Tennis and sports psychology

Mental toughness as a decisive factor in critical moments of elite male tennis

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Summary

Introduction

The study is based on tennis and its connection to sport psychology. Matches are often five hours long, against opponents who possess the same tennis skills as oneself. Mental toughness can therefore be the deciding factor, especially over time.

Aim

The aim of this study is to investigate whether mental toughness is a decisive factor in critical moments in tennis at the elite level, and to form a deeper understanding of the impact that mental toughness has in tennis by means of qualitative interviews with world-class Swedish coaches.

Method

Qualitative interviews were implemented to gather relevant answers to the study's research question. Thematic analysis was conducted for each interview where we researchers processed the entire transcription and then looked for meaningful patterns and themes given the data that the researchers had obtained.

Results

The researchers divided the interview results within different sections where each section belonged to individual interview results, these are Mental toughness and self-confidence, Coaches’ views on the critical moments of tennis, Handling in critical moments and Mental toughness as an area for development. The results presented in this study are linked to the themes associated with the interview guide, which in turn are designed to answer the research questions.

Discussion

The same subheadings were used as in the result section. The discussion combined the results from the interviews with the sources that were found which helped answer the research questions. The result indicates that the coaches believed the best tennis players in the world are mainly the best because of their mental toughness. That mental toughness is needed to handle critical moments in tennis and that it can be trained.
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1 Introduction

1.1 Tennis

Tennis is an advanced racket sport that includes all the sub-capacities in terms of physical and technical aspects. However, what should be taken into account is the mental factor demonstrated by tennis' counting system, congested competition calendar and the work/rest ratio at the elite level. Matches are played best of three or five sets, depending on the competition being played. A set is played first to six games won with a two-game margin. At 6-6 in a set, a tiebreak is played to decide the respective set; a tiebreak is played first to seven points won with a two-point margin (SvTF, 2018). Tennis matches have no time limit, entailing that a tennis match can last for more than five hours. During a tennis match, an average of 160 points are played and the points last for an average of less than 10 seconds (Houwer et al., 2017; Kovacs, 2006). In terms of the scoring system of tennis, a game starts with 0, followed by 15, 30 and then 40. After 40, the game is won. However, one must win by a margin of two points to win the game (SvTF, 2018). Tennis players do not have a team or a coach to help them during the match. The scoring system results in a tennis player having the ability shift the momentum to their side at any given moment of the tennis match. No win is guaranteed until the tennis match is over. In a singles Grand Slam tournament, there may be 127 players who lose and only one winner at the end of the tournament (Meffert et al., 2018). It is not possible to predict how long a tennis match might be. As a result, tennis becomes a sport with high demands on how mentally tough a player must be, especially at the higher performance level (Houwer et al., 2017; Kovacs, 2006).

Each point can contribute mental impressions that affect both the match picture, the remainder of the competition, or even an entire competitive season - both positively and negatively (Cowden et al., 2016; Harris et al., 2021). Some of these points are considered more important than others. Points such as break points, points played in tiebreaks, in even matches and set points or match points become directly decisive for the outcome of the match. Which players win these points? Why do these players win these points? Statistics show that the three players ranked as the best of all time, only won 54% of all the points they played during their professional tennis career - just over half (Meffert et al., 2018; Ultimate Tennis Statistics - Statistics Leaders, n.d.). As such, the margin of points won compared to the remaining players is small.
1.2 Mental toughness

Mental toughness is a psychological factor that helps an athlete get to the next level. The other sub-skills that come with the physical, technical and tactical aspects are of great importance considering how physically demanding tennis can be. On the other hand, a tennis player must maintain a consistently high level of performance for a long time as the competitive season in tennis extends throughout the year. As a result, the player needs to stay mentally tough in order to cope with the pressures that can come with elite sport and reduce the risk of mental exhaustion (Casagrande et al., 2018; Cowden et al., 2016). Mental toughness is highly valued when it comes to individual sports such as tennis. This is because when an athlete competes against an opponent with the same level of performance, coaches estimate that 80-90% of what determines whether the athlete wins or loses is based solely on the player's mentality (Weinberg & Gould, 2014). The tennis player who is mentally tougher will be the one that comes out on top in a tennis match. In a single interview regarding mental toughness, former world number one, Serena Williams, states that what will determine up to 70% of matches in tennis is mental toughness (Williams, 2019). As mentioned earlier, a tennis match may well last for more than five hours and with many breaks during the course of the match, mental toughness is considered very important for the performance.

Cowden et al. (2020) argue that mental toughness is a psychological factor that opens up an opportunity for athletes to incorporate as well as maintain high levels of effort to achieve optimal levels of performance. Even with the pressure an athlete is exposed to seen to an elite performance, as has been previously mentioned. Mental toughness is a key factor associated with various indicators of success in sport, it has a potential to improve sport performance and promote athletes' well-being. Crust et al. (2010) claim that mental toughness has received considerable attention in the last two decades. This is because of the impact of mental toughness on athletes' ability to perform, develop, and thrive in sport. Golby and Sheard (2004) and Jones et al. (2007) reinforce this claim by defining mental toughness as a way for an athlete to take advantage of and thrive on various opportunities that may occur during one's professional career.

Cowden (2016) argues that young tennis players who are mentally tough are more persistent, tenacious and determined regardless of setbacks and disappointments that may occur during a tennis match. In case a mentally tough tennis player failed to take advantage of various opportunities to break the opponent's serve game, that tennis player will sustain their effort during the course of the match in order to achieve their performance goals. The tennis player who is
mentally tough will continue to try to create additional chances to break the opponent's serve, something a less mentally tough player would have a difficulty doing. As mentioned earlier, mental toughness is a key factor associated with various indicators of success in sport, it has the potential to improve sports performance. Cowden (2016) claims that mentally tougher tennis players emphasize the critical match situations because of the subsequent opportunities included from winning these critical match situations.

