

ABSTRACT

Mental Toughness in Sport: Perspectives of Master Strength and Conditioning Coaches

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In recent years, mental toughness (MT) has frequently been associated with success in sports. However, MT remains one of the most misunderstood terms in Applied Sport Psychology. Moreover, although evidence links the crucial role of environmental influences that coaches create for their athletes, no research has been done concerning the perceptions of MT among Master Strength and Conditioning Coaches (MSCC) to date. Therefore, the purpose of this study was to investigate the perceptions of MSSCs in regards to MT using a mixed-method design.

Purposeful quantitative and qualitative data were collected using a questionnaire (i.e., S.T.A.M. II) from these important stakeholders about (a) whether or not MSCCs perceive MT to exist as a unique construct in the sports domain, (b) how MSCCs define/conceptualize MT, (c) whether or not MSCCs perceived MT as transferability to other areas of life, (d) how to measure MT and/or if they would be willing to use an MT instrument, (e) whether or not MSCCs think that MT can be developed, (f) whether or not MSCCs know how to train MT, incorporate MT training, design an MT training program, (g) the extent to which MSCCs believe MT affects optimal performance, (h) whether or

not MSCCs perceive differences in MT on the basis of gender, and (i) the extent to which MSCCs perceived differences in views on MT between SCCs and Head Coaches (HCs).

The response rate was 45%.

Although there was variation in the MSCCs responses, the findings have both clinical and methodological implications. The majority of MSCCs believes in the existence of MT and really appreciates its value. Although there is no clear conceptualization of the construct, MSCCs believe that MT is developed and transferable, while there are no gender differences nor differences between the perceptions of MSCCs and Head Coaches. In addition, although they do not appear to know how to measure the construct, MSCCs use more physical than psychological strategies when training it. Based on the above perspective of MSSCs, a new working definition of MT was created.

Mental Toughness in Sport:
Perspectives of Master Strength and Conditioning Coaches

by

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DEDICATION

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CHAPTER ONE

Introduction

Concentration and mental toughness are the margins of victory.

—Bill Russell, 11-time NBA champion and 5-time NBA most valuable player,
(Biography.com Editors, n.d.)

Mental Toughness is to physical as four is to one

—Bobby Knight, 3-time NCAA champion, Naismith College Coach of 1987, (Pace,
2012)

To me, football is so much about mental toughness, it's digging deep, it's doing whatever you need to do to help a team win and that comes in a lot of shapes and forms.

—Tom Brady, 4-time Super Bowl Champion, 3-time Super Bowl MVP, (Coffey, 2015)

... We all have to give up a little bit of something in this sport, and mental toughness is going out there and doing what's best for the team even though everything isn't going exactly the way you want it to. That's what defines mental toughness in my mind.

—Bill Belichick, 3-time AP NFL Coach of the Year, 6-time Super Bowl Champion,
(Reiss, 2013)

Mental toughness is many things and rather difficult to explain. Its qualities are sacrifice and self-denial. Also, most importantly, it is combined with a perfectly disciplined will that refuses to give in. It's a state of mind – you could call it character in action.

—Vince Lombardi, Pro Football Hall of Fame Inductee (Sun, 2015)

Since the groundbreaking work of Loehr in the mid-1980s, mental toughness (MT) has become synonymous with sporting greatness. Although MT research is in its relative infancy (Connaughton & Hanton, 2008), the concept appears extremely popular (Weinberg, 2013). Athletes, coaches, and psychologists commonly use it to separate the “good” from the “great” athlete (Sheard & Golby, 2010). In fact, a substantial amount of research has emerged concerning the possibly important concept of MT in sports (Crust,

2007). The influence of MT on athletic performance - as is true with other psychological phenomena - is an area of considerable interest in the interdisciplinary field of sport psychology. Sport psychology is the application of psychological principles to sport and physical activity at all levels of skill development (Browne & Mahoney, 1984).

In the next sections of this chapter, the researcher will briefly describe the history of sport psychology. Towards the end of the chapter, the different areas of MT research along with the purpose, and the procedures, of this study will be analyzed.

A Brief History of Sport Psychology

Psychology has “a long past but a short history” (Ebbinghaus, 1910). Compared to the already recognized sciences of physics, astronomy, or physiology, psychology does indeed have a short history. However, many of psychology’s fundamental questions (e.g., the relationship between mind and body) can be traced to Ancient Greece and Rome, which provided the roots of the Western civilization.

Although the scientific study of psychology *per se* was not developed in Ancient Greece, psychology’s parent disciplines (i.e., natural sciences and philosophy) were founded in Ancient Greece between 500 B.C and 400 A.C.: medicine (e.g., Asclepiadae, Alcmaeon, Hippocrates, Galen), mathematics (e.g., Thales of Miletus, Pythagoras), cosmology (e.g., Democritus, Zeno of Elea), and philosophy (e.g., Socrates, Plato, Aristotle, Epicurus) (Jones, 1979).

The 1800s

Until the middle of the 19th century, psychology, which was directly descendant from philosophy, was still trying to separate itself as more “scientific” than its parent

discipline (Sarason, 1981). Eventually, the philosophers who used laboratories were named psychologists (Vealey, 2006). Wilhelm Wundt and William James were the most influential psychologists of that era. Wundt established the first psychological laboratory in Germany, while James wrote *Principles of Psychology*, in which he described the relationship between physiology and psychology. In addition, G. Stanley Hall established the first American psychological laboratory in 1883 and was the first president of the American Psychological Association in 1892. In 1890 James M. Cattell published *Mental Tests and Measurement*, the first attempt toward quantification of human experience, which is still prevalent in Sport Psychology today. Both Hall and Cattell worked with Wundt; Hall as a colleague in Wundt's lab and Cattell as Wundt's student.

In 1884, Rieger published the very first work in sport and exercise psychology (Morgan, 1972), in which he concluded that hypnosis facilitated muscular endurance. Against the strong push in psychology to embrace positivism, the first work in sport and exercise psychology was a case study.

1895-1920

Several events and developments in the beginning of the 20th century led to the very first steps of a new sub-discipline of psychology, Sport and Exercise Psychology: (a) scientists from psychology and physical education were writing about the psychological benefits of exercise (e.g., Franz & Hamilton, 1905); (b) the Association of the Advancement of Physical Education, the Academy of Physical Education, and kinesiology laboratories (e.g., first kinesiology laboratory was established at Harvard University by George Fitz) were established; (c) important motor control research emerged (Cummins, 1914; Washburn, 1916); and (d) Social Psychology, although not yet

recognized, started gaining interest, especially after Norman Triplett's "theory of dynamogenesis" (Triplett, 1898).

1920-1939

Thanks to Coleman Griffith's and Dorothy Yates's works in the decades of 1920s and 1930s, the interest in the relationship between sports and psychology was solidified. In 1925, Griffith established the first sport psychology laboratory in Leningrad and wrote *Psychology and Its Relation to Athletic Competition*. One year later, Griffith published *Psychology of Coaching* and two years later, he published *Psychology and Athletics*. In 1938, the Chicago Cubs hired Griffith as a sport psychologist. In 1932, Yates published *Psychological Racketeers* unfolding her work with boxers.

Personality and social psychology. In the 1930s, Personality and Social Psychology surfaced as separate sub-disciplines of traditional Experimental Psychology (Allport, 1937; Murray, 1938; Roethlisberger & Dickson, 1939; Sherif, 1936). This area of study in psychology functioned as a foundation for Sport and Exercise Psychology, since the latter focuses on social behavior too.

1940-1964

The two and a half decades spanning from 1940 to 1964 led to the official acknowledgement of Sport and Exercise Psychology as a sub-discipline of kinesiology (Hoffman, 2009). The most important work mainly took place at Pennsylvania State University, the University of Maryland, UCLA, and the University of California-Berkeley. In 1951, John Lawther published *Psychology of Coaching*. In 1960, Warren Johnson published *Science and Medicine of Exercise and Sports*. In 1964, Bryant Cratty

published *Motor Behavior and Motor Learning* and Franklin Henry wrote *Physical Education: An academic discipline*. The above works not only helped in the establishment of Sport and Exercise Psychology as an academic discipline but also increased its scientific credibility (Vealey, 2006).

1965-1979

The period from 1965 to 1979 has been characterized as the most important in the history of Sport and Exercise Psychology. First, in 1965, the first World Congress of Sport Psychology took place. In 1967, the first North American Society for the Psychology of Sport and Physical Activity conference occurred. In 1969, the first Canadian Society for Psychomotor Learning and Sport Psychology conference took place, while the first European Sport Psychology federation was established. Second, important journals began publication, such as *International Journal of Sport Psychology* in 1970 and *Journal of Sport Psychology* in 1979. Third, the University of Illinois became the powerhouse of research. Through the works of Dan Landers, Rainer Martens, and Glyn Roberts the field of Sport Psychology was recognized (Vealey, 2006). Fourth, in 1969, Morgan's work, *Physical Fitness and Emotional Health: A Review*, established him as the pioneer of the knowledge base in Exercise Psychology. Fifth, the cognitive revolution shook psychology (e.g., Bandura, 1977). Lastly, women in sports were studied for the first time from a feminist perspective (Harris, 1972; Oglesby, 1978).

1980-1992

This period is characterized by the rapid growth of the field. More programs were added and the second generation of sport exercise psychology researchers brought about

many changes. First, they established a broader knowledge base in exercise psychology. The alarming increase in obesity and sedentary lifestyles in the USA brought a lot of interest and funding into research that investigated the relationship between physical activity and well being. For instance, research was undertaken about exercise and stress (Crews & Landers, 1987), exercise and mental health (Folkins & Sime, 1981), exercise and self-esteem (Gruber, 1986), exercise and overtraining (Morgan, Brown, Raglin, O'Connor, & Ellickson, 1987), exercise and body image (Hart, Leary, & Rejeski, 1989), exercise dependence (Hailey & Bailey, 1982), and interventions to change habits and increase physical activity (Dishman, 1988). In 1988 the *Journal of Sport Psychology* was renamed to *Journal of Sport and Exercise Psychology*. In 1992, the first exercise psychology textbook was published (Willis & Campbell, 1992); Second, the research shifted towards a more cognitive perspective (e.g., Feltz, Straub, & Williams, 1984) and the field was chosen more often as the context of research (e.g., Landers, 1983). Third, the field was professionalized. Several articles were published regarding professionalization (e.g., Harrison & Feltz, 1979), and in 1983, the United States Olympic Committee (USOC) established guidelines for provision of Sport Psychology services. In 1985 the USOC hired Shane Murphy as the first full-time sport psychologist. In the same year, the Association for the Advancement of Applied Sport Psychology (AAASP) was established. In 1987 Division 47 (Exercise & Sport Psychology) of the American Psychological Association (APA) was established and *The Sport Psychologist* began publication. In 1989, *Journal of Applied Sport Psychology* began publication. In 1991 AAASP offered “certified consultant” designation in Sport and Exercise Psychology. Steve Danish’s and Bruce Hale’s proposal for human development

framework for intervention in 1981 and Rainer Martens's work *Science, Knowledge, and Sport Psychology* are considered key contributions towards the professionalization of the field. Fourth, research focused on children, and guidelines for youth were proposed (Gould, 1982; Weiss & Bredemeier, 1983). Fifth, psychophysiological research emerged (Hatfield & Landers, 1983; Hatfield, Landers, & Ray, 1987). For instance, the heart rate started being used in relation to performance (e.g., Boutcher & Zinsser, 1990).

1993-2016

Diversifying knowledge development and practice is evident in the current period. Several researchers are conducting research using different theories and paradigms (e.g., Brustad & Horn, 2002; Dziewaltowski, 1997; Giacobbi Jr, Poczwadowski, & Hager, 2005; Krane, 1994), but this diversification has been slow (Vealey, 2006). One of these different theories is the theory of *Positive Psychology* by Seligman and Csikszentmihalyi (2000) (see Chapter 2). Overall, the field is still trying to balance the demands of quantitative and qualitative methodologies (Denzin & Lincoln, 2000).

Along with diversifying knowledge, the field has increased its knowledge base. In 2000, *Psychology of Sport and Exercise* and in 2003, *International Journal of Sport and Exercise Psychology* began publication. At the same time, reviews and meta-analyses focused on examining comprehensively the increasing knowledgebase (e.g., Craft & Landers, 1998; Dishman & Buckworth, 1996; Landers & Petruzzello, 1994; Sibley & Etnier, 2003; Sonstroem, 1997; Youngstedt, O'Connor, & Dishman, 1997). Lastly, several reviews examining the validity of assessment instruments, which claim to measure several constructs used in Sport and Exercise Psychology, have been published (e.g., Duda, 1998). Among these constructs is MT.

Mental Toughness

Among other constructs, there has been an increasing attention to the concept of MT in several domains, such as business, academics, the military, medicine, and of course, sports. It would be difficult to study MT as only related to sports, as many other stressful and competitive environments exist beyond sports.

MT in Business

MT is important in the business environment. Research has revealed significant effects for both managerial position and age. MT levels are expected to be higher in more senior positions, and MT generally should increase with age (Marchant et al., 2009a). MT has been also found to have a relationship with organizational stress and effective management (Fawcett, 2005).

MT in Academics

There are several reasons to suggest that MT is also important in educational settings too. First, MT and conscientiousness are positively correlated (Horsburgh, Schermer, Veselka, & Vernon, 2009) and conscientiousness is established as a good predictor of academic achievement (Bauer & Liang, 2003; O'Connor & Paunonen, 2007; Poropat, 2009). Second, high levels of MT are associated with low anxiety levels (Clough, Earle, & Sewell, 2002), which have been linked to greater academic attainment (Owens, Stevenson, Norgate, & Hadwin, 2008). Third, there is strong indication that adjustment to university life (e.g., transition from high-school to college, cultural differences/diversity issues) is related to optimism and self-esteem (Pritchard, Wilson, & Yamnitz, 2007), both of which are associated with MT (Clough et al., 2002). Finally,

undergraduate students with low levels of MT have been found to be more prone to drop out of their undergraduate courses, while students with high MT perform significantly better academically than those with low levels of MT (Crust, Clough, Earle, Nabb, & Clough, 2012).

MT in the Military

MT also matches with core facets of the military identity, such as pain tolerance, elitism, and courage in the face of adversity (Tanielian & Jaycox, 2008). Therefore, it should come as no surprise that MT has been researched in this context (e.g., Castro, Hoge, & Cox, 2006; Reivich, Seligman, & McBride, 2011). Not only has MT been shown to be useful in training soldiers before the battle (Walker, Lennemann, McGregor, Mauzy, & Zupan, 2011), but also MT has provided them an alternative and practical framework from which to address posttraumatic stress disorder (PTSD) (Hammermeister, Pickering, McGraw, & Ohlson, 2012) and suicidal tendencies (Bryan, Jennings, Jobes, & Bradley, 2012).

MT in Medicine

When it comes to medicine, MT has been described as an important psychological factor in surviving cancer (Rom, Miller, & Peluso, 2009). In sports medicine though, high MT levels have been associated with obstructing rehabilitation behaviors and recovery (Levy, Polman, Clough, Marchant, & Earle, 2006; Mack & Ragan, 2008).

MT in Sport

Definitions of MT vary widely among coaches, sport commentators, fans, and athletes, and also among researchers. Yet, MT is one of the most significant

psychological constructs related to successful sport performance (Jones, Hanton, & Connaughton, 2007; Orlick, 1998). In general, MT describes the superior mental characteristics of those competitors who keep progressing in both practice and competition, while others quit. Especially at the elite level, it seems that these characteristics separate the players (Kreiner-Phillips & Orlick, 1993; Orlick & Partington, 1988). In addition to physical skills, the great athletes, when compared to the good athletes, are considered to have those mental attributes that empower them to excel beyond their physical capabilities (Gordon, 2001; Orlick, 1998). This study focuses on MT in Sport.

