

MENTAL TOUGHNESS IN TEAM SPORTS
VERSUS INDIVIDUAL SPORTS IN
COLLEGIATE ATHLETES POPULATIONS

by

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ABSTRACT

Mental toughness is an increasingly important area of study due to trait desirability. Many variables influence the development of hardiness within an individual. The variables that define mental toughness in this study use Clough et al., 2010's model of control, commitment, challenge, and confidence (the 4 C's). The study focuses on a collegiate sample of athletes participating in sport within the Dallas Fort Worth Metroplex and focused on the influence of being an athlete participating in an individual sport compared to a team or dual sport. The study took 34 participants and looks at how variables of NCAA Division, team and or dual sport, and sport type influenced mental toughness level using the Mental Toughness Questionnaire 18 (MTQ18). Overall, no significant differences were found based on these variables, but the results of the study can be utilized for future data collection techniques and strategies that could lead to meaningful contributions in the study of the development of hardiness within an individual. The construct is influenced by many variables and posed a challenge for determining the variable(s) that influence mental toughness.

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INTRODUCTION

Sport psychology is the study of people and their behaviors in a sport and/or exercise setting and the application of knowledge. Research in the field of sport psychology is critical of the advancement of consultation as well as teaching. Sport psychology is a field with several different concepts that are used to creating a successful athlete, but from collegiate athletes to Olympian athletes, there is agreement that mental toughness is seen as a crucial prerequisite of all successful athlete (Gould, Dieffenbach, & Moffett, 2002).

Mental Toughness

The term mental toughness can be traced back to the research done by Suzanne C. Kobasa in 1979. Kobasa conducted research outside of a sport setting and noticed that managers and executives had certain personality traits that allowed them to remain healthy under stressful life events; this was compared to their peers who faced health problems in stressful situations. Kobasa eventually derived three components of a person that made them, what she termed as, “psychologically hardy” and they included Control, Commitment, and Challenge. The three components are important in understanding how mental toughness can be defined. The definition relevant to this study is the definition by Peter Clough, Keith Earle, and David Sewell (2002). Clough defines mental toughness using Kobasa’s three components of Control, Commitment, and Challenge, but also added the concept of Confidence. Confidence was added because the researchers believed and found it to be important in the realm of sport performance.

There are many other definitions of “mental toughness”, and researchers debate whether this is a trait that both elite and non-elite athletes should have. It is tied to athletic success and necessary for athletes of all types of sports. A model that encompasses mental toughness is the social-cognitive framework for the understanding and development of mental toughness in sport.

Mental toughness is a skill that can be learned (Goldberg, 1998; Loegr, 1995), but is also found to be a trait in which people inherently have as a dimension of their personality (Tutko & Richards, 1972). Mental toughness can be increased through Psychological Skill Techniques administered by a licensed sport psychologist. The Mental Toughness 4C Model can be used as a guiding principle and is Clough's definition of mental toughness.

Some believe mental toughness to be correlated with the concept of coping; with coping being a mechanism that helps in reducing levels of stress within a person; however, measuring coping is a challenge. Coping can change in a person over time and certain methods can become more effective or less effective as a person develops this trait. In general, it is a subjective personal experience that is difficult to observe. Even at a certain stage of life, a coping method could work for one situation but be completely useless in another situation.

There are many different definitions of mental toughness, but consensus in how important it is to athletic success (Gould, Dieffenbach, & Moffett, 2002). Certain traits characterize a person who is mentally tough; noticeably sociable, outgoing, have the ability to remain calm and relaxed, and exhibit lower levels of anxiety (Clough, Earle, & Sewell, 2002). Mental toughness has also been found to be both inherited and taught (Tutko & Richards, 1972; Goldberg, 1998) but it can be seen that when an athlete becomes involved in a sport, the coach then becomes the most influential component to the athlete's mental toughness (Coulter et al. 2010). The question remains: why certain athletes are more mentally tough than others and how can this trait be manipulated to create more successful athletes.