1.3 Critical moments
The importance of a tennis point and how critical it is during a tennis match depends on the extent to which the outcome of the match is affected by the given score (González-Díaz et al., 2012). Miller and Weinberg (1991) mention that coaches as well as athletes talk about momentum shifts as critical moments for winning but also for losing. Nowadays, it is normal for tennis players to hit serves at 210 km/h (Kovacs, 2007). As a result, the person serving has the advantage. Cowden (2016) argues that mentally tough players may come to understand the importance of maintaining momentum on their side when serving and to carry with them the advantage of being able to anticipate as well as control a point during a serve game. In case an opponent manages to break the serve, i.e., win a game that is returned by the server, it could be considered as a critical moment within the tennis match. As a “break” has a psychological impact on both players (O'Donoghue, 2012). Points such as break points, points played in tiebreaks, when matches are even and set points or match points become directly decisive for match results. As mentioned earlier, points that can determine the outcome of a tennis match lean towards being critical moments during a tennis match.

As a tennis match can last for several hours and with pauses between each point, game and set, the mental toughness of the player will play a major role in the outcome of a tennis match. Kent et al. (2018) argue that for a player to perform at a high level in professional settings, it will usually require the athlete to make decisions with small second margins. As the average tennis point lasts less than ten seconds and approximately 160 points are played during a tennis match (Houwer et al., 2017; Kovacs, 2006), this results in the tennis player having to rely on their instincts to make quick decisions during a tennis point, multiple times during a tennis match. If a tennis player lacks in mental toughness and falls into too much muscle tension during a match, this will
result in numerous unforced errors, especially during the critical moments of the matches where a mistake can be a deciding factor (Harris et al. 2021; Cowden et al., 2016).

1.4 Mental toughness and critical moments

Cowden et al. (2016) have conducted a study concerning the mental challenge that is a given factor in tennis competition. The study was conducted with 185 male and 166 female tennis players from South Africa. They had to answer the “Sports Mental Toughness Questionnaire” and a modified version of the “Recovery-Stress Questionnaire for Athletes” to look at the relationship between the players recovery and level of stress between points played during tennis matches. The results of the study show that all aspects examined were affected. This shows the great impact that the less mentally tough tennis players are exposed to and that stress management is a big part of the sport. Furthermore, this demonstrates the importance of having a relatively neutral approach to lost points and the importance of staying composed throughout the tennis match. As this affects the points played after, including the most important ones (Cowden et al., 2016). This correlates very well with the study that we researchers will be working with, as the study above shows the impact that mental toughness can have in sport.

Harris et al. (2021) have investigated the psychological pressures that affect Grand Slam participating tennis players. Between the years 2016-2019, approximately 650,000 tennis points were examined to see the relationship between mental toughness in the match and unforced errors made. The results of the study show that there is a clear correlation between pressured positions and easy mistakes. This indicates that the mental aspect plays an essential role for a tennis player playing in the most prestigious competitions in the world. In addition, the study shows that both “unsuccessful” and “successful” players are affected by the psychological pressure. On the other hand, some players have the ability to cope with this, while some suffer what the study chooses to call “mental breakdowns”. The Harris et al. (2021) study has great relevance to this paper as it demonstrates that the outcome from points played under mentally tough conditions affects important points that can decide matches. Staying positive is then of great importance in terms of this study and as previously mentioned, the results of this study suggest that mental pressure such as situational pressure has a negative effect on subsequent performance in elite level tennis. Furthermore, results from Cowden et al. (2016) show that mental toughness is negatively associated with stress, i.e., if a player is mentally tough then the chances of the player being affected
by stress are much less. Ultimately, these results in an understanding that mental toughness is a crucial factor in critical moments concerning tennis at the elite level.

In summary, the two studies above show that mental toughness is of great importance in tennis at the elite level. The result from both studies indicate that mental toughness can help a tennis player who is about to face tough challenges that can appear during a tennis match. That mental toughness will be of great help throughout the professional career of a tennis player. These two quantitative studies get their results from statistics and various tests that have been conducted. As sport psychology is a very broad topic, there is a lot of information to cover. However, the scientific articles that can be found through different databases are mostly quantitative studies. As a result, this qualitative study related to tennis and mental toughness is of great importance. Since instead of obtaining results using quantitative methods, the present study will rely on world-class Swedish tennis coaches to seek whether mental toughness is a crucial factor in critical moments concerning tennis at the elite level. This will also provide insight into the specific psychological aspects that are important in elite tennis.

One justification of the choice for this particular type of study is to find a new dimension in the link between match situations in terms of critical moments, and mental toughness. These aspects are rarely linked in studies of similar nature. That is, how mental toughness influences the match outcome and not only it’s meaning. Moreover, there are scientific studies that show that tennis is an excellent sport to educate about this, how situational stress affects the match result. This is because tennis' counting system of “individual points played” allows statistics to show patterns based on different moments and makes a match decomposable where, among other things, the number of unforced errors, the number of “break balls” won or lost exposes the player. With this information, it is possible to look at the situations that are considered more mentally challenging, and therefore make arguments about the importance of mental toughness and how crucial this becomes for a player who wants to play tennis at an elite level. Therefore, the purpose of this study is to see patterns between mental toughness and the handling of critical moments, and how this is significant for a tennis player to be successful.
2 Aims and questions

2.1 Aim

The aim of this study is to investigate whether mental toughness is a decisive factor in critical moments in tennis at the elite level, and to form a deeper understanding of the impact that mental toughness has in tennis by means of qualitative interviews with world-class Swedish tennis coaches.

