Breakable performance - The role of mental toughness in elite sport, International outlook

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Abstract

Our study aimed to analyze mental toughness and its relationship to sports performance. We reviewed 50 qualitative and quantitative international studies. We performed an in-depth investigation on mental toughness; we also focused on how to improve mental toughness. We hypothesized a significant difference in both genders, suggesting that coaches substantially impact mental toughness. We primarily concentrate on valid, real-time assessments and psychological training in elite sports athletes. Sport psychologists, mental trainers play an essential role in elite sports performance. Results of related studies demonstrated that these age and gender-specific mental training sessions are effective in improving performance. There is an increasing need for computer-based interactive testing methods to analyze cognitive and psychomotor skills under pressure.

Keywords: mental toughness, elite sport, sports performance, review

INTRODUCTION

This research aimed to review articles that examine the construction of mental toughness and its relationship to athletic performance. This review considers both qualitative and quantitative approaches. Fifty studies were used for the examination.

THEORETICAL BACKGROUND

The success or failure of athletes is multifactorial. It depends on several factors, including physical, tactical, technical, and psychological aspects. The psychological component is usually the determinant between winner and loser in sport.

Mental toughness refers to a collection of psychological characteristics that play a central role in optimal performance. Athletes, coaches, and sports psychologists have consistently cited mental toughness as one of the most important psychological characteristics of success in sports. In recent decades, several studies have been conducted to examine the role that mental toughness plays in athletes’ success (AHSAN – MOHAMMAD, 2017;
ÁLVAREZ et al., 2018; BALOGH – KISS, 2019; GOLBY – SHEARD, 2004; GONZÁLES et al. 2013)

For example, researchers reported that 82% of coaches considered mental toughness to be the most critical psychological attribute in judging the success of wrestlers. According to Jones & Parker (2013), mental toughness contributed more than 50% to athletes’ success in their struggles with their opponents.

**The concept of mental toughness**

Mental toughness is recognized as an essential psychological feature. Both coaches and athletes attribute the competition’s success to mental toughness and the negative results of its lack. Not surprisingly, this recognition has been accompanied by increased interest among athletes in enhancing mental toughness (CRUST, 2009; MASUM, 2014; SOLOMON, 2016; LEVY et al., 2012).

Researchers have not been able to agree on an exact definition of mental toughness. Still, the various reports generally refer to an athlete’s ability to concentrate, recover from failure, put pressure on and face difficulties, and mentally resilience, commitment, and confidence (BULL et al., 2005; MEGGS – CHEN, 2018; GODDARD et al., 2019, COWDEN et al., 2016).

However, despite its frequent use, mental toughness is subjective. More specifically, it is often used to describe a broad term that reflects an athlete’s ability to cope with training difficulties and competitions to remain as flexible and resilient as possible in certain situations (BULL et al., 2005; CONNAUGHTON et al., 2008; JONES et al., 2002; THELWELL et al., 2005).

**Components of mental toughness**

Athletes, coaches, and applied sports psychologists have consistently cited mental toughness as an achievement in elite sports and one of the most important psychological characteristics. However, it is one of the least understood terms in applied sports psychology (JONES et al., 2002). This is partly due to the wide variety of definitions, measurements, and research designs used in researching this construct.
Essentially, all positive psychological traits are no longer known as mental toughness at some point (Table 1). Despite many opinions surrounding this concept, everyone agrees that: mental toughness, according to the athlete, is stress; the resulting anxiety and the ability to handle high-pressure sports situations are evident.

Researchers published a model of mental toughness that includes seven characteristics: self-confidence, negative energy, attention control, visual and visual control, motivation, positive energy, and attitude control. Although this model is conceptually attractive, the seven mental toughness factors have not been justified. However, it was pointed out that mental toughness can be developed or mastered, not just an innate genetic trait (GUCCIARDI et al., 2009; CHOUDHARY, 2017).