Purpose of Study

Despite the increased interest and attention, MT remains both one of the most accepted and misunderstood terms in Applied Sport Psychology (Crust, 2007; Jones, 2002; Middleton, Marsg, Martin, Richards, & Perry, 2007; Nicholls, Polman, Levy, & Backhouse, 2008; Sheard, 2012; Weinberg, 2013). Evidence links the crucial role of environmental influences that coaches create for their athletes, such as motivational climate and exposure to competitive environments, to the development of MT (Bull, Shambrook, James, & Brooks, 2005; Connaughton, Wadey, Hanton, & Jones, 2008). However, there is limited research when it comes to strength and conditioning coaches' (SCC) perceptions of MT. In addition, no research has been done concerning the perceptions of MT among Master Strength and Conditioning Coaches (MSCC) to date. Therefore, the purpose of this study was to investigate, using a mixed-method design, the perceptions of MSSC's in regards to MT.

Overview of Procedures

The study followed an observational and cross-sectional design. The sample was a criterion-based purposive sample as all participants were certified master strength and conditioning coaches (MSCC). Currently, there are 157 MSCCs. Seventy-one MSCCs participated in this research project.

The Stronger Than Average Mentality (S.T.A.M.) II Questionnaire, a 52-item instrument created by the researchers, was administrated (see Appendix). In addition to demographic questions, the questionnaire's items addressed the MSCCs' perceptions about nine areas of interest: existence of MT, Characteristics/definitions of MT, Development, Practices, Transferability, Gender differences, Value of MT, Measurement, and differences in the perspective about MT between SCCs vs. Head Coaches. All items were administered online using the Qualtrics software (Qualtrics LLC, 2015).

The study used a mixed-method design. Therefore, concerning data analysis, it was different based on the type of data: (a) quantitative data: for the categorical variables, frequencies and percentages were generated, while for the continuous variables, means and standard deviations were reported; and (b) qualitative data: data reduction was the goal of analysis. Layers of analysis were reported.

The following two chapters provide more detail concerning the literature of MT in Sport and the methodology of the research project. The last two chapters include the data analysis and the implications to practice. Lastly, the instrument, S.T.A.M. II, can be found in the Appendix.

CHAPTER TWO

Literature Review

In recent years, there has been an increased awareness and consideration of the psychological factors involved in high performance. Among them, mental toughness (MT) has frequently been associated with success in a wide variety of activities: from academic performance in higher education (Crust et al., 2012) to occupation (Marchant et al., 2009b), to military (Arthur, Fitzwater, Hardy, Beattie, & Bell, 2015), to sports (Bull et al., 2005; Connaughton, Hanton, & Jones, 2007; Jones, 2002; Thelwell, Weston, & Greenlees, 2005). The focus of this research was specifically on MT in Sport. The purpose of this chapter is to provide a review of literature related to (a) the existence of MT, (b) possible definitions/conceptualizations of MT in Sport, (c) transferability of MT to other areas of life, (d) instrumentation for measuring MT in Sport, (e) development of MT, (f) practicing MT, (g) perceived value of MT in Sport, and (h) perspectives from which MT has been examined. The chapter concludes with a statement of the guiding research questions.

Existence of Mental Toughness

MT, although popular, is a construct that is still in conceptual ambiguity (Hammer, 2012). In fact, Andersen (2011) provided a commentary on whether or not MT is a separate psychological construct or just an old term (e.g., resilience, grit, performance intelligence, hardiness) with a new label. Based on past conceptualizations of MT through several definitions, frameworks, and instruments, Andersen reported over 70

attributes, characteristics, behaviors, concepts, perceptions, and emotions that have been associated with the concept (Andersen, 2011). His summary of previous research provided important insights into the nature of MT. On one hand, he casts doubt of the novelty of MT by likening it to “mutton dressed up as lamb” (Andersen, 2011, p. 69). On the other hand, he argued that athletes with certain characteristics would be considered mentally tough by any standard. Considerations and questions such as those raised by Andersen are important because if MT is nothing more than a “fancy” name for an existing construct, then all resources should be directed towards researching them. If not, then we should keep our research attention towards MT starting by clearly and deeply conceptualizing it.

Definitions and Conceptualizations of Mental Toughness

Despite the term mental toughness having been popularized by James Loehr (1982), MT has been described in various ways (Alderman, 1974; Clough et al., 2002; Clough & Strycharczyk, 2012; Coulter, Mallett, & Gucciardi, 2010; Goldberg, 1998; Graham & Yocom, 1990; Gucciardi, Gordon, & Dimmock, 2008; Jones, 1982; Jones, Hanton, & Connaughton, 2002; Loehr, 1982; Scarnati, 2000; Strycharczyk & Elvin, 2014; Teitelbaum, 1998; Thelwell et al., 2005; Tunney, 1987; Tutko & Richards, 1971; Williams, 1998). For instance, Alderman (1974) proposed that high-level sports were a cruel business, where only the physically and *mentally tough* athletes could survive [emphasis added]. Tunney (1987) identified MT as one of the four factors that winning teams were built on. The other three were self-discipline, self-sacrifice, and teamwork. Loehr (1982) suggested that mentally tough players always responded to difficulties, stress, and making mistakes with the appropriate mentality. Goldberg (1992) believed

that the ability to control competition anxiety was the most crucial skill of MT. A sample of definitions proposed to date are presented in Table 1 in chronological order.

The majority of the definitions in Table 1 tend to describe Mental Toughness as a collection of qualities that allow an athlete to successfully confront and overturn negative circumstances.

Popular Definitions

Among all the definitions, Jones' (2002; c.f., Butt, Weinberg, & Culp, 2010; Crust, Nesti, & Bond, 2010; Driska, Kamphoff, & Armentrout, 2012), Gucciardi's (2008; c.f., Crust, Swann, Allen-Collinson, Breckon, & Weinberg, 2014; Mattie & Munroe-Chandler, 2012; Nicholls, Levy, Polman, & Crust, 2011), and Clough's (2002; c.f., Crust & Azadi, 2010; Crust, Nesti, & Littlewood, 2010; Crust & Swann, 2013) seem to have gained more acceptance within the scientific community. Jones defined MT as:

Having the natural or developed psychological edge that enables you to: generally, cope better than your opponents with the many demands (competition, training, lifestyle) that sport places on a performer; specifically, be more consistent and better than your opponents in remaining determined, focused, confident, and in control under pressure (Jones, 2002, p. 209).

Gucciardi and colleagues defined MT as:

... a collection of values, attitudes, behaviours and emotions, which enable an individual to persevere and overcome any obstacle, adversity or pressure experienced, but also to maintain concentration and motivation when things are going well, to consistently produce high levels of performance (Gucciardi, Gordon, & Dimmock, 2008, p. 278).

Table 1

Definitions of Mental Toughness

Source	Definition
Tutko and Richards (1971, p. 46)	“The ability of an athlete to withstand strong criticism and to avoid becoming upset when losing or performing poorly.”
Alderman (1974, p. 149)	“The degree of insensitivity the individual has to criticism playing badly or losing.”
Jones (1982, p. 31)	“Mental toughness is a learned skill . . . and concerns freedom from stress and pressure in high-level championship matches.”
Loehr (1982, p. 11)	“A constellation of mental skills all of which are learned that are characteristic of mentally tough competitors.”
Tunney (1987, p. 49)	“You may have the determination to stay at something to keep trying to never give up but mental toughness means you also have the self-control and focus to limit your efforts to only the ones that are effective.”
Graham and Yocom (1990, p. 47)	“Achieving consistency is the ultimate measure of mental toughness.”
Williams (1998, p. 60)	“Mental toughness is really another name for desire. Given talent and luck desire overcomes just about everything.”
Goldberg (1998, p. 219)	“Mental toughness is the outward manifestation of an inner commitment. It’s a refusal to quit on that dream no matter what.”

(continued)

Source	Definition
Goldberg (1998, p. 219)	“Mental toughness is the ability to stand tall in the face of adversity. It’s a psychic resilience that allows you to rebound from setbacks and failures time and time again.”
Teitelbaum (1998, p. 2)	“Mental toughness is the ability to sustain high levels of motivation activity and confidence in the face of anything that life throws at you.”
Teitelbaum (1998, p. 7)	“Mental toughness is the ability to keep picking yourself up no matter what life hits you with – to keep marching steadily forward to achieve the specific victories you have made up your mind you are going to make happen.”
Scarnati (2000, p. 174)	“In much the same manner that a body builder fosters physical stamina, mental toughness fosters ‘between the ears’ mental stamina.”
Clough, Earle, and Sewell (2002, p. 38)	“Mentally tough individuals tend to be sociable and outgoing; as they are able to remain calm and relaxed, they are competitive in many situations and have lower anxiety levels than others. With a high sense of self-belief and an unshakeable faith that they control their own destiny, these individuals can remain relatively unaffected by competition of adversity.”
Jones, Hanton, and Connaughton (2002, p. 209)	“Mental toughness is having the natural or developed edge that enables you to: (i) generally, cope better than your opponents with the many demands (competition, training, lifestyle) that sport places on a performer; (ii) specifically, be more consistent and better than your opponents in remaining determined, focused, confident, and in control under pressure.”
Thelwell, Weston, and Greenlees (2005, p. 328)	“Mental toughness is having the natural or developed edge that enables you to: (i) (continued)

Source	Definition
	always, cope better than your opponents with the many demands (competition, training, lifestyle) that sport places on a performer; (ii) specifically, be more consistent and better than your opponents in remaining determined, focused, confident, and in control under pressure.”
Gucciardi (2008, p. 278)	“... a collection of values, attitudes, behaviours and emotions, which enable an individual to persevere and overcome any obstacle, adversity or pressure experienced, but also to maintain concentration and motivation when things are going well, to consistently produce high levels of performance.”
Coulter, Mallett, and Gucciardi (2010, p. 715)	“Mental toughness is the presence of some or the entire collection of experientially developed and inherent values, attitudes, emotions, cognitions, and behaviours that influence the way in which an individual approaches, responds to, and appraises both negatively and positively construed pressures, challenges, and adversities to consistently achieve his or her goals.”
Clough and Strycharczyk (2012, p. 1)	“The quality which determines in large part how people deal effectively with challenge, stressors and pressure...irrespective of prevailing circumstances.”

Clough and colleagues described the attributes of mentally tough individuals as:

Mentally tough individuals tend to be sociable and outgoing; as they are able to remain calm and relaxed, they are competitive in many situations and have lower anxiety levels than others. With a high sense of self-belief and an unshakeable faith that they control their own destiny, these individuals can remain relatively unaffected by competition or adversity (Clough, Earle, and Sewell, 2002, p. 38).

Criticism of popular definitions. Despite the fact that the above three definitions have led to increased interest and greater research attention, criticisms remain. There are many researchers who believe that there is still a need for a finer and deeper conceptualization (Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015). Although Jones and colleagues stated that MT can be developed and found in all three contexts (i.e., competition, training, lifestyle), Crust (2007) underlined concerns with Jones and colleagues' research with respect to using small numbers in the initial focus group stage of the research. Another concern is that the definition of MT emphasizes what MT allows athletes to *do*, rather than what MT actually *is*.

Concerning Gucciardi's definition, although MT is identified as the key to sustaining effort when things are going well, it is based on the theory of Personal Construct Psychology (PCP), which is a phenomenological approach. According to PCP, one's unique personality is expressed by the way one comprehends his or her own world. These "constructs", or ways of understanding the world, are based on interpretations of experiences. They are not necessarily deliberate and clear, but they may be derived from behavior (Kelly, 1955). When applied to the study of MT, important fundamental components related to this construct could be ignored since it is not being treated as multi-dimensional (Mahoney, Gucciardi, Ntoumanis, & Mallet, 2014).

Lastly, Clough and his colleagues based their definition on what they call the ‘4Cs model of mental toughness’ (i.e., control, commitment, confidence, and challenge). Although this definition was developed after gathering evidence from research, athletes, coaches, and sport psychologists, MT is presented as an extension of hardiness (Horsburgh et al., 2009).

Remaining Questions about Conceptualizations of Mental Toughness

Other characteristics of MT associated with the conceptualization of the construct that still remain unclear include: whether there are gender differences, whether MT is an exclusive characteristic of the elite athlete, whether there is inter-context, inter-sport, and inter-position variability, and if high levels of MT could affect the athlete negatively.

Gender Differences

Due to the increased participation of women in high-level sports that originated with Title IX of the Education Amendments of 1972, the study of gender differences in many facets of sport and exercise has bloomed as a field of research. However, much of the research related to MT includes participants from both genders (e.g., Madrigal, Hamill, & Gill, 2013) or males only (e.g., Gucciardi, Gordon, & Dimmock, 2009b). Although there is evidence that males score significantly higher than females on MT instruments (Crust & Keegan, 2010; Nicholls, Polman, Levy, & Backhouse, 2009), gender differences have not been systematically explored. The discovery of gender differences could affect the allocation of resources, such as the time and financial resources spent specifically with female athletes training in MT.

Elite Athletes

Most of the influential studies in the scientific community (e.g., Bull et al., 2005; Connaughton et al., 2007; Connaughton et al., 2008; Gould, Dieffenbach, & Moffatt, 2002; Gould, Hodge, Peterson, & Petlichkoff, 1987; Gucciardi, Gordon, & Dimmock, 2009c; Jones et al., 2002, 2007; Jones & Moorhouse, 2007; Thelwell et al., 2005) included elite athletes as participants. Recently, several researchers rejected the *a priori* hypothesis that MT is a quality of elite athletes only and conducted studies with participants of different levels (e.g., Crust & Swann, 2013; Golby & Sheard, 2004; Gucciardi, Gordon, et al., 2009b). Despite recent attention on non-elite athletes, the importance of the focus on elite athletes led Caddick and Ryall (2012) to consider the implications of the social construction of MT. In more detail, MT currently reflects an elitist ideal (e.g., ‘Hollywood hero’ athlete) leading to a morally-problematic association of MT with ultimate success only (e.g., the athlete who fails can’t be mentally tough) (Caddick & Ryall, 2012). General agreement on whether or not elite athletes are always mentally tough and vice versa has not been reached.

Inter-sport and Inter-position Variability

Many studies have included athletes from several sports within the same project (e.g., Golby, Sheard, & Van Wersch, 2007). Most of the sports investigated are team sports (e.g., Yukelson & Rose, 2014) although some research has also focused on individual sports (e.g., Drees & Mack, 2012) or has included participants from both (e.g., Middleton, Marsh, Martin, Richards, Savis, et al., 2004). The sports that have received the most attention in the literature are soccer (e.g., Cook, Crust, Littlewood, Nesti, & Allen-Collinson, 2014), rugby/Australian football (e.g., Gucciardi & Gordon, 2009b), and

cricket (e.g., Gucciardi, 2011). More research efforts to compare inter-sport variability between individual and team sports, as well as power and endurance sports, are needed (Gucciardi, Gordon, & Dimmock, 2009).

Several components seem to be common in most sports (e.g., focus, motivation, goal-setting, commitment). At the same time though, MT has been found to be sport-specific (Loehr, 1986). Fawcett (2006) suggested that the fear of survival might be present and part of MT in some sports (e.g., climbing) but not in all. Additionally, Fourie and Potgieter (2001) underlined the absence of team spirit in individual sports.

Instruments have even been created for specific sports (e.g., the Australian football Mental Toughness Inventory). Moreover, MT has been found to be of higher importance to certain positions, such as the front rowers, halfback, five eighth, and hooker in rugby (Cupples & O'Connor, 2011).