2.2 Questions

- Which aspects of mental toughness do coaches consider more important at critical moments of a tennis match?
- Do the coaches believe that mental toughness is something that can be trained?
- In what ways, in terms of their expertise, can tennis coaches apply this to help young people learn from what determines critical/decisive moments?

3 Method

3.1 Population/sample

A convenience sampling has been done which has resulted in the choice of tennis coaches as the idea was that there should be no major problems in booking interview times with them. All four tennis coaches were contacted in person. The inclusion criteria for the selection of each tennis coach were that they must have coached many categories of tennis players, from amateurs to world elite tennis players, and that they preferably have had experience as an elite tennis player. On the other hand, these coaches have both a high status in the world, as well as possessing great expertise and having a lot of experience.

The tennis coaches that were interviewed are between 40-60 years old and most have experience as players at the highest world level. All have worked for many years as tennis coaches, with players from amateur to world level. The tennis coaches are still working with tennis at elite level, with various Grand Slam wins to their credit. Every tennis coach has played major roles in the careers of well-known tennis players, both when they were young and promising, and during their peak as professional tennis players. The tennis coaches who were interviewed have experience working with a variety of players, bringing diverse perspectives to each of the tennis coaches. Two
of them have worked for a long time at both the WTA (Women's Tennis Association) and ATP (Association of men’s professional), which gives even more perspectives on the sport of tennis and how different tennis players are coached. One of the tennis coaches has several years of university studies supporting the topic, which adds an extra dimension to the study. Another tennis coach has received awards from a high-profile tennis organization for the coaching efforts. The expertise of all the tennis coaches was extremely interesting for the study because in many ways the tennis coaches are similar, but in other ways, very different. The coaches will be called “coach 1”, “coach 2”, “coach 3” and “coach 4”, to keep them anonymous.

3.2 Procedure
For this study, interviews were used to obtain relevant information. The questions were open-ended and were sometimes asked in a different way from the planned interview guide. The interview guide was pilot tested on another tennis coach before the interviews, to carefully ensure that it was done in a way that would actually provide answers to the questions asked. This has been done by having open-ended as well as embedded-response options (Hassmén & Hassmén 2008). There were no changes made to the interview guide after the pilot test. As three out of the four tennis coaches interviewed are colleagues of one of the researchers for this study, this has resulted in a natural way to plan out the interview times. However, due to the fact the researchers knew the tennis coaches, they were fully aware that this could have resulted in the tennis coaches giving socially desirable answers. Nevertheless, as the tennis coaches has done several interviews in the past, the researchers were not worried of this risk.

Reflexive thematic analysis was conducted for each interview, leading the researchers to review the entire transcript for each interview and then look for meaningful patterns and themes given the data the researchers had obtained, and which linked to the research questions (Welsh & Lusher, 2022; Clarke & Braun, 2016). Each interview took between 30-50 minutes.

3.3 Credibility
The researchers for this study have strived for good credibility by going through the future interview guide in detail together. This has been done for the purpose of formulating the best possible questions so that the interviewee can give the most relevant answers possible to the research question on which the study is based. As a qualitative interview has been implemented to
elicit answers to the study's research question, the researchers of this study have considered validity and reliability to be irrelevant. Graneheim and Lundman (2004) argue that reality can be interpreted in different ways, therefore it is important to go through the interview responses and look at possible interpretations in order to increase the credibility of the study. The researchers have aimed for high priority in data collection and approach in order not to leave any gap for mistakes.

3.4 Ethical considerations

The utilitarian requirement, the information requirement, the consent requirement, the confidentiality requirement are the four main ethical requirements on which this study has been based upon (Vetenskapsrådet, 2002). Information about what this study is about was communicated to each interviewee and the tennis coaches were asked to sign a consent form before the start of each individual interview. The whole process was confidential and the researchers have the responsibility to keep the information given by the interviewees and no unauthorized person should then be able to access it. The interviewees had the option to withdraw from the interview and the study at any time. The personal data collected was their name and professional role. The researchers of this study have also given each interviewee the opportunity to request to see the written study at any time during its creation. The material extracted from the interviews has been used exclusively for the study and its content. The researchers have no authority to discuss what was said in other contexts, or to use the material in other studies.

3.5 Data management

The researchers of this study have followed the eight steps that come with personal data processing in essays (Jäppinen, 2018). The steps are as follows:

1. Assessing whether it is necessary to store personal data
2. Defining the purpose of the processing, and what data must be collected
3. Registering the data by informing our supervisor
4. Deciding how the information will be stored and handled securely during the work
5. Deciding which parts of the data are to be deleted or retained when the work is finished
6. Obtain documented consent from the participants in your study, inform then and collect the necessary information
7. Processing the collected data
8. Deleting or, exceptionally, archiving the personal data material after processing.

3.6 Analysis
The interviews were recorded by the respective researchers. The reason why two mobile phones were used to record the interviews was in case there was a technical error with anyone’s recording. The recording of the interviews resulted in both researchers being able to focus on the tennis coach being interviewed, the answers that were given out and the follow-up questions that were asked after each answer. The recordings of each interview also assisted in transcribing verbatim. The transcription has resulted in a reduced chance of misinterpretation of the interviewee's answers and thus succeeded in obtaining a more accurate interview result. This has then resulted in the application of a thematic analysis, where the researchers sat down together and read through the transcripts. Patterns and themes that appeared from the captured data were immediately marked down on paper and analyzed further.

4 Result
The researchers divided the interview results within different sections where each section belonged to individual interview results. The results presented in this study are linked to the themes associated with the interview guide, which in turn are designed to answer the research questions.