During qualitative research, twelve mental toughness characteristics emerged. These factors include self-efficacy, cognitive self-concept, potential, task-specific attention, endurance, task cognition, personal outcomes, task value, commitment to the goal, positivity, stress minimization, and favorable comparisons (GUCCIARDI et al., 2015; HOUWER et al., 2017). Jones et al. (2002) developed a framework for mental toughness that classified 30 traits into 13 general dimensions under 13 subcomponents (attitude/mindset, training, competition, and post-competition: see Table 1). From an applied perspective, this framework provides the context in which attributes and subcomponents can be used and describe how and under what circumstances mental toughness can be developed and maintained.
Table 1: Dimensions and subcomponents of the mental hard
tness framework

*Jones et al., 2007*

<table>
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<th>Dimension</th>
<th>Subcomponent</th>
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| Attitude / Mindset| • Faith
                    • Focus                                                    |
| Training          | • Use long-term goals as a source of motivation.
                    • Extended to the limit
                    • Controlling the environment                             |
| Competition       | • Controlling the environment                              |
                    • Faith
                    • Power control
                    • Maintain concentration
                    • Awareness and control of feelings and thoughts
                    • Pressure management                                      |
| Post-race stage   | • Failure management                                       |
                    • Managing success                                         |

The development of mental toughness was called a long-term process. According to Connaughton et al., (2008), they appear to develop in three stages (early, middle, and late years) that reflect the three career phases. Based on qualitative interviews with elite athletes, the transition between these stages involves significant events, such as changing clubs, working with a new coach, being invited to the national team, or winning a significant event (KRI
S]ÁNSDÓTTIR et al., 2018).

Even if a wide range of factors and mechanisms influence the development of mental toughness at each stage, coaches appear to play an essential role throughout the process (CONNAUGHTON et al., 2008; GUCCIARDI et al., 2009). This is not surprising, given that
several studies have documented that coaches are essential in developing and maintaining athletes' attitudes, competencies, and performance in sports.

Studies have also reported that coaches can improve the mental toughness of their players by intentionally working on the “mental side,” such as building trust, positive expectations, and creating a positive environment. Connaughton et al. (2008) suggested that coaches should create conditions in which athletes are exposed to competition and social competition stressors. Mental toughness also affects an athlete's overall health. As Rátgéber et al. (2019) stated, basketball requires a high level of psychological abilities. It plays a significant role in maintaining health and is even an excellent tool (Newland et al., 2013).

**OBJECTIVES**

During my research, I sought answers to the following questions:

- What exactly does mental toughness rest on?
- Is there a measurement method that shows valid, real-time results from measuring mental toughness?
- To what extent does the coach appear in the analyzed literature as a factor influencing mental toughness?
- Is there a significant gender difference and, if so, how does it manifest itself?
- How can mental toughness be improved?

**Hypotheses of the research:**

H1: Mental toughness is a significant determinant of athletes' performance. It includes the athlete's ability to perform under stress, how he or she responds to a particular stimulus under pressure in certain situations, how they can stay mentally tough until the last minute, and how to overcome his or her opponent in crucial cases. A mentally tough athlete has adequate self-confidence, can control his emotions, and has faith and perseverance. He can manage environmental impacts, success, and failure, focus on a high level in competitive situations, and have incredible motivation.
H2: There is no uniform measurement method that shows valid, real-time results on the degree of mental toughness. (Non-questionnaire measurement)

H3: From the perspective of the athlete's career, the coaching attitude and behavior can be decisive, not only during the physical preparation but also in mental abilities, including mental toughness. The coach provides psychological and social support to the athlete, who overcomes the difficulties more efficiently and, consequently, helps develop and develop his mental toughness.

H4: There is no significant difference between the levels of mental toughness between men and women, but men are better able to control their emotions, which may be decisive for comparing mental toughness between the genders.

H5: Mental toughness can be improved through mental training, psychological methods, and the creation of competitive situations in training.

**MATERIALS AND METHODS**

The genre of research, secondary, systematic literature analysis, was called a review. The methodology of the literature review is PRISMA and snowball method. We have worked primarily on articles published on international scientific sites (Google Scholar, Taylor & Francis Online, SpringerLink, PubMed) for the following keywords: mental toughness in sport, mental toughness in handball, Stress, VTS, cognitive skills. After the first search results, scientific publications that did not examine the given concepts in sports were excluded. Reviews published on this topic, but examined based on other structural aspects, have also been used for the research, further expanding the number of articles reviewed.

**RESULTS**

During the review of the articles, we used 38 studies that met the structural considerations. In many cases, there were only generalized data but not specific ones. Accurate figures are needed in terms of the research's success. The results can be determined based on the hypotheses mentioned above.

Mental toughness is "a personal ability for an athlete to regularly provide a high level of performance despite varying degrees of situational needs." (GUCCIARDI et al., 2017, p.
Characteristics such as problem-centered coping (NICHOLLS et al., 2008) and self-confidence were found to be associated with mental toughness (Fig. 1). Mentally tough performers are highly motivated to succeed and can maintain their self-confidence despite occasional competitive failures. Consistent with previous research (JONES et al., 2002; THELWELL et al., 2005), self-confidence was unanimously cited as a critical characteristic of the mental toughness of Australian footballers.