Based on the discussion of how MT has been conceptualized, it seems reasonable that some characteristics of MT are going to be more or less significant as a consequence of sport type (Crust, 2007). Due to many sports never having been investigated, a comprehensive understanding of the differences in MT between sports and/or different positions remains unclear.

The Negative Aspect of Mental Toughness

Despite the benefits of being mentally tough, individuals with a high degree of mental toughness were found to associate pain with weakness (Levy, Polman, Clough, Marchant, and Earle, 2006); they concluded that the rehabilitation behavior of athletes with high MT may hinder the recovery outcomes. The extent to which MT may have negative associations in other areas of performance and sport remains unclear.

Overall, operationally defining and quantifying a theoretical construct, such as MT, is a crucial element involved in research methodology (Kimberlin & Winterstein, 2008). Based on an accurate and complete definition, researchers can move forward to construct the framework, which will allow for a more comprehensive examination of the phenomenon (Gucciardi et al., 2008). Research focused on a theoretically justified definition increases the likelihood of providing practitioners with accurate and relevant information about the construct of interest (Rosemann & Vessey, 2008). In MT research, specifically, this is important because it can identify the participants and the sport contexts researchers should be focusing on when investigating MT in Sport.

Transferability of Mental Toughness

Although there is some evidence (e.g., Fawcett, 2005) of relationships of MT with other contexts besides sport (e.g., school, personal life, work), mental skills acquired in a sport environment may not always nor automatically apply to non-sporting settings or from non-sport domains to the sporting context (Gould, Collins, Lauer, & Chung, 2007). Therefore, there is still a need to better understanding how much, if any, MT influences the athlete beyond his or her sport and vice versa. In other words, researchers need to establish how mentally tough individuals cope with pressure and stress in situations that do not relate with their sport. In addition, the mechanisms through which MT would be transferred constitute another issue that remains unclear. For instance, Nicholls et al. (2008) found MT to be correlated with coping. In more detail, MT was positively correlated with approach coping strategies and negatively correlated with avoidance coping. Nevertheless, whether the same coping processes used by athletes to deal with sport-related stressors are also used in non-athletic contexts remains undetermined.

The potential transferability of MT is important and could have several practical implications. For instance, if MT could be transferred beyond sports or into sports, the concept may impact perceptions, cognitions, and behaviors in the other contexts. If MT can be transferred, practitioners should not only focus on developing MT, but also on programs that would teach athletes how to transfer this skill successfully from the sport context into all life arenas and vice versa. Once students are provided with the appropriate mental skills to cope with stressful situations they should learn how to transfer those skills to a variety of different areas of their life. This will ultimately improve their quality of life as a whole (Danish, Petitpas, & Hale, 1993).

Current Mental Toughness Instrumentation in Sports

Despite the several conceptual issues that still exist, the many efforts in defining MT and creating frameworks for measuring MT support its popularity. To date, at least eight instruments have been used to measure the construct of MT. Each is briefly introduced and discussed below:

1. *Cricket Mental Toughness Inventory* (CMTI) (Gucciardi & Gordon, 2009a).

CMTI is an empirically-driven five-factor, 15-item instrument measuring MT in cricket. It was developed through a mixed-method approach. Each of the five subscales (i.e., affective intelligence, attentional control, resilience, self-belief, and desire to achieve) were positively correlated with dispositional flow, hardiness, and resilience and negatively correlated with athlete burnout. Despite the encouraging preliminary support for the factor structure, internal reliability, and construct validity of the CMTI, replication is necessary with additional samples;

2. *Sports Mental Toughness Questionnaire* (SMTQ) (Sheard, Golby, & Van Wersch, 2009). SMTQ is an 18-item instrument that possesses encouraging psychometric integrity. In more detail, its reliability, divergent validity, and discriminatory power contributed to promising preliminary evidence for the instrument's factorial validity and reliability. However, further construct validation is recommended.;

3. *Performance Profile Inventory* (PPI) (Loehr, 1986). PPI is a 42-item scale, and it was one of the first measures to include cognitive and behavioral dimensions. It produces an overall MT score as well as seven six-item subscale scores (i.e., self-confidence, negative energy control, attention control, visualization and imagery control, motivation, positive energy, and attitude control). Little support has been provided for the instrument's proposed seven-factor structure (Golby, Sheard, & van Wersch, 2007). Additional reliability and validity evidence is necessary to better evaluate its technical properties;

4. *Mental Toughness Questionnaire* (MTQ48) (Clough, Marchant, & Earle, 2007). MTQ48 is perhaps the most widely used of the MT instruments. It is a 48-item instrument that measures MT in terms of four core components: control, challenge, commitment, and confidence. Hardiness serves as the basis for the instrument's subscales. Its factor structure has been criticized extensively (e.g., Gucciardi, Hanton, & Mallett, 2012). Additional reliability and validity evidence is necessary to better evaluate its technical properties;

5. *Mental Toughness Inventory* (MTI) (Middleton, Marsh, Martin, Richards, & Perry, 2004). MTI is a 67-item instrument for which validity evidence was collected using only elite sports high-school athletes aged from 12 to 19 years. Additional

administrations with different populations are needed in order to provide a more comprehensive body of evidence for its validity;

6. *Mental, Emotional, and Bodily Toughness Inventory* (MeB-Tough) (Mack & Ragan, 2008). MeB-Tough contains 43 items. It has produced data that demonstrate good model-data fit and the difficulty of the items varies appropriately. Uniquely, it was developed from the athletic trainer's perspective, but additional reliability and validity evidence is necessary to better evaluate its overall technical properties;

7. *Mental Toughness Scale* (MTS) (Madrigal et al., 2013). MTS is an 11-item instrument. Evidence for reliability and validity was demonstrated through positive correlations with self-esteem and flow. Convergent, divergent, and criterion validity was demonstrated through correlations with related measures. CFA provided moderate support for the MTS as a one-dimensional measure of mental toughness in sport. It was developed for measuring MT in college athletes; and

8. *Australian Football Mental Toughness Inventory* (AfMTI) (Gucciardi, Gordon, & Dimmock, 2009a). AfMTI is a 24-item scale. It measures four components of MT in Australian football: thrive through challenge, sport awareness, tough attitude, and desire success. Preliminary data on the factor structure, internal reliability ($\alpha = .70-.89$), and construct validity of the AfMTI were encouraging. However, the factor structure, reliability, and validity of the AfMTI must be verified.

Overall, the presence of so many instruments that report to analyze MT speaks to the challenges of understanding and measuring this construct. This is important because measurement is extremely important in psychological research and practice (Miller & Salkind, 2002). Those measures are going to be used to test theories, to develop/evaluate

interventions, and to help practitioners make the right inferences (Monette, Sullivan, & DeJong, 2013). Choosing the most appropriate instrument is a fundamental step in the research process (Roberts & Stone, 2003). The instrument is the tool through which the data are going to be obtained, evaluated and scored through a standardized process (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014; Haladyna & Rodriguez, 2013).

Development of Mental Toughness

There are three general views regarding the heritability or possible development of MT: (a) researchers, such as Clough et al. (2002), Kroll (1967), Nicholls et al. (2008), and Werner and Gottheil (1966) describe MT as an inherent personality trait; (b) researchers, such as Gibson (1998) describe it as a state of mind; and (c) researchers, such as Jones (2002, 2007) and Horsburgh et al. (2009) suggest it is both.

If one adopts the first view, then external factors (e.g., type of sport, coaching) have no effect on any aspect of MT. For instance, Clough and his colleagues (2002) based their conceptualization of MT on hardiness; that is, being born with hardiness will lead to resilience, which may eventually lead to MT.

On the other hand, if one conceptualizes MT completely or in part as a state of mind, then the type of sport or the individual characteristics of the athletes and the coach will affect the way MT is developed and influenced in training and competition. For instance, Gibson (1998) suggested that success is achieved through determination and dealing with difficult situations. Horsburgh and his colleagues (2009), having evaluated MT in 219 pairs of adult monozygotic and dizygotic twins, concluded that MT is partly heritable. In other words, the results of the first study suggested that there is a positive

relationship between development of MT and exposure to hardships. The results of the second study suggested that it might be wiser to try to strengthen the components of MT with the lowest heritability (e.g., commitment and control) than one's overall MT. Clearly, one's position on the heritability has important implications for how MT is conceptualized and leveraged in sports.

Practicing Mental Toughness

Although there is an increase in the MT research, only a small portion of that research has made an effort to cover the practical issue of ways to actually develop that psychological construct. Among them, there are some case studies (e.g., Breslin, Murphy, Kremer, McClean, & Davison, 2014; Tibbert, Andersen, & Morris, 2015). Some researchers used a cross-sectional design (e.g., Chen & Cheesman, 2013; Dongsung & Kang-Heon, 1994; Golby & Sheard, 2004; Kumar & Ahmed, 2013). Lastly, there are projects that were designed as pre-test/post-test experiments (e.g., Abdelbaky, 2012; Bell, Hardy, & Beattie, 2013; Bhambri, Dhillon, & Sahni, 2005). In general, two kinds of interventions are observed: psychological (e.g., relaxation training, imagery, coping, punishment-conditioned stimuli) or physical strategies (e.g., one year training with the team). It is noteworthy that although in most of the psychological strategy interventions specific details are given, there is a substantial vagueness when it comes to physical strategies.

The next step in the conceptual evolution of MT is to focus on ways to train, develop, and maintain the attribute. There is evidence that the coach has to: (a) be challenging and have high expectations, (b) have an approach to training planning that develops MT in competition too, (c) create a tough, but also motivational climate that

fosters MT (Butt et al., 2010; Schneider & Stier Jr, 2006), and (d) integrate mental skills training within physical training to accelerate the transfer of mental skills into competition (Devonport, 2006). However, the coaches seem restricted by the lack of evidence-based information on best practices regarding the processes and mechanisms by which mental toughness could be developed (Gucciardi, Gordon, Dimmock, & Mallett, 2009).

Value of Mental Toughness in Sport and Coaching

Effective coaching is defined as “that which results in either successful performance outcomes (measured in terms of either win-loss percentages or degree of self-perceived performance abilities) or positive psychological responses on the part of the athletes (e.g., high perceived ability, high self-esteem, an intrinsic motivational orientation, high level of sport enjoyment)” (Horn, 2008, p. 240). Whether the goal is successful performance or positive psychological responses, there is evidence that MT could support effective coaching. For instance, Clough and Strycharczyk (2012) suggested that MT can improve performance and wellbeing. Gucciardi (2010) concluded that MT could help individuals towards the completion of their achievement goals. There is also evidence that MT levels affect the psychological response to injury (Podlog & Eklund, 2005). Yet, questions remain.

There is a need to identify the extent to which MT affects optimal performance, whether or not MT gives players an advantage over components, and if accurate MT scores should be considered that valuable to be used for high-stake decisions (e.g., recruiting, starting team). More research is needed in these areas in order to justify the allocation of resources towards developing MT training programs.

Perspectives on Mental Toughness

Although lately the production of scientific research regarding MT in Sport has increased remarkably, the vast majority of the research has examined the nature of MT from the athletes' perspective (e.g., Crust et al., 2014). Although coaches have participated in several research projects (e.g., Driska et al., 2012), there is not commensurate amount of research concerning their perceptions with regard to MT in Sport. Their perspectives are very crucial in various ways, which are discussed in more detail below.

Coaches

According to coach James Wooden, arguably the greatest coach of all-time in any sport (D'Alessio, 2009), coaching is teaching (Nater, 2006). The coach (or the teacher) is a leader. That leader has a very powerful influence on the individuals he or she leads. The influence could be more than anyone outside of their families. This is how much responsibility coaches have and how much they impact their athletes' lives (Wooden & Jamison, 2005).

Coaches may benefit from having the information from the athletes' perspective as it could help them to create the appropriate environments to foster the development of MT in their players. However, the perspective of coaches themselves is crucial towards a broader understanding of the construct (Crust, 2008). It appears that the role of the coach has important implications for the development of MT (Beattie, Hardy, Savage, Woodman, & Callow, 2011). In fact, research has suggested that coaches are very interested in learning more about MT (Schneider & Stier Jr, 2006), and they strongly

believe that it is a good performance indicator (Gucciardi, Gordon, Dimmock, et al., 2009).

Based on the above, it is imperative to examine the unique roles that coaches have in MT in Sport. Moreover, triangulation of data from coaches and athletes will provide researchers with the opportunity to cross validate their perspectives.

Strength and Conditioning Coaches

When it comes to strength and conditioning coaches (SCC), research is limited (e.g., Radcliffe, Comfort, & Fawcett, 2013; Wade, Pope, & Simonson, 2014; Winwood, Cronin, Keogh, Dudson, & Gill, 2014). This gap in the literature is alarming because SCCs are viewed as an essential part of the team due to the increased significance of their role and the amount of time spent with athletes (Martinez, 2004).

In more detail, in NCAA for instance, SCCs spend more “countable hours”¹ with the athletes throughout the year than the sport coaches (University of Notre Dame, 2015). Moreover, the salaries of SCCs could be used as an indication of how athletic directors and head coaches perceive their impact in their teams. The highest-paid SCC in the nation makes the same in salary (i.e., \$515,000 per year) as the school’s offensive and defensive football coordinators (Rovell, 2015). Last, there is increased interest in determining their exact role in athlete development beyond the physical development , which is already established (Meylan & Malatesta, 2009; Plisk & Stone, 2003; Simenz, Dugan, & Ebben, 2005). Based on the above, the perceptions of the SCCs about MT in Sport are and should be of high importance.

¹ A countable athletically-related activity is any activity with an athletics purpose involving student-athletes that occurs at the direction of or supervised by one or more institutional coaching staff members (including strength and conditioning coaches).

Strength and Conditioning Coaches versus Head Coaches

A head coach (HC) is in charge of the team, including staff. He or she develops a coaching philosophy, the budget, and is responsible for ensuring violations do not occur in his or her program. The HC is actively involved in recruiting, sport practices, and game strategies. The head coach is also not required to maintain strength and conditioning coach certification (Pac-12 Conference, 2015).

An SCC answers to the HC but has a different professional identity. The SCC is in charge of implementing sport-specific strength training and conditioning programs. His or her responsibilities include directing pre-practice and game warm up and cool-down, instructing players in proper execution of lifts, speed, agility, and quickness drills, position-specific conditioning drills, and assisting in the rehabilitation of injured players. During the season, the SCC travels with the team (Professional Baseball Strength and Conditioning Society, 2015).

The potential differences in perspectives of MT between SCCs and HCs is important, because although both coaches have the same goal (i.e., bringing each player to his or her potential) their ways and means are drastically different (e.g., basketball vs. dumbbell, court vs. weight-room). In fact, due to the vast differences between these two professions, one of the premier professional organizations strongly discourages dual job responsibilities of being HC and SCC (Collegiate Strength and Conditioning Coaches association, n.d.). To date, no research has been done concerning differences between SCCs' and Head Coaches' (HC) perceptions in regards to MT.

Master Strength and Conditioning Coaches

A master strength and conditioning coach (MSCC) is (a) the certified strength and conditioning coach (SCC) and (b) an active member of the Collegiate Strength & Conditioning Coaches association (CSSC_a), who has been employed as a full-time strength and conditioning coach on the collegiate or professional level for at least 12 years (Collegiate Strength & Conditioning Coaches Association, n.d.).

Being a MSCC is considered to be one of the highest honors in this field. It represents experience, proficiency, and longevity in the profession. Recruiting MSCCs as participants of a study about MT in Sport has the potential to drive the field vertically, since their highly-valued opinion is yet to be revealed. To date, no research has been done concerning MSCCs' perceptions on MT. The perspectives and perceptions of MSCCs serve as the basis for the current study.

