


**Research Article**

## Mental Toughness as A Predictor of Competitive Success in Boxing: A Review of Psychological Determinants and Performance Outcomes

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**Abstract**

Boxing is a cognitively and physically demanding combat sport in which psychological factors frequently determine the outcome of competition. This paper reviews the existing literature on mental toughness (MT) as a predictor of competitive success in boxing. Drawing on more than seven peer-reviewed empirical and theoretical studies, the review examines how MT defined through conceptual frameworks such as the 4Cs model (Clough et al., 2002) and the attributes model (Jones et al., 2002, 2007) relates to anxiety regulation, self-confidence, emotional control, resilience and decision-making under pressure. Evidence consistently demonstrates that elite-level boxers exhibit higher MT than sub-elite competitors and that MT inversely predicts competitive anxiety while positively predicting self-confidence and performance outcomes. The review further explores the role of psychological skills training in cultivating MT and identifies gaps in research specifically targeting amateur and professional boxing populations. Implications for sport psychologists, coaches and athletes are discussed, along with directions for future research.

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## 1. INTRODUCTION

Boxing is among the oldest and most psychologically demanding of all competitive sports. Unlike team-based disciplines, the boxer faces an opponent alone, relying entirely on individual psychological resources when confronted with pain, fear and the pressure of immediate defeat. In this context, mental attributes may matter as much as or even more than physical conditioning. Sport psychologists and practitioners have long noted that the defining difference between elite and sub-elite boxers often lies not in their physical capabilities, but in their capacity to maintain composure, sustain focus and recover from adversity under extreme competitive pressure (Thelwell et al., 2010; Jones et al., 2002). Mental toughness (MT) is a psychological construct that has received increasing scholarly attention over the past two decades as a key determinant of athletic performance (Gucciardi et al., 2008; Liew et al., 2019). Broadly understood as the ability to remain determined, focused, and in control when confronted with challenges and stressors, MT is considered a multidimensional trait encompassing self-confidence, resilience, emotional regulation and goal orientation (Clough et al., 2002; Jones et al., 2007). Despite the growing body of research on MT in sport, relatively few studies have examined boxing specifically, even though the demands of the sport make it an ideal context for studying how psychological robustness translates into competitive outcomes. This literature review aims to synthesize the available empirical and theoretical evidence on MT as a predictor of competitive success in boxing. Specifically, it addresses three central questions: (a) How is MT conceptualized and measured in combat sports research? (b) What is the relationship between MT and key performance-related psychological variables in boxing and closely related combat sports? (c) What role does psychological skills training play in developing MT among competitive boxers? By answering these questions, this review contributes to the theoretical understanding of boxing performance and offers practical implications for athletes and coaches seeking to optimise psychological preparation.

## 2. LITERATURE REVIEW

### Conceptualising Mental Toughness in Sport

The construct of mental toughness has been defined in numerous ways across the sport psychology literature, resulting in both conceptual richness and definitional ambiguity. One of the most widely cited frameworks is the 4Cs model developed by Clough et al. (2002), who defined MT as a personality trait that shares similarities with psychological hardiness. Within this model, MT comprises four components: Control (the tendency to feel influential over one's environment), Commitment (deep engagement with tasks and goals), Challenge (the view of difficulties as opportunities for growth) and Confidence (an unshakable belief in one's own abilities). This framework gave rise to the Mental Toughness Questionnaire-48 (MTQ48), the first psychometrically validated instrument for assessing MT in sport contexts.

An alternative and highly influential account was provided by Jones et al. (2002), who employed a qualitative methodology with elite sport performers to produce a definition of 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 and lifestyle) that sport places on a performer and specifically, to be more consistent and better than your opponents in remaining determined, focused, confident and in control under pressure" (p. 209). A subsequent study by the same research group (Jones et al., 2007) refined this definition and identified key MT attributes relevant to elite sport, including unshakable self-belief, the ability to regain psychological control after unexpected events and an insatiable desire to succeed. These attributes are especially germane to boxing, where setbacks such as a knockdown or a contested judges' decision demand immediate psychological recovery.

Gucciardi et al. (2008) contributed to conceptual development by examining MT within Australian football through a personal construct psychology framework, emphasizing that MT is not a static trait but a dynamic psychological resource that is context-dependent and trainable. Liew et al. (2019), in a systematic review of MT research, synthesized these frameworks and concluded that despite variation in definitions, core attributes such as self-belief, motivation, focus under pressure and resilience are consistently represented across the literature. This convergence is relevant to boxing, where all four dimensions are regularly tested within a single bout.