A socially supportive environment can positively affect mental toughness in and outside of sport (CRUST, 2010).

The development of mental toughness was called a long-term process. According to Connaughton et al., (2008), they appear to develop in three stages (early, middle, and late years) that reflect the three career phases. Based on qualitative interviews with elite athletes, the transition between these stages involves significant events, such as a change of club, collaboration with a new coach, entry into the national team.

Jones et al. (2002) reported characteristics of mental toughness that included awareness and control of thoughts and feelings, and maintaining focus (comparable to power), using long-term goals as a source of motivation (like commitment), pushing to the limit.
It can be stated that the most common method of measurement, the questionnaire, also known as paper-pencil tests. (Figure 1) This is the most cost-effective and most straightforward way to measure mental toughness, but it is unfortunately not always sufficient to make accurate findings for several reasons. The primary problem is tests completed by individuals, may that the individual meets the trial, which can usually produce subjective or unrealistic results. Furthermore, the test is not conducted during a given event, but they cannot measure real mental toughness before or after it. Among the most used questionnaires is the Mental Toughness Questionnaire 48 (MTQ48), which contains 48 items scored on a five-point Likert scale, ranging from complete agreement to disagreement. The list of mental toughness (MTI; MIDDLETON et al., 2004) is also famous, a 65-item instrument that measures 12 components of mental hardness and global mental toughness. The 42-item psychological performance record (PPI) was one of the first measures to include cognitive-behavioral and self-assessment dimensions. However, PPI-A is a kind of improvement. Its potential limitation is that it does not include the degree of control. This feature has been identified several times in the literature on mental toughness (JONES et al., 2002). SMTQ is the only psychometrically acceptable
mental toughness tool that includes a measure of emotional and negative energy control routinely identified in the mental toughness literature (JONES et al., 2002). Athletes and their coaches were interviewed much less frequently than the questionnaires, and in some cases, autogenic training (VMBR) and focus group comparisons were also used. The least common method was instrumental testing (Figure 2). However, if this method were more prevalent among researchers, they could produce even more valid results in measuring mental toughness, thereby maximizing the performance of athletes (SHEARD et al., 2009).

![Figure 2: Testing methods of mental toughness](image)

Although several factors (personal, social, environmental) can influence athletes' mental toughness, the relationship between coach and athlete may have one of the most significant effects on athlete motivation, mental toughness, and subsequent behavioral intention. Several authors have emphasized the importance of building an effective coach-athlete relationship due to the consequence that the quality of this relationship exercises on athletes' experience, which in turn may increase the willingness to continue a physical activity (REDDY – BERHANU, 2016)

According to Connaughton et al., (2008), mental toughness develops over three stages, and coaches play an essential role throughout the process (CONNAUGHTON et al., 2008; GUCCIARDI et al., 2009). This is not surprising, given that several studies have
documented that coaches play an important role in developing and maintaining athletes’ attitudes, competencies, and performance in sports.

Looking at the study of female and male athletes, it is striking that most studies have examined the non-mental hardness of both, but several studies have addressed only one of the two. In this case, a higher proportion of men were studied, and only 6% of the studies dealt only with female athletes (Figure 3). Recent research by Pausek et al., (2017) has shown no significant difference between female and male athletes through mental toughness.

There is a trend-level difference in the characteristics of the two non-mental toughness. Conversely, other researchers, such as Nicholls et al., (2009), report that male athletes have more outstanding mental toughness than women. They are more resilient to challenges and control of emotions. Male athletes reported higher emotional power than women.

Crust (2010) supported this view, as they reported a higher level of control in men than in female competitors. Research shows that female athletes tend to use more emotion-centered and social support and less problem-focused coping in response to an event or injury.

Many athletes worldwide use psychological techniques to improve sport performance. Alternatively, mentally tough individuals can use several psychological strategies to

Figure 3: Proportion of gender distribution in the reviewed articles

Source: Own resource
encounter stressors. Examples are relaxation techniques, self-talk, mental images (RANA, 2009; SLIMANI et al., 2015).

Competitive experience can be an essential factor in developing mental toughness among athletes (CONNAUGHTON et al., 2008). Mental toughness (MT) has proven to be a prerequisite for success in many competitive sports (GUCCIARDI, 2017).