Purpose of Current Study

This chapter has presented an introduction to the following areas related to MT: (a) its history, (b) its definitions and conceptualizations, (c) its transferability to other areas of life, (d) how it's measured, (e) its development, (f) how it's practiced, (g) its value in coaching, and (h) how it has been studied. As mentioned above, the current literature is curiously devoid of research on perspectives and perceptions of MT held by MSCCs, whose views should be among the most highly valued in sports.

Based on the literature review above, the following research needs exist. There is a need for MSCCs: (a) to respond to whether or not they perceive MT to exist as a unique construct in the sports domain; (b) to be asked to define MT, to state how they conceptualize MT (including possible gender differences), and even to describe

characteristics of athletes who lack MT; (c) to comment on the potential transferability between practice and competition, sport and social life, and social life and sport; (d) to indicate if they know how to measure MT and/or if they would be willing to use an MT instrument; (e) to be asked to clarify if they think that MT can be developed and if so; (f) to report if they know how to train MT, incorporate MT training, design an MT training program, receive help from a specialized professional, and train MT as much as they would like; and (g) to identify how much they believe MT affects optimal performance.

The purpose of this study was to investigate, using a mixed-method design, the perceptions of MSSCs in regards to MT. Specifically, using a questionnaire (i.e., STAM II) and based on the literature, field tendencies, and practice, nine research questions were explored. Each question below was considered within the context of MSSCs' perceptions and perspectives. That is, *according to MSSCs*:

1. Does MT exist in the sports domain?
2. How is MT defined in sports?
3. Is MT inherited, developed, or both?
4. Is MT transferable to academic and/or social life and vice versa?
5. What is the value of MT in Sport overall?
6. Are MSSCs practicing MT training?
7. Do gender differences exist with respect to MT in Sport?
8. Do MSSCs know how to measure MT?
9. Do differences exist between views of SCCs and HCs when it comes to MT training?

CHAPTER THREE

Methodology

The purpose of this chapter is to present the methodology for study. It consists of five subsections: participants, instrumentation (i.e., S.T.A.M. and S.T.A.M. II), design, procedure, and data analysis.

Participants

Certified master strength and conditioning coaches (MSCCs) were the target population. A strength and conditioning coach is a physical performance professional who uses exercise prescription to (a) improve performance in athletic competition, (b) reduce athletic injuries, and (c) monitor general health (e.g., mental state) (American Kinesiology Association, 2011; Haff & Triplett, 2016).

A MSCC must be a certified strength and conditioning coach (SCCC) and be an active member of the Collegiate Strength and Conditioning Coaches association (CSSC_a) who has been employed as a full-time strength and conditioning coach on the collegiate and/or professional level for at least 12 years (Collegiate Strength & Conditioning Coaches Association, n.d.). Being a MSCC is considered to be one of the highest honors in this field. These individuals represent experience, proficiency, and longevity in the profession. Therefore, their opinion is highly valued.

Since all participants were MSCCs, the sample was a criterion-based purposive sample. Currently, there are 157 MSCCs in the CSSC_a. Their contact information (i.e.,

email addresses) was obtained online since CSSC_a provides an MSCC directory. Thus, there was no random selection of participants.

A few MSCCs were working on the professional level (mainly coaching football) or were in-between teams. One MSCC was reported to work at a high-school (Collegiate Strength & Conditioning Coaches Association, 2015). However, the vast majority of the MSCCs were employed by academic institutions, which are members of the National Collegiate Athletic Association (NCAA).

According to the NCAA, it is a membership-driven organization devoted to preserving the well-being of student-athletes and offering them with the opportunities to create the necessary skills to succeed as athletes, students, and citizens. Academic institutions are categorized into three divisions (i.e., Divisions I, II, and III). These divisions represent 1,144 institutions that are members of NCAA (National Collegiate Athletic Association, 2015). Three hundred and fifty colleges and universities are considered Division I institutions, while Divisions II and III are collections of 300 and 450 members respectively (National Collegiate Athletic Association, 2016a, 2016b, 2016c). Compared to the schools of the other two divisions, Division I schools are considered to recruit the most talented student-athletes, as well as offering the most scholarships.

Instruments

In the following section, details about the S.T.A.M. questionnaire will be provided first, since it is the predecessor of S.T.A.M. II. In addition, the changes that were made on S.T.A.M. II, including the exclusion of Jones' definition, the areas of

interest, the types of questions, the items, and the questions concerning demographics are presented in detail.

The S.T.A.M. Questionnaire

The S.T.A.M. II questionnaire is an updated version of the S.T.A.M questionnaire used in a previous but smaller projects. In this second version, several changes (see below) were made based on the unique characteristics of this research, advances in research since the development of S.T.A.M., and feedback from the first project and from pilot-testing S.T.A.M II.

The S.T.A.M. questionnaire was inspired by a description of the questionnaire developed and provided by Weinberg, Butt, and Culp (2011). Jones's et al. (2002, 2007) definition and the attributes of the term MT were used in this questionnaire to increase the construct validity of the research. Four professionals with relevant experience in athletics (i.e., a collegiate strength and conditioning coach, a high-school baseball coach, and two collegiate basketball coaches) reviewed the S.T.A.M. to provide face and content validity evidence. Based on their feedback, one alteration was made: in items 13 and 14 the word "practice" was substituted with "session".

The S.T.A.M questionnaire is a 34-item instrument with two rank-order questions (i.e., items 19 and 27), two matrix-table questions (i.e., items 13 and 14), one short-answer question (i.e., item 17), and 29 multiple-choice questions (i.e., 28 Likert-type and one yes-or-no). Seven areas of interest are covered: (a) Do Strength and Conditioning Coaches (SCC) know what mental toughness is? (b) What's their opinion about the value of mental toughness? (c) Are they implementing any kind of mental toughness training? (d) Do they know how to measure mental toughness? (e) Can they identify and rank the

key issues in this area? (f) Do they think that there are gender differences when it comes to implementing mental toughness training? (g) Would they be interested in learning more about mental toughness? and (h) Do they think that there are any differences in the responsibilities to develop mental toughness when compared to basketball coaches?

Information about the gender, job title, academic background, years of experience as a SCC, years of experience as a SCC for female student-athletes, and years of experience as a SCC for collegiate female basketball players of the participants are collected via the demographic questions.

Although the S.T.A.M. has not been comprehensively evaluated psychometrically, it was administered for data collection in a previous small scale study involving eight strength and conditioning coaches. The item clusters for which reliability could be estimated were (a) Importance, (b) Gender Differences, (c) Development, (d) Applications, and (e) SCCs versus HCs. Reliability was estimated using Guttman's λ_2 , which is arguably a more trustworthy estimate of reliability than coefficient α (Sijtsma, 2009). The λ_2 estimates for the item clusters mentioned above were .61, .91, .92, .73, and .69, respectively. Furthermore, evidence is available for the instrument's content-related validity. That is, strength and conditioning experts were involved with the development and review of the instrument, and they approved of its content. Furthermore, it was related to a well-known definition (i.e., Jones, 2002) and attributes of MT.

The S.T.A.M. II Questionnaire

The Stronger Than Average Mentality (S.T.A.M.) II Questionnaire is an updated version of the S.T.A.M questionnaire. It consists of 52 items. In December 2015 and before proceeding to empirical testing, the instrument was given to a group of experts to

be evaluated. Eight strength coaches agreed to fill out the questionnaire and provide feedback in regards to content-related validity and face validity. Preliminary reliability estimates (λ_2) were computed based on the eight sets of responses.

The instrument's appearance was assessed. Furthermore, the test items were checked based on the research questions and they were evaluated whether they sample the particular performance domain. The experts reported that the items adequately collect information about the perceptions of Master Strength and Condition Coaches in regards to MT in Sport. Besides some minor grammatical and syntactical errors, they did not report any major issues in regards to the content, the level of complexity, the item format, or the response format of the items. However, based on their suggestions one item was added (i.e., item 26). Item 26 is open-ended and assesses MT training issues.

Overall, the main changes between the two questionnaires consist of (a) the exclusion of Jones' definition/framework, (b) the areas of interest, (b) the substitution of all Likert-type questions with slider questions, and (c) the questions concerning demographics.

Exclusion of Jones' definition. In the S.T.A.M. Questionnaire, Jones' (2002) definition of MT is provided in the very beginning in order to enhance the content validity of the study. Since the participants are considered as the top professional in their field, in S.T.A.M. II that was not considered necessary. As a result, Item 27 that has to do with ranking Jones' (2007) dimensions of attributes of MT was also excluded.

Areas of interest. There are 9 areas of interest (See Table 2 for a detailed presentation of the research questions and their corresponding items):

1. Existence of MT: Item 1 provides the MSCCs the opportunity to reveal their opinions regarding the existence or not of this construct in sports. Item 1 asks, “Does the psychological construct of Mental Toughness (MT) exist in the Sports domain?”. Item 1 is a key item of this questionnaire. In case the participant replies “NO” to this question, he or she will be taken directly to the demographic questions without replying to any other questions. The rationale behind this decision is that Item 1 serves as the cornerstone of S.T.A.M. II. If a coach does not believe in the existence of MT in Sport then, there is no point for the researchers to collect any other data but demographics. No reliability estimate was computed due to only one item being used for this research question.
2. Characteristics/definitions of MT: Items 2, 10 to 16, 18, and 19 provide the MSCCs the opportunity to reveal their opinions regarding the topic of what MT is and isn’t, as well as the characteristics of a mentally-tough athlete. For instance, Item 2 asks the participants to briefly define MT in Sport. The reliability estimate (λ_2) for these items in the pilot was .75.
3. Development of MT: Items 3 to 5 and 39 to 41, provide the MSCCs the opportunity to reveal their opinions regarding the topic of whether MT is inherited, developed (if so, in what age?), or both. For instance, item 3 asks if “MT is hereditary only.” The reliability estimate (λ_2) for these items in the pilot was .84 with item 5 excluded. It was excluded from the reliability calculation because it was dimensionally different from the other items. The results of the study are not summarized by subscale so its exclusion from the calculation was not considered problematic.
4. Transferability of MT: Items 7 to 9 provide the opportunity to the MSCCs to reveal their opinions regarding the topic of MT transference from one aspect of life to another. For instance, Item 8 asks, “A student-athlete can transfer his or her MT from sports to personal and academic life”. The reliability estimate (λ_2) for these items in the pilot was .86.
5. Value of MT: Items 6, 17, 20, 36, and 37 provide the opportunity to the MSCCs to reveal their opinions regarding the value of MT. For instance, item 6 asks “MT provides collegiate athletes a psychological advantage over opponents”. The reliability estimate (λ_2) for these items in the pilot was .87.
6. Practicing MT training: Items 25 to 34, provide the MSCCs the opportunity to reveal their opinions regarding the topic of practicing MT training and their training techniques. For instance, Item 25 asks “I incorporate MT training when working with athletes”. The reliability estimate (λ_2) for these items in the pilot was .67. The items that asked

about frequency of MT training during certain times of year were excluded from the reliability calculation.

7. Gender differences: Items 42 to 45 provide the opportunity to the MSCCs to reveal their opinions regarding the topic of variability in MT based on gender. For instance, Item 42 asks, “Which gender of collegiate athlete is generally mentally tougher?”. The reliability estimate (λ_2) for these items in the pilot was .34, but it should be noted there was very little variability in the responses (i.e., reported no gender differences on average). The results of the study are not summarized by subscale so the low reliability from the calculation was not considered problematic.
8. Measurement of MT: Items 35 and 38 provides the opportunity to the MSCCs to reveal their opinions regarding the topic of measurement issues. For instance, Item 38 asks, “I don’t know exactly how to measure MT”. The reliability between these two items was not estimated because there was very little variability. That is, the majority of respondents, regarding their interest in a psychometrically sound instrument, selected the maximum possible response.
9. SCCs vs. Head Coaches (HCs): Items 21 to 24, provide the MSSCs the opportunity to reveal their opinions regarding the topic of potential differences in their perspectives about MT compared to HCs. For instance, Item 22 asks, “In general, SCCs believe in MT more that the sport (i.e., football, basketball, soccer) coaches”. The reliability estimate (λ_2) for these items in the pilot was .57.

Table 2

The Research Questions and Their Corresponding Items

Research Questions	Item(s)
Existence of MT	1
Definition/Characteristics of MT	2, 10-16, and 18-19
Development of MT	3-5, 39-41
Is MT transferable?	7-9
Value of MT	6, 17, 20, and 36-37
Practicing MT	25-34
Gender differences in MT	42-45
Measurement of MT	35 and 38
Head Coaches vs. MSCCs	21-24

Types of questions. The S.T.A.M. II questionnaire consists of slider questions, multiple-choice question, text-entry questions (i.e., short-answer), and matrix table questions. There are no Likert-type questions as in the first version of S.T.A.M. Instead, the majority of the items in S.T.A.M. II are slider questions.

1. The slider question type was used as a more engaging interactive alternative to the Likert-type question. Rather than simply selecting a scale point, participants could drag a bar to indicate their level of preference and therefore, this question type can be used as a continuous scale.

In more detail, the sliders were customized in that they had three labels (i.e., strongly disagree, neutral, and strongly agree, definitely females, same, definitely males, or team sports, same, individual sports) or were designed as scale (i.e., a scale from 0 to 100), and grid lines so the participants could move the slides easier to the exact point they wanted. Two decimals were allowed for more detail. Moreover, the “show value” option was activated, so, next to each scale, the selected value was displayed and the respondents were able to see it. The start position of the slider and specified default value was “zero”/neutral. However, participants would need to move the slider bar slightly for the question to have counted as answered.

2. The two multiple-choice questions were about the existence of MT in Sport (i.e., Item 1) and the gender of the participants (i.e., Item 46). This is the most traditional type of question. It is simple to understand and familiar to responders.

3. The short-answer questions, although the analysis was more challenging, collected open-ended information (i.e., Items 2, 19, and 26). Single-line or multiple-line entries were available according to the amount of information collected.

4. Matrix table questions (i.e., Items 33 and 34) provided a little more information in a question than would have been possible with traditional multiple choice. This type of questions allowed the researcher to ask about multiple items in one question and, by doing so, shorten the instrument.

Demographics. Items 46 to 52 were designed to deliver demographic statements concerning gender, age, race, academic background, affiliation, experience, and specialty area(s) of each MSCC.

Design

This study followed an observational and cross-sectional design. Data were collected using an instrument (i.e., questionnaire). The research problem was suited for mixed methods because one data source would have been insufficient and the authors were looking for offset (it minimizes the weaknesses of these two designs of research), completeness (combining the strengths of these two designs adds depth and breadth to the study), and complementarity (it increases a study's validity and interpretability by effectively managing overlapping, but different aspects of a phenomenon) (Creswell & Clark, 2011). A mixed-method design can be described as a kind of research in which a researcher combines quantitative and qualitative research techniques, methods, approaches, concepts, or language into a single study (Johnson & Onwuegbuzie, 2004).

Procedure

Questionnaire

After the Institutional Review Board (IRB) approval, the questionnaire was uploaded on Qualtrics (www.qualtrics.com). The participants were contacted electronically receiving information about why they were chosen to participate in this project, the rationale of the study, and the link along with the necessary password. The participants were then able to go online and complete the questionnaire. The Mobile Friendly option was also activated so that the questionnaire could reformat on mobile screens. A second and third email was sent reminding the subjects to complete the questionnaire. These follow-up emails also contained the link and the password.