Individual Sports

Individual sports are sports in which an athlete competes by himself or herself. Examples would be golf, rifle, track, boxing, and more. In this study by Cowden et al., the researchers

compared the mental toughness perceptions of collegiate tennis players versus coaches' perceptions. The study used the Sport Mental Toughness Questionnaire (SMTQ) that was mentioned above. The results of the study indicated that coaches are increasingly seen to play larger and larger roles within the athlete's level of mental toughness, which means that they held the perception of mental toughness having the ability to be changed and increased (incremental theory); 16 intercollegiate tennis players were used and two measures of mental toughness were either weighted or un-weighted from the SMTQ. The athlete's coaches were asked to complete an inventory from each tennis athlete and the hypothesis was that the athletes would rank the items of mental toughness similarly with significant correlations to each other. The data showed that the coaches and athletes both agreed on the most important items that lead to mental toughness within a tennis competition setting, but the results showed differences in the importance of certain items that were considered highly important by the other group. The two items on the scale that both groups agreed on as important included: "not giving up in difficult situations" and "having what it takes to perform well while under pressure".

Another study about the mental toughness perceptions in swimmers is relevant because having harmonious perceptions of mental toughness between coaches and their respective athletes help to create opportunities for better developing aspects of mental toughness relevant to the sport and personal needs (Driska et al. 2012). The study investigated another possibility of increases in mental toughness among the tennis players: through player rankings. The results of the study indicated that the higher the ranking of the tennis player resulted in higher levels of mental toughness by both the athlete and coach. This would be a phenomenon pertaining to the "halo" effect in sports, which is a cognitive bias referring to an observer's overall impression of a person based on only one or more characteristics.

Team Sports

Team sports can be defined as sports where a group is organized and competes against another group. Examples of this would be soccer, volleyball, cricket, lacrosse, and such. The literature does not include many studies looking at mental toughness looking specifically in team sports, but many have been done in looking at the coach athlete relationship in team sports.

Gurmeet et al. (2013) conducted a study of mental toughness specifically among athletes who played hockey, volleyball, and kabaddi. The hypothesis of the experiment was that there would be differences in mental toughness among the different sports. One hundred six males from a sports club within the country of India participated in this study. The instrument used to measure mental toughness was the Psychological Performance Inventory (PPI). The hypothesis was proven to be somewhat true and the results revealed specific ways each sport had different levels of mental toughness. For example, the volleyball players had a greater attention control and higher focus on match situations. Overall, the sports did not have mental toughness levels that were significantly different from one another, but these athletes did have higher levels of mental toughness than the average means of the PPI.

Another study investigated the relationship between mental toughness in young cricket players and the importance of coach-athlete relationships. Research has indicated that coaching philosophies have the potential to be detrimental and can result in hindering the development of mental toughness in athletes (Gucciardi et al. 2009). The Cricket Mental Toughness Inventory was used to measure the level of mental toughness in adolescent cricket athletes (CMTI: Gucciardi & Gordon, 2009). The results of the study found that there were no differences in mental toughness pertaining to the player's experience and hours/week training. The study concluded through its results that effective ways to enhance mental toughness within the sport of

cricket was to give athletes opportunities to demonstrate goal setting, problem solving, and time management.

Soccer players have been involved in studies pertaining to mental toughness done by Thelwell et al. (2005). This study included six male, professional soccer players and they were each asked to create a definition of mental toughness. The participants' definitions were then compared to an experimental group of 43 other male soccer players. The consensus was that soccer players believed mental toughness to be a trait that was both a natural phenomenon and a trait that can be developed through personal experience.

Implicit Theory of Mental Toughness

Implicit theories of mental toughness are divided between those who believe that it is a trait and not changeable, incremental or entity theorists; some refer to that as a mindset. Gucciardi et al. (2014) explored the implicit theories of mental toughness by looking at people's perception of the cognitive, motivational, and behavioral elements of mental toughness. The study of undergraduate students, employees, and adolescent aged athletes completed measures of implicit theories of mental toughness and fear of failure/perceived stress (cognitive). They rated their levels of performance and creativity (behavioral), and filled out measures of resilience and thriving (motivational). Each group who filled out these measures had shared implicit theories of mental toughness that differ from other subgroups of people (Gucciardi et al. 2014). The hypothesis was that a person believed in would influence how they lead to different developments and results found in human behavior; these would include how a person reacts or progresses within an event or how a person sets goals in his or her life. Another part of the hypothesis was that the dominant theory would be found that mental toughness was an incremental theory.

The results of the experiment found that the participants within the groups did not have a dominant theory and the researchers found different implicit theories about mental toughness, not just the three that had been defined in the beginning of the experiment: incremental, entity, and ambivalent. The important finding related to the use of sport pedagogy and how athletes, athletes may be influenced by the theories of what they believe the nature of mental toughness is can change depending on whether the athlete is a part of a team or individual sport.