### Mental Toughness and Competitive Performance in Combat Sports

A central question in the MT literature concerns whether higher levels of MT actually predict superior competitive performance. The evidence from combat sports contexts is instructive. A landmark study by Chen and Cheesman (2013) examined MT among 136 male mixed martial arts (MMA) athletes categorized as amateur, semi-professional, and professional. Using the Psychological Performance Inventory Alternative (PPI-A) and the Sports Mental Toughness Questionnaire (SMTQ), the researchers found statistically significant differences across competitive levels, with professional athletes scoring higher on confidence, positive cognition, and determination than semi-professional and amateur competitors. These findings support the hypothesis that MT not only differentiates elite from sub-elite performers but may also serve as a prerequisite for progression through competitive levels a pattern likely applicable to professional boxing.

Complementary evidence was provided by Cejuela et al. (as cited in Miçooğulları & Kirazci, 2022) and by research on kickboxing. Comparing winners and losers in championship kickboxing competitions, investigators found that winners exhibited significantly higher total MT scores, particularly on the confidence, constancy, and control subscales of the SMTQ (Miçooğulları & Kirazci, 2022). These subscales map directly onto the psychological demands of boxing bouts, where pre-fight confidence determines approach behavior, constancy maintains effort through fatigue and pain, and control determines a fighter's capacity to execute a tactical game plan when emotionally aroused. The consistency of these findings across structurally similar combat sports provides indirect but compelling evidence for MT as a predictor of boxing success.

Morais and Gomes (2022), studying boxing athletes specifically, found significant correlations between personality dimensions (particularly neuroticism, agreeableness, and conscientiousness), physical fitness scores, and mental toughness as measured by the SMTQ. Their results indicated that MT specifically the constancy and control subscales was a meaningful psychological differentiator among boxers operating at competitive levels. Importantly, the study found that neuroticism (a tendency toward emotional instability) was negatively associated with MT, consistent with theoretical predictions that emotional regulation is a core component of competitive psychological performance.

### **Mental Toughness and Competitive Anxiety in Boxing and Combat Sports**

A well-established psychological challenge in boxing is the experience of pre-competitive and in-fight anxiety. Anxiety in combat sports encompasses both cognitive dimensions (worry, fear of failure, negative expectations) and somatic dimensions (physical symptoms of arousal), and when unregulated, it can significantly impair both decision-making and physical performance (Scanlan & Lewthwaite, 1988, as cited in Miçoogulları & Kirazci, 2022). MT has been theorized and empirically shown to serve as a buffer against debilitating competitive anxiety.

Casali et al. (2023) conducted a cross-sectional study of 194 combat sports athletes including boxers, kick boxers, and MMA competitors to examine the relationship between MT, competitive anxiety and sportspersonship. Participants completed the Mental Toughness Questionnaire-10 (MTQ-10) and measures of somatic and cognitive anxiety. The results revealed that mentally tough athletes reported significantly lower levels of both cognitive and somatic anxiety alongside higher self-confidence prior to competition. These findings are consistent with Clough and Strycharczyk's (2015) theoretical proposition that MT functions as a resilience buffer, enabling athletes to appraise competitive stressors as challenging rather than threatening, thereby converting anxiety into motivational arousal.

Similar results were reported by Kaiseler et al. (2009), who found that MT was associated with lower stress appraisal and more effective coping strategies in athletic populations. Athletes higher in MT were more likely to use problem-focused coping (actively addressing stressors) and less likely to use avoidance or emotional-venting coping patterns directly applicable to boxing, where effective emotional regulation between rounds and during exchanges is essential for sustained tactical performance. The relationship between MT and anxiety management is therefore not merely statistical but mechanistically meaningful: MT shapes the cognitive appraisal process itself, reducing the likelihood that competitive pressure will be experienced as debilitating.

### **Self-Confidence and Resilience as Components of Mental Toughness in Boxing**

Among the various components of MT, self-confidence and resilience have received particular empirical attention in boxing and combat sports contexts. Self-confidence defined as the

belief in one's ability to execute a specific behavior required to produce a desired outcome is widely regarded as the single most important psychological predictor of athletic performance (Vealey, 2001, as cited in Liew et al., 2019). In boxing, confidence determines approach strategy, willingness to initiate exchanges, and the ability to continue fighting effectively after absorbing punishment.