Data Analysis

Capturing the descriptive information (e.g., central tendencies, amount of variation) about the sample was the goal of analysis of the quantitative data. Therefore, first, descriptive statistics for each of the variables of interest were generated. For the only categorical variable (i.e., gender), frequencies and percentages were generated. For all the continuous variables, means and standard deviations were generated.

Data reduction was the goal of analysis of the qualitative data. The data from the data entry questions (i.e., items 2, 19, and 26) were analyzed through thematic analysis. The analyses for these items were displayed through figures.

Second, the two strands of data were examined together. These nine areas provide lenses through which data were viewed in a relational structure. More details are given below.

Research Question 1 (RQ1)

Item 1 was about the existence of MT is Sport. Item 1 was a categorical variable. Therefore, to answer RQ1, frequencies and percentages were generated;

Research Question 2 (RQ2)

Items 2, 10 to 16, 18, and 19 were about characteristics/definitions of MT. To answer RQ2: (a) For items 2 and 19, the layers of the thematic analyses were generated; and (b) for the rest of the items (interval variables) basic statistics, such as minimum, maximum, mean, and standard deviation, were generated.

Research Question 3 (RQ3).

Items 3 to 5 and 39 to 41 were about the development of MT. To answer RQ3, since there were all interval variables, basic statistics, such as minimum, maximum, mean, and standard deviation, were generated.

Research Question 4 (RQ4)

Items 7 to 9 were about the transferability of MT. To answer RQ4, since there were all interval variables, basic statistics, such as minimum, maximum, mean, and standard deviation, were generated.

Research Question 5 (RQ5)

Items 6, 17, 20, 36, and 37 were about the value of MT. To answer RQ5, since there were all interval variables, basic statistics, such as minimum, maximum, mean, and standard deviation, were generated.

Research Question 6 (RQ6)

Items 25 to 34 were about practicing MT. To answer RQ6: (a) for the interval variables, basic statistics, such as minimum, maximum, mean, and standard deviation were generated; (b) concerning the Matrix Table questions (i.e., items 33 and 34), the statistics table included the ideal and actual percentage of sessions per season; and (c) For item 26, the layers of the thematic analysis were generated.

Research Question 7 (RQ7)

Items 42 to 46 were about gender differences. To answer RQ7, since there were all interval variables, basic statistics, such as minimum, maximum, mean, and standard deviation, were generated.

Research Question 8 (RQ8)

Items 35 and 38 were about measurement of MT. To answer RQ8, since both were interval variables, basic statistics, such as minimum, maximum, mean, and standard deviation, were generated.

Research Question 9 (RQ9)

Items 21 to 24 were about different perspectives between SCCs and HCs. To answer RQ9, since there were all interval variables, basic statistics, such as minimum, maximum, mean, and standard deviation, were generated.

CHAPTER FOUR

Results

The purpose of this descriptive study was to examine the perceptions of MSCCs regarding MT in Sport. Between two and ten items were developed for each of the nine research questions resulting in a 52-item instrument, the S.T.A.M. II. Quantitative and qualitative data were collected and analyzed.

Summary of Analyses

Concerning quantitative analysis, descriptive statistics were used to provide summaries about the sample and the responses to the questions, including frequencies (i.e., percentages), measure of central tendency (i.e., mean) and/or measures of variation (i.e., minimum, maximum, and standard deviation), depending on the type of responses. Overall, the analyses were conducted using the Microsoft Excel software (Microsoft Corporation, 2010).

Concerning qualitative analysis, the researcher conducted thematic analysis after downloading the responses from Qualtrics. After preparing and organizing the data in appropriate text units (i.e., a word, a sentence, an entire paragraph), a preliminary read-through was conducted in order to get a sense of the whole before breaking it into parts (Agar, 1980) and, via “memoing”, key concepts were pinpointed (Creswell, 2013, p. 183).

The next step in analyzing the qualitative data included coding and establishing themes via data reduction. In more detail, coding consisted of data reduction into

meaningful segments and assignment of names to those segments. In this study, coding involved aggregating important and relevant information into small categories and seeking evidence for that code from several text units and respondents. Then, a label was assigned to each code. Those codes were later combined into broader categories (i.e., themes) to form a common idea. Lastly, the data were represented in figures.

Three issues about the coding process of this study need to be addressed. First, based on the suggestion of Huberman and Miles (1994) code counting was conducted. Counts of data codes offer an indicator of frequency of occurrence (Miles & Huberman, 1994). However, although counts were considered as indicators of each code's importance, the numbers of times those codes appeared in the database were not reported in this study. Counting suggests a quantitative emphasis of the analysis, which is conflicting to qualitative research (Asmussen & Creswell, 1995). Moreover, counting implies that all codes are equally important, while neglecting to consider that the text units coded may essentially represent opposing opinions (Creswell, 2013).

Second, in regards to coding strategies (Miller & Crabtree, 1992), no “prefigured” categories were used. Again, as in the case of excluding Jones' definition (2002), codes from a theoretical framework that exist in the literature were considered to limit the analysis due to guiding the coding process. “Emergent” categories were thought to better serve the purpose of this project and its participants.

Third, based on the guidelines of Creswell (2013), the code names – whether *in vivo* or not - represent: (a) expected information, (b) surprising information, and (c) interesting or unusual information.

In the following sections, the results of pattern matching for the items of each research question are presented together. For research questions 2 and 6, which contain both quantitative and qualitative data, the two strands are presented separately. However, both strands are used during interpretation to supplement each other. Before the results of each research question, questionnaire completion statistics and demographic information are presented.

Questionnaire Completion Statistics

As seen in Table 3, all 157 MSSCs were contacted. From January 11th 2016 to February 4th 2016, 71 responses were received resulting in a response rate of 45%. Fifty-seven out of the 71 respondents completed all 52 questions resulting in 80% completion rate. The average time needed for the completion of the questionnaire was 17 minutes.

Table 3

Questionnaire Statistics

Variable	Count/%
Sent Out To	157
Responses	71
Response Rate	45.22%
Complete	57
Partial	14
Completion Rate	80.28%
Average Time Taken to Complete Questionnaire	17 minutes

Missing Data

Missing data result from unanswered items and should be always expected (Fink, 2012). In self-administered surveys, respondents may not answer questions for several reasons, such as too much amount of reading or confusing question formats. Due to the importance of Item 1, the “force option” was activated just for that item. For all the other

items the “suggested option” was activated. Although the completion rate is not 100%, the minimum amount of responses received were 47 (items 44 and 45), which represents one third of the total MSCCs. All responses are reported for each item along with the number of participants that did not respond. Therefore, all available data were included in the analyses.

Demographic Information

Descriptive characteristics of the sample are displayed in Table 4. MSCCs in the sample were predominantly white males and in the mid-forties (they ranged from 36 to 63 years). They tended to have a Master’s degree and to be certified through the National Strength and Conditioning Association (i.e., CSCS). They mostly worked for an NCAA Division I institution, had on average of more than 22 years of experience as SCCs (they ranged from 13 to 37 years), and their specialty sports were primarily football and/or basketball.

Research Question 1 – Existence of MT in Sport

The first research question is whether or not the MSCCs believe MT exists in sports. It was represented by Item 1 (i.e., Does the psychological construct of Mental Toughness exist in the Sports domain?). Item 1 is the most fundamental question of this project. All 71 coaches replied to this item. More specifically, 67 MSCCs (94.37%) replied “Yes” and 4 MSCCs (5.63%) reply “No”. It is evident that the vast majority of the MSCCs believe in the existence of the construct in sports.

Table 4

Demographic Information about Participants (n=71)

Variables	Count/Mean	Percentage/SD
Gender		
Males	49	69.01
Female	7	9.86
Did not respond	15	21.23
Age		
Responded	46.42	6.78
Did not respond	16	15.38
Race		
Caucasian/White	45	63.39
African American/Black	4	5.63
Hawaiian	1	1.41
American Indian	1	1.41
Other ^a	4	5.63
Did not respond	16	22.54
Academic Background		
Degrees		
Bachelor's	10	14.08
Master's	45	63.39
PhD	1	1.41
Did not respond	15	21.23

(continued)

Variables	Count/Mean	Percentage/SD
Certifications ^b		
CSCS ^c (including RSCC ^d , RSCC*E ^e , and RSCC*D ^f)	43	60.56
USAW ^g	23	32.39
FMS ^h	4	5.33
TPI ⁱ	3	4.23
USATF ^j	2	2.82
NASE ^k	2	2.82
CPT ^l	2	2.82
No other than MSCC	2	2.82
Other ^m	7	9.86
Did not respond	17	23.94
Current affiliation		
NCAA Division I	46	64.79
NCAA Division II	6	8.52
NCAA Division III	1	1.41
NFL	1	1.41
Private Business	1	1.41
Did not respond	15	21.23
Experience as SCC		
Responded	22.48	6.29
Did not respond	14	19.72
Specialty Sport		
Football	30	42.25
Basketball	25	35.21
Volleyball	15	21.23

(continued)

Variables	Count/Mean	Percentage/SD
Baseball	12	16.90
Softball	9	12.68
Soccer	7	9.86
Swimming	6	8.52
Track & Field	6	8.52
All sports	6	8.52
Tennis	4	5.33
Lacrosse	3	4.23
Hockey	3	4.23
Rowing	2	2.82
Golf	2	2.82
Other	5	7.04
Did not respond	15	21.23

Note. ^a “human”, “all”, “n/a”. ^b All participants are MSCCs. ^c Certified Strength and Conditioning Specialist. ^d Registered Strength and Conditioning Coach. ^e Registered Strength and Conditioning Coach (Distinction). ^f Registered Strength and Conditioning Coach (Emeritus). ^g USA Weightlifting. ^h Functional Movement Screening. ⁱ Titleist Performance Institute. ^j USA Track & Field. ^k National Association of Speed & Explosion. ^l Certified Personal Trainer. ^m Certifications that only one MSCC possess each

Research Question 2 – Conceptualization of MT

The second research question is about MSCCs conceptualization of MT (e.g., characteristics, definition). It was represented by Items 2, 10 through 16, 18, and 19. Descriptive statistics (i.e., measure of central tendency and variation) about all items except items 2 and 19 are displayed in Table 5. Since items 2 and 19 are text-entry items, their layers of analysis are displayed separately in Figures 1 and 2.

Table 5

Descriptive Statistics for Item Responses related to Conceptualization of MT

Item	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
MT is associated with ultimate success only	56	-1.68	1.44	-3.00	3.00
The student-athlete who succeeds is mentally tough by definition	56	-1.09	1.49	-3.00	3.00
A high MT level could affect student-athletes in a negative way	57	-0.19	1.62	-3.00	3.00
For which kind of sports is MT more crucial: team or individual sports?	50	0.48	0.97	-1.53	2.50
MT is of difference importance for certain levels of sport than others	52	0.00	1.85	-3.00	3.00
MT is of different importance for certain sports/events than for others	54	-0.42	1.65	-3.00	2.72
MT is of different importance for some positions than for others	53	-0.39	1.86	-3.00	3.00
I am sure I know what exactly MT in Sport is	55	0.90	1.69	-3.00	3.00

As shown in Table 5, a minimum of 50 (i.e., item 13) and a maximum of 57 (i.e., item 12) coaches responded to the close-ended items of the second research question. Overall, the interpretation of the results shows that there is no consensus on the conceptualization of the construct. In more detail: (a) although MSCCs are slightly sure they know what exactly MT in Sport is ($M=0.90$, $SD=1.69$), they believe that MT is not associated with ultimate success only ($M=-1.68$, $SD=1.44$) or vice versa ($M=-1.09$,

SD=1.49); (b) they slightly disagree with the statement that high levels of MT could affect a student-athlete in a negative way ($M=-0.19$, $SD=1.62$); and (c) they don't appear to come to a conclusion in regards to MT being context-, sport-, or position-specific ($M=0.48$, $SD=0.97$; $M=0.00$, $SD=1.85$; $M=-0.42$, $SD=1.65$; and $M=-0.39$, $SD=1.86$). The standard deviations for each of the items, except Item 13, were 1.44 or higher. This suggests that there is variation in the MSCC's responses. The reliability estimate (λ_2) for these items in the full sample was .73.

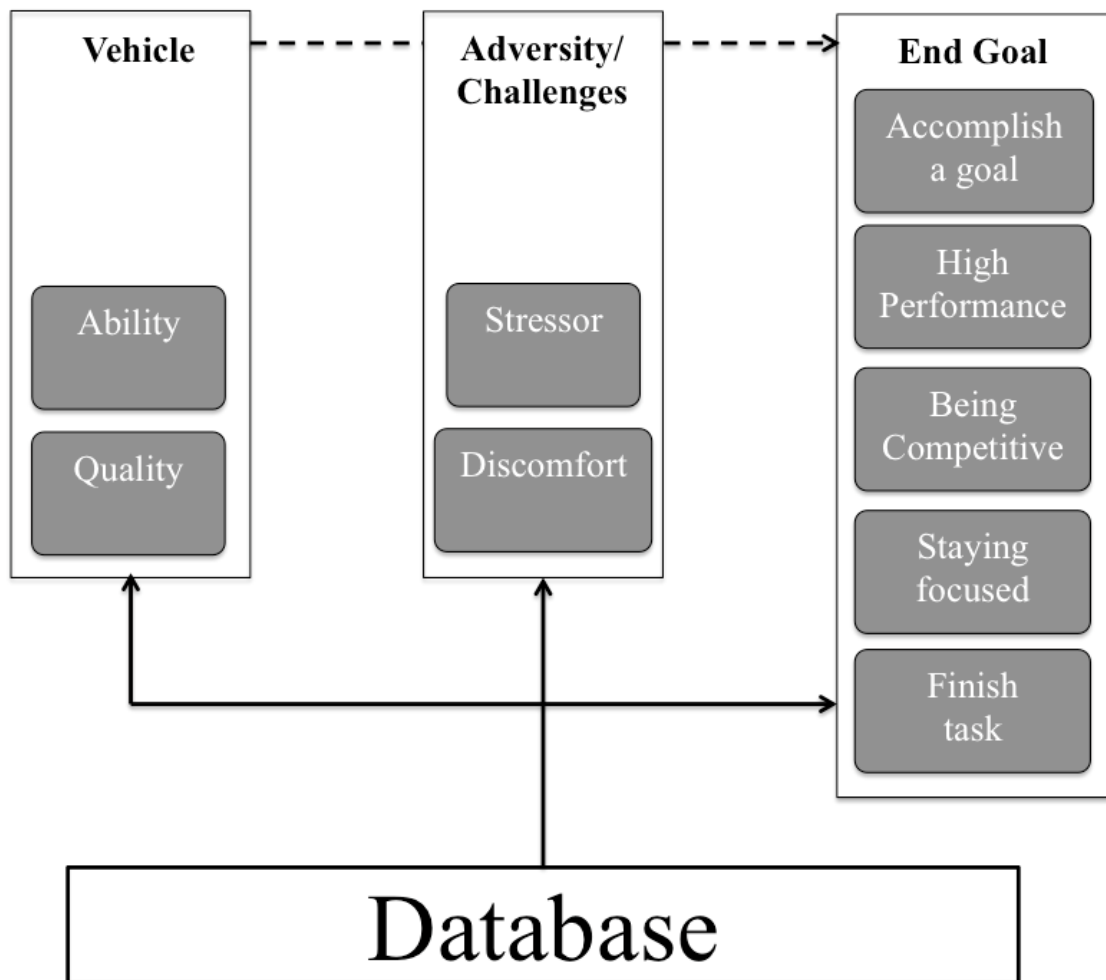


Figure 1. Layers of analysis for definition of MT (n=57).