Methods of Measurement and Influence

A way to measure mental toughness is by using a psychometric test called the Mental Toughness Questionnaire 48 (MTQ48) created by Clough et al. 2002. This questionnaire is administered to athletes and measures the four broad categories of mental. Each of the 48 questions correlate with one of the categories and uses a Likert type scale (1=strongly disagree; 5=strongly agree). An example of commitment is “I usually find something to motivate me”; an example of control is “I generally feel in control”; commitment is displayed through the item of “I can generally be relied upon to complete the tasks I am given”; and challenge: “I don’t usually give up under pressure, ” These are just a few examples of the items within the MTQ48.

The Sport Mental Toughness Questionnaire is another questionnaire used to measure mental toughness (SMTQ; Sheard et al., 2009). This questionnaire is similar to the MTQ48 in that it has questions based on a Likert-type scale from 1 (not at all true) to 4 (very true) but contains a smaller amount of items: 14.

The Psychological Skills inventory is yet another tool used to measure mental toughness. The measure has 42 items with each question falling into one of seven psychological skills relevant to the performance of athletes. The inventory uses a six point likert-like scale that ranged from 1 (false) to 6 (true) across seven categories that measured: self-confidence, negative

energy, attention control, visual and imagery control, motivation level, positive energy, and attitude control (Gurmeet et al. 2013).

There are factors that athletes attribute to mental toughness and those include: sibling rivalries, supportive parents, coach expectations, motivational training environments, coping, and more. Mental toughness is influenced by different factors of an athlete's life and can be increased through factors controlled by the coach of a team or individual. A positive motivational practice environment, intense competitive practices, goal setting, instructional supportive feedback, appropriate attributions for success and failure, are just a few ways to increase mental toughness.

Expectancy Theory

Expectancy theory states that certain expectations from an outside source influence the behavior of others so that the expectation becomes a reality (Solomon, 2010). This theory originated within the classroom setting. Rosenthal conducted an experiment within an elementary school in 1968 in which he told teachers that certain students were labeled as “intellectual boomers” who were brighter than other students due to a fake test (Rosenthal, 1968). The IQ of the students was taken before and after the experiment and the results demonstrated that the experimental group labeled as “intellectual boomers” had a statistically significant increase in their IQ scores (Rosenthal, 1968).

In a sport setting, there is a four step process that impacts expectancy within athletic development and includes: impression cues, acting upon impression cues toward athlete, athlete response to coach feedback, and coach expectations influence the behavior of athletes to the initial expectation (Solomon, 2010). Solomon looked at this theory through the use of track and field coaches within a junior college level. The most important element from the perspective of the coaches' was a player's coachability, while the athlete found crucial importance of being a

team player and having physical skill (Solomon, 2010). The experiment was completed with the use of the Solomon's Expectancy Sources Scale. Solomon found that athletes who had high expectations from the coach received instruction that helped their development as athletes, while the performance of low expectancy athletes suffered due to their perception of a lack of attention by the coach (Solomon, 2010).

Project Significance

Mental toughness is an important concept to understand because it is a crucial trait that all types of athletes need for success. Athletes find that mental toughness is one of the most important skills to have in determining success in the sport (Gould et al. 1987). Mental toughness is important, so it is crucial to find out what kind of people are mentally tough and how to manipulate it. If individual sports and team sports vary in mental toughness, then different methods could possibly be found to uniquely and efficiently enhance mental toughness up to levels that will not harm the athlete.

Purpose

The purpose of the experiment is to investigate at whether mental toughness is higher in team sports or individual sports in varsity level collegiate athletes. Team sports are sports where a group is organized and competes against another group. Examples of this would be soccer, volleyball, cricket, lacrosse, and such. Individual sports are sports in which an athlete competes by himself or herself. Examples of these would be golf, rifle, tennis, track, boxing, and more. Another purpose of the experiment is to analyze at levels of mental toughness comparing competitive divisions and sport. If mental toughness levels depend on whether an athlete participates in a team sport versus an individual sport, then athletes participating in individual sports will have higher levels of mental toughness.