4.1 Mental toughness and self-confidence
Self-confidence is a psychological trait that was often mentioned during the interviews when speaking about mental toughness. It was mentioned that the tennis player who has high self-confidence will usually be a tennis player who is very mentally tough. A tennis player with high confidence will have the ability to stay calm during moments where many tennis players who do not have as high confidence will most likely break down under pressure, which can be linked to “drop height, as Coach 3 describes:

“… They are quite aware that it is a game where you lose too. And I think that this knowledge makes the drop height not so high for them and that in turn leads to more courage. But having said that, they are prepared to almost sell their mother at the circus to win, but that doesn't mean that they aren’t fully aware of the consequences”
This would also have resulted in the tennis player who carries less confidence usually falling for more unforced errors than a player with more confidence. Coach 2 believes that there are a lot of elements around what creates a mentally tough player, ultimately, it is a habit in competing, getting them to play a lot more tennis matches. That a tennis player with confidence is usually a player who is tougher mentally. Coach 2 tells us that: “… They have good self-confidence, you don't see them fold, they don't doubt, they win.”

Coach 2 also believes that the tennis players who are a little more confident, those players who carries the ability to stay calm even when they have a lot of down time are much better at handling their slightly poorer game in a better way. Coach 2 refers to Novak Djokovic as a mentally tough player. That as a tennis player, Novak Djokovic has always had the crowd against him when he has faced other world-class tennis players like Rafael Nadal and Roger Federer in the big matches. Also, that despite all the adversity, Novak Djokovic manages to be the tennis player who succeeds in the even matches. He is such a tennis player who is good at elevating his game, turning the negative into something positive which results in Novak Djokovic taking the negative emotions and turning it into something positive. That it is in these situations that the mental toughness becomes apparent. The ability to see possibilities rather than creating anxiety. Coach 2 implies that:

“… It is players like Novak Djokovic who usually play in something positive and they don't hold back in critical moments, it is in these situations where you have to be relaxed. If you get so nervous that you can barely lift your arm, it becomes quite difficult, it is in these situations that the mental toughness shows.”

This links to how Coach 4 talks about mental toughness in tennis. Coach 4 explains that tennis players who like to play big games with very big crowds, who like it when there are sharp situations and see opportunities instead of there being fear occasionally, who plays the same game at 4-4 or 5-5 in sets as if there was a tie in the first or second set, that these are tennis players who are mentally tough. Coach 4 tells us that: “…. A person who likes a challenge and have a belief in his game so that he dares to play in the toughest situations.”

Staying positive, being able to see opportunities instead of creating anxiety, a player who likes challenges and believes in himself is also linked to how both Coach 1 and Coach 3 defined mental toughness. Coach 1 explains mental toughness for a tennis player on a tennis court is about: “… To be able to handle important situations in the game. To be able to handle when you feel the
tension in the air during big tennis matches. To be able to play relaxed, as if it were a practice match” Coach 3 defines mental toughness as: “... The ability to get out what I have in me in that situation. The ability to reflect and be positive. Dare to do what needs to be done.”

As such, we see a very clear pattern around how these world-class tennis coaches view tennis players who are mentally tough in terms of how tennis looks today, what defines a mentally tough tennis player and what it means to be mentally tough in tennis matches.

4.2 Coaches' views on the critical moments of tennis

All four tennis coaches interviewed consider that there are critical moments that may occur during a tennis match. This is because of the way points are counted in a tennis match, there are usually moments that can directly determine the outcome of a tennis match. Coach 4 also believes that there are situations during a tennis match that can be extremely decisive. It doesn't have to be just one match point, but that there can be several points during a tennis match that become decisive. Obviously the first point is very important, but every point played during a game is of great importance for the outcome of a tennis set. Coach 2 explains that everyone knows how the first point in tennis is important. However, “pressure points” were addressed and how these types of points can be critical during a tennis match. If a tennis player manages to win those pressure points, then the tennis player will put a certain kind of pressure during the match. That there are points during a tennis game to where you can put yourself in a very good position to break. Coach 2 states that:

“... It is like this: 15-30/30-15 are the kind of points that are hugely important. Going to 30-30 or 40-15/15-40, those scores are incredibly important. Drop a point 15-30 as a server to 15-40 and the server has to grab the game. Those "pressure points" 30-15/15-30, those are such important points.”

Coach 3 explains how there are statistics that show that a tennis player should always try and win the first point on each game that is played as winning it will gain the tennis player an advantage. Coach 1 also explains how the very first point of each game weighs a lot during tennis matches. That a tennis player should not risk the first point as it is too valuable. Coach 1 states that: “The beginning of each set and game are often important, 30-30, 40-40 are of course important. There are definitely periods during games, sets and matches that are more or less important.”
also explains that the knowledge a tennis player carries on his or her opponent can help change the outcome of a match. Coach 3 states that:

“… The first point you should try to win every game because it's purely statistical that you have an advantage, you shouldn't gamble on it, it's too valuable. The 30-ball is also important, especially in your service games. However, the more you know about the tennis player's possible strengths and weaknesses, it will lead you as a tennis player to be able to play out your match much better.”

Coach 4 states that there are many points that can be directly decisive for the outcome of a tennis match, and that it does not only have to be about the match point. That there are many critical moments that can appear during a tennis match that can decide the outcome of it. Coach 4 tells us that: “… There are situations in matches that can be hugely decisive without it being a match point. I would say that there are absolutely many balls or points that can be directly decisive for the outcome of the match. ”

The tennis coaches agree that there are critical moments that can be found during a match of tennis. It does not have to be just one match point, but that there can be several points during a tennis match that become decisive. Furthermore, “pressure points” are points that can completely shift momentum of a tennis match.

