies. The inductive approach pertaining to qualitative data relies on textual (spoken or written) data to generate ideas. On the contrary, deductive method follows a theoretical framework and applies data to approve or disapprove the idea (Holloway, 1997). Due to the ambiguity of the construct of MT an effort has been made to employ a combination of both the approaches to have a holistic view. Qualitative and quantitative methods involve differing strengths and weaknesses; they constitute alternative, but not mutually exclusive, strategies for research (Patton, 1990, p. 14). In order to accomplish this aim it was also considered worthwhile to compare the findings of inductive and deductive approaches to reach a consensus on the sub-components of MT. The study examined descriptive, exploratory, contextual and explanatory and inferential data for the accomplishing this task.

The qualitative data analysis was comprised of several exploratory stages. Qualitative research helps players to share their experiences which results in better understanding of the constructs (Dale, 1996). Qualitative data was collected via: i) Interview of the seasoned performers; ii) Interview in the form of focus group comprised of elite and sub-elite players and iii) unstructured interview of the vice-president. Interview technique was considered to be more a more appropriate technique to gain in-depth understanding of MT (Patton, 1997).

Based on the relevant literature review and by following the practice of inductive approach of a coding framework created that was based on the scale ("Athletes "how tough are you" Enders, Pamela Lynn, 2007). The coding framework was constantly developing and being modified. In the light of the interview with the seasoned performers the MT scale ("Athletes "how tough are you" Enders, Pamela Lynn, 2007) was modified and categories like consistency, motivation, focus, positive cognition, ability to deal with negative self-talk, ability to handle pressure and visualization were established. A comparison of these categories was also made with the unstructured interview by the vice-president of STA.

A pilot study was also conducted to find out any pitfalls of the research design and it was found out that several items of the MT scale generated identical responses. Since the interview questions were adapted from a scale that was originally designed as a 30-item questionnaire and questions are intentionally repeated to countercheck response bias of the respondents. To suit the need of an interview the 30 items were reduced to 15. For example, item 1: "How frequently do you worry about mistakes in general?" and item 3: "How easy is it for you to let go of your mistakes?" were open ended questions and had generated somewhat identical responses during the pilot study so it was considered appropriate to use only item1. Based on this technique a similar method of item selection was adopted for all other repetitive items. Consequently, out of 30 items 15 were selected that provided a modified coding framework for semi-structured interviews of the seasoned performers.

At the first stage, consistent with inductive methodology (Lincoln & Guba 1985; Patton, 1990) semi-structured interviews of the seasoned performers were conducted individually. The interviews begun with general open ended questions: their experience of the sport and their idea of the most important trait needed for tennis. It followed by more specific questions which were adapted from the scale "Athletes "how tough are you". The expertise of the three seasoned performers was used for thematic analysis the MT scale. In the light of their interview 8 themes were extracted which were used as a coding framework for the focus group session.

At the second stage a focus group session was conducted that was comprised of 8 elite and 7sub-elite players. Consistent with Patton (1990) at the beginning of the session players were asked to share their experiences of tennis and how these experiences were translated into positive and negative outcomes. Furthermore eight items selected from MT scale were used to generate discussion. The focus group session lasted for 50 minutes.

The last interview was held with the Vice-President of STA. The duration of the unstructured interview was 45 minutes.

On the basis of the main themes of the qualitative data, Psychological Performance Inventory-Alternative (2007) was selected that allowed the researcher to make relevant comparisons with the numerical measure. PPI-A was used to have a consensus regarding the components of MT, and to measure the difference between elite and sub-elite players and lastly to assess gender differences. Statistical Package for the Social Sciences (SPSS) version 20.0 was used for quantitative data interpretation and statistical inferences.

Qualitative Data Analysis:

The qualitative analysis with the help of research questions was conducted in the following manner:

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Research question 1: Based on their experience, to what extent seasoned performers relate to the essential properties of mental toughness?

The first question of the study served the major purpose by develop a consensus on the properties of MT and but also to explain the process. The interviews began by asking them to explain what according to them is the single most essential attribute that they as players need to possess. Interestingly, although each one of the seasoned performers considered experience, skill and strategy to be decisive factors for their success but mental toughness was above the rest. According to seasoned performer 1, "when it comes to a single trait that has to be there then without question, that is your mental toughness, because you do not expect a player to have reached to any level of success without mastering the technique and skillfulness. What sets two players of the same experience and skill apart is their mental toughness. Seasoned player two considered an unwavering desire to conquer all odds. Seasoned player three attributed, "the attitude of the player to remain positive minded especially when he is on the verge of losing a match since you can turn a match around even at the last ball".