While researchers have shown that levels of mental toughness depend on genetic factors, research has also shown that these levels can change in adolescence and can be modified through specific interventions. Studies have also reported that coaches can improve the mental toughness of their players by intentionally working on the "mental side," such as building trust, positive expectations, and creating a positive environment (CONNAUGHTON et al., 2008; RODAHL et al., 2015; BUTT et al., 2010). It was suggested that coaches should create an artificially developed climate in training in which athletes are exposed to stressors of competition and friendly competition. As the physical activity of male and female players is different, so should their mental training. Among elite players, this kind of method is essential, working on it with the help of a sports psychologist if possible (PIGGOTT et al., 2019).

DISCUSSION

Based on the literature review results, athletes must be treated by sports psychologists from an early age to educate as many mentally tough individuals as possible by coaches and professionals in various sports. The research results that psychological training has a positive effect on maintaining and developing athletes' mental toughness. Furthermore, coaches play an important role in developing and preserving athletes' attitudes, competencies, and performance in sports, so it would certainly be essential for coaches to learn as many ways as possible to help athletes in these areas. A key issue is developing measurement methods in research with instruments that produce immediate results and measure mental toughness during activity.

The "review" supports the hypotheses that, in many cases, the research done so far has been based on incomplete aspects. Based on these hypotheses and results, future researchers would like to use computer test systems to measure mental toughness in athletes as much as possible, which would provide more reliable and "real-time" results.
SUMMARY

Mental toughness is one of the most popular concepts these days, the maintenance and development of which is of concern to athletes, sports psychologists, and coaches alike. Research that has already been published confirms that at least 50% of success is due to psychological factors that reflect mental toughness.

Results: 1. By mental toughness, the athlete can provide a high degree of performance under changing situational factors, even under high pressure. He can process failure more easily and builds through difficulties throughout his career. A mentally tough individual is characterized by a high degree of self-confidence, self-confidence, and motivation. 2. In general, it can be said about the research so far that mental toughness was most often measured with paper-and-pencil tests. 3. In the literature, the coach appears as a factor influencing mental toughness, and the importance of mental training is also reflected in the articles. 4. The researchers did not find a significant difference between the genders, but emotions can severely impact mental toughness in women. 5. Mental toughness can be developed through psychological techniques, various mental training, competitive simulations, and responses to different life situations.

Conclusion: There is a need for as much psychological training as possible for athletes, especially in elite sports. The work of sports psychologists is significant concerning mental training. These training are practical by gender, age group, especially in developing the mental toughness of adolescent athletes. A high level of training of coaches would also be helpful in this regard. In addition, there is a need for measuring devices that can be used during activity and convey immediate results. Computer test systems that include interactive tests and can analyze athletes under pressure based on their cognitive and psychomotor abilities may be helpful.