4.3 Handling of critical moments

Different tennis players act in different ways when these critical moments occur. The tennis coaches believe that how a tennis player handles these critical moments will depend on how mentally tough they are. That mental toughness becomes a crucial factor in critical moments concerning tennis at the elite male level. Both Coach 2 and Coach 4 cite Novak Djokovic as an example of a mentally tough tennis player who has the ability to manage his game during the critical moments that may arise during a tennis match. Coach 2 states:

“… You cannot expect to be at 5,000 break balls won. However, on the days that you do, you are doing something correct, your ambitions are correct. The mentally tough tennis players dare to go about more against the lines of the tennis court in their groundstrokes, they are braver. They are incredibly good at playing the depth of the ball. Novak is the one who is the best at it, you are not safe even if you have four double breaks against him, and you cannot hold the serve either.”
The statement from Coach 2 also goes together with how Coach 1 believes the mentally tough tennis players handle the critical moments that can occur during a tennis match. Coach 1 explains how the mentally tougher tennis players carries the ability to sense when there are important moments during tennis matches, and then being able to shift into another gear and play more aggressively when they find themselves in important match situations. Coach 1 states that: “…They are extra aggressive when there are important match situations. Almost like they want to surprise the opponent by being a little extra aggressive. They're very much with it mentally in those situations.” As mentioned earlier, Coach 4 refers to Novak Djokovic as a mentally tough tennis player during the interview. However, Coach 4 also implies that if Novak Djokovic finds himself in a situation where his opponent would hit their groundstrokes with a lot of power, then Novak Djokovic himself would hit back with the same speed instead of increasing. That there is a balancing act which Novak Djokovic manages to achieve due to the fact that he is a mentally tough tennis player. Coach 4 explains:

“… Like Djokovic, if the opponents hit hard then he uses the speed created and hits back with the same speed instead of increasing, so in those situations I would say there is a balancing act, and that those who are mentally toughest in those situations have an understanding. So, if it's 30-40 in the opponent's serve or 30-40 in his serve, so break point either way, he plays more cross than straight, but he still plays very offensive, but he's smart in that he to play in the easiest way”

The coaches explains how mentally a tough tennis player has over time won more “pressure points” during their professional career as a tennis player. If there ever is any critical moment or point in a tennis match, such as a break ball, the tennis players who are mentally tougher carries the ability to play offensively without any hesitation. As Coach 1 mentioned, the mentally tougher opponents almost surprise their opponents by how aggressive they can be on court whilst a crucial point is being played during a tennis match. The tennis players who are mentally tougher manage to find the lines on their shots, they find good depth on court, though they are smart enough to play it in the easiest way possible.

4.4 Mental toughness as an area for development

The theme “Mental toughness as an area of development” deals with the main question; “can mental toughness be trained up? If so, how?” Where all coaches are insisting that it is possible to
They generally talk about how good preparation usually leads to confidence and calmness, where they believe that quality physical/tennis training leads to mentally tough individuals. Coach 2 states that they constantly work on court to create mentally tough tennis players. That it is about behaviors and how the tennis players show their body language both on and off court. That it is part of the tennis coaches’ job to work with the different elements that comes with tennis. Coach 2 explains:

“… It's about preparing a player as much as possible for different types of scenarios, for example, if game strategy "a" doesn't work we might have to have plan "b" and "c", planned out so that it creates a certain security for the players.”

Coach 3 believes that if a tennis player must hit a goal X number of times in 10 strokes in training but fails to complete that goal, then that tennis player should not receive another chance. As they are not given new chances during a match of tennis. That they need to learn the nature of failing every time that it is important for a tennis player’s mentality to learn to fail. Coach 3 implies:

“… You can't give new chances in a match; you've been given this chance. Some people will find it difficult to give up a training session, but then you must give up. Therefore, the player cannot be given new chances in training all the time, learn to fail, and fail a little less next time”.

Coach 4 tells us that the two highest ranked players that he worked with, were managing the mental toughness-part differently. One of the players was working with a mental coach and took care of all the work with a different person than the tennis coach, which Coach 4 says is normal. The tennis coach and the mental coach were communicating from time to time, but just to check that the work was doing any good. In the other players case, the player was “way to nice” and “to quiet” as Coach 4 explained and described what could be better: “… If you are two meters tall and you have a bit more energy and you show that positive energy when you do something good, then you get more impact.”

The coaches emphasizes the importance of body language both on court and off court, as the body language can have an impact towards each individual tennis players post-performance. Making sure a tennis player is prepared for any type of scenarios that can occur during a match of tennis. That mental toughness is something each coach can work with their tennis players.
5 Discussion

The discussion consists of the same headings as the result in expanded form. Moreover, this section is also linked to scientific articles, which in turn allows for conclusions to be drawn.

5.1 Mental toughness and self-confidence

Tennis players at the highest level in the world show remarkable ability to handle the important moments as coach 1 mentions, largely due to their well-built confidence. This factor, which can be linked to courage, is something that all the coaches interviewed described as crucial. The knowledge is further confirmed by Weinberg and Gould (2014) who explain that there are many people who are extremely good at the sport, but when the level of performance is reasonably equal, and there is an 80-90% likelihood that matches are decided on mental toughness. Coach 3 describes that courage is linked to “drop height”. Coach 3 means that the players are aware of the potential outcome of a tennis match. They both know the winning- and loosing outcome. With this knowledge, the players can play freer, it brings out the courage, which are necessary to be a winner long term. This proves that these tennis players feel nervousness and understands the idea of the game. There might be situations where the tennis player knows that they can lose the point, but they dare to play their game to the fullest as they know that it will give them the best chance of winning.