METHODS

Participants

A sample population of 35 participants (n=35) was used for this study. The sample was recruited through the use of email. Specific head coaches were contacted via email and were provided with a Qualtrics survey link in the email that they then distributed to the athletes on their respective team. There were visits made to the coaches at Dallas Baptist University, the University of Dallas, and Texas Christian University to follow up with the coaches in order to increase the response rate. The researcher drove to the athletic building at each school to meet the coaches face-to-face and personally ask them to distribute the surveys with a follow up email. Additional recruitment was through word of mouth. Follow up to original emails were made two weeks later, and the link finally expired a few days later to give a deadline for response time. The athletes recruited were currently participating in one team or individual sport at a varsity level. The athletes came from a school in each of these divisions: The Big 12-DI (n=16) and the Heartland Conference-DII (n=19). The schools that participated were from Texas Christian University and Dallas Baptist University. Both of these schools reside in similar regions. Participants were not currently injured, which is defined as injury within the last two weeks. The exclusion criteria were the opposite: person is not a varsity collegiate athlete, varsity athlete not participating in any of these three conferences, or they are currently injured and unable to participate. This is a low to no risk study due to the nature of the questionnaires; there are no sensitive topics examined. Participants chose to participate by filling out the survey within an allotted time of survey availability.

Measures

The study consisted of the completion of two different surveys: the MTQ18 (Mental Toughness Questionnaire 18) and a generic demographics survey. The MTQ18 looks at the four C's of mental toughness: Control, Commitment, Challenge, and Confidence. Control refers to a person's inclination toward emotions and behaviors as if the individual is influential. Commitment refers to the level of involvement a person is to a task at hand. Challenge refers to seeking opportunities for personal growth. Challenge refers to seeking out opportunities for personal growth. The format of this survey is that it has 18 items organized into a Likert type scale ranging from 1 (strongly disagree) to 5 (strongly agree). When scoring, question numbers 1, 4, 5, 7, 10, 13-15, and 18 are scored normally, while the other numbers are reverse scored (numbers 2, 3, 6, 8, 9, 11, 12, 16, 17). All of the numbers are then summed up as a total. The MTQ18 has been verified of its psychometric properties measuring mental toughness a global measure of mental toughness along with the expanded version, the MTQ48. Both measures are strongly correlated with each other (Clough et al. 2002, Vaughan et al., 2017).

The demographics survey will gather background information on the participants; it contains information such as age, gender, division, sport-type, and date of birth.

Statistical Analysis

The method of analysis will be through the use of the analysis of variance (ANOVA) because of the variable of mental toughness that we are testing for in the MTQ18 and the When the ANOVA is completed a post hoc analysis was done afterwards in order to ensure that the experimenter-wise error rate is reduced as much as possible.

RESULTS

NCAA Division I and II

Group statistics are expressed with the means and standard deviations from the statistics program for NCAA Division I (n=15) and II (n=19); these are represented in Table 1. The mean score for NCAA Division I athletes was observed as 59.93 ± 8.844 ; for Division II the mean score was observed as 62.32 ± 7.079 . When looking at the independent samples test, $p = .389$, which means that there were no statistical differences between NCAA Division I and II.

Sport Type

Group statistics for individual sports (n=28) and dual or team sports (n=6) are again expressed with means and standard deviations, and can be found in Table 2. Individual sport athletes had a mean of 61.04 ± 8.444 and dual or team sports had a mean of 62.33 ± 4.719 . The independent sample test has $p = .720$, which means that there was no statistical significance in mental toughness scores between individual sport athletes and dual or team sport athletes.

Sport

The scores for the MTQ18 were also compared based on the type of sport, and this is found in Table 3. Female soccer players (n=9) who participated in the survey had a mean of 58.33 ± 10.759 . Equestrian females (n=6) had a mean of 62.33 ± 4.719 . Volleyball females (n=19) had a mean of 62.32 ± 7.079 . The total mean for all three sports was 61.26 ± 7.871 . The value between the groups was .841 and $p = .441$, which means there is no difference between any of the three sports. Figure 1 visualizes the means of the three sports next to each other.

DISCUSSION

The purpose of this study was to determine if any differences between athletes in individual sports or dual/team sports at the collegiate level. Overall, the results of this study did not find any significant differences between the type of sport type (individual or dual), the NCAA division (I or II), or the sport being played (soccer, volleyball, or equestrian).

Individual Sport

Individual sports have research-based support of individual sport athletes having higher mental toughness scores based on ranking (Driska et al. 2012). There was no significant difference between individual sport athletes compared to team or dual sport athletes in this study.

Team Sport

There is a lack of research on team sport mental toughness levels, but the results in this study support no differences among the sport types (soccer and volleyball versus equestrian). There is a perception of what athletes perceive to be important, which include being a team player as one of the most important (Solomon, 2010). Gurmeet et al. found that overall, some teams have higher mental toughness levels than others, but within the group there is no significant variance. This study did not find differences in mental toughness of team sports being different than individual sports.