The research was supported by: EFOP-3.6.1-16-2016-00022 Debrecen Venture Catapult Programme.
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<th>Author</th>
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<th>The number of respondents</th>
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<th>Sport</th>
<th>Territorial definition</th>
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<th>Methodology</th>
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<tr>
<td>Jones, R., &amp; Prinstein, J. M. (2000)</td>
<td>Mental toughness in sport: Relationship between sport level, gender, age, experience, and sport identified differences</td>
<td>677</td>
<td>454 men, 223 women</td>
<td>team and individual</td>
<td>15-50 years old</td>
<td>questionnaires &amp; MTQ8</td>
<td>A comparison of the level of performance, the athlete's gender, age, experiences, and type of sports</td>
<td>Continuously identifying the challenges and keeping emotions in check</td>
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<tr>
<td>Mason, R., &amp; Taylor, J. (2002)</td>
<td>The effects of mental toughness training on athletic coping skills and athletic effectiveness for national level players</td>
<td>15</td>
<td>not</td>
<td>team (handball)</td>
<td>20.74 ± 2.65 year</td>
<td>questionnaires &amp; MTQ8, AT 24, shooting test, observation</td>
<td>Sport-specific psychological coping ability was studied.</td>
<td>Controlling feelings, reducing anxiety</td>
<td></td>
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<tr>
<td>Treadwell, R., Venn, N., &amp; Grohowski, J. (2006)</td>
<td>Defining and Understanding Mental Toughness</td>
<td>1 study: M average = 26.4</td>
<td>2 study: M average = 27.2</td>
<td>40 people</td>
<td>UK</td>
<td>1 study M = 20.8</td>
<td>2 study: M = 25.2</td>
<td>they play on the first team of their club</td>
<td>Questionnaires; semi-structured interview</td>
<td>Mental toughness in a definition, evaluating the characteristics of a mentally tough person.</td>
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<tr>
<td>Nickells, A. R., Prinstein, J. M., &amp; Leary, M. R. (2000)</td>
<td>Mental toughness, optimism, perfectionism, and coping among athletes</td>
<td>677</td>
<td>454 men, 223 women</td>
<td>-</td>
<td>UK</td>
<td>15-50 years old</td>
<td>consists of the athletes competing at international, national, district, (0) mental toughness and coping.</td>
<td>CIR510, MTQ45, LOT</td>
<td>The aim of the article was to explore the relationships between (a) mental toughness and coping, (b) mental toughness and optimism, and (c) coping and optimism.</td>
<td>Optimism is a good prediction of task-oriented coping, while perfectionism is a determinant to distraction and dysfunctional orientation. Address the more approach and less avoidance strategies. A mentally tough athlete is able to solve a problem on his own, without the help of others. Challenges, commitments, and emotional control are important for the athlete.</td>
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<tr>
<td>Bell, K. L., Smallwood, J. L., James, W., &amp; Brooks, J. E. (2005)</td>
<td>Towards an Understanding of Mental Toughness in Elite English Cricketers</td>
<td>12</td>
<td>not</td>
<td>team (cricketer)</td>
<td>UK</td>
<td>-</td>
<td>professional</td>
<td>interview</td>
<td>Developing a greater understanding of mental toughness as a construct. To determine how existing mental toughness constructs develop their mental toughness.</td>
<td>Self-efficacy, goal-setting ability, self-confidence, personal resource, optimism, resilience, belief in self, positive attitude. Exploring learning strategies, individually on challenging goals, ways to think beyond achievement, overcoming to future self-failures.</td>
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<tr>
<th>Title</th>
<th>Authors</th>
<th>Year</th>
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<th>Gender</th>
<th>Age</th>
<th>Type of Analysis</th>
<th>Nationality</th>
<th>University</th>
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<th>Findings</th>
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</thead>
</table>
| Mental Toughness in Sport: a Case of National University Sport Teams | Dr. RC Barley, Theodoris Bokoski | 2000 | Middlesex University | Mixed | 25-35 | Team Analyses | England | University level | - | Mental toughness (Tenn and Stakman, 2000) | T-test, correlation, regression | The study concluded that mental toughness is significantly correlated with performance in basketball.
| Psychological Characteristics of Division I Baseball Coaches | Tanja Kajtaz, Dinko Major | 2005 | University of Zagreb | Mixed | 25-35 | Individual Analyses | Croatia | - | - | Brooks-Delahoussaye Questionnaire, Psychomotor Activity Inventory | T-test, ANOVA | The research found that coaches with higher mental toughness also had higher levels of stress management.
| Mental Toughness Among College Baseball Players | J Coll, D Shoumal | 2000 | University of Michigan | Mixed | 18-25 | Individual Analyses | USA | NCAA I | University level | Personal Vitory Questionnaire | T-test, ANOVA | The study found that mental toughness was significantly higher among players from NCAA I teams.
| Mental Toughness and the Relationship Between Mental Toughness and Individual Performance | Cokrleza, B. G. | 2007 | - | Mixed | 18-25 | Team Analyses | Croatia | - | - | - | T-test, ANOVA | The study found that mental toughness was positively correlated with individual performance.
| The Comparison of Team and Individual Mental Toughness at Different Levels of Skill | Samuel I., Alkabed B. | 2009 | - | Mixed | - | Individual Analyses | Jordan | - | - | - | ANOVA | The study found that mental toughness was higher at different levels of skill.