The mental attitude is something that should be embraced at the earliest possible stage of the tennis carrier, which both Coach 3 and Coach 4 believe can be misinterpreted as it is easy for it to fall in the “too brave” direction. As mentioned in the results, Coach 2 describes the link between courage and being mentally tough: “It has good self-confidence, you don't see it give in, it doesn't doubt, it wins”. By this he means that a player with less confidence, less courage and therefore less mental toughness is more likely to experience a shift in momentum in a negative direction. This results in a consequence that reflects the match. This is something that Miller and Weinberg (1991) argue that players who are mentally tough can manage. To convert into something good, “gasoline on the fire”, to perform even better. Coach 2 describes along with this, the importance of staying relatively positive during a situation that clearly consists of high stress and pressure - something the other tennis coaches also confirm. Other studies, including one by Cowden et al. (2016), also suggest that the most successful players often have a relatively neutral approach to losing points. They must be experts hiding their emotions. In relation to this finding, the study
argues that a slippage in the mental rollercoaster can lead to a player losing confidence and living in the past, which in turn can lead to the loss of critical points, and therefore the match (Cowden et al., 2016). Linked to this, statistics show that the top three tennis players of all time (in terms of number of Grand Slam tournaments won) won approximately 54% of all points they played during their professional tennis careers (Official Site of Men's Professional Tennis | ATP Tour | Tennis, n.d.). These statistics show that professional tennis is very much about being able to deal with defeat in the form of lost points, saves, sets and points even if the player manages to win the match. Coach 3 describes it as a road end, where it is impossible to survive if the fall gets too hard, which links back to what Cowden et al. (2014) says.

Both Coach 3 and Coach 4 claim that the most successful players in the world like the “nerves” that arise on the big stage, in matches that matter a lot, with many people watching and the stakes high. Something that not all players in the world's elite feel equally comfortable with. Coach 1 says that the best players, can play relaxed during these high circumstances, which also is evidence of high self-confidence, referring to Weinberg and Gould (2017).

5.2 Coaches' views on the critical moments of tennis

Majority of the tennis coaches interviewed, talks about Novak Djokovic as the best performer under pressure, during key moments in the matches and handling critical moments. This is also the tennis player who has won the most points in percentage terms during his tennis career, the tennis player who is best in percentage terms when a set is decided by a tiebreak and in general when it comes to “points under pressure”. As explained in the result section, Coach 2 states that it is unrealistic to win 5,000 break points in a row, but the best players are managing to play with the right ambition, to be brave in these situations. The players who are mentally tough are playing closer to the lines with higher intensity and depth. Coach 4 also mentions it in a similar way. The mentally tough players understand the situation, of the critical moments. They play without fear, without making it crazy. So, if the score is 30-40, they play offensive, but in the easiest way possible. The mental toughness and confidence that Novak Djokovic displays in handling the critical moments is something Weinberg and Gould (2017) link to goal setting. The athlete's lofty goals, and work to achieve the goal positively influences.

The barrier of critical situations that arise becomes an obstacle on the path to something greater, something that Novak Djokovic overcomes with, for him, obvious mental toughness. In
addition, all tennis players' decision making is instinctive, which means that the most successful players' abilities are well trained and systematically ingrained to perform during critical points and moments. This ability can be further linked to prolonged concentration that becomes vital during an entire tennis match in order not to lose important parts of the match (Kent et al., 2018). Another conclusion that can be drawn is that Novak Djokovic does not win all the points played, but often just over half. Meffert et al. (2018) cites a case from 2016 when the world number one, Novak Djokovic, won 96% of the matches that he played during the year (46-4), whilst only managing to win 56% of the points. At the same time, world number nine, Tomas Berdych won 51.8% of all points played during that year. This shows that not all the points in a tennis match are important but rather winning the points during the match that directly influence the result - something that all tennis coaches emphasize.

5.3 Handling of critical moments

Since all interviewees believe that there are some points that carry more weight than others, this seems highly likely. The question is what is meant by “more valuable”? Coach 3 talks about the fact that, statistically speaking, winning the first point in the aggregate is proven to be of great benefit, over time. Coach 2 also agrees. There, both coaches mention that it does not have to be game points (and therefore break points) that are most important, this is something that the (Meffert et al., 2018) study can substantiate. Meffert et al., (2018) study argues that the points at 15-30 and 30-30 in the opponent's serve give the player a good chance to break the opponent's serve, and that these points are more important than the breakpoint itself. Breaking the opponent's serve gives a good chance of winning the set, and ultimately the match, because the serve is very important. This means that a player is “expected” to win his service games, as the serve gives a significant advantage. The study can also show how the breakpoint is percentage-wise easier to win than any other point in the opponent's service game, this because of the pressure that the break point brings to the server (Meffert et al., 2018). That said, break points are points that all four coaches argue is a critical moment in a tennis match, as they occur relatively infrequently and can be directly match-deciding.

As mentioned in the results, Coach 4 believes that there are points that can bring big advantages mentally speaking. Coach 4 means for example that a final stage of a second set, in a best of five set match, can be decisive, and that it can change a lot. Coach 1 emphasizes the courage
in the critical moments and means that the best players really want to win the most important points by showing courage and mental toughness. Coach 1 means that the players can be extra offensive in these situations, to “surprise” the opponent in a way. It is a mental war out there, to bring a slight edge.