A mental calculation was made to ensure that each seasoned player has mentioned any property of MT. All seasoned players related to MT in the first quarter of the interview (time duration 1st performer- 3minutes, 2nd performer-7minutes, and 3rd performer-2minutes). An effort was made that the seasoned players should acknowledge the significance of MT without any persuasion so that it could be used as a baseline measure. Once they acknowledged MT, they were further asked to give their version of mental toughness. According to the first Seasoned Player, "Mental toughness is a player's ability to remain focused on his game despite all adversities". The second seasoned performer considered, "mental toughness to be an ability to focus on "here and now" or lose the game". The definition proposed by seasoned performer three assumed MT "as an ability to rise above human limitations and transcending time and space by grabbing the opportunity as and when it comes". In the light of these interviews the scale on MT-"Athletes "how tough are you"- was modified which served as a semi-structured interview for the focus group.

After a through session of 45 minutes with each seasoned performers components of MT scale were further modified to eight items: ability to deal with adversity (item 4), dealing with pressure (item 7), focus (item 17), visualization (item 18), confidence (item 19), ability to deal with negative self-talk (item 24), motivation (item 25) and consistency (item 26 respectively). Interviews are tape recorded and the transcribed and revised several times. These themes have also been identified by previous research in this regard (Jones, Hanton & Connoughton, 2002, Loher, 1985). These themes were provided a coding framework for the unstructured interview with the vice-president.

The unstructured interview with the Vice-President of STA highlighted the importance of physical fitness and MT to serve as crucial traits which decide the success of players in the long run. However, monetary rewards and titles provide essential incentives to tennis players to acquire MT and physical fitness.

Research question 2: How far elite and sub-elite players relate to the properties of mental toughness?

The analysis of qualitative data provided almost similar accounts of experiences of elite and sub-elite tennis players According to Patton 1990 such themes provide a framework to the participants to respond within the domain of the research. Quotations provided by the focus group were used to depict their perceptions about their experiences of tennis. Significance of

themes was measured by the level of frequency as per which each type of players mentioned it, (Table 1). This was accomplished by rigorously listening to the tape recorded interviews of the participants. After critically reviewing all the transcribed data nine themes emerged out of these interviews (with the addition of social domain). Sub-elite players considered routine practice and motivation to be essential for their survival in tennis. Six sub-elite players frequently referred to their family and friends who provided them with required vigor and necessary support that was meaningful to their outcomes. Elite players referred to focus more often than sub-elite players. Several interesting comparisons emerged during the discussion, for example the elite players emphasized that very often it is the negative outcome (fear of losing a match) that becomes more of a driving force than simply the joy of winning a match. Moreover, significance of other constructs like "complying with public image" were also highlighted.

Table1: Overview of the extracted themes of Mental Toughness for elite and sub-elite players

Mental Toughness	Frequency of Occurrence	
	Elite Players	Sub-elite Players
1. Ability to dealing with adversity	14%	7%
2. Ability to deal with pressure	15%	13%
3. Social Domain	6%	11%
4. Focus	19%	9%
5. Ability to visualize	10%	10%
6. Self-confidence	7%	7%
7. Ability to deal with negative Self-talk	17%	8%
8. Motivation	5%	18%
9. Consistency	9%	17%
Total	100%	100%

Research question 3: To what extent male and female players relate to similar themes of mental toughness?

Female elite players related to the properties of MT with the same rigor. However, female sub-elite players regarded social domain to be negatively influencing their performance. Female players also interpreted focus in terms of trajectory and how this affected the quality of their play. Moreover, female players, who had less than 5 years of experience, attributed family influence, peer pressure, and the instinct to deal with the issue of trajectory to be more pertinent issues than the conventional properties of MT. Two sub-elite players (one male and two female) also referred to the coordination of mind and body to be the major concerns that interfered with their performance. The cultural element seemed to be more crucial for non-elite female players who did not relate to their career in tennis in the long run. Tennis for them was "here and now", which highlights division of labor to some degree. These younger female athletes also related to the joy more often than the older group.

At the end of the session participants of the focus group were asked to attribute their performance to any one factor that they all considered was the central to their performance in tennis and they mutually agreed that it was regular and timely practice.