The layers of analysis concerning Item 2 are displayed in Figure 1. In general, MSSCs seem to define MT as the mean (e.g., ability, quality) a student-athlete uses to continuously overcome, handle, and push through adversity and challenges (e.g., stressors, discomfort) in order to make progress towards an end goal (e.g., accomplish personal or team goal, perform in high level, be competitive, stay focused, finish any given task). For instance, one coach defined MT as “Playing through even when things get tough” while another coach defined MT as “The ability to execute precise actions repeatedly regardless of internal or external conditions.”

The layers of analysis for Item 19 are displayed in Figure 2. MSSCs seem to strongly associate lack of MT with a weak mindset. In more detail, the majority of the coaches gave three types of characteristics about the student-athlete who lacks MT: they either described him or her through a quality that is missing or at low levels (e.g., confidence, focus, discipline, trust to himself or herself, being strategic, competitiveness), or through a feature that he or she is easily exhibiting (e.g., pain, disappointment after any failure or adversity, excuses), or both. The main theme was that a weak mindset makes and keeps the athletes unable of reaching any kind of goal. For instance, one coach describe the athletes who lacks MT as “First to fold when things get tough or rough”, while another describe him or her as "Someone who quits or gives up at the first difficult obstacle.”

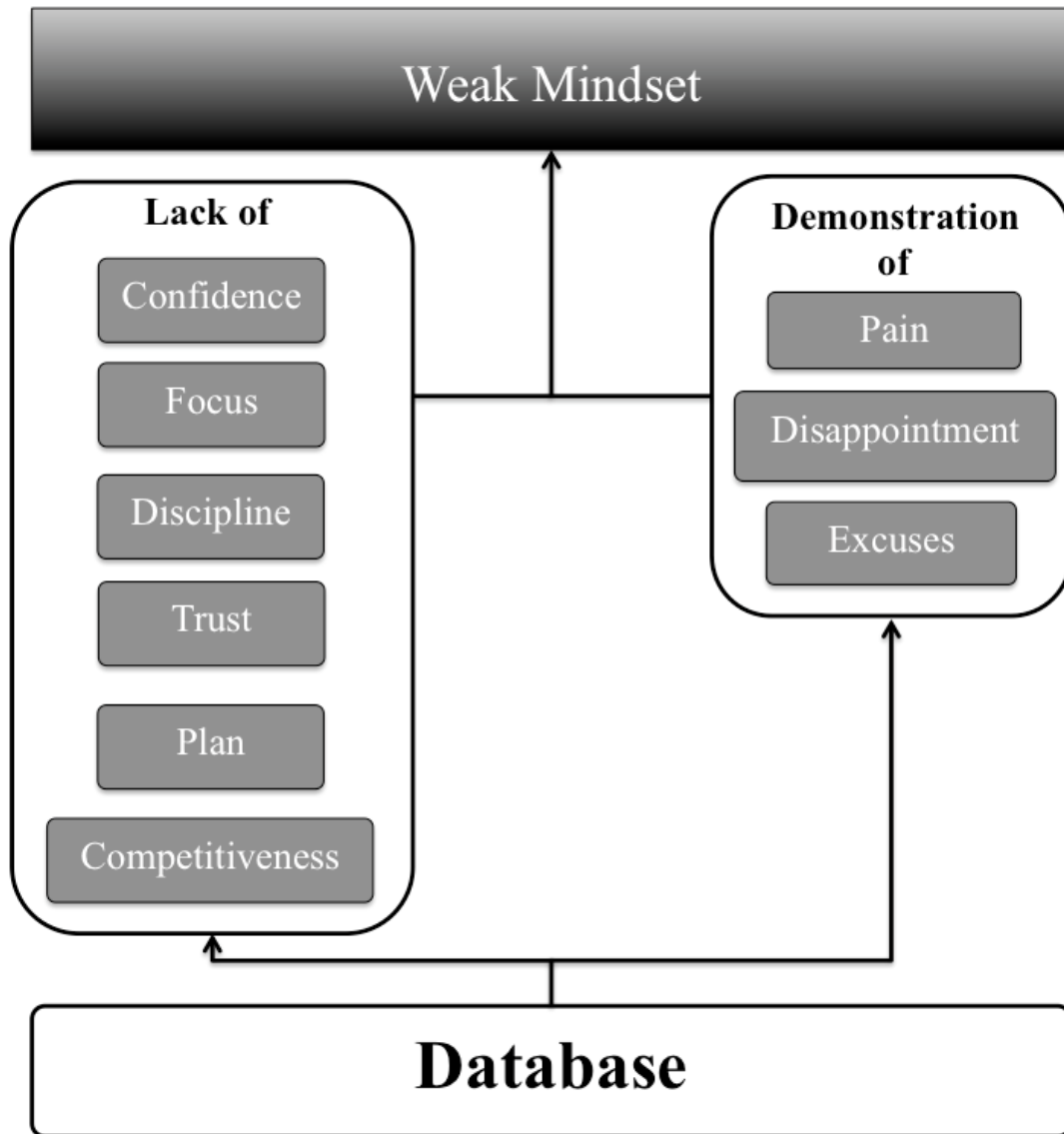


Figure 2. Layers of analysis for characteristics of student-athletes who lack mental toughness ($n=56$).

Research Question 3 – Can MT be Developed?

The third research question is about the perceived nature and heritability of MT. It was represented by Items 3 through 5 and 40 through 42. Descriptive statistics (i.e., measure of central tendency and variation) about each of these items are displayed in Table 6.

As shown in Table 6, a minimum of 53 (i.e., item 39) and a maximum of 55 (i.e., Items 3, 4, and 5) responded to the slider questions of the third research question. Overall, the interpretation of the results suggests that MSCCs view MT as a construct that can be developed. In more detail, MSSCs seem to believe that: (a) MT can be developed even if a portion of it may be hereditary ($M=-0.90$, $SD=1.54$; $M=1.81$, $SD=0.92$; and $M=1.50$, $SD=1.22$) and (b) MT can be developed in athletes of any age, including athletes aged from 18 to 22 ($M=1.47$, $SD=1.54$ and $M=-1.85$, $SD=1.42$). In fact, MSCCs believe that they can increase their student-athletes levels of MT by more than 50 percent in the four years of their eligibility ($M=54.71$, $SD=27.22$). The standard deviations for each of the items, except item 4, were 1.22 or higher. This suggests that there is variation in the MSCC's responses. The reliability estimate (λ_2) for these items in the full sample was .53. The responses were not aggregated into subscale, so the lower reliability was not considered problematic. Item 5 was dimensionally different from the other items and, if item 5 were excluded, the reliability estimate increases to .65.

Table 6

Descriptive Statistics for Item Responses Related to Development and Heritability of MT

Item	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
MT is hereditary only	55	-0.90	1.54	-3.00	3.00
MT can be developed even if a person is not born with it.	55	1.81	0.92	-0.98	3.00
MT is both hereditary and can be developed	55	1.50	1.22	-2.04	3.00
I believe MT can be developed in athletes of any age	53	1.47	1.54	-3.00	3.00
Trying to develop MT in traditional college-athletes is a waste of time. It's too late.	54	-1.85	1.42	-3.00	2.01
On a scale of 0 to 100, between their freshmen and senior years how much can you increase MT levels in your athletes?	54	54.71	27.22	4.98	100.00

Research Question 4 – Transferability of MT

The fourth research question is about the perceived transferability of MT. It was represented by Items 7, 8, and 9. Descriptive statistics (i.e., measure of central tendency and variation) about each of these items is displayed in Table 7.

As shown in Table 7, 57 coaches responded to all three items. Overall, the results suggest that MSCCs tend to agree that MT can be transferred. In more detail, MSSCs tend to believe that MT can be transferred from practice to competition ($M=1.74$, $SD=1.28$), from sports to personal life ($M=2.06$, $SD=0.90$), and from personal life to sports (Item 9). The standard deviations for each of the items, except Item 7, were 0.93 or lower. This suggests that the variation in the MSCC's responses is relatively low. The reliability estimate (λ_2) for these items in the full sample was .71.

Table 7

Descriptive Statistics for Item Responses related to Transferability of MT (n=57)

Item	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
I believe that student-athletes with the most MT during practice are also the toughest ones with the most MT during competition	1.74	1.28	-1.86	3.00
A student-athlete can transfer his or her MT from sports to personal and academic life	2.06	0.90	-1.00	3.00
A student-athlete can transfer his or her MT from personal and academic life to sports	1.96	0.93	-1.00	3.00

Research Question 5 – Overall Value of MT

The fifth research question is about the perceived overall value of MT. It was represented by Items 6, 17, 20, 36, and 37. Descriptive statistics (i.e., measure of central tendency and variation) about each of these items are displayed in Table 8.

Table 8

Descriptive Statistics for Item Responses related to Value of MT

Item	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
MT provides collegiate athletes a psychological advantage over opponents	56	2.50	0.59	0.92	3.00
How much would MT affect optimal performance from 0 to 100 compared to factors like recovery, nutrition, and level or arousal?	57	61.80	19.94	15.12	100.00
It is important for a SCC to be mentally tough	54	2.15	1.01	-3.00	3.00
If there were an instrument available to measure MT in collegiate athletes, the coaches, athletic trainers, professors, and administrative staff would be able to collaborate and protect the students' health and improve their overall college experience.	54	1.39	1.49	-3.00	3.00
Accurate MT measurements/scores should be used for high-stakes decisions	54	0.66	1.60	-2.98	3.00

As shown in Table 8, a minimum of 54 (i.e., Items 20, 36, and 37) and a maximum of 57 (i.e., Item 17) responded to the items of this research question. Overall, the responses from MSCCs suggest that they perceive MT at having high value in sports. In more detail, MSSCs reported that: (a) MT provides collegiate athletes a psychological advantage over opponents ($M=2.50$, $SD=0.59$); (b) MT can affect optimal performance by more than 61 percent ($M=61.80$, $SD=19.94$); (c) It is important for a strength coach to be mentally tough ($M=2.15$, $SD=1.01$); and (d) Although they slightly agree that MT scores should be used for high-stake decision ($M=0.66$, $SD=1.60$), they do believe that accurate measurements could be used to protect the student-athletes health and improve their overall college experience ($M=0.66$, $SD=1.60$). The standard deviations for each of the items, except Item 6, were 1.01 or higher. This suggests that there is variation in the

MSCC's responses. The reliability estimate (λ_2) for these items in the full sample was .53.

Research Question 6 – MT Training

The sixth research question is about perceptions about MT training. It was represented by Items 25 through 34. Descriptive statistics (i.e., measure of central tendency and variation) about all items but Items 26, 36, and 37 are displayed in Table 9. Since Items 36 and 37 are both matrix table items, they are displayed separately in Table 10. The layers of analysis of item 26 are displayed in Figure 3.

As shown in Table 9, a minimum of 52 (i.e., item 32) and a maximum of 54 (i.e., items 25, 27, 29, and 30) responded to the slider questions of the sixth research question. Overall, the interpretation of the results shows that there is consensus on practicing MT, including training techniques, although they practice less than desired. In more detail: (a) MSCCs believe that MT training is not worthless ($M=-2.54$, $SD=0.77$) and they report that they incorporate MT training ($M=2.04$, $SD=1.06$). Although they slightly disagree that it should peak on specific dates ($M=-0.49$, $SD=1.75$), nor that it can be develop by a specialized professional only ($M=-1.22$, $SD=1.84$), MT training must occur on a regular basis in order to be successful ($M=1.67$, $SD=1.29$). Lastly, although they know exactly how to develop MT ($M=-1.19$, $SD=1.65$) there are interested in learning more about it ($M=2.23$, $SD=1.02$). The standard deviations for each of the items, except Item 31, were 1.02 or higher. This suggests that there is variation in the MSCC's responses. The reliability estimate (λ_2) for these items in the full sample was .50.

Table 9

*Descriptive Statistics for Item Responses related to MT Training:
Items 25 and 27 through 32*

Item	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
I incorporate MT training when working with athletes	54	2.04	1.06	-2.09	3.00
MT training must occur on a regular basis in order to be successful	54	1.67	1.29	-2.01	3.00
MT training has to be designed in a way that its levels peak on specific dates in order to be successful	53	-0.49	1.75	-3.00	3.00
MT can be developed with a specialized professional only	54	-1.22	1.84	-3.00	3.00
I don't know exactly how to develop MT	54	-1.19	1.65	-3.00	3.00
I believe MT training is worthless	53	-2.54	0.77	-3.00	0.13
I would be interested in knowing more about how to develop MT	52	2.23	1.02	0.16	3.00

As shown in Table 10, 54 coaches responded to the matrix table questions of this research question. With the exception of the coaches that would like to do six to seven sessions throughout the year and the coaches who would like to do one to two sessions during offseason, all other results indicated that MSCCs are doing less MT training that they would like on average. The biggest differences are reported in no sessions during postseason and inseason and in three to five sessions in offseason.

Table 10

Descriptive Statistics for Item Responses related to MT Training: Items 36 and 37 (n=54)

Season	Sessions per week							
	0		1-2		3-5		6-7	
	I ^a	A ^b	I	A	I	A	I	A
Postseason	29.63	38.89	29.63	24.07	31.48	27.78	9.26	9.26
Offseason	0	3.70	18.52	24.07	66.67	57.41	14.81	14.81
Preseason	0	9.26	38.89	35.19	46.30	40.74	14.81	14.81
Inseason	24.07	35.19	38.89	29.63	24.07	22.22	12.96	12.96

Note. ^a Ideal percentage. ^b Actual percentage.

The layers of analysis for Item 26 are displayed in Figure 3. In general, two types of strategies were identified: physical (e.g., competition of small teams, early morning workouts, creation of unfairness through punishment of the whole team when it is one person's mistake, adding repetitions, sets, drills without notice) and psychological (e.g., sport psychology meeting).

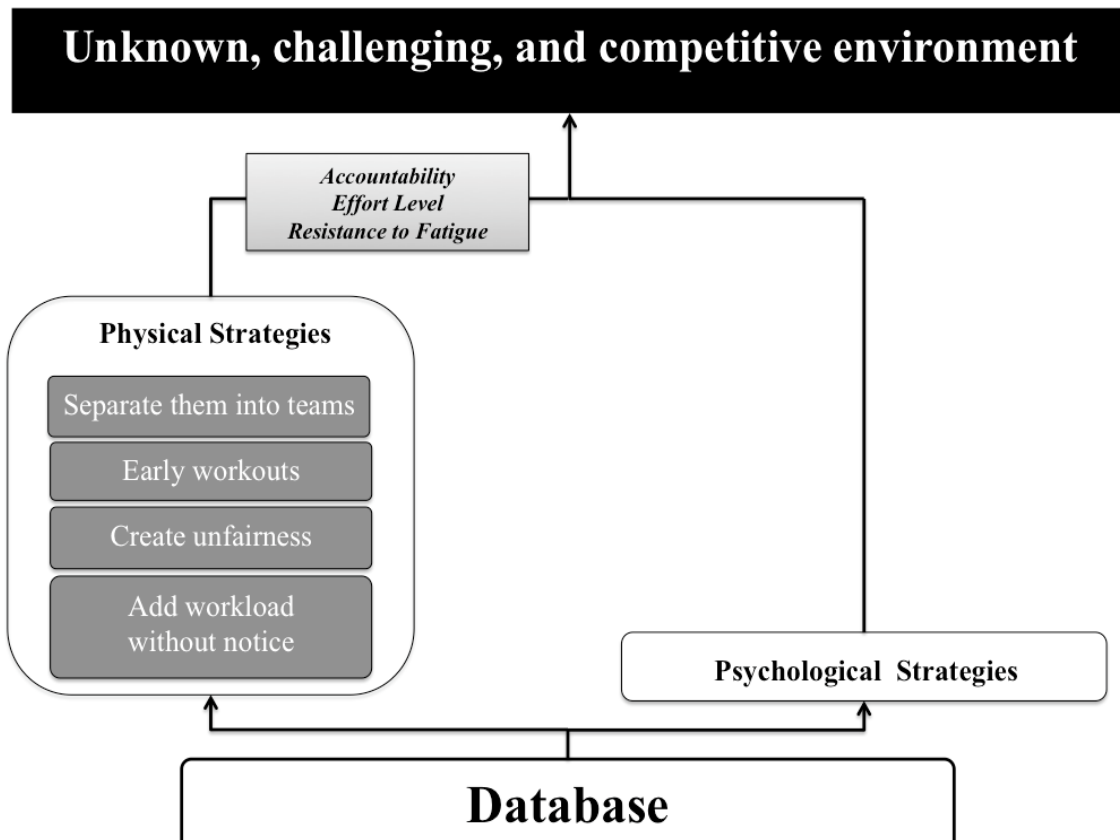


Figure 3. Layers of analysis for examples of MT training ($n=54$).