Thelwell et al. (2010), studying elite female gymnasts and by extension combat sport practitioners, found that confidence was described by athletes as both a prerequisite for and an outcome of mental toughness development. In boxing specifically, pre-fight self-confidence has been shown to discriminate between winners and losers (Scanlan & Lewthwaite, 1988, as cited in Miçoogulları & Kirazci, 2022): boxers who enter competition with higher self-confidence perceive the competitive situation as less threatening, maintain a more adaptive attentional focus, and are more persistent when adversity arises mid-bout. This resilience the capacity to bounce back from setbacks—is a related and equally critical construct.

The MT framework of Jones et al. (2007) explicitly included "bouncing back from performance setbacks as a result of increased determination to succeed" as a key MT attribute. In boxing, setbacks are not abstract: they include knockdowns, cuts, point deficits, and the perception of a failed game plan. Research with elite combat sport athletes suggests that those scoring higher on MT measures demonstrate greater psychological resilience, sustaining performance intensity and tactical coherence even when behind on scorecards or physically disadvantaged (Chen & Cheesman, 2013; Casali et al., 2023). This resilience component of MT may be particularly trainable through exposure to adversity in controlled sparring contexts, progressive overload of psychological demands, and targeted psychological skills work.

### **Psychological Skills Training and the Development of Mental Toughness**

A key question for applied sport psychology is whether MT can be developed through structured interventions or whether it is primarily a fixed personality characteristic. The evidence strongly supports the former position. Gucciardi et al. (2009) conducted one of the first controlled studies of MT training in youth-level Australian football, demonstrating that a systematic psychological skills training (PST) program resulted in measurable increases in MT scores and associated performance improvements. The program incorporated goal setting, relaxation, imagery and self-talk techniques that target the core MT components of control, commitment, and confidence.

In combat sports, research has shown that specific PST techniques are effective in cultivating MT-related attributes. Miçoogulları and Kirazci (2022), in their review of MT and performance strategies among martial artists, found that higher MT was associated with increased use of self-talk, relaxation techniques, goal setting, and pre-competition imagery routines. These associations suggest bidirectionality: MT both promotes the use of psychological strategies and is enhanced by their systematic practice. For boxing practitioners, this translates into a strong rationale for incorporating structured mental skills programs alongside technical and conditioning training.

Research on the role of the Environment in MT development further highlights the influence of coaches, significant others, and training culture. Liew et al. (2019), synthesising multiple studies, reported that coaches who model and reinforce MT behaviours, provide performance-contingent feedback, and create an appropriately challenging training environment facilitate the development of MT in athletes. This is particularly relevant for boxing, where the coach-athlete relationship is exceptionally close and the coach's psychological framing of hardship whether training discomfort is framed as weakness or as character-building may significantly shape an athlete's MT trajectory over time.

### **Mental Toughness, Personality, and Boxing-Specific Physical Performance**

The intersection of MT with personality traits and physical performance metrics has been explored in boxing-specific research. Morais and Gomes (2022) assessed 57 competitive boxers using the Big Five Inventory and the SMTQ, alongside physical performance tests including countermovement jump (CMJ) and medicine ball throw (MBT). Their analysis revealed that MT specifically the control and constancy subscale was significantly correlated with personality dimensions and moderately associated with physical test outcomes. Specifically, agreeableness was associated with endurance performance (sit-up scores), while neuroticism showed significant negative correlations with all three SMTQ subscales, suggesting that emotionally stable boxers are both physically more capable of sustained effort and psychologically more resilient under pressure.

These findings align with theoretical accounts proposing that MT and physical performance are not independent constructs but mutually reinforcing. A boxer with high MT is more likely to maintain technical execution under physical fatigue, persist through conditioning discomfort during training, and execute a tactical plan during the final rounds of a bout when physical resources are depleted. The sport-specific demands of boxing where the ability to "dig deep" in the championship rounds often separates winners from losers make this relationship between MT and physical endurance particularly meaningful.

Beattie et al. (2017), examining MT and performance in individual sport athletes, further demonstrated that MT predicted objective performance outcomes even when controlling for physical fitness variables, suggesting that the psychological contributions of MT to competition success are independent of and additive to physical preparedness. This has significant implications for boxing talent identification and athlete development programs, indicating that psychological profiling alongside physical assessment may produce more accurate predictions of competitive potential.

### **Mental Toughness and Decision-Making Under Pressure in Boxing**

Beyond anxiety regulation and resilience, MT is theorized to support superior cognitive functioning and decision-making under the extreme pressure conditions of competitive boxing. A boxer must constantly make rapid tactical decisions when to attack, defend, clinch or change rhythms often while managing

pain, fatigue, and the psychological pressure of the competitive environment. Cognitive clarity and attentional control in these moments are critical determinants of outcome.