5.4 Mental toughness as an area for development

The coaches are talking about mental toughness “as an area of development” a little different compared to each other, but every example is about preparing the player for matches. As brought up in the results, Coach 4 mentions two players who work very differently, but with the same goal. One was working with a mental coach to be mentally tougher during tennis matches, and the other one was working with the tennis coach to become more energetic on the tennis court. Both players wanted to be able to maintain a behavior that they believed could help them to win matches. This is what Miller and Weinberg (1991) wrote about, to turn every situation to something good, to keep the rollercoaster steady. These goals were of course a part of their training. Coach 3 has another example of how mental toughness is tested during training. Coach 3 believes that if a player is to hit X number of shots into the court, and has 10 attempts, and fails the task, then the player should not always be given additional attempts to succeed. Coach 3 also believes that it becomes “fake news” if the player learns that he gets another try, which then does not reflect what it looks like in the match, or “in reality” as Coach 3 chooses to call it. The interviewee believes that players need to be equipped for the future and prepared to deal with the mental pressure that tennis brings, as all interviewees confirm.

Duda et al., (2005) argue that preparation and change are to some extent the recipe for success. Striving to develop elements that influence the outcome (and thus preparing) is crucial (Duda et al., 2005). Coach 2 talked about being prepared when it comes to the tennis-part. Coach 2 means that a player must be ready for everything, to have a few extra tactics, if the first one is failing. This makes the player feel secure. To have different plans and game strategies, requires preparation. He means that if a player’s tennis game is strongly built up, and the player feels prepared, that will help the player to have self-confidence, which is directly connected to mental toughness and can help perform in critical moments that can appear. As mentioned earlier, Coach 2 also states that they constantly work on court to create mentally tough tennis players. That it is about behaviors and how the tennis players show their body language both on and off court and
how it is all about preparing a tennis player as much as possible for different types of scenarios. The body language of a tennis player is very important both on court and off court. As a positive body language will help a tennis player to not fall into a spiral of psychological negativity. The study from Martínez-Gallego and Carrillo Molina, (2019) supports this by claiming that there is a connection between a tennis player’s body language and post-performance. That a dominant body language from a tennis player will result in a greater number of positive actions and that a submissive body language will result in negative actions later.

5.5 Practical implications
The study is important because it reveals a relatively forgotten part of elite tennis, but one that can have a crucial impact. The image of junior tennis players is that the technical, tactical, and physical is what is focused on, while the mental is often something a person just "has to have". However, this becomes interesting as this study along with several scientific articles point to the mental toughness as the crucial thing in tennis matches, especially when the players' tennis skills are relatively even. This study is therefore not only aimed at younger tennis players who are interested in a professional tennis career, but also the coaches of these young tennis players, who should focus more on the mental aspect of tennis than they do as of today.

Further, the study can be considered as an interesting tool for other players/coaches whose goal is to carry out the same type of investment, especially in sports such as padel, badminton and table-tennis where the calculation method is similar.

5.6 Limitations
The obstacles that have existed are the time aspect. If time had been unlimited, the same narrow limits would not have had to be drawn, which in turn could have led to a more comprehensive work. There would have been no need to delimit the gender of players, the level of players, etc. In addition, the delimitation on the type of coaches interviewed for the study made it something that only showed one perspective. As tennis is played all over the world, cultural differences in learning exist in terms of all capacities within tennis, something that was noted by one interviewee. Another interviewee explained the differences between training a male versus a female player at the elite level, which would have been an interesting point to mention in context, as the way mental toughness is trained in tennis players, has been shown to be different. Another interesting aspect to
study for the future would be to look at the player’s perspective of mental toughness. A final aspect
that has been limited is the type of tennis player that has been highlighted and discussed. In the
world’s top players, there is almost unlimited money to spend on the necessary means in their
training, they also play under different conditions that could affect mental toughness in general. A
question that could be asked in future work is "how does the level of competition and world ranking
affect the mental toughness of a tennis player?"

The problems encountered in the course of the work are mainly the time schedule of the
tennis coaches. There were specific coaches that we wanted to interview, who had limited time,
which led to various delays before all interviews were completed. However, the authors agree that
this did not affect the result, as the opinions of all coaches on the subject were made clear, and the
preparation before the interviews were very well executed. Another possible problem would be
that the coaches used in this study are colleagues to one of the authors. This could affect the answers
to the questions that the coaches were asked. With this said, the authors are convinced that this
wouldn’t affect the interview results. The coaches have made interviews before, and have a definite
opinion in most of the questions.

5.7 Conclusion
There is no doubt among any of the interviewees, and hence the tennis coaches, or the scientific
articles examined that the best players in the world are those who are the toughest mentally. They
claim that the elite level of tennis is really even, and that it is mental toughness that will be the
deciding factor. It does not determine every point, every set, or every match. But it determines
competitions, seasons, and careers. What these athletes manage to achieve in the critical moments
of a match is to have the courage to play their game to the fullest in those moments. In other words,
they get the best out of themselves when it matters most. This is achieved, according to the
interviewees, through careful preparation, as well as an understanding of how tennis and its
counting system works. By this they mean that they want to win at all costs, feel pressure and stress,
but are fully aware that they need to summon up great courage to succeed. If they fail, they will
have an understanding of it, and with that, and understand that not every point can be won. This
understanding and "reasonable" fallback means that they do not give up in defeat but continue to
believe in themselves. Coaches should therefore inform, create contexts and training sessions that
focus on these factors, as a complement to the training that is mainly conducted where the focus is on technical, tactical, and physical aspects.
List of sources and literature


Appendix 1

Source and literature search

Aims and questions:

The aim of this study is to investigate whether mental toughness is a decisive factor in critical moments in tennis at the elite level, and to form a deeper understanding of the impact that mental toughness has in tennis by means of qualitative interviews with world-class Swedish coaches.

Questions:

- Which aspects of mental toughness do coaches consider more important at critical moments of a tennis match?
- Do the coaches believe that mental toughness is something that can be trained?
- In what ways, in terms of their expertise, can tennis coaches apply this to help young people learn from what determines critical/decisive moments?