There was a distinct emphasis on physical strategies. In addition, no details were given about any psychological strategies for MT training. On the other hand, the participants stated specifically that the physical strategies were designed to test their athletes' accountability, effort level, and resistance to fatigue. MSCCs reported that both types of

strategies were implemented in order to prepare the athletes for unknown, challenging, and competitive environments. For instance, one coach when asked to provide an example of MT training wrote “During a workout most of our lifts have some kind of competition attached to it. It creates an atmosphere where they are always trying to challenge themselves or others on the team”. Another participant described “Putting the athletes in situations that make them uncomfortable, things outside of the comfort zone.”

Research Question 7 – Gender Differences in MT

The seventh research question is about perceived gender differences regarding MT. It was represented by Items 42 through 45. Descriptive statistics (i.e., measure of central tendency and variation) about each of these items are displayed in Table 11.

As shown in Table 11, a minimum of 47 (i.e., Items 44 and 45) and a maximum of 48 (i.e., Items 42 and 43) responded to the items of this research question. Overall, the results suggested that MSCCs do not perceive gender differences in MT in Sport.

Table 11

Descriptive Statistics for Item Responses related to Gender Difference in MT

Item	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Which gender of collegiate athlete is generally mentally tougher?	48	-0.13	1.04	-2.59	3.00
Collegiate players of which gender need more training in MT?	48	0.08	1.12	-2.25	3.00
In which gender of collegiate athletes is MT more difficult to develop?	47	0.26	1.12	-2.94	3.00
For which gender of collegiate athletes does MT make more of a difference is sports?	47	0.03	0.89	-3.00	3.00

MSSCs reported that both genders are equally tough ($M=-.013$, $SD=1.04$), both genders need the same amount of MT training ($M=0.08$, $SD=1.12$), the same difficulty levels

applies to both genders when it comes to developing MT ($M=0.26$, $SD=1.12$), and MT makes the same difference for both genders ($M=0.03$, $SD=0.89$). The standard deviations for each of the items were 1.12 or lower. This suggests that variation in the MSCC's responses is relatively low. The reliability estimate (λ_2) for these items in the full sample was .71.

Research Question 8 – Measurement of MT

The eighth research question is about MSSCs' views about measurement practices of MT. It was represented by Items 35 and 38. Descriptive statistics (i.e., measure of central tendency and variation) for each of these items are displayed in Table 12.

As shown in Table 12, 55 coaches responded to the two items of this research question. Although they don't seem to think they know how to measure MT ($M=0.80$, $SD=-1.85$), MSSCs would like to have access to a psychometrically-sound instrument ($M=1.68$, $SD=1.46$). The standard deviations for the items were 1.46 or higher. This suggests that there is variation in the MSCC's responses. The reliability estimate (λ_2) for these items in the full sample was .33. Although the reliability estimate was low in the traditional sense, it was expected to be low because perceived knowledge about and reported interest in measurement are dimensionally different.

Table 12

Descriptive Statistics for Item Responses related to Measurement of MT (n=55)

Item	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
It would be very useful to have access to an instrument that could produce (a) reliable measurements of MT and (b) valid inferences about athletes' level of MT.	1.68	1.46	-3.00	3.00
I don't know exactly how to measure MT.	0.80	1.85	-3.00	3.00

Research Question 9 - Differences between HCs and MSCCs

The ninth research question is about perceived differences in MT between HCs and MSSCs. It was represented by items 21 through 24. Descriptive statistics (i.e., measure of central tendency and variation) about each of these items are displayed in Table 13.

As shown in Table 13, a minimum of 51 (i.e., item 24) and a maximum of 54 (i.e., items 21 and 22) responded to the items of this research question. Overall, the results suggest that MSCCs tend not to perceive any difference in MT between HCs and MSCCs. When compared to HCs, MSCCs did not report that (a) they have more responsibility towards developing MT ($M=0.19$, $SD=1.56$), (b) they believe in MT more, ($M=-0.28$, $SD=1.51$) and (c) their training can develop MT more ($M=0.29$, $SD=1.64$). However, they think that they have more knowledge than their HCs when it comes to MT training ($M=-1.31$, $SD=1.08$). The standard deviations for each of the items, except item 24, were 1.51 or higher. This suggests that there is variation in the MSCC's responses. The reliability estimate (λ_2) for these items in the full sample was .71.

Table 13

Descriptive Statistics for Item Responses related to Differences between HCs and MSCCs

Item	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
SCCs have more responsibility towards developing MT than the sport coaches	54	0.19	1.56	-3.00	3.00
In general, SCCs believe in MT more than the sport coaches	54	-0.28	1.51	-3.00	3.00
I believe that the training designed by SCCs can develop MT more than the sport-specific training	53	0.29	1.64	-3.00	3.00
I think my head coach has more knowledge than me when it comes to MT training	51	-1.31	1.08	-3.00	0.13

CHAPTER FIVE

Discussion

The purpose of this study was to investigate, using a mixed-method design, the perceptions of MSSCs in regards to MT. Specifically, using a questionnaire (i.e., STAM II) and based on the literature, field tendencies, and practice, nine research questions were explored. These questions were related to the following areas of MT: (a) whether or not MSCCs perceive MT to exist as a unique construct in the sports domain, (b) how MSCCs define/conceptualize MT, (c) whether or not MSCCs perceived MT as transferability to other areas of life, (d) how to measure MT and/or if they would be willing to use an MT instrument, (e) whether or not MSCCs think that MT can be developed, (f) whether or not MSCCs know how to train MT, incorporate MT training, design an MT training program, (g) the extent to which MSCCs believe MT affects optimal performance, (h) whether or not MSCCs perceive differences in MT on the basis of gender, and (i) the extent to which MSCCs perceived differences in views on MT between SCCs and HCs.

Unique to this study and the strong contribution it makes is its collection of perspectives and perceptions from MSCCs who play a vital role in athletic development but have not been represented in the body of literature on MT. Purposeful quantitative and qualitative data were collected from these important stakeholders through the S.T.A.M. II Questionnaire. Following is a discussion of implications for practice as it relates to MT in terms of the guiding research questions. Then, the limitations of the

study are discussed along with suggestions for future research, and a tentative definition for MT in Sport based on the data provided by the MSCCs are displayed.

Implications for Practice

In the following sections the conclusions and the practical implications of each research question are presented.

Existence of Mental Toughness

Based on the results, it was clear that the vast majority of the MSCCs believe in the existence of MT in Sport. There was a need for the MSCCs to cover this topic, which has been largely overlooked in the general research on MT. If MSCCs did not believe that MT exists, this would call into question any efforts to develop or practice MT. Furthermore, if they reported not to believe in MT and were correct, this could mean the efforts so far to conceptualize it, measure it, train it, and research it, in general, were in vain. The importance of this issue was the reason the MSCCs were asked this question first. Again, the overwhelming majority of MSCCs reported that they do believe that MT exists so the above concerns are avoided. It should be noted that MSCCs' perceptions that MT exists does not make it so; yet the support of MSCCs as experts with specialized training is an important step in better understanding the nature and characteristics of MT.

Conceptualization of Mental Toughness

The instrument gathered information regarding MSCCs description of MT because, as noted previously, there is still considerable conceptual ambiguity in the extant literature. Based on the results from the quantitative data, there was no clear consensus on the conceptualization of the construct. In more detail, MSCCs reported only slightly

positive views with respect to knowing exactly what MT in Sport is. This finding is consistent with conclusions of previous research that, although MT is reported to be widely used, it is at the same time a very unclear term (Jones, 2002; Weinberg, Butt, & Culp, 2011). The high variation of MSCCs' responses throughout this study constitutes an additional indication of the conceptual ambiguity of the construct. These conclusions suggest that more education is needed. For example, professional organizations, such as CSCC_a and NCAA, and scientific journals may need to expose SCCs to more information concerning MT.

MSCCs slightly disagreed with the statement that high levels of MT could affect a student-athlete in a negative way, which are inconsistent with findings from previous research. For instance, Crust and Clough (2005) and Levy and his colleagues (2006) concluded that the rehabilitation behavior of athletes with high MT might hinder the recovery outcomes (i.e., pain might be associated with weakness). The implications of these antithetical findings suggest that the researchers may need to revisit this area. If high MT levels relate to maladaptive outcomes, measurement and practice (i.e., measure and adjust MT training accordingly) of this construct become even more valuable towards the ultimate goal of optimal performance.

MSCCs tended not to have strong views for or against MT being context-, sport-, or position-specific, which again counters previous research. For instance, Loehr (1986) concluded that MT appears sport-specific. Moreover, Crust (2007) suggested that some characteristics of MT are going to be more or less significant as a consequence of sport type. Last, MT has been found to be position-specific in rugby (Cupples & O'Connor, 2011). The implications of these conclusions suggest that although the approach of being

sport-general has not been very successful thus far (Gucciardi, Gordon, & Dimmock, 2009), the field may not be ready to (a) shift their efforts of conceptualizing MT to being sport- and/or position-specific, such as Thelwell, Weston, and Greenlees (2005) did, or (b) develop instruments for specific sports (e.g., the Australian football Mental Toughness Inventory).

MSSCs reported that MT is not associated with ultimate success only or vice versa. These results support findings of several researchers that reject the *a priori* hypothesis that MT is a quality of elite athletes only (Crust & Swann, 2013; Golby & Sheard, 2004; Gucciardi, Gordon, et al., 2009b). The implications of these conclusions suggest that MT should be found and therefore researched and trained in all levels of competency.

Analyses of the qualitative data provided important steps towards developing a common definition of MT from MSCCs. Their way of defining the construct presents many similarities with several existing definitions. In general, MSCCs tended to define MT as a vehicle (e.g., ability, quality) by which student-athlete continuously overcomes, handles, and pushes through adversity and challenges (i.e., negatively related to stressors, discomfort) in order to make progress towards an end goal (i.e., positively related to accomplish personal or team goal, perform in high level, be competitive, stay focused, finish any given task). Therefore, MSCCs describe MT as a group of personal faculties (Hobfoll, 2002) related to the coping process (i.e., stress), resilience (e.g., “bounce back”) (Masten, 2011; Windle, 2011) and thriving (not only “bounce back”, but also intentionally sustain a superior level of performance) (Carver, 1998; Gucciardi et al., 2015).

This approach of defining the construct shows several similarities with Jones' (2002) definition "...remaining determined, focused, confident, and in control under pressure", Gucciardi's (2008) definition "...to persevere and overcome any obstacle, adversity or pressure experienced, ... to consistently produce high levels of performance", Clough's (2002) definition "...have lower anxiety levels than others, ... these individuals can remain relatively unaffected by competition or adversity", Uphill's (2009) statement "How individuals respond to adversity is one component of mental toughness and athletes may manage the adversity of a defeat in very different ways" and Gucciardi et al.'s (2015) definition "a personal capacity to produce consistently high levels of subjective or objective performance despite everyday challenges and stressors as well as significant adversities" (Gucciardi et al., 2015). Last, these suggestions also agree with Connaughton and Hanton (2008), who describe MT as an important factor to success and as a defensive mechanism against adversity. The implications of these conclusions support the researcher's efforts of developing a tentative definition that could be later tailored to create an authoritative definition (see Proposed Definition).

MSSCs commonly reported associating lack of MT with a weak mindset. In more detail, the majority of the coaches gave two types of characteristics about the student-athlete who lacks MT: they either described him or her through a quality that is missing or at low levels (e.g., confidence, focus, discipline, trust to himself or herself, being strategic, competitiveness), or through a feature that he or she is easily exhibiting (e.g., pain, disappointment after any failure or adversity, excuses), or both. The primary theme was that a weak mindset makes and keeps the athletes unable of reaching goals. This conclusion strongly supports findings of previous research that described the opposite of

a mentally tough individual as a “mentally weak” individual (Clough & Strycharczyk, 2012) while rejecting research that described the opposite of a mentally tough individual as a “mentally sensitive” individual (Gucciardi & Gordon, 2011). These conclusions further support the researcher’s efforts of developing a tentative definition that could be later tailored to create an authoritative definition (see Proposed Definition).

Development of Mental Toughness

The instrument gathered information regarding MSCCs views of whether or not MT can be developed and the relationship between development and age given that most of the MSCCs work with collegiate student-athletes. Overall, the results suggested that MSCCs view MT as a construct that can be developed, even if a portion of it may be hereditary. Therefore, they rejected any dichotomous approach to understanding mental toughness. These conclusions support other researchers’ findings, such as Jones (2002, 2007) and (Horsburgh et al., 2009) who suggest that MT is both hereditary and can be developed.

Concerning age, the MSCC’s perceive MT as a construct that can be developed in athletes of any age, including athletes aged from 18 to 22 (i.e., 50% increase during those four years). However, MT has been found to have a significant relationship with chronological age and years of experience (Connaughton et al., 2008; Nicholls, Polman, Levy, & Backhouse, 2009). This discrepancy seems to support Crust’s (2008) suggestion that more research is necessary to assess the relationship between MT and age. These conclusions have a significant impact on the training of MT. If MT can be developed and especially 50% during college, more resources should be allocated towards this kind of training.

Transferability of Mental Toughness

The instrument also gathered information regarding the MSCCs the issues of transferability between practice and competition, sport and social life, and social life and sport. If MT is considered a personality trait, then transferability should be expected (Crust, 2008). Overall, the results suggested that MSCCs tend to agree that MT can be transferred from practice to competition, from sports to personal life, and from personal life to sports. These conclusions agree with Devonport (2008), who suggests that MT can be transferred between practice and competition. MSCCs' perceptions seem to be in an agreement with sport coaches perceptions, who also believe that MT is transferable (Gould et al., 2007).

Although research on the transferability of MT is relatively new (Gould, Griffes, & Carson, 2011), these findings could have severe practical implications if MT were considered a life skill. For instance, if MT could be transferred beyond sports or into sports, developing this construct may well impact perceptions, cognitions, and behaviors in other contexts. Furthermore, MT of athletes cannot only increase through their coaches' training, but also through cultural and environmental influences and more general life based skills (c.f., Gould, Dieffenbach, and Moffett, 2002). In addition, if MT can be transferred, practitioners and researchers should not only be focusing on developing MT, but also on programs that would teach athletes how to transfer this skill successfully from one context to the other. This could ultimately contribute to improving their quality of life as a whole (Danish et al., 1993).