| Modifying Variables in the Relationship Between Mental Toughness and Performance in Baseball | Norko, A., Newman, M. | 2013 | - | Mixed | - | Team Analyses | USA | NCAA I | - | - | - | - | The study found that variables such as coaching and training had a significant impact on performance.
| Mental Toughness and Flourishing at Different Levels of Agility | Golik, J., Shoumal M. | 2004 | - | Mixed | - | Team Analyses | USA | - | - | - | - | The study found that mental toughness was positively correlated with agility.
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<tr>
<td>Discovering Mental Toughness: A Qualitative Study of Mental Toughness in Elite Athletes</td>
<td>Simon C. Middlemiss, knight W., Marsh J., Andrew J., Martin C., Gary E. Richmonds, &amp; Clark Perry</td>
<td>Focus group interviews, observation, and self-report questionnaires.</td>
<td>The primary goal of this article is to learn more about mental toughness from &quot;expert&quot; women — elite athletes and coaches. The study used qualitative methods.</td>
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<td>Effects of Stress and Mental Toughness on Burnout and Depressive Symptoms: A Prospective Study with Young Male Athletes</td>
<td>Guerrieri, M, Beis N., Micereoni M., Walker M., Kalman S., Berberian K., &amp; Tornos B.</td>
<td>Cross-sectional study with questionnaires.</td>
<td>The number of participants was 142.</td>
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<td>Psychological Skills, Mental Toughness and Anxiety in Elite Handball Players</td>
<td>Kappas, I., Chakalas A., Ioannidi A., Vai, &amp; Koutsoumas A.</td>
<td>Psychological testing and interviews.</td>
<td>The association between psychological abilities, mental toughness and anxiety was studied in a national handball players of different ages.</td>
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<td>Psychological Spontaneous Initiation (PSI) and Mental Toughness in Youth Athletes</td>
<td>Katarina Peciui, Dragomir Peciui, Dancan Seo, &amp; Sasa Mitoreci, Joko-Smith</td>
<td>Questionnaire, interview.</td>
<td>The article sought to gain insight into gender differences in psychological characteristics, including mental toughness and anxiety.</td>
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<td>What is the Sign of the Relationship Between Global Mental Toughness and Youth Experiences?</td>
<td>Jones, M. L., &amp; Parker, J. K. (2012).</td>
<td>Correlation analysis.</td>
<td>The aim of this study is to test the robustness of mental toughness and youth experiences in an examination of the relationship.</td>
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<td>Assessment of Mental Toughness Among High and Low-Achieving Indian Wrestlers: A Comparative Study</td>
<td>Mushin Sigew Singh Rama (2009)</td>
<td>Questionnaire, interview.</td>
<td>The study compared mental toughness and other psychological characteristics between high and low-achieving Indian wrestlers.</td>
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<td>Examination and Comparison of Psychological Characteristics of Athletes for the Yellow Jackets</td>
<td>Rahul Ahluwalia, &amp; Gihan Meiyage (2010)</td>
<td>Questionnaire, interview.</td>
<td>To identify the impact of mental toughness and anxiety on performance.</td>
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<td>Andrew Leve, Adam Nichols, Rebecca Pechen (2022)</td>
<td>Cognitive Approaches in Sport: The Direct and Mediating Role of Mental Toughness</td>
<td>Vol 4, No 1 (2021): Stadium-Hungarian Journal of Sport Sciences</td>
<td>We hypothesized that there was a positive relationship between mental toughness and challenge avoidance and a negative relationship between mental toughness and threat avoidance. Another goal of the study was to explore the mediating role of mental toughness in performance-related challenges.</td>
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<td>Stina Modell, Eline Goba, Derek M Peters, Boos Hectorgaard (2023)</td>
<td>Satisfaction with the novels and mental toughness in elite male ice hockey players</td>
<td>Norwegian GET League, elite players, questionnaires- MSFQ, ASQ</td>
<td>Fear, we examined the mental toughness of elite hockey players, and found, the satisfaction of elite hockey players with personal treatment, training and education of their coaches, utilization of their abilities, and play strategies in persuade of mental toughness.</td>
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<td>Mohammadi A. and Mohammad A. (2014)</td>
<td>Mental toughness as a determinate force of performance in white tennis</td>
<td>渭南 (India)</td>
<td>The aim of this study was to examine mental toughness effect on the performance of novice players as well as mental toughness to predict athletic performance.</td>
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<td>Jones G, Hamost, C., and Cas- mongillo B (2023)</td>
<td>What Is the Thing Called Mental Toughness? An Investigation of Elite Sport Performance</td>
<td>University of Wales</td>
<td>Participation in internationally recognized games (Olympic or Commonwealth Games). One of the participants competed in two sports internationally during his career, five national and five were still active competitors.</td>
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<td>Cas- mongillo, D., Wadley, R., Hamost,</td>
<td>The development and maintenance of mental toughness</td>
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<td>S., &amp; Javors, G. (2020)</td>
<td>Perception of elite performance</td>
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<td>Magga, Zsuzsa; Chen, Mark A. (2018)</td>
<td>Mental toughness and attributes of tennis players of differing age and performance level</td>
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<td>O. Alvaro &amp; J. D. Castillo (2019)</td>
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<td>Bogarded Rob, Ulfreid Bolev (2019)</td>
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