The analysis of qualitative data provided almost similar accounts of experiences of seasoned performers and elite and sub-elite tennis players and the free flow of experiences not only was helpful in gathering participants' individual experiences but also for acquiring the properties of MT.

Quantitative data analysis:

Descriptive Statistics for Mental Toughness

The following table 2 presents descriptive statistics for mental toughness and both category of players. The mean of elite players is considerably more than the elite players.

Table 2: Difference of Mental Toughness based on the categories of players

Players	N	Minimum	Maximum	Mean	Standard Deviation
Elite	58	46.00	65.00	56.86	4.582
Sub-elite	57	38.00	62.00	48.59	6.506

Table 3 presents a significant difference of mean between the scores of males and female tennis players.

Table 3: Differences of Mental Toughness between males and females

Gender	N	Minimum	Maximum	Mean	Standard Deviation
Males	74	43.00	65.00	55.500	4.644
Females	41	38.00	65.00	47.82	7.787

Reliability Statistics for PPI-A:

Quantitative data was gathering by administering PPI-A to 115 participants. Nunnally (1978) recommends that instruments used in basic research are reliable if the value is about 0.70 or more. In Social-Sciences value above .7 is considered to be satisfactory. Cronbach's Alpha and the Guttaman Split-Half were obtained for PPI-A to test the reliability the scale. The values show that there was internal consistency among the items and the questionnaire was reliable, (Table 4).

Table: 4 Reliability Statistics of Mental Toughness

Cornbach's Alpha	Guttaman Split-half	No of items
.852	.835	14

Hypotheses:

Result of quantitative data analysis is as follows:

Hypothesis 1: There is no significant difference of mental toughness between elite and sub-elite players.

The findings of the first question are obtained with the help of statistical indicators, like mean and standard deviation, and independent sample t-test. A Mean difference of 8.27 has been found out between the scores of elite and sub-elite with regards to mental toughness. The value of t-test also reinforces this difference that the level of MT is higher in the case of elite player and the result is significant t =7.864, p=<.000, df =113, (Table 5). On the basis of this result it can be concluded that there is a significant difference between the MT of elite and sub-elite tennis players. Thus null hypothesis is rejected.

Table 5: Difference between elite and sub-elite in relation to MT

	Players	N	Mean	Standard Deviation	t	p
Mental Toughness	Elite	58	56.8621	4.58238	7.864	.000*
	Sub-elite	57	48.5965	6.53523		

Correlation is Significant at 0 .01 level (2-tailed)

Hypothesis 2: There is no significant difference between male and female tennis players on MT.

For hypothesis 2, independent sample t test was employed. The test is significant because there is a statistically significant difference between male and female tennis players on MT, t =6.622p=<.000, df =113.

Males scored higher (Males=55.50, SD= 4.644) than females (M= 47.82, SD= 7.787) on MT. Table 6 shows that there is a significant difference between male and female tennis players on MT thus null hypothesis is rejected on the basis of these findings.

Table: 6 Difference between males and females in relation to Mental Toughness

	Gender	N	Mean	Standard Deviation	t	p
Mental Toughness	Male	74	55.500	4.644	6.622	.000*
	Female	41	47.82	7.787		

Correlation is Significant at 0 .01 level (2-tailed)

Hypothesis 3: There is no significant association between the properties of MT and tennis players.

Stepwise multiple regression analyses were performed to predict the value of Independent variable (Mental toughness). The result yielded a coefficient of multiple regression of .591, a multiple R Square of .349 and an Adjusted R square of .338. This accounts for 33% of the total variance in their MT. The findings indicate that there is an association between the properties of MT Self-Belief, and Determination (B-=.086, T= 4.701, p<.000) and (B=.066, T=3.162, p<.000) respectively in predicting performance in tennis, thus the null hypothesis is rejected.

On the basis of this test it can be assumed that these two components "Self-Belief" and "Determinism" are relevant in predicting Mental Toughness. It is also shown that analysis of the variance for the multiple regression produced a result of F (1, 114) = 30.080, p<.000, (Table 7). However, caution needs to be used with stepwise regression analyses because the findings are sample dependent. Two components of MT were excluded in stepwise regression: "Positive-Cognition" and "Visualization". More research is required in this required to measure the role these two sub-components. The main purpose of Statistical analysis is to assess how far the study helps to understand the behavior of the general population in relation to the construct of MT and to what extent generalizations can be made. All tests were found to be significant because differences were found in relation to players, gender and the properties of MT.