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Comments

There are many studies on tennis and sports psychology. All studies found from databases have been quantitative.
Appendix 2

Information letter

Hamed Dares studerar sitt tredje år på tränarprogrammet och Patrik Eriksson studerar sitt fjärde år på ämneslärarprogrammet vid Gymnastik- och idrottshögskolan (GIH) och skriver ett självständigt arbete tillsammans. Denna studie kommer rikta sig mot korrelationen mellan mental styrka och de kritiska moment som kan uppstå under en tennismatch på elitnivå.

Appendix 3

Consent form

_Samtycke till att delta i studien:_ Tennis och idrottspsykologi - Mental styrka som en avgörande faktor i kritiska moment rörande tennis på elitnivå

Jag har skriftligen informerats om studien och samtycker till att delta.

Jag är medveten om att mitt deltagande är helt frivilligt, att jag kan avbryta mitt deltagande i studien utan att ange något skäl och att jag som tränare kommer att hållas anonym.

Min underskrift nedan betyder att jag väljer att delta i studien och godkänner att Gymnastik- och idrottshögskolan, GIH behandlar mina personuppgifter i enlighet med gällande dataskyddslagstiftning och lämnad information.

___________________________
Underskrift

___________________________
Namnförtydligande

___________________________
Ort och datum

Kontaktperson vid frågor:

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Patrik Eriksson
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Handledare: Alexandra Pérez Ferreirós
_alexandra15pf@gmail.com_
Appendix 4

Interview guide – Swedish

- Frågor
  - Frågor vid behov

Introduktion:
- Förklara syftet av den kvalitativa studien.
- Hur länge har du jobbat som tennistränare?
  - Hur länge har du jobbat med elitspelare?
  - Har du själv spelat på elitnivå?

Del 1: Mental styrka
- Hur hade du definierat mentalt stark tennisspelare på elitnivå?
  - Kan du se ett gemensamt beteende mellan dessa spelare?
- Hur viktigt är det för en tennisspelare på elitnivå att vara mentalt stark?
  - Kan det förekomma situationer under en tennismatch på elitnivå där mental styrka blir viktigare?
  - Om ja, vilka är dessa moment?

Del 2: Mental styrka under träning
- Tror du att mental styrka är något som kan tränas upp?
  - Om nej: varför?
  - Om ja: på vilket sätt? Vet du om detta är en genomgående röd tråd inom träningen på din arbetsplats? Är det en del av “läroplanen”?
- Kan du som tennistränare påverka en tennisspelas mentala styrka inför en match?
  - Kan detta påverka resultatet av en match?
  - Varför?

Del 3: Genomgående mönster
- Kan du som tennistränare se ett samband mellan mental styrka och antal oprovocerade misstag under en match?
o Under vilka moment kan antalet oprovocerade misstag komma att ökas?

- Ser du ett gemensamt beteende på träning och match mellan de spelare som är framgångsrika inom tennis?
  o Vilket beteende är detta?

Del 4: Viktiga poäng och dess betydelse
- Finns det poäng som du anser är mer kritiska under en tennismatch?
  o Om ja: Vad lyckas de framgångsrika spelarna åstadkomma under dessa poäng?
  o Har mental styrka och förmågan att “spela sitt spel fullt ut under viktiga moment” en korrelation?
  o Om nej: Varför?

- Det finns statistik som visar att några av de mest framgångsrika tennisspelarna någonsin (Federer, Nadal och Djokovic) har högst vinstprocent sett till spelade poäng (ca 54 %). Varför tror du att dessa spelare har högst procent vunna poäng?

Del 5: Avslutning
- Hur vill du att dina framtida elittennisspelare ska se till mental styrka kopplat till tennis?
  o Hur kommer du att jobba för att de ska nå denna syn?

- Har du några funderingar eller någonting som du vill tillägga kring det som har diskuterats?
- Tacka intervjuaren för sin medverkan
Appendix 5

Interview guide – English

- Questions
  - Questions if needed

Introduction:
- Explain the purpose of the study.
- How long have you worked as a tennis coach?
  - How long have you been working with elite players?
  - Have you played at an elite level yourself?

- Part 1: Mental toughness
  - How would you define mentally tough tennis players at the elite level?
    - Can you see a common behavior between these players?
  - How important is it for an elite level tennis player to be mentally tough?
    - Can there be situations during an elite level tennis match where mental toughness becomes more important?
    - If so, what are these moments?

Part 2: Mental toughness during training
- Do you think mental toughness is something that can be trained?
  - If no, why?
  - If yes: in what way? Do you know if this is a common thread in the training at your workplace? Is it part of the "curriculum"?
- As a tennis coach, can you influence a tennis player's mental toughness before a match?
  - Can this affect the outcome of a tennis match?
  - Why?

- Part 3: Consistent patterns
- As a tennis coach, can you see the correlation between mental toughness and the number of unforced errors during a tennis match?
  - During which moments can the number of unforced errors be increased?
• Do you see a common behavior at practice and match between the players who are successful in tennis?
  o Which behavior is this?

Part 4: Critical points and their importance
• Are there points that you consider more critical during a tennis match?
  o If yes, what do the successful players achieve during these points?
  o Does mental toughness and the ability to "play your game to the fullest during key moments" have a correlation?
  o If no, why?
• There are statistics that show that some of the most successful tennis players ever (Federer, Nadal and Djokovic) have the highest winning percentage in terms of points played (about 54%). Why do you think these players have the highest percentage of points won?

Del 5: Closing
• How do you want your future elite tennis players to look at mental toughness linked to tennis?
  o How will you work to help them achieve this view?
• Do you have any thoughts or anything you would like to add about what has been discussed?
• Thank the interviewer for his/her participation