Division

There was no variance on mental toughness found among the divisions, which was expected. The mental toughness scores had no significant differences. More data is useful to see this trend in a larger sample.

Limitations

Limitations to this study include the use of the MTQ18 and small sample size of only female participants. The MTQ18 does not break down the three C components of mental

toughness and has fewer questions to answer. The sample size only had participants from division I and II schools, so there was not a possibility of comparing division I with III, which may have had a significant difference in MTQ18 scores. One way to effectively measure mental toughness would be to use the MTQ48 survey and collect data across all three of the divisions; having a higher response rate would have been desirable to have more data finding no variance between the groups.

Implications and Future Direction

Explanations for these results could possibly be due to the many limitations within the sample taken, but the results lead to further potential revisions in the research process to find significant differences within the groups, which include coach influence (Cowden et al. 2014), the influence of family variables, and an athlete's perception of a skill pertaining to their performance. This could be applied to one sport, or among different levels of one sport. Mental toughness is a growing field of study that can help with performance enhancement of athletes competing at all levels, and finding out the variables that influence increases of mental toughness will help to maintain motivations to stay active and achieve higher levels of activity and sport.

FIGURES AND TABLES

Table 1.

Level of Competition	Sample (n)	Mean	Standard Deviation	Std. Error Mean
NCAA Division I	15	59.93	8.844	2.283
NCAA Division II	19	62.32	7.079	1.624

Table 2.

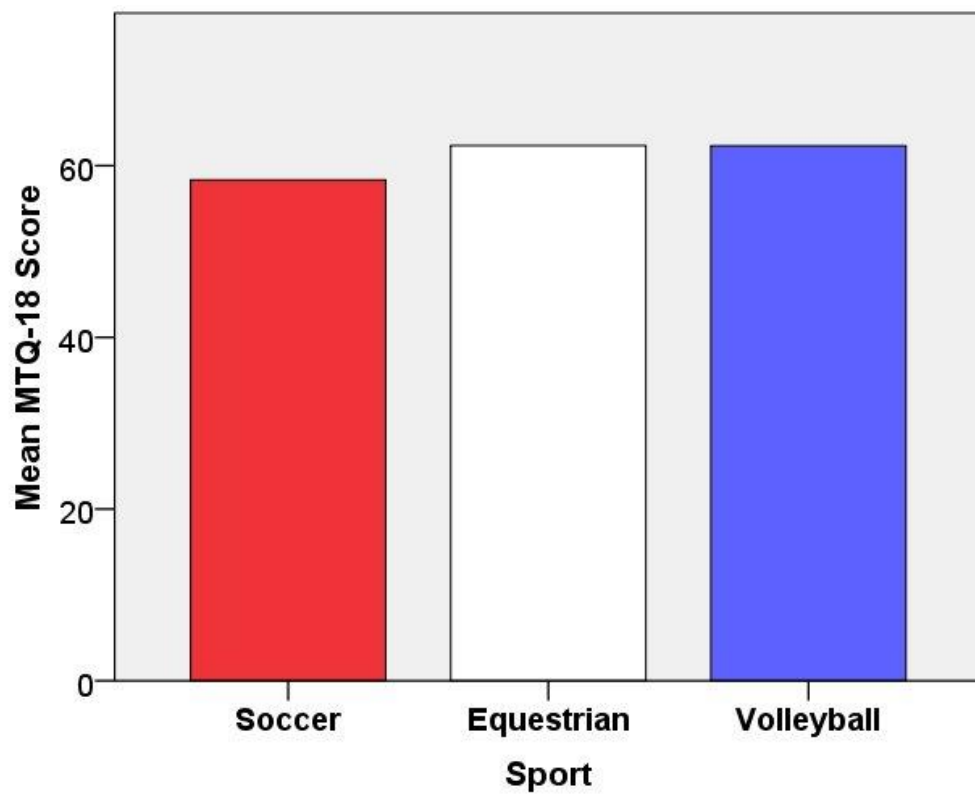
Sport Type	Sample (n)	Mean	Standard Deviation	Std. Error Mean
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Individual	28	61.04	8.444	1.596
Dual or Team	6	62.33	4.719	1.926

Table 3.

Sport	Sample (n)	Mean	Standard Deviation
Soccer	9	58.33	10.759
Equestrian	6	62.33	4.719
Volleyball	19	62.32	7.079
Total	34	62.26	7.871

Figure 1.



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