Value of Mental Toughness

Overall, the responses from MSCCs suggest that they perceive MT as having high value in sports. That is, they agreed that MT provides collegiate athletes a psychological advantage over opponents; MT can affect optimal performance by more than 61 percentage points; it is important for a strength coach to be mentally tough; and accurate measurements could be used to protect the student-athletes health and improve their overall college experience. Based on the level of support reported by MSSCs for the value of MT, the recent increase in MT research is justified. Furthermore, higher demand for resources allocated towards studying MT may also be justified. Lastly, these conclusions coincide with previous research stating that MT is a highly-valued concept (Gucciardi et al., 2015).

Practicing Mental Toughness

The instrument also gathered information related to MSSCs ratings of (a) their knowledge about how to train MT, (b) the specific techniques for MT they incorporate into the design of an MT training program, (c) which specialized professional performs MT training in their team, and (d) whether or not they train MT as much as they would like. This is important because the next step in the conceptual evolution of this construct is to focus on ways to train, develop, and maintain the attribute.

MSCCs reported that MT training is not worthless and that they incorporate MT training into their program. Although they did not think that it should peak on specific dates, nor that it can be developed by a specialized professional only, MT training should occur on a regular basis in order to be successful. Lastly, although they reported that they know how to develop MT, there were interested in learning more about it. These findings

have implications for developing training programs or modules designed specifically for MSCCs who assist athletes with MT development.

In general, two types of MT training strategies were identified: physical (e.g., competition with small teams, early morning workouts, creation of unfairness through punishment of the whole team when it is one person's mistake, additional repetitions, sets, and drills without notice) and psychological (e.g., sport psychology meeting). Both types of strategies were implemented in order to prepare the athletes for unknown, challenging, and competitive environments.

Researchers have considered physical toughness as a component of mental toughness (Gucciardi et al., 2007). However, in this study, there was a distinct emphasis on physical strategies, although positive correlations between mental toughness and use of a variety of psychological strategies have been reported (Crust & Azadi, 2010; Devonport, 2005). The participants stated specifically that the physical strategies were designed to test their athletes' accountability, effort level, and resistance to fatigue. On the other hand, no justification was given about any specific psychological strategies (e.g., positive self-talk, relaxation, imagery). Although the aforementioned physical strategies promote psychological development too (e.g. some strategies, such as "creating unfairness" could be conceptualized as psychological as well), the implications of these conclusions suggest that possibly more education or professional help (e.g. sport psychologists) is needed in regards to solid psychological strategies. The academic institutions, where MSCCs work, CSCC_a, and NCAA could all assist towards this goal through hiring additional personnel, additional training of the coaches, and availability of more resources, in general.

Gender Differences with Respect to Mental Toughness

The instrument also gathered information regarding MSCCs opinions about which gender is mentally tougher, which gender needs more training, and for which gender MT makes more of a difference in sports. Overall, the results suggested that MSCCs do not perceive gender differences in MT in Sport. Although MSSCs reported that both genders are equally tough, there is evidence that males score significantly higher than females on MT instruments (Crust & Keagan, 2010; Nicholls et al., 2009). The inferences of these results have a noteworthy impact on research and allocation of resources. More specifically, it seems that more research is needed to clarify this issue, especially with the increased participation of women in high-level sports (e.g., Title IX).

Measurement

The instrument also gathered information regarding MSCCs knowledge about how to measure MT and if they would be willing to use an instrument. MSSCs did not appear to know how to measure MT; however, they would like to have access to a psychometrically-sound instrument. These results have crucial implications because the MSCCs need reliable MT scores to design, develop, and evaluate their interventions. Furthermore, these results suggest that more education and more access to resources are needed in order to realize the benefits of studying and using MT for reaching optimal performance.

Perceived Differences Between MSCCs and HCs

The instrument also gathered information regarding MSCCs views of whether or not they believe in MT training more than the sport coaches, and their training is more

effective towards developing MT as compared to the sport coaches. Overall, the responses suggested that MSCCs tend not to perceive any difference in MT between HCs and themselves. When compared to HCs, MSCCs did not report that they have more responsibility towards developing MT, that they believe in MT more, or that their training can develop MT more. However, they think that they have more knowledge than their HCs when it comes to MT training. This is important because although both coaches have the same goal, their ways and means can be drastically different (e.g., basketball vs. dumbbell, court vs. weight-room). The inferences of these conclusions have practical implications because, according to MSCCs, strength and conditioning training has similar effects to sport-specific training in regards to MT.

Limitations and Delimitations

This study has several limitations and delimitations. Before discussing those, the considerations regarding research validity are presented. First, the purpose of this study was descriptive in nature with respect to the perceptions and perspectives of MSCCs. The purpose was not to generalize the findings across populations (e.g., sport coaches), settings (e.g., professional level), or time (i.e., this study presents the perceptions of MSCCs at a single point of time). Therefore, generalizability was not generally viewed as a limitation of the study in that sense.

It is important to note (a) the implications of the response rate and (b) whether or not the coaches that participated in this study (sample) were representative of all MSCCs (population) on the conclusions reached. Although the sample may not be considered large ($n=71$), the relatively high response rate (i.e., 45%), along with the high level of difficulty to access this particular population, should be taken into consideration during

the interpretation of the results of this study and their practical inferences. Furthermore, based on limited available and accessible demographic information (i.e., gender), the sample of this study should be considered fairly representative of the population. More specifically, 8.28% (i.e., 13 out of 157) of the whole population is comprised of females MSCCs, while 9.86% of the participants of this study were females. However, having access to information about the gender of MSCCs only constitutes a limitation for this study. Having compared more demographic information, such as age and academic institution, would have given us a clearer image concerning the representativeness of the population.

A word of caution is necessary regarding the nature of the data collection. They are self-reported data, which means that they may be subject to certain types of bias. For example, some coaches may be reluctant to reveal their practicing techniques assuming that there is a high risk of a leak of their “secrets.” Social desirability may have also been present for items, such as whether or not they perceive differences exist in MT in male and female athletes. As a method of minimizing this effect, all responses were anonymous. That is, the researcher did not know the identity of the coaches who completed the online questionnaire, although most of the coaches may know each other and may have communicated prior or even during the completion of the questionnaire. Therefore, no personally identifying information was recorded and only aggregated data were reported. Moreover, although the questionnaire was piloted, there is limited evidence for the reliability of the results and the validity of inferences drawn from the data. That said, although the psychometric evidence provided from the pilot and full sample were positive, the interpretation of the results should be done with caution.

Finally, the researcher was the only who analyzed the qualitative data. Therefore, there is no information about inter-rater reliability, which may affect negatively the credibility and the transferability of the conclusions.

Future Studies

Over the next few years, researchers will continue to explore MT in Sport. While the study of mental toughness has clearly advanced in recent years, a lack of systematical synthesis of this research and a number of theoretical and practical problems are still evident. With a rising number of coaches attributing positive outcomes in sports to MT and an apparent increase in demand from coaches for procedures to develop MT, it is surprising that there has been little attention given to the scientific study of this important concept from the perspective of Master Strength and Conditioning Coaches.

More research is needed with regard to the opinions of strength and conditioning coaches. Future research should proceed with a more grounded theory approach towards MT's conceptualization (including possible negative effects and continuation of not focusing on elite athletes only) while recruiting SCCs from different environments (e.g., competition level, country).

While it is important to establish a clear conceptualization of MT, practitioners are most likely to be concerned with developing mental toughness in their athletes. One key question has to do with high quality empirical research using experimental designs that test the effectiveness of specific regiments (physical, psychological, or both) and their success based on accurate pre- and post-intervention MT scores. In addition, the relative contribution of genetic factors should be determined. Furthermore, the

relationship between MT development and age and the mechanisms of transferability outside sports, are two issues that should be addressed in future research efforts.

Concerning the present study, two issues should be addressed: (a)

Instrumentation: Based on the reliability of the pilot and the full sample, S.T.A.M. II could get updated and become more psychometrically sound by keeping the strongest parts while adjusting the parts with the lowest reliability estimates; and (b) Data analysis: the collected data could be analyzed differently, including investigating frequency using categorized data or considering the item-to-total correlation.

Last, it should be clarified why the MSCCs train less than they would like. Is it because their HCs do not believe in the role of MT as much as they do? Is it due to NCAA restrictions? Concerning measurement, the way that MT is measured should be purposefully addressed. Since they are not sure how to measure the construct, what do they do in assessing its presence? Are they only using “body language”? Overall, it is evident that more resources should be allocated towards MT research. This would satisfy the need to further educate all of the stakeholders involved.

Proposed Definition

In the face of several limitations, the findings have both clinical and methodological implications. In lieu of summary, the researcher proposes a new definition of the MT in Sport based on the perspective of MSCCs:

Mental toughness is a transferable life skill, which can be developed at any age and found in all levels of competition. This extremely valuable group of resources (e.g., confidence, discipline, focus) appears similar in all contexts, sports/events, and positions,

and in both genders. Mental toughness' key features include coping, resilience, and thriving.

While this is the beginning of the development of a theory that brings together the concept of MT and the profession of Strength and Conditioning, it is evident that the inferences of the results of this study will have an impact on the researchers, the SSCs, and the organizations that are in close relationship with SCCs, such as CSCC_a and NCAA.

APPENDIX

APPENDIX

The Stronger Than Average Mentality (S.T.A.M.) II Questionnaire

Directions:

This project investigates **Master Strength and Conditioning Coaches' (MSCC)** opinions about **Mental Toughness (MT) in Sport**.

There are no right or wrong answers, so please respond as honestly as possible. It should take you less than 15 minutes to complete.

Slider questions: The slider bar begins at zero for all pertinent questions. You will need to move the slider bar slightly for the question to count as answered (*even if* you choose to bring it back to zero).

Information Sheet

Before starting completing the questionnaire, please read the “Information Sheet” and indicate consent by selecting the “I agree” button.

1. Does the psychological construct of Mental Toughness (MT) exist in the Sports domain?

Yes

No

2. **As an expert in strength and conditioning training and since you believe in the existence of Mental Toughness in Sport, please define it briefly.**

3. **MT is hereditary only.** (Drag the bar to indicate your level of preference)

Strongly Disagree Neutral Strongly Agree

4. **MT can be developed even if the person is not born with it** (Drag the bar to indicate your level of preference)

Strongly Disagree Neutral Strongly Agree

5. **MT is both hereditary and can be developed.** (Drag the bar to indicate your level of preference)

Strongly Disagree Neutral Strongly Agree

6. **MT provides collegiate athletes a psychological advantage over opponents.** (Drag the bar to indicate your level of preference)

Strongly Disagree Neutral Strongly Agree

7. **I believe that student-athletes with the most MT during practice are also the ones with the most MT during competition.** (Drag the bar to indicate your level of preference)

Strongly Disagree Neutral Strongly Agree

8. **A student-athlete can transfer his or her MT from sports to personal and academic life.** (Drag the bar to indicate your level of preference)

Strongly Disagree Neutral Strongly Agree

9. A student-athlete can transfer his or her MT from personal and academic life to sports. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

10. MT is associated with ultimate success only (i.e., a student-athlete who fails can't be mentally tough). (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

11. The athlete who succeeds is mentally tough *by definition*. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

12. A high MT level could affect student-athletes in a negative way. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

13. For which kind of sports is MT more crucial: team or individual sports (e.g., water polo vs. fencing)? (Drag the bar to indicate your level of preference)

Team Sports

Neutral

Individual Sports

14. MT is of difference importance for certain levels of sport than for others (e.g., college vs. professional or high school). (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

15. MT is of difference importance for certain sports/events than for others (e.g., marathon vs. rifle). (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

16. MT is of difference importance for certain positions than for others (e.g., kicker vs. linebacker in American football). (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

17. How much would MT affect optimal performance from 0 to 100 (100 being optimal performance is completely dependable on MT) other factors are recovery, nutrition, and lever of arousal? (Drag the bar to indicate your level of preference)

0

10

20

30

40

50

60

70

80

90

100

18. I am sure I know what exactly MT in Sport is. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

19. Which characteristic(s) best describes a student-athlete who lacks MT?

20. It is important for a strength and conditioning coach (SCC) to be mentally tough. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

21. SCCs have more responsibility towards developing mental toughness (MT) than the actual sport (i.e., football) coaches. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

22. In general, SCCs believe in MT more than the sport (i.e., football) coaches.

(Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

23. I believe that the training designed by SCCs can develop MT more than the sport-specific (e.g., football, basketball, soccer) training. (Drag the bar to

indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

24. I think my head coach(es) has/have more knowledge than me when it comes to MT training. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

25. I incorporate MT training when working with athletes (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

26. Please provide an example of MT training (*even if you don't incorporate any MT training*)

27. MT training must occur on a regular basis. In order for it to be successful.

(Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

28. MT training has to be designed in a way that its levels peak on specific dates (as physical training does through periodization) in order for it to be successful. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

29. MT can be developed with a specialized professional (i.e., sport psychologist)

only. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

30. I don't know exactly how to develop MT. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

31. I believe MT training is worthless. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

32. I would be interested in knowing more about how to develop MT. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

33. Ideally, how many sessions per week would you incorporate MT training during each time period of the year? (*Choose one per row*).

TIME OF THE YEAR	SESSIONS PER WEEK			
Postseason	0	1-2	3-5	6-7
Offseason	0	1-2	3-5	6-7
Preseason	0	1-2	3-5	6-7
Inseason	0	1-2	3-5	6-7

34. How many sessions per week do you actually incorporate MT training during each time period of the year? (Choose one per row).

TIME OF THE YEAR	SESSIONS PER WEEK			
Postseason	0	1-2	3-5	6-7
Offseason	0	1-2	3-5	6-7
Preseason	0	1-2	3-5	6-7
Inseason	0	1-2	3-5	6-7

35. It would be very useful to have access to an instrument that could produce (a) reliable measurements of MT and (b) valid inferences about athletes' level of MT (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

36. If there were an instrument available to measure the construct of MT in collegiate athletes, the coaches, athletic trainers, professors, and administrative staff would then be able to collaborate in adjusting their support of student-athletes in order to protect their health and improve their overall college experience. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

37. Accurate MT measurements/scores should be used for high-stake decisions (e.g., recruiting, starting team). (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

38. I don't know exactly how to measure MT. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

39. I believe MT can be developed in athletes of any age. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

40. Trying to develop MT in traditional college-aged athletes (i.e., aged from 18 to 22) is a waste of time. It is too late. (Drag the bar to indicate your level of preference)

Strongly Disagree

Neutral

Strongly Agree

41. On a scale from 0 to 100, between their freshmen and senior years, how much can you increase MT levels in your athletes? (0 being you cannot increase MT at all). (Drag the bar to indicate your level of preference)

0 10 20 30 40 50 60 70 80 90 100

42. Which gender of collegiate athlete is generally mentally tougher?

Definitely Females

Same

Definitely Males

43. Collegiate players of which gender need more training in MT? (Drag the bar to indicate your level of preference)

Definitely Females

Same

Definitely Males

44. In which gender of collegiate athletes is MT more difficult to develop? (Drag the bar to indicate your level of preference)

Definitely Females

Same

Definitely Males

45. For which gender of collegiate athletes does MT make more of a difference in sports. (Drag the bar to indicate your level of preference)

Definitely Females

Same

Definitely Males

46. What is your gender?

Male

Female

47. What is your age?

48. With which race do you identify?

49. What is your academic background (degrees and certifications)?

Degrees (e.g., BS or MS in Kinesiology).

Certifications except for SCCC (e.g., CSCS, USAW):

50. What is your current affiliation?

NCAA Division I

NCAA Division II

NCAA Division III

Olympics

Other (please specify): _____

51. How many years of experience do you have working as SCC (include years from other universities/organizations)?

52. Which sport(s) would you consider as your specialty?

Click to the next page to submit your responses. Thank you!

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