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Table 7: Showing Stepwise Regression Analyses for the properties of Mental Toughness

players	B	SE	t	Sig
Constant	3.534	.266	13.305	.000*
Self-Belief	.086	.018	4.701	.000*
Determination	.066	.021	3.162	.002*

R Square	.349
Adjusted R Square	.338
F Statistic (sig.)	30.080 (.000*)
Standard Error of Estimate	.40864
Sample Size (N)	115

Dependent Variable: Players

Significant Predictors: *Self-Belief, Determination*

Comparison of the two methodologies:

The current study aims to measure the difference of MT between elite and sub-elite players. The study also examines the influence of gender on MT. On the basis of the results of qualitative and quantitative data, it can be proved that for the abstract constructs like MT, it is productive to conduct both types of data analyses. Each method offered exploratory analyses that can be explained by developing themes and numerically measuring their significance.

Summary of findings:

1. Mixed method approach helped to develop theoretical understanding of MT.
2. Comparison of the two methodologies can provide framework for developing instruments that help measure MT for sports in general and tennis in particular.
3. Seasoned performers had 100% consensus on MT for being the single most essential trait of successful tennis.
4. According to elite player "Focus" "ability to deal with negative talk" and "public image", are essential properties of MT. Thus elite players rely more on these two properties of MT for their performance in tennis.
5. Factors like "trajectory", "social domain", "motivation" influence the performance of sub-elite players. The sub-elite players relate to mastering the technique of tennis as well as a strong concern for maintaining their motivational level to perform up to an optimal standard.
6. "Determination" and "Self-Belief" were significant determinants of MT. Almost 33% variability can be described with the help of these two properties of MT
7. Insignificant test for two properties of MT: "Positive-Cognition" and "visualization" were not significant as well.
8. The study proposes that if the properties of MT can be identified then players can be trained in accordance with the findings.

DISCUSSION AND RECOMMENDATIONS

The current study has examined MT with regards to tennis players. With the help of inferential statistics it has been found out that there is a difference between the MT of elite

and sub-elite and male and female tennis players with regards to MT. The findings of the qualitative data demonstrate research that both elite and sub-elite players relate to MT but in the case of elite players the reference is explicit. On the contrary, sub-elite players despite, relying on this measure are elusive about it at individual level. More research is needed to enhance understanding on the influence of culture and social with regards to tennis. Gucciardi and Gordon (2012) highlighted that cross-cultural research can offer more insight into fully comprehending the construct of MT.

With the prospect of increasing popularity of tennis the following recommendations are made for future research to assess the implications of mental toughness:

1. Comparison of team sports with tennis can help isolate more relevant properties of MT for tennis.
2. It is also recommended that comparison may be made between single and double match performances of the same tennis players to assess the extent of MT in both settings.
3. A longitudinal study in more diverse settings can also synthesize the construct of MT with special reference to tennis.
4. If an instrument is developed by following these recommendations then players can be accorded with training in the specific domain. In this regard Pre and Post-Hoc one way ANOVA tests can be used to measure the influence on their performance in tennis.
5. Future research may also establish a link between MT and physical fitness of the players.

Research Implications:

The limitations of the research warrant discussion:

1. Apart from type of players and gender more demographical variables like age, experience and socio-economic status can offer better insight into the construct of MT.
2. Experience of the seasoned players seem play a significant role in cultivating MT and can be investigated further to develop instruments to measure MT in tennis players. Due to the restriction placed by constraint of time could not been followed further.
3. The duration of this research stretched over two major tournaments of tennis and the research finding may comply with these events. A further investigation into a daily course of players' life can establish more firm ground to understand MT.
4. Due to the cross-sectional nature of this research and findings obtained through stepwise regression analyses for the quantitative data, it is important to conduct the research in diverse settings. Since these results have a tendency to become more sample dependent and may not be reliable.
5. The influence of personality-type has not been gauged.

CONCLUSION

With the help of mixed method analysis, results of the current study advance the "consensus" as well as "conceptual" domains of MT with special reference to tennis. The findings reinforce the already established properties of MT, and make contribution to tennis with regards to the existing literature. Consistent with Crust (2008), the study highlights the importance of the contextual and cultural cues which can explain the difference between the performance of males and females. The study also emphasized that monetary rewards and titles can also serve as major incentives for acquiring mental toughness thereby offering more avenues for future research in the field of tennis.

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