Research from sport psychology indicates that higher MT is associated with more effective attentional focus and decision-making during competitive stress (Jones et al., 2007; Clough et al., 2002). Athletes higher in MT are better able to maintain task-relevant focus in the face of external distractions and internal emotional states, a capacity that maps directly onto the sustained tactical attention required in boxing. Liew et al. (2019) reviewed evidence suggesting that MT is associated with superior inhibitory control and the capacity to sustain performance under distraction cognitive functions that are tested continuously in the ring, where an opponent's feinting, physical intimidation and the crowd's reaction all compete for attentional resources.

The role of pre-competition psychological preparation in optimizing in-competition decision-making is also relevant. Research demonstrates that mental imagery the practice of mentally rehearsing competition scenarios is associated with improved performance outcomes (Williams & Cumming, 2016, as cited in Altıntaş et al., 2025). Boxers who practice systematic visualization of tactical scenarios, including responding to adversity such as knockdowns or unexpected opponent strategies, may develop enhanced automaticity in decision-making, reducing cognitive load during actual competition. This form of preparation is consistent with MT development frameworks and supports the integration of mental rehearsal within boxing training programs.

### **3. DISCUSSION**

The reviewed literature converges on a coherent and empirically robust picture: mental toughness is a significant psychological predictor of competitive success across boxing and structurally similar combat sports. The evidence demonstrates that MT operates through multiple mechanisms reducing competitive anxiety, enhancing self-confidence, supporting resilience after setbacks, enabling effective attentional control, and sustaining tactical performance under physical and psychological stress. Critically, higher MT consistently differentiates winners from losers and elite from sub-elite performers in combat sport contexts (Chen & Cheesman, 2013; Miçooğulları&Kirazci, 2022; Casali et al., 2023).

Several theoretical and practical implications emerge from this synthesis. First, the consistent association between MT and lower competitive anxiety validates the prioritization of psychological skills development alongside physical conditioning in boxer preparation. The boxing community has traditionally placed overwhelming emphasis on physical and technical training, yet the reviewed evidence suggests that integrating systematic PST including self-talk training, imagery, goal setting, and relaxation may yield meaningful competitive advantages. Practitioners are encouraged to treat psychological preparation as a technical discipline, not a supplementary concern.

Second, the developmental evidence supports a view of MT as a trainable and environment-sensitive construct. Coaches play a

pivotal role not only in developing boxers' physical attributes but in shaping the psychological climate within which MT is or is not cultivated. A training environment that normalizes adversity, rewards persistence, and provides constructive performance feedback is likely to accelerate MT development. Conversely, environments characterized by fear-based motivation or punishment for failure may suppress the confidence and resilience dimensions of MT.

Third, the relationship between MT and personality factors particularly neuroticism has implications for athlete selection and long-term development planning. While MT can be developed, athletes with dispositional emotional instability may require more intensive and sustained psychological intervention to achieve competitive MT levels. This suggests the value of routine psychological profiling at talent identification stages, enabling early and targeted psychological development alongside technical and physical preparation.

Several limitations in the existing literature must be acknowledged. While the evidence base is strong for combat sports generally, research specifically targeting boxing populations remains limited. Most studies rely on cross-sectional designs and self-report measures, which limit causal inference. Longitudinal studies tracking MT development alongside competitive outcomes in boxing-specific populations are needed. Additionally, the cultural and weight-class diversity of boxing populations remains underexplored, with most research drawing from non-representative samples of predominantly male, Western athletes.

#### 4. CONCLUSION

This literature review has synthesized evidence demonstrating that mental toughness is a substantive and multi-mechanistic predictor of competitive success in boxing and related combat sports. Through frameworks encompassing confidence, commitment, control and challenge (Clough et al., 2002), alongside empirically identified MT attributes in elite sport contexts (Jones et al., 2002, 2007), MT shapes how boxers respond to the psychological demands of training and competition. The reviewed studies collectively indicate that higher MT is associated with lower competitive anxiety, greater self-confidence, superior resilience, more effective use of psychological coping strategies and better performance outcomes.

The findings carry meaningful implications for practitioners. Sport psychologists, boxing coaches, and athletic development programs should integrate systematic psychological skills training as a core component of boxer development, recognizing that mental preparation is not peripheral but central to competitive excellence. Future research should prioritize longitudinal designs, boxing-specific samples and the evaluation of MT interventions in controlled competitive contexts to establish causal pathways and optimize training protocols. As boxing continues to develop as a performance science, understanding and cultivating mental toughness must be considered as fundamental as developing footwork, combination punching or cardiovascular capacity.

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