Chapter II
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REVIEW OF RELATED LITERATURE

Sincere efforts have been made by the research scholar to locate literature related to this study. The relevant studies found from various sources which the research scholar has come across have been cited below.

The reviews are further categorized to three major section i.e. reviews related to mental skills, mental toughness and anxiety.

Reviews Related To Mental Skills

Hellstedt and Jon (1987) describes a sport psychology program conducted at a ski academy for a group of 43 competitive skiers in Grades 8–12. The program's effectiveness is discussed using evaluations from participants and coaches. The positive results of the evaluations and a drop in scores on the Sport Competition Anxiety Test indicate the various components of the program were helpful in developing skills in sport and in the athletes' lives in general. Implications for future programs of this type are discussed, as is the role of the sport psychologist in this type of setting.

Moran (1993), in examining imagery assessment in sport, referred to two simple definitions of the term. The first, presented by Matlin (1989), described imagery as a procedure for mentally representing things that are not physically present. The second definition, developed by Solso (1991), described it as "a mental representation of non-present object or event". Moran (1993) extended these descriptions by emphasizing that imagery should include not only the visual sense but multiple sensory inputs. Such a belief contrasts with a tendency in areas of the sport psychology literature, even in relatively recent texts (Cox 1998; Wann 1997), in which the definition of imagery concentrates on the visual perspective only, through terms such as "visualization", "mental picture," or "the mind's eye" (Morris 1997). Hardy, Jones, and Gould (1996) avoided this problem by focusing on the sensorial nature of imagery, describing the term "as a symbolic sensory experience that may occur in any sensory mode". Murphy (1994) proposed.
Bunon & Dieffenbach (1998) did a work on logbooks: their role in mental training success. Because logbooks have received scant attention in both the research and professional practice literatures, this symposium is designed to provide a variety of perspectives about logs and their role in mental training. The first presentation will introduce the topic and highlight some of the key issues to be addressed. Next a presentation on the role of logbooks in adherence to mental training will provide a conceptual and empirical understanding of logs in the self-change process. The third and fourth presentations will focus on journal-format logs and how they are used in private consultation as well as with different sports teams at various levels of competition. The next presentation will investigate the role of logs in multiple base lines across individual’s approaches to mental training, both in terms of research and consultation. Presentation six will examine the use of workbooks logs to develop mental skills with adolescents and children. Finally, the last presentation will summarize design and implementation issues about log books and provide ideas for future research and consultation applications.

Meyer & Wenger (1998) and Meyer (2000) were instrumental in pioneering research into the efficacy of adventure-based training with sporting teams. This investigation adds to the growing body of knowledge in this area by demonstrating the positive effects an adventure training intervention has on athletes’ ability to learn new team and psychological skills. Quantitative measures investigated the development of team cohesion among elite netball players during their national season. In three of four team-cohesion sub-scales ATG-T, ATG-S, and GI-T significant differences were noted between the treatment and control groups. These significant results were supported by the athletes’ qualitative accounts of the intervention. In qualitative terms, focus group and one on one phenomenological interview were triangulated against observational and statistical data to help build a picture of the athletes’ experience. In the phenomenological tradition, obtaining the athletes’ perspective of the intervention was most important. With this in mind, both the outcomes and the process that led to the outcomes were documented.

Gould’s (1998) symposium- developing effective mental skills training strategies in junior tennis- report’s findings from studies designed to understand why mental skills training information is not being used by coaches and to identify ways to more effectively convey this information. The first presentation will report findings from a qualitative study
involving focus group interviews conducted with 20 junior tennis coaches of elite players. One of the major findings was that the coaches identified a need for more mental skills training. In the second presentation, a related investigation surveyed 153 junior tennis coaches to determine their opinions relative to the importance of mental skills training. Findings indicated the most important mental skills for tennis, the mental skills they found to be most difficult to teach, and the need for practical mental skills, forms, and exercises. In the third presentation, the results from the two previous studies are used to develop an interactive framework model for coaching mental skills. The model has implications for the use of mental skills training in tennis.

Nicole (1998) did a study on a qualitative investigation of mental skills training in junior tennis coaches. In the last decade, considerable attention has been paid to the development of mental skills training for tennis athletes (Braden & Wool, 1993; Loehr, 1990; 1991; 1992; 1994; Loehr & Striegel, 1994; Taylor, 1993; Weinberg, 1988). This investigation was designed to understand why mental skills training information is not being used by junior tennis coaches and to identify ways to more effectively convey this information. Four focus-group interviews were conducted with 20 (4 female and 16 male) junior tennis coaches. The coaches had a mean of 15 years of coaching experience and represented various regions of the United States. Using Glaser and Strauss's (1967) constant comparative analysis of the typed interview transcripts, results revealed that the coaches defined mental toughness or skills training as emotional control, focus and readiness, passion, and the ability to develop a winning strategy. A need for coaches' education focusing both on content information and the process of teaching mental skills was emphasized. The coaches had several suggestions for making mental skills training information more user-friendly.

Medbery & Lauer (1998) did a survey assessment of mental skills training knowledge, opinions, and practices of a national sample of junior tennis coaches. This study was designed to determine coaches' opinions relative to the importance of mental skills training and recommendations for making mental skills training more effective. A secondary purpose was to determine if individual differences in terms of gender, coaching experience, and sport psychology training affected the coaches' responses. Participants were junior tennis coaches (n= 153) attending the 1997 USTA Area Training Center Workshop. Results revealed the mental skills that were important for junior tennis success,
the mental skills thought to be most difficult to teach. Roadblocks to mental skills training, and a feeling that there are a lack of models and examples of coaches actually mentally training players. Finally, similar to the findings of Gould, Giannini, Krane, & Hodge (1990), the coaches indicated that there is a need for practical mental skills, forms, and exercises that can be implemented in 10 to 15 minutes. The greatest number of differences between the groups was evident on the coach experience factor.

Walker (1998) did the work- an exploratory examination of psychological techniques employed by triathletes. This study was designed to examine the use of psychological skills, cognitive strategies, and goal-setting behaviors by triathletes. Participants were 161 national and international triathletes who completed a questionnaire 13 to 16 hours prior to competing in a half-ironman distance race. Questions consisted of inquiries about training schedules, distractions they experience, and psychological skills they utilize prior to and during races. Results indicated that 95% of the athletes in the study set goals for themselves during the training season, and reported using a performance oriented approach. They used an associative style as their dominant attention focus. Anxiety and weather were reported as the biggest dis$I$ 74 I Colloquia, Lectures, Posters & Workshops Abstracts tractors prior to and during a race. All psychological skills listed in the questionnaire were endorsed by at least one athlete, but none were significantly associated with reported finish time. Further results and implications for intervention as consultation as well as for future research are explored.

Roper and Kerr (1998) did athletes' assessment of a mental skills program. This investigation examined athletes' experiences with a mental skills program. Five intercollegiate swimmers (3 male, 2 female) participated in 5 individual sessions geared to enhancing such skills as cognitive restructuring, intentional training, competition planning, and imagery. Following the program, semi-structured interviews were conducted. The data were analyzed inductively from a top down approach. Six higher order categories emerged including perceived benefits, application of skills, suggestions and specific preference of techniques. Suggestions from the participants and their preferred strategies will be discussed. The findings have implications for coaches and sport psychology consultants interested in learning about athletes' experiences with a mental skills program.
Martin (2002) has distinguished between performance confidence, self-regulatory confidence, and outcome confidence. Self-regulatory confidence is athlete’s confidence that they can successfully perform in the face of obstacles or setbacks (Bandura 1997), whereas performance confidence is athletes confidence that they can achieve a certain level of performance (e.g., race times). Martin’s self-regulatory complex incorporates Vealey and Knight’s (2002) SC cognitive efficiency and Hays etal.’s (2007) psychological factors and tactical awareness. Martin’s performance confidence is similar to Hays et al.’s achievement confidence. Martin’s outcome confidence is athlete’s confidence that they can achieve performance outcomes, such as winning or placing high in a race compared with competitors. Outcome confidence has been also defined as comparative efficacy (Feltz & Chase, 1998), and is similar to Hays et al.’s superiority to opposition confidence.

Fournier & Calmels (1998) presented the effects of a season-long psychological skills training program on gymnastic performance and on psychological skills. This presentation report’s findings of an evaluation of the effects of a 10 month PST program on psychological and performance indicators. Ten nationally ranked female gymnasts (m = 12 years old) trained physically 25 hours per week followed a group mental skills program for half an hour per week. The 5-step intervention consisted of relaxation, self-talk, goal setting, focusing and visualization. Performance scores were obtained using results in competitions. Psychological indicators were appraised individually by the OMSAT (Durand-Bush & Salmela, in press). Data were recorded before the intervention to establish a baseline (Hrycaiko & Martin, 1996) and 5 times during the course of the competitive season. Interpretation of the effects of the different phases of the program on the performance and mental indicators will be discussed on an individual basis. Psychometric properties of the OMSAT will be reported for the present participant sample.

Inomata, et al. (1998), worked on a mental training program for a university soccer team. Back in 1995, the Japanese university national soccer team received a gold medal at the Unlversiad games that were held in Fukuoka, Japan. At that time, Japanese sport psychologists provided the soccer team with an opportunity to receive training and advice to improve their mental skills. In 1997, the mental training program that was administered to the national team was adapted and administered to a university soccer team for one season. The mental training program consists of five stages: 1) a basic mental training workshop for 15 hours; 2) application of mental training for daily practice and games for step one; 3) an intermediate mental training workshop for 15 hours; 4) application of
mental training for daily practice and games for step two; and 5) preparation for competition. This presentation has been designed to identify the background and support of sport psychology with a Japanese university soccer team. As a result, the university team became the Kanto Regional Champion and the University Division II Kaura Regional Champion for the competition season. In addition, the data from a sport psychological test (Taikyo Sport Motivation Inventory) shows significant improvement of motivational factors during the soccer season.

Albaugh & Moore (1998) presented psychological skills training and practice regimens for performance in golf and related self-paced sports. The primary objective of the workshop will demonstrate psychological skills training and practice strategies used extensively in golf performance workshops and consultations. There will be an emphasis on closed skill movements, specific 10 golf and other self-paced sport skills, including: 1) concentration routines, 2) trust, 3) kinesthetic and visualization awareness, 4) practice regimens and 5) emotional intelligence. Interactive and innovative small group sessions will allow participants to view demonstrations and to learn from three experienced golf performance consultants of the role applied sport psychologist consultants play in the enhancement of golf experiences. Handouts will include worksheets and questionnaires applicable to the consultant and client relationship.

Lesyk (1998), presented the nine mental skills of successful athletes: a holistic model for assessing and teaching mental skills to athletes. This is a practical model for systematically integrating the many diverse techniques used in performance enhancement. The author proposes a hierarchical model in which nine mental skill groups are defined. Both the model itself and the definition of the skills are intended to be easily understood and used by athletes and coaches. The nine skills are presented in three, sequential levels: Level Lc-skills that constitute a broad base necessary for achieving long-range goals, learning and developing as an athlete, and sustaining daily practice (attitude, motivation, goals and commitment, people skills). Level Il-c-skills that are used immediately before performance (self-talk, mental imagery), and Level Illskills that are used during actual performance (dealing with anxiety, dealing with emotions, and concentration). Each level incorporates and is based upon skills learned at the preceding levels. The purpose of the workshop is to introduce this new model to participants and to teach them how to use it in the assessment and planning of mental skills training programs with their own clients. The
author has used this model successfully and will illustrate its application with an assessment interview, case examples and audiovisual materials. Handouts will enable interested participants to apply these concepts to their own work. Finally, this model provides a framework for applying mental skills learned through sports participation to other areas of life.

Francis and Andersen (2001), Maley, et al. (1991) sought trainers opinions on the role of psychological techniques in injury rehabilitation with the study physiotherapists' and professional athletes' views on psychological skills for rehabilitation (1998). This study replicated the Wiese et al. (1991) study with Australian physiotherapists (Study 1) and extended it to include the viewpoints of professional basketball players (Study 2). One hundred and fifteen surveys were sent to physiotherapists working in sport medicine clinics in Melbourne and 57 were returned completed. Sixty surveys were forwarded to professional basketball players in the Australian National Basketball League. Twenty-eight responded by returning the completed survey. The results indicated that a great deal of importance was attached to communication and motivation by both physiotherapists and athletes in the rehabilitation process. Physiotherapists placed more emphasis oil communication, and athletes believed motivation to be the most important characteristic for injury recovery. Interestingly, both athletes and physiotherapists did not think relaxation or imagery techniques to be useful tools in the recovery process. These beliefs could indicate a lack of experience with these techniques, and this may be an area that psychologists can contribute to Facilitating athletic injury recovery.

In 2002, Bloom and Stevens presented relatively few mental skills training programs have solely focused on team-building issues. The purpose of this article is to briefly describe the design, implementation, and evaluation of a team building mental skills training program for an intercollegiate equestrian team. In particular, theoretical and methodological rationales for the teambuilding intervention are provided. The data are analyzed and future recommendations are offered for using team-building intervention programs.

Boyd and Munroe (2003), worked with climbers. As the popularity of climbing has grown, so has the interest in researching the psychological aspects of climbers. However, it is only recently that research has examined the use of imagery in climbing (see for
example Barton, 1996; Hardy & Callow, 1999; Jones, Mace, Bray, MacRae & Stockbridge, 2002). The purpose of this study was twofold: first to examine the extent to which beginner and advanced climbers used the five functions of imagery (Cognitive Specific, Cognitive General, Motivational Specific, Motivational General-Arousal and Motivational General-Mastery), and second to examine if and how climbers’ use of imagery differed from track and field athletes. The Sport Imagery Questionnaire (SIQ; Hall, Mack, Paivio, & Hausenblas, 1998) and the Climbing Imagery Questionnaire (CIQ; modified from Hall et al., 1998), was used to measure how often varsity track and field athletes (n = 38) and climbers (n = 48), used imagery. A Multivariate Analysis of Variance (MANOVA) showed that track and field athletes used the motivational components (MS, MG-A and MG-M) of imagery significantly more than climbers. Advanced and beginner climbers displayed no significant differences in their imagery use patterns. The results of this study give us a greater understanding of how climbers use imagery and increase the body of research of the types of imagery used across various athletic situations.

In 2003, Thelwell and Greenlees examined the effects of a mental skills training package on competitive gymnasium triathlon performance and evaluated the utilization and impacts of the mental skills during performance. Four participants competed against each other on 10 occasions in a single-subject multiple baseline across individuals design, which was used to evaluate an intervention package including goal setting, relaxation, imagery, and self-talk. The results indicated the mental skills package to be effective in enhancing all participants' competitive triathlon performance and usage of mental skills from baseline to intervention phases. Qualitative data revealed that each of the mental skills were employed both prior to and during each triathlon and had varying impacts depending on when they were utilized. Issues regarding mental skill effectiveness and usage within competitive endurance performance are discussed.

Thelwell and Maynard examined(2003) the efficacy of a mental skills package to both improve consistency and level of performance in cricketers, and to investigate the influence of different performance measures on cricketing performance. Semi-professional cricketers (n=16) were matched into experimental and control groups. Cricketing performance was monitored subjectively and objectively across two seasons. Prior to the second season, the experimental group were provided with an intervention package consisting of goal-setting, activation regulation, self-talk, mental imagery and
concentration. Data from two, two-way multivariate analyses of variance (MANOVAs) indicated that cricketers in the experimental group experienced improved performance consistency and improved performance when using subjective scoring procedures, but only a performance improvement was recorded using objective measures. Subsequent single-case analysis applied to the data of four of the experimental participants also revealed support for the efficacy of the intervention. A mental skill package was seen to be beneficial to enhance performance consistency and actual levels of performance. In view of these findings, practitioners and coaches may wish to consider both objective and subjective scoring measures to improve the sensitivity of performance indicators.

In 2004, Gregg et al. worked to replicate and extend the mental skills training (MST) package of Wanlin, Hrycaiko, Martin, and Mahon (1997) to Special Olympics track and field athletes with intellectual disabilities. Three participants ranged in age from 21 to 23 years. A multiple baseline design across individuals was used to assess the effects of the intervention on off-task behaviors and athletic performance (i.e., work output and competition results). The results were clearly beneficial for two participants, decreasing the frequency and duration of off-task behaviors and increasing the percentage of laps completed for the third participant. A social validity assessment provided further support for the effectiveness of the intervention.

Harwood, et.al (2004) investigated associations between achievement goal orientations and reported psychological skill use in sport. Five hundred seventy three elite young athletes completed the Perceptions of Success Questionnaire (POSQ; Roberts, Treasure, & Balague, 1998) and the Test of Performance Strategies (TOPS; Thomas, Murphy, & Hardy, 1999). Cluster analysis revealed three distinct goal profile groups: Cluster 1—Higher-task/Moderate-ego (n = 260); Cluster 2—Lower-task/Higher-ego (n = 120); and Cluster 3—Moderate-task/Lower-ego (n = 119). A MANOVA revealed a significant multivariate effect, Pillai’s Trace = .11, $F(16, 1076) = 3.75$, $p = .001$, $\eta^2 = .05$, with post hoc tests determining that higher-task/moderate-ego athletes reported using significantly more Imagery, Goal setting, and positive Self-talk skills when compared with Lower-task/Higher-ego and/or Moderate-task/Lower-ego athletes. These findings are discussed with respect to the potential role that achievement goals play in the application and development of psychological skills in youth sport.
Behncke (2004) worked on Mental skills training for sport is reviewed in relation to general cognitive-somatic techniques. These techniques include mental rehearsal, mental imagery and visualization, visuo-motor behavior rehearsal, cognitive-behavior therapy, biofeedback, progressive muscle relaxation and meditation. It is concluded that the initial and continued ability to self-monitor, though enhanced by mental skills training, is fundamentally important for any implementation of cognitive-somatic therapy.

Trask (2007) presented a thesis on elite Australian basketball coaches’ knowledge and application of mental skills. This qualitative study had three aims: (1) develop an understanding of the baseline mental skills knowledge of elite Australian basketball coaches; (2) describe how this mental skills knowledge is used; and (3) establish where gaps exist in the mental skills knowledge base of elite Australian basketball coaches. Semi-structured interviews were conducted with eight elite basketball coaches, their responses were transcribed verbatim, and subsequently content analyzed. Participant coaches were provided with a Sport Psychology Related Themes checklist early in the interview process to stimulate discussion. All three aims of this study were at least, partially achieved. The coaches in this study demonstrated substantial mental skills knowledge of sport leadership, communication and team building, and identified motivation, concentration, decision making, goal setting, confidence, and team cohesion as important mental skills in basketball. Participant coaches, demonstrated less or incomplete knowledge of imagery, self-talk, emotion, arousal and anxiety management. The majority of coaches do not intentionally teach mental skills to their athletes. Nevertheless, some coaches organize training drills to expose their athletes to aspects of decision making, anxiety management, communication, concentration, and leadership. Based on the findings of this research I recommend that greater attention is given to more systematically integrate sport psychology theory and practice into basketball coach training in Australia.

According to Edwards & Steyn (2008) the impact of psychological skills training (PST) package programs on life, health, and well-being in general and South African youth in particular has been relatively neglected. For example, prior to this research the impact of PST on the core health component of psychological well-being had not been evaluated, nor had the conceptual and/or empirical relationship between psychological skills and psychological well-being been investigated. While PST is often conducted individually due to its personal and specific nature, group training should not be overlooked especially in
South Africa where community interventions are an important part of health promotion. With the above considerations in mind a triangulated design involving individual, group and community interventions, as well as elite and expert case studies was utilized to evaluate the effectiveness of a PST program and to investigate the relationship between psychological skills and psychological well-being. Results based on quantitative and qualitative outcome and process measurements indicated general improvement in psychological skills, psychological well-being and sporting performance. Psychological skills and psychological well-being were found to be interrelated concepts, with overlapping components. Recommendations for ongoing and future research at individual, group and community level are made.

Katsikas, C et al (2009) did a work on psychological strategies of Greek track and field athletes: gender and level difference psychological skills play an important role in athletic performance. The aim of the study was to examine possible differences in the use of psychological skills of Greek track and field athletes of different gender and level. The sample consisted of 364 track and field athletes (241 males, 123 females), aged 18.9 ± 3.9 years, with different level (elite - non elite). The Test of Performance Strategies (TOPS) was used. The participants completed the TOPS questionnaire during the precompetitive period. The results showed that elite level athletes were significantly better compared to non elite in emotional control, goal setting, imagery, negative thinking and relaxation. Also, male athletes had better emotional control and used more relaxation, compared to females. Among elite level athletes, gender differences in psychological skills remained, with females displaying less effective emotional control and relaxation. The differences between athletes of different gender and level could be considered from coaches and sport psychologists in order to help athletes improve their athletic performance.

Salmela et al (2009) did a study on mental skill profiles and expertise levels of elite Iranian athletes. The purpose of the present study was to determine whether differences between of the OMSAT-3 scales occurred with an international sample of Iranian athletes with various levels of expertise in sport, e.g., qualifiers versus non-qualifiers or medalists versus non-medalists. Durand-Bush, Salmela and Green-Demers (2001) showed how the OMSAT-3 differentiated between international and national level Canadian athletes on most mental skill scales after ANOVA and MANOVA analyses. It was believed that with the present sample, fewer scales would differentiate between skill levels. Six months prior
to the 15th Asian Games in Doha, the Persian version of the OMSAT-3 was administered to 208 Iranian athletes, 110 of whom were selected for the Games in 15 different sports. An overall ANOVA revealed that the selected athletes reported higher mental skill scores. Post-hoc analyses revealed that stress reactions and refocusing skills separated the selected and non-selected athletes at (p < .05) and that the relaxation skill differences approached borderline significance. Following the Games, 38 medal winners and 30 non-medalists were compared and it was found that the stress reaction scale was the only one that differentiated between both groups of athletes. This demonstrated there are expertise-related differences between selected OMSAT-3 scales in international sport.

Gany, Belal, & Azim (2010), did a study on development of psychological and mental abilities for the elite of junior players through the application of a mentoring program and the purpose of this study is to develop psychological and mental abilities for the elite of junior players through applying a program of mentoring and some techniques of neuro-linguistic programming (NLP). It is a new program in sports filed at the middle East, whereas the programs were limited in the mental training and psychological skills training (PST) without different psychological techniques or methods like mentoring, counseling and neuro-linguistic programming. Considering that the athlete does not have any social or psychological problems, the important goal from sports psychology is to improve the performance in the competition; therefore, the researchers have studied different psychological techniques, participated in courses and various programs to get the expertise, and certified practice. The study sample had made up of 15 players, representing the Basketball National Team of Youth. The program consisted of eighteen sessions the aim of which is to develop psychological and mental abilities for the elite of junior players by using mentoring and some NLP techniques. The results show the importance of using mentoring with elite players besides the other psychological methods. Explicit improvement in all mental and psychological abilities for the elite of junior players had also recorded.

Sadeghi, et.al (2010) did a study on the mental skills training of university soccer players. The purpose of this study is to identify the kind of mental skills training needed most by the university soccer players. Eight male university football players (aged 25 to 36) from one large university in Kuala Lumpur agreed to participate in this study. On average, they have 10 years of playing experience. All of them have signed the informed
consent letter to be tape-recorded. The interview transcripts were then hierarchically content analyzed to identify the themes. The findings revealed four themes emerged which are imagery, goal setting, self-talk, and relaxation. These four themes were the most needed psychological skill training by the respondents.

Thelwell (2010) examined the use of psychological skills throughout soccer Performance. The effects of a soccer-specific psychological skills intervention comprising self-talk, relaxation and imagery, on three performance subcomponents specific to midfield players throughout performance. Using a modified multiple baseline design, three participants had three performance subcomponents (passing, first touch and tackling) assessed across first and second half of performance, for a period of eight competitive games. The results showed the intervention to be effective in enhancing performance in the second half of performance for all participants in at least two of the performance subcomponents. As such, the findings provide some evidence to suggest that psychological skills may affect performance in differing ways throughout competition. Given the findings, potential applied implications and future research directions are discussed.

A research done by Holland. et.al (2010) on the psychological characteristics of elite performers has primarily focused on Olympic and World champions; however, the mental attributes of young developing and talented athletes have received less attention. Addressing this, the current study had two aims: (a) to examine the perceptions held by youth athletes regarding the mental qualities they need to facilitate their development and (b) to investigate the mental techniques used by these athletes. Forty-three male youth rugby players participated in a series of focus groups. Inductive content analysis revealed 11 categories of psychological qualities, including enjoyment, responsibility, adaptability, squad spirit, self-aware learner, determination, confidence, optimal performance state, game sense, attention focus, and mental toughness. Techniques employed included personal performance strategies, reflection on action, taking advantage of a supportive climate, and team-based strategies. Findings are discussed in relation to their implications for mental skills training program development and evaluation in the case of youth elite team sport athletes.

Moona et al. (2012) did a study to (1) examine the theoretical relationships between trust, mental skills associated with athletic performance (MSAP), and athlete satisfaction in
the context of a gambling-legal bicycle racing business, and (2) provide bicycle racing managers with information and recommendations for improving athlete's satisfaction and retention. A structural equation model test with maximum likelihood estimation was employed to test the relationships among the research variables. In addition, the mediating effect of MSAP on the relationship between trust and athlete satisfaction was examined. Survey data from 328 bicycle racing athletes suggested that trust between constituents has a positive influence on both the MSAP and athlete satisfaction; MSAP has a positive influence on athlete satisfaction; and the MSAP mediates the relationship between trust and athlete satisfaction. The results of this study provide a scholarly contribution to the literature and provide managers with meaningful managerial and policy implications.

Reviews Related to Anxiety

Liebert and Morris (1967) examined the relationship between two aspects of the TAQ, identified as "worry" and "emotionality," and performance expectancies on a college examination. For this purpose, a short pre-examination questionnaire was developed. As predicted, worry (W) was inversely related to performance expectancy. No relationship between expectancy and emotionality (E) was found.

Sonstroem, et.al, in 1982 tested an extension of the inverted—U curve hypothesis by defining low, moderate, and high arousal levels as an athlete's lowest, median, and highest pregame state anxiety values across 3 games of a basketball tournament. Performance was measured by a game statistics composite (PER) and by total points (TP) in each game. Ss were 30 female university varsity basketball starters from 6 teams. They were trichotomized on competitive trait anxiety (A-trait), and a 3 by 3 ANOVA with repeated measures on A-state categories was used. Ss were administered the Sport Competition Anxiety Test before a practice session and the Competitive State Anxiety Inventory 20–30 min before each game. Significant A-state effects were found for both PER and TP. Although A-trait predicted absolute A-state levels extremely well, it failed to achieve a significant relationship with performance. When intra-S T-scores for PER and TP were regressed separately on intra-S A-state T-scores, the relationship of variables consisted essentially of a quadratic function that explained 18.4 and 16.9% of within-S
variance for PER and TP, respectively. High A-state scores were associated with poorest performances in all 3 trait groups, but plotting performance T-scores across A-state categories indicated this effect to be particularly pronounced in high-competitive trait-anxious.

In 1983, Asser & Seese used modified version of the life experiences survey (LES) to examine the relationship between positive and negative life change and subsequent athletic injury among 104 collegiate varsity football players drawn from two teams. The findings from Team One indicated that players who incurred a significant time-loss injury had experienced greater negative—but not positive—life changes in the previous twelve months than non-injured players. Further, injured players tended to have higher object loss scores than non-injured players. No between-group differences were found for team two. Trait anxiety, competitive trait anxiety, and locus of control were examined as possible moderator variables in the life change—injury relationship, and were found to have no significant effects. While partially supporting past research, the findings indicate that more work on the stress—injury relationship is needed before life change measures can contribute to the assessment of athletes' injury potential.

Henschen, et al. (1984) done a study on a visual comparison of psychological profiles between able-bodied and wheelchair athletes. The purpose of this study was to visually compare the psychological profile of 33 male wheelchair athletes who competed in track and field events, with previous results of able-bodied athletes. Based on the data gathered using the Profile of Mood States and the State-Trait Anxiety Inventory the wheelchair athletes demonstrated a profile similar to that of able-bodied athletes. This finding was discussed in terms of mental skills that may be developed by wheelchair athletes because of their injuries, possible influence of medication, and higher level of demonstrated anger. Compares the psychological profiles of 33 male wheelchair athletes with those of able-bodied athletes. Subjects complete the Profile of Mood States and the State-Trait Anxiety Inventory. Finds that world class and wheelchair athletes demonstrate similar profiles. Discusses these results in terms of the mental skills that may be developed by wheelchair athletes because of their injuries, medications, and higher level of demonstrated anger. Subjects were wheelchair-sport; man; track-and-field; elite-athlete; anxiety; comparative-study; quadriplegia; emotion; sport; paraplegia; Profile-of-Mood-States; State-Trait-Anxiety-Inventory. No discipline assigned.
Huband, et.al (1986) worked with two groups of 21 college team athletes identified as high and low on competitive trait anxiety on the Illinois competitive questionnaire—Form A ([ICQ]; R. Martens, 1977) completed the Competitive State Anxiety Inventory (Martens, 1977) on 4 occasions around a league game: day before (during practice), just before, just after, and day after. 18 college-aged non-athletes answered the test at the 1st administration and obtained similar scores to their athletic counterparts. On the 3 subsequent administrations, high anxiety athletes became more anxious just prior to the game, then systematically declining to baseline 1 day later. Low anxiety athletes remained close to baseline just before and just after the game, but declined significantly on the final test. Results support the validity of the ICQ and suggest the operation of a compensation mechanism that may provide Ss with relief through sub normally low state anxiety.

Demoja and Demoja (1986) completed a study in which the prediction from state-trait theory that subject low in anxiety will perform better than highly anxious subjects on a more difficult task was tested on a motocross competition. We analyzed the relationships among the entire rank order of finish and state and trait anxiety measured by state-trait anxiety inventory for 32 motocross riders (males whose age ranged from 16 to 27 yrs.) participating in a national competition in Italy. A negative correlation between performance (measured by rank at the finish of competition) and state anxiety was noted. State and trait anxiety scores were also negative, but that between performance and trait anxiety was non-significant. Additional studies of sport competitions will provide data relevant to planning interventions to control athlete’s anxiety.

In 1988, Krohne and Hindel employed the data of 36 top table-tennis players the present study analyzes the relations between general and sport-specific trait anxiety, coping dispositions, use of “naive” self-regulatory techniques, emotional and cognitive anxiety reactions in situations of varying stress, and success in athletic competition. The study is based on the cognitive theory of evaluative anxiety, Spielberger's trait-state anxiety model, Lazarus' theory of coping, and the concept of person-specific coping modes. The interaction between trait anxiety and degree of stress, postulated by the trait-state model, could be verified empirically for both, emotional and cognitive anxiety. This result, however, only holds true for a test of general, not for a test of sport-specific anxiety. In addition, several significant associations between the preferred use of vigilant coping strategies and the amount of cognitive (interfering) anxiety reactions were observed.
Successful table-tennis players were characterized by few interfering anxiety reactions (worry cognitions), little vigilant coping, and an extended use of cognitively avoidant self-regulatory techniques.

In 1988, Hanson, et al examined the ability of coaches to estimate their athletes' trait and state anxiety levels, variables influencing this ability, and the physical or behavioral cues coaches use in assessing the anxiety levels of their athletes. 28 collegiate cross-country coaches (aged 23–65 yrs) and 126 athletes (aged 17–44 yrs) completed questionnaires prior to and on the day of a meet. Overall, the coaches were found to be inaccurate estimators of anxiety levels. Analyses revealed that the coach's age was a significant predictor of the ability to assess an athlete's trait anxiety level. Coaches of women's teams were significantly more accurate than coaches of men's teams in their estimates of trait and state anxiety levels. Changes in athlete's communication levels and behavior patterns were regarded as the most important cues when assessing anxiety levels.

Smithac, et al. (1990) presented an article and it describes the development and validation of a sport-specific measure of cognitive and somatic trait anxiety. The sport anxiety scale measures individual differences in somatic anxiety and in two classes of cognitive anxiety, worry and concentration disruption. Both exploratory and confirmatory factor analyses supported these dimensions in several different athlete samples. Psychometric properties of the sport anxiety scale are described, as are its relations with other psychological measures and with pre-competition affective state measures. In the last of the four studies reported, scores on the concentration disruption scale were negatively related to the performance of college football players over the course of a season. The studies suggest that the sport anxiety scale may be useful in defining sport-related anxiety more sharply and assessing how the cognitive and somatic anxiety components relate to performance and other outcome measures in sport.

Raglin & Turner (1993) completed a study on the relationship between anxiety and sport performance was explored by comparing the efficacy of task based and individualized variants of the inverted-U hypothesis with the zone of optimal function (ZOF) theory. State anxiety (STAI) was measured in 68 college varsity track and field athletes 1 h prior to competition in three meets. ZOF or inverted-U criteria were used to identify cases when athletes possessed optimal pre-competition anxiety. For ZOF, optimal
ranges were based upon each athlete's recollection of anxiety associated with best past performance. For inverted-U, optimal anxiety was determined via: (I) published, optimal anxiety ranges of various sporting events, (II) the median pre-competition anxiety value of each subject for the three meets. Subjects were then grouped as being either inside or outside the optimal anxiety range using each of these criteria. Attained performance values of the athletes were transformed using several standards. For ZOF, the mean performance of the inside group was better ($P < 0.05$) than the outside group when performance was transformed using national college standards. The difference neared significance ($P < 0.06$) using international standards. For either variant of inverted-U, no differences in performance were found between inside or outside groups. In summary, the findings support ZOF theory. The relationship between anxiety and sport performance is best explained by individual differences in optimal pre-competition anxiety which vary considerably among athletes.

Raffety et al. (1997) worked with 19–23 yr-old college students completed anxiety and coping diaries during 10 periods that began 7 days before an academic stressor and continued through the evening after the stressor. Profile analysis was used to examine the anxiety and coping processes in relation to 2 trait anxiety grouping variables: debilitating and facilitating test anxiety (D-TA and F-TA). Anxiety and coping changed over time, and high and low levels of D-TA and F-TA were associated with different daily patterns of anxiety and coping. Participants with a debilitative, as opposed to facilitative, trait anxiety style had lower examination scores, higher anxiety, and less problem-solving coping. Covarying F-TA, high D-TA was associated with a pattern of higher levels of tension, worry, distraction, and avoidant coping, as well as lower levels of proactive coping. Covarying D-TA, high F-TA was associated with higher levels of tension (but not worry or distraction), support seeking, proactive and problem-solving coping.

Finch (1998) did a study on relationships between coping strategies, trait anxiety, and motivational orientations in youth sport athletes. Recent sport psychology research has focused on the coping strategies of elite, adult athletes but little is known about how younger athletes cope with sport stress and how these strategies are related to anxiety and motivational orientations. Adolescent female athletes (n = 108) served as participants. The most prevalent coping strategies were adaptive and problem focused coping strategies.
Maladaptive strategies were used least frequently. Higher trait anxiety was positively related to maladaptive and emotion-focused coping. Higher task-orientation was positively related to adaptive, problem focused coping whereas higher ego-orientation was positively related to maladaptive, emotion focused coping. Thus, significant relationships existed between coping strategies, trait anxiety, and goal orientations. Future research should examine when and how these coping strategies are developed in athletes, the relationship between achievement motivation and coping styles, and the best ways to assist younger athletes in developing adaptive coping strategies and using them consistently.

Gordon, et.al (1998) did a research on a comparison of intensity and direction of state and trait anxiety among NCAA division I college athletes. Research on anxiety in sport has focused on determining differences between groups of individuals such as youth versus adults and sport participants versus non-sport participants. Overall, little research has been performed to determine state anxiety differences among athletes at the college level. Furthermore, a majority of anxiety research has focused on how differing levels of anxiety influence performance, rather than on how individuals perceive their own anxiety. Research does show a relationship between performance and facilitative or debilitative perceptions of anxiety. Facilitative and debilitative anxiety research findings, however, have focused on state anxiety more so than trait anxiety. The main purpose of this investigation was to determine differences in the amount and direction of perceptions of anxiety among college athletes by gender, age, grade point average, academic classification, participation status, scholarship status, and team versus individual sport participants will also be examined. Male (n = 65) colloquia, lectures, posters & workshops abstracts I S145 and female (n = 55) collegiate athletes from a southeastern university completed directionally modified versions of the sport competition anxiety test and competitive state anxiety inventory-2 (Martens, Vealey, & Burton, 1990). Both inventories were given prior to a practice, and the CSAI-2 was re-administered within 48 hours of a competition. Data will be presented comparing the athletes' results on the variables of interest.

In 1998, Jackson, et.al examined possible psychological correlates of flow in a sample of non-elite athletes (aged 25 yrs and older) participating in a world masters games. Both state and trait, or dispositional flow states, were examined. 398 athletes (cyclists, triathletes, swimmers and track and field athletes) completed questionnaire assessments on
2 occasions while competing at an international masters sport competition. The Ss completed a questionnaire assessing intrinsic–extrinsic motivation, goal orientation, trait anxiety, and perceived ability. In addition, a 36-item Trait Flow Scale was administered based on the 9 dimensions of flow espoused by M. Csikszentmihalyi (1990). Of the 398 Ss, 213 completed a questionnaire after and in relation to one event they competed in at the games. This second questionnaire assessed state flow, as well as perceptions of success, skills, and challenges in a selected sport event. Correlational and multivariate analyses were conducted to examine psychological correlates of state and trait flow Patterns of relationships were found between flow and perceived ability, anxiety, and an intrinsic motivation variable.

Ntoumanis and Jones (1998) investigated differences in the cognitive labelling of competitive anxiety symptoms generally experienced prior to an important competition as a function of locus of control beliefs. Eighty three university and county sport performers, including 45 males and 38 females, responded to the modified Competitive Trait Anxiety Inventory-2 (Jones & Swain, 1995) which measures the intensity of pre-competition anxiety symptoms generally experienced, as well as how they are generally interpreted on a debilitative-facilitative continuum. The performers also responded to the Internal-External Locus of Control Scale (Rotter, 1966). The results showed that although there were no significant differences between those having an internal and those having an external locus of control on the intensity of their cognitive and somatic anxiety symptoms, the internals viewed their trait anxiety as significantly more facilitative and less debilitative than the externals. Discriminant function analysis corroborated these findings by showing that the best predictors for distinguishing between the two locus of control groups were the direction scores for cognitive and somatic trait anxiety. The results of the present study provide support for the need to assess the direction as well as the intensity of competitive trait anxiety. Furthermore, they corroborate findings of other studies which have shown that internal locus of control is associated with more adaptive emotional responses in sport.

Spielberger, et.al (1999) did a study on the nature of anxiety and anger as emotional states and personality traits, and the procedures employed in their measurement are briefly reviewed here. Measures of state and trait anxiety, and the development of the State-Trait Anxiety Inventory (STAI) are discussed first. The next part examines conceptual
ambiguities in the constructs of anger, hostility, and aggression, briefly evaluates several instruments developed to assess anger and hostility, and describes the construction and validation of the State-Trait Anger Scale (STAS). The development and validation of the anger expression (AX) Scale and the State-Trait Anger Expression Inventory (STAXI) for assessing the experience, expression, and control of anger are considered next. The chapter concludes with a discussion of the utilization of measures of anxiety and anger in treatment planning and evaluation.

Ommundsen and Pedersen (1999) completed a study on goal orientation theory and competence motivation theory were used to examine the relationships between young athletes' achievement goals and indices of somatic and cognitive trait sport competition anxiety. Included in these analyses were also the potential mediating and moderating role of the athletes' perceived competence in sport. We examined 136 young athletes aged 13 to 18 years involved in organized sport within a community in northern Norway. Whereas no association was found between an ego oriented achievement goal and indices of anxiety, multiple regression analyses revealed that both a high task goal orientation and high perceived sport competence predicted a reduced tendency to report cognitive anxiety when competing in sport. In addition, athletes who perceived their competence in sport as high were found to be less predisposed to experiencing somatic anxiety in the form of elevated physiological arousal when competing than those who doubt their competence. The results further showed that perceived competence did not mediate or moderate the relationships between achievement goal orientations and somatic and cognitive indices of trait sport competition anxiety. The findings suggest that being task oriented in sport as well as having a sense of being competent is important in order to prevent sport competitions giving rise to elevated cognitive anxiety in young athletes.

Giacobbi, et al. (2000) examined, the coping responses of different subgroups of athletes (e.g., high and low trait anxious athletes) were examined to assess the consistency of athlete's coping behaviors across situations. 273 athletes completed the sport anxiety scale (SAS) and coping assessments in trait and state versions of the sport adapted COPE (MCOPE). The results reveal that athletes use a wide range of coping responses that could be considered by both adaptive and maladaptive depending on the nature of the situation. In addition, multiple coping strategies were reported in response to single stressors as shown by the mean responses for each subscale in the two state measures. For instance, the
athletes reported using effort, active coping, and planning at similar levels across the three coping administrations. Up to 50 more results found for "state and trait anxiety of athlete"

Baker et al. (2000) did a study on the relationship between coaching behaviours and sport anxiety in athletes. For the majority of athletes involved in sport, the coach is an influential element of the competitive experience. Two hundred and twenty-eight athletes from 15 sports completed the sport anxiety scale (SAS) and the coaching behavior scale for sport (CBS-S). The predictive ability of athletes' perceived frequency of seven coaching behaviours (physical training, mental preparation, goal setting, technical skills, competition strategies, personal rapport and negative personal rapport) on four forms of sport anxiety (total anxiety, somatic anxiety, concentration disruption and worry) was examined. Results indicate that negative personal rapport was a significant predictor of all measured forms of sport anxiety while competition strategies were a significant predictor for total anxiety, concentration disruption, and worry. Other behaviours were not significant. The findings suggest that negative rapport between coach and athlete is an important contributor to athlete anxiety. In addition, behaviours that the coach demonstrates relative to competition can be influential in reducing athlete anxiety.

Filaire et.al (2001) completed a study on the relationships between psycho physiological variables were investigated by comparing physiological responses (salivary cortisol and testosterone concentrations) and psychological responses (measured by the competitive state anxiety inventory-2 -CSAI-2-and the state-trait anxiety inventory - STAY-) prior to judo competitions at two levels (regional versus interregional). Twelve male judo competitors at interregional level (mean age 22.2+/-1.6 years) entered the experimentation after informed consent. Judo athletes completed the CSAI-2 prior to both competitions and collected saliva for cortisol and testosterone analysis on three occasions: during a resting day (baseline values) and prior to and after both competitions. Trait scales of the STAI (Y-2) were used during a resting baseline period with no stressful situations in order to measure participant's self reported anxiety. Cognitive and somatic anxiety was higher in interregional championships compared to regional championships whereas self-confidence was significantly lower. Cortisol levels increased sharply (about 2.5 fold resting levels) throughout both competitions with no changes in testosterone levels. Positive relationships between anxiety components (somatic and cognitive anxiety) and cortisol were noted in both competitions. Salivary cortisol, together with anxiety
components, may provide a better sensitive index of physiological stress than testosterone concentrations.

Martinent & Ferrand (2007) did a study and the purpose of this study was to examine whether athletes of different sports clustered in meaningful ways, based upon their intensity, direction and frequency of cognitive and somatic anxiety using hierarchical cluster analysis, and to compare the subgroups of athletes on trait anxiety, perfectionism and self-confidence. One hundred and sixty six male and female athletes completed the sport-multidimensional perfectionism scale, the sport anxiety scale and the competitive state anxiety inventory-2 Revised including direction and frequency scales. Results revealed five-clusters labelled “anxious facilitators”, “anxious debilitators”, “low anxious facilitators”, “low anxious debilitators” and “ruminator debilitators”. Clusters differed significantly on concentration disruptions, trait somatic anxiety, worry, and concern over mistakes, perceived parental pressure, and intensity and frequency of self-confidence. The importance of considering all dimensions of anxiety simultaneously when examining the functional nature of the construct and the five-clusters are discussed.

Sameer et.al (2008) did a comparative study of the psychological profiles of Indian railways and Madhya Pradesh national and international level male cricket players: a pilot study. The purpose of the study was to find out the comparative result of the psychological profiles of Indian railways and Madhya Pradesh international and national level male cricket players. The subject's age ranged between 18 and 25 years, they all were selected randomly from the Railways and Madhya Pradesh as U-19 and U-22 Cricket teams. The experts made two groups of 49–49 players, one group made up of Madhya Pradesh cricket players and another group made up of Railways Cricket players, those who are continuously participating at national and international level. The experts used questionnaires of Rainer and Martin's Sports Competition Anxiety Test (SCAT) and the Maudsley Personality Inventory; the questions addressed various aspects of Sports Competition Anxiety and Personality traits of cricket players, respectively. The questionnaire has filled by the Railways and Madhya Pradesh U-19 and U-22 Cricket team players, respectively. For the evaluation of questionnaire two sample t test was employed, and the findings revealed that there was a significant difference found that is, 2.8 in their Personality parameters, it means Railways Cricketers were better in their Personality as compare to Madhya Pradesh Cricketers and found Insignificant that is, 0.12 in the SCAT,
which means there was no difference in Sports Competition Anxiety of Railways Cricketers and Madhya Pradesh Cricketers. Sports Psychology can help a lot in assessing the personality and sports anxiety characteristics of the players or individuals performance in cricket not only demands systematic training to develop physical and physiological variables but also demands training and considerations of psychological characteristics for success in this field.

Bois, et.al (2009) did a study on psychological characteristics and their relation to performance in professional golfers. This study investigated the psychological characteristics of professional golfers and their relation to golf performance. The aims of the study were (a) to provide descriptive data on professional golfers, (b) to test possible differences between successful and unsuccessful players and (c) to estimate whether psychological characteristics could predict golf performance. The data were collected from 41 male professional golfers the day before an official competition. Results revealed that players who made the cut were characterized by higher scores on performance-approach goal, cognitive and somatic anxiety, relaxation strategies, attentional control, emotional control and lower score on performance-avoidance goal. Subsequently, a multiple regression analysis revealed that higher cognitive anxiety, more frequent use of relaxation strategies and emotional control strategies were associated with better player’s ranking at the end of the competition.

Ma, et al. (2009) worked on roles of state and trait anxiety in physical activity participation for adults with anxiety disorders. Physical activity has benefits for reducing levels of anxiety. However, factors that affect physical activity participation for individuals with anxiety disorders have not been well studied. Here, we aimed to clarify the roles of state and trait anxiety in physical activity participation by examining relationships among seven major study variables in Taiwanese adults with anxiety disorders. A multi-site, cross-sectional explanatory design was used. Data were collected using one interview and five self-administered questionnaires. The sample included 144 Taiwanese adults diagnosed with anxiety disorders. State and trait anxiety were significantly correlated with most of the study variables. Physical activity participation by subjects with anxiety disorders was significantly correlated with state anxiety, benefits of activity, self-efficacy for activity, and social support for activity. When age, sex, and education were controlled in the analysis, state anxiety was
associated significantly and negatively with physical activity, benefits of activity, and self-efficacy for activity, and was correlated positively with barriers to activity. Trait anxiety was found to be correlated significantly and negatively with benefits of activity and self-efficacy for activity, and correlated positively with barriers to activity. State anxiety demonstrated greater power than trait anxiety in its relationship with physical activity. These findings suggest that clinical mental health professionals should consider state anxiety when encouraging Taiwanese adults with anxiety disorders to engage in physical activity.

Weinberg and Genuchi (2011) worked on the relationship between competitive trait anxiety, state anxiety, and golf performance: a field study. The purpose of the present investigation was to determine the relationship between competitive trait anxiety (CTA), state anxiety, and golf performance in a field setting. Ten low, moderate, and high CTA collegiate golfers (N = 30) performed in a practice round on Day 1 and Day 2 of a competitive tournament. State anxiety results indicated a significant CTA main effect with low CTA subjects displaying lower state anxiety than moderate or high CTA subjects. The competition main effect was also significant, with post hoc tests indicating higher levels of state anxiety during Day 1 and Day 2 than during the practice round. Performance results produced a significant CTA main effect with low CTA subjects displaying higher levels of performance than moderate or high CTA subjects. Correlations between SCAT and state anxiety indicated that SCAT was a good predictor of precompetitive state anxiety. The direction of state anxiety and performance CTA main effects provide support for Oxendine’s (1970) contentions that sports requiring fine muscle coordination and precision (e.g., golf) are performed best at low levels of anxiety. Future directions for research are offered.

Horikawa.M & Yagi.A (2012) had done a study on the relationships among trait anxiety, state anxiety and the goal performance of penalty shoot-out by university soccer players. The present study examined how the level of trait anxiety, which is a personality characteristic, influences state anxiety and penalty shoot-out performance under pressure by instruction. The high and low trait anxiety groups were selected by using Spielberger's trait anxiety scale, with trait anxiety scores, and control and pressure conditions manipulated by instructions. The participants were two groups of eight university male
soccer players. They individually performed 20 shots from the penalty shoot-out point, aiming at the top right and top left corner areas in the soccer goal. Each condition had 10 trials in a within-subject design. The dependent measures comprised the number of successful goals and the state anxiety scores under each instructional condition. The result showed a significant main effect of instruction. State anxiety scores increased more and the number of successful goals decreased more in high trait anxiety groups than in low trait anxiety groups under pressure instructional condition. These findings suggest that players with higher trait anxiety scores tend to experience increased state anxiety under a pressure-laden condition, and higher state anxiety interferes with goal performance.

Reviews Related to Mental Toughness

Thomas et al. (1996) investigated the psychological and psychomotor skills associated with ten-pin bowling, and a number of characteristics identified by Gould, Eklund, and Jackson (1993), and Gould, Finch, and Jackson (1993) are present and suggested in the study. Findings from Thomas et al. (1996) exemplify how thought control, and management of emotion in pre-performance and performance routines can be developed through time to play an important part in the game. For all of the dimensions and mental skills suggested from previous literature, the ability to apply these skills when it matters most is when mental toughness has been achieved. Meeting the demands and handling the pressures is vital and one lapse can cause huge consequences. Thomas et al. (1996) created a 37-item questionnaire incorporating specifically the factor of mental toughness to evaluate concentration and coping with pressure during competitive bowling. It was found that the subsection of mental toughness showed one of the highest results for reliability with a coefficient of 0.80 for internal reliability and 0.87 for test-retest reliability. Also 89% were correctly classified as skilled bowlers from the responses to the items in the seven subscales of the Ten-Pin Bowling Performance Survey, with mental toughness one of the major components. From this 89%, successful players like these reported that they perform well under pressure, have no difficulty handling the pace, can concentrate for long periods, and often come from behind to win. Although the previous studies provide insights into the mentally tough performer, there are none that attempt to
define mental toughness, while also stating sufficiently all the characteristics associated with mental toughness. It has been found that only 9% of coaches have been successful in developing or changing mental toughness in performers they worked with, therefore Jones et al. (2002), and Gould et al. (2002) attempted to clarify how to achieve such goals, and did so with relative success. Through using participants that had achieved full honors and represented their country in the Olympics or commonwealth games, Jones et al. (2002) implemented interviews to try and complete a profile of the mentally tough performer. The procedure was carried out in three stages. In stage 1 the athletes were drawn into a focus group and asked to discuss (a) a definition of mental toughness, and (b) a list of qualities and attributes of the 84 ideal mentally tough performer. In stage 2, individual interviews were carried out on each athlete where they were asked for their definition of mental toughness, views on the focus group definition, and sentiments regarding the attributes associated with mental toughness. Stage 3 involved the researchers independently then collectively reviewing the participants; comments. The definition and attributes of the ideal mentally tough performer were presented to all participants in the form of questionnaires for agreement rating of definitions and rank orders of the attributes.

In 1999 Norris conducted a project to achieve greater understanding of the developmental and psychological processes of tennis champions. Phenomenological research design, employing the qualitative in-depth interview was used. Constant comparative analysis, as applied to grounded theory, was used to guide data collection and analysis. Champions were asked to describe their processes toward championship achievement, and what facilitated their athletic and psychological development. Of particular interest was how they traced their development, which included the following themes: The roles of parents, teachers, coaches and mentors, conceptualizations of mental toughness, process versus outcome orientations to competition, the zone, triumphing when not in the zone, sportsmanship, regulation of emotion, self-talk, self-knowledge, self-complexity, motivation, confidence, dreams and childhood imaging, goal setting, acting skills when competing, humor, independent thinking, discipline, the history of their personal competitiveness, and their achievement of successfully contending with the psychological pressures of competition. Common to nearly all the participants was an enduring love of the game of tennis, the joy of competing, and a strong desire to do
supremely well and work hard in whatever endeavor the champions pursued. Correlations with existent literature and previous research were present in the domains of family and social factors, most of the experiential characteristics of peak performance, and the importance attributed to having a coach or mentor who had the ability to relate well personally and professionally. In contrast to some previous research about champions and high achievers, most of these champions had not met an abundance of pain and trauma in their personal lives. How champions define champion was an area of this research new to literature. Emergent from the interviews were three styles of definition: External, reflecting accomplishment; External–Internal, meaning accomplishment and exemplary self-conduct; and Internal, reflecting both model self-conduct—and the value that a champion is one who fully actualizes innate potential. Potential seeking is how most of the champions described their drive for championship development and their orientation to life.

Fourie and Potgieter (2001) investigated the components of mental toughness as reported by 131 expert coaches and 160 elite athletes from 31 sport codes. The written statements of coaches and athletes were analysed by means of an inductive content analysis. This resulted in the identification of 12 components of mental toughness. These are: motivation level, coping skills, confidence maintenance, cognitive skill, discipline and goal-directedness, competitiveness, possession of prerequisite physical and mental requirements, team unity, preparation skills, psychological hardiness, religious convictions and ethics. The coaches regarded concentration as the most important characteristic, while the athletes regarded perseverance as most important. The coaches rated the effectiveness of coaches and sport psychologists in strengthening the characteristics of mental toughness more highly than athletes did.

Despite widespread agreement on the importance and benefits of mental toughness and calls to identify psychological attributes that create champions, high quality research into mental toughness is limited. Most recently, Jones, et.al (2002) conducted a qualitative study of elite athletes, aiming to define mental toughness and to determine the essential attributes required to be a mentally tough performer. The definition that emerged from their analysis concluded that: Mental toughness is having the natural or developed psychological edge that enables you to: 1) Generally, cope better than your opponents are with the many demands (competition, training, lifestyle) that sport places on a performer;
and, 2) Specifically, be more consistent and better than your opponents in remaining determined, focused, confident, and in control under pressure.

Burke (2003) conducted a study to identify both mental skills and training done during the preparation by the Mount Everest climbers. The main factor that was identified to was program planning, mental fitness, imagery, focus, short term goal, previous experience, supports from experienced climbers, believe in one’s self and ability and the relationship of physical and mental. This research had shown that mental skill is not only important for the athletes in the competition but it should also be mastered by mountain climbers. Therefore, there is no exemption for football players to understand mental skills. The position and medals won are the predictor of the team’s achievement in this study. Many previous studies stated that medals (Gould et al., 2000; Jones et al., 2007) and the success of the athletes (Gucciardi et al., 2008) are what measure their success in sport in various level.

Golby and Sheard (2003) did a study on mental toughness and hardiness at different levels of rugby league. The increasingly business-like environment of professional sport has resulted in greater scrutiny and analysis of player’s performance. The roles of physiological parameters in predicting success in the world of professional and amateur sport are well established. However, to date, evidence is sparse concerning the role of personality traits in predicting such success. The present study examined the potency of measures of personality style and mental skills in predicting success in the criterion sport of professional rugby league. Mental toughness was assessed by questionnaire using the Psychological Performance Inventory. Hardiness was assessed by questionnaire using the personal views survey III-R. Subjects in this study were 115 professional rugby league footballers representing the top three playing levels in the game in Great Britain (International, Super League, and Division One). Findings demonstrated that performers playing at the highest standard (International players) scored significantly higher in all three hardiness subscales (commitment, control and challenge) and in two of the seven mental toughness subscales (negative energy control and attention control). Results are discussed relative to previous findings, in particular, of the efficacy of high levels of hardiness. Practical implications focus on the advocacy of mental toughness and hardiness training to improve sports performance.
Middleton, et.al (2004) did a study on the psychological performance inventory: is the mental toughness test tough enough? Mental toughness, stemming in part from Loehr’s 1986 classic research, is widely alluded to as a critical variable in the popular media and applied sport psychology. We evaluated the construct validity of responses to Loehr’s (1986) Psychological Performance Inventory (PPI) by student-athletes from an elite sports high school. As confirmatory factor analysis yielded a poor model fit and an improper solution for the a priori model, we pursued exploratory factor analyses that resulted in a 5-factor model that fitted the data well. However, further analyses showed that key correlates of mental toughness were more strongly correlated with the factors based on the original structure than factors based on the alternative structure. In conclusion, neither the original PPI nor the subset of PPI items in the better-fitting alternative model was a sound measure of mental toughness, indicating that a good fit is a necessary but not sufficient condition for construct validation. Good instrumentation must be strong in terms of conceptual/theoretical considerations, psychometric properties, and relationships to key correlates hypothesised to be meaningfully related to it.

In 2005, Bull et.al completed a study on mental toughness is a critical element in contemporary international cricket. However, little is known beyond the obvious basics of what constitutes mental toughness in an English cricketer. This study addressed two main objectives: 1) develop a greater understanding of what mental toughness is within cricket, and 2) identify how existing mentally tough English cricketers developed their mental toughness. Twelve English cricketers identified as being among the mentally toughest during the previous 20 years were interviewed. Analysis of the focused interview transcripts identified the critical role of the player's environment in influencing ‘Tough Character,’ ‘Tough Attitudes,’ and ‘Tough Thinking.’ The global themes are presented in a mental toughness framework that has been used to disseminate the findings to the cricket coaching and playing population in England. The contrasting and complementary nature of the global themes are used to help provide a structural appreciation of the need for consistent interaction between environment, character, attitudes, and thinking in order that a performer can consistently be considered as mentally tough in cricket. Implications of the findings in relation to the delivery of sport psychology support within English cricket are also highlighted.
Bhambri et al. (2005) aimed at examining the effect of psychological interventions such as General relaxation, Imagery and combination of both on the mental toughness dimensions of Table-Tennis players. The study was carried out on 32 national level table-tennis players in the age group of 12-17 years. Loehr psychological performance inventory was administered to assess their mental toughness on seven variables viz. self confidence, negative–energy, Attentional control, visual and Imagery control, motivational level, positive energy and attitude control. The data obtained was analyzed using ANOVA, t test and percentage distribution. The results indicate that all the 3 psychological interventions enhanced mental toughness dimensions of sports persons. However combined intervention consisting of both relaxation and imagery therapies showed the maximum effect on mental toughness dimensions.

In 2006, Fawcett did in-depth qualitative investigation into mental toughness combining phenomenological interview, interpretative phenomenological analysis (IPA) and emergent grounded theory (EGT) was conducted, in order to understand how adventurers/explorers, elite coaches and elite athletes perceived the concept. Twenty-one adventurers/explorers, thirty-three elite coaches and thirty-seven elite athletes (total=91) were interviewed 'in depth' about their perceptions of mental toughness from which 3 discrete grounded theories emerged. Strict sampling criteria were applied and 86% of elite athletes and 88% of elite coaches had either won medals or coached medal winning athletes at World, Olympic or Commonwealth level. The adventurer/explorer sample contained successful Everest mountaineers and world renowned climbers (11), polar explorers (3), round the world yachtswomen and travelling adventurers (6). Phenomenological interviews were conducted, transcribed, member checked and returned by over 93% of the sample. Preliminary IPA analysis provided the resonant and meaningful data themes for the emergent grounded theory analysis (Glaser, 1989). The research approach was unique to the study of mental toughness from within the naturalistic paradigm and complements existing research which has attempted to understand the phenomenon (Fourie and Potgieter, 2001; Jones et al., 2002; Middleton et al., 2004; Bull et al., 2005). The findings demonstrate evidence of huge individual diversity of meaning of what mental toughness means to participants within all samples. Such diversity was clouded when findings were assumed under collective conceptual headings which combined related themes. When conceptual and category data is considered the findings show support for previous work. However, findings show the real meaning attached to
what mental toughness is to people lies beneath the broader category and conceptual frameworks. Such meaning is only understood when deeper levels of analysis are explored. These findings offer evidence that such diversification of personal meaning exists when alternative methodology is applied. As a result there will be no attempt to offer an all encompassing operational definition of what mental toughness is from within each of the three discrete samples. Findings showed striking similarity in elite athletes and elite coach perceptions of mental toughness with major categories emerging in self confidence and belief, dealing with event pressure, effective mental application, physical coping ability, training and situational toughness and commitment and determination. Athletes perceived the additional category of self control and discipline to be centrally related to the concept, a category not strongly supported by elite coaches. The categories were supported by 20 and 24 inter-related concepts within the elite coach/athlete samples and by 16 concepts within the adventure/explorer sample. Adventurer/explorers perceived mental toughness to be more related to safety and survival, coping with stress and anxiety, knowing oneself, coping with success and failure, having undivided attention and physical coping ability. Findings support preliminary work of Jones et al. (2002) Middleton et al. (2004) and Bull et al. (2005) which suggests mental toughness is strongly related to self belief, dealing with pressure and anxiety, focus and dealing with pain. The findings also show that mental toughness is perceived by all three samples to be a complex integration of psychological concepts that support the major categories and is contextually driven. It is a multi-dimensional psychological phenomenon. These findings provide a clearer conceptual understanding of mental toughness that may assist future research. Overall, this study has advanced existing research understanding in the provision of a well grounded theoretical framework for mental toughness and provides evidence in the value of adopting a phenomenological approach which is unique in attempting to understand the concept. However, it also appeals for further qualitative studies which explore different methodologies within the naturalistic paradigm in an attempt to further explain mental toughness. The investigation was principally focused on establishing what mental toughness 'is' based on people's perceptions and 'lived experience'. Future research should focus on how it can possibly be developed and if mental toughness transfers across different contexts. The nature of the situation (i.e. adventure v elite sport) is thought to be an influential factor in differing perceptions and future research may also target more diverse populations attempting to provide more evidence that it is situational specific, contextually driven or indeed transferable.
Levy et al (2006) to investigate the relationship between mental toughness, sport injury beliefs, pain, and adherence toward a sport injury rehabilitation program. A prospective design was employed that evaluated adherence over the entire rehabilitation period. 70 patients undertaking a sport injury rehabilitation program for a tendonitis related injury. Adherence was measured using self report measures of clinic and home based rehabilitation alongside attendance. No association was found between mental toughness and coping appraisals, although high mentally tough individuals displayed more positive threat appraisals and were better able to cope with pain than their less mentally tough counterparts. Greater attendance at rehabilitation sessions was displayed by more mentally tough individuals; however, more positive behavior during clinic rehabilitation was characterized by low mental toughness. Despite the benefits of being mentally tough, sports medicine providers need to be aware that a high degree of mental toughness may have negative consequences upon rehabilitation behavior and subsequently recovery outcomes.

Devonport (2006) used semi-structured interviews to explore the views of three high performance kickboxers regarding the contribution of psychology to the development and maintenance of expert performance within kickboxing. The results provide a useful insight into the experiences of high performance kickboxers, identifying those mental skills and psychological attributes that are perceived to contribute to success. Participants identified seven mental skills that they believed to be linked to success in kickboxing; 1) effective use of self-talk, 2) relaxation, 3) heightened concentration, 4) self-regulation of arousal, 5) goal setting, 6) coping with being hit, and 7) imagery. Three psychological characteristics were identified by all participants as contributing to success, 1) high self-efficacy, 2) highly motivated and 3) mental toughness. Although not specifically identified by participants, it is suggested that a fourth psychological characteristic was also apparent. Participants demonstrated varying degrees of emotional intelligence through their ability to monitor and manipulate their emotional states prior to and during competition. Martial artists used a number of long and short-term psychological strategies in preparing for competition. Furthermore, whilst mental skills were not systematically practiced, all participants endeavored to integrate some form of mental training within physical training. It is recommended that sport psychologists help martial artists develop and refine individualized mental training routines, assisting with the formal integration of
psychological training into physical training. Martial artists spend the majority of their time practicing as opposed to competing. As such, the integration of mental skills training within physical training may help ensure quality practice, and facilitate the effective transfer of mental skills into competition.

Jones et al. (2007) conducted an investigation of mental toughness in a sample population of athletes who have achieved ultimate sporting success. Eight Olympic or world champions, 3 coaches, and 4 sport psychologists agreed to participate. Qualitative methods addressed 3 fundamental issues: the definition of mental toughness, the identification of its essential attributes, and the development of a framework of mental toughness. Results verified the authors’ earlier definition of mental toughness and identified 30 attributes that were essential to being mentally tough. These attributes clustered under 4 separate dimensions (attitude/mindset, training, competition, post competition) within an overall framework of mental toughness. Practical implications and future avenues of research involving the development of mental toughness and measurement issues are discussed.

Kuan and Roy (2007) examined the association between goal orientations and mental toughness and its influence on performance outcomes in competition. Wushu athletes \((n = 40)\) competing in Intervarsity championships in Malaysia completed Task and Ego Orientations in Sport Questionnaire (TEOSQ) and Psychological Performance Inventory (PPI). Using cluster analysis techniques including hierarchical methods and the non-hierarchical method (k-means cluster) to examine goal profiles, a three cluster solution emerged viz. cluster 1 - high task and moderate ego\((\text{HT/ME})\), cluster 2 - moderate task and low ego \((\text{MT/LE})\) and, cluster 3 - moderate task and moderate ego \((\text{MT/ME})\). Analysis of the fundamental areas of mental toughness based on goal profiles revealed that athletes in cluster 1 scored significantly higher on negative energy control than athletes in cluster 2. Further, athletes in cluster 1 also scored significantly higher on positive energy control than athletes in cluster 3. Chi-square \((\chi^2)\) test revealed no significant differences among athletes with different goal profiles on performance outcomes in the competition. However, significant differences were observed between athletes (medalist and non medalist) in self-confidence \((p = 0.001)\) and negative energy control \((p = 0.042)\). Medalist’s scored significantly higher on self-confidence \((\text{mean} = 21.82 \pm 2.72)\) and
negative energy control (mean = 19.59 ± 2.32) than the non-medalists (self confidence-
mean = 18.76 ± 2.49; negative energy control mean = 18.14 ± 1.91).

Crust (2007), presented a study on mental toughness. Athletes, coaches, and
applied sports psychologists have consistently referred to mental toughness as one of the
most important psychological characteristics related to outcomes and success in elite sport,
although researchers have, until recently, devoted little time to studying this concept. This
review considers some of the emerging definitions and conceptualizations, and examines
how mental toughness might be developed in performers. Qualitative and quantitative
approaches to the study of mental toughness are evaluated, and developments in measuring
this important concept are discussed. Research that has examined the relationship between
mental toughness, performance, and perception are also reviewed. Future directions for
research are offered.

framework in an attempt to reveal a holistic understanding of mental toughness in the
context of Australian Football. Eleven male coaches (M age = 42, SD = 9.62) with
considerable playing and coaching experience at the elite level were interviewed using a
PCP-based interview protocol. Transcribed verbatim data were analyzed using grounded
theory procedures. Three independent categories (characteristics, situations, behaviors)
were inductively derived and integrated into a model in which the importance of
understanding each component individually was emphasized. The relationship between
these three central categories was also highlighted. Results identified the key mental
characteristics and their contrasts together with those situations that demand mental
toughness, and the behaviors commonly displayed by mentally tough footballers.
Conceptualized in the context of these three categories, mental toughness in Australian
Football can be considered as a buffer against adversity but also as a collection of
enabling factors that promote and maintain adaptation to other challenging situations.
Practical implications of the findings are discussed and focus on issues pertaining to
enhancing and/or developing mental toughness.

Connaughton et al., 2008 did the study on mental toughness research: key issues in
this area. This report reflects on the many books and articles which describe and attempt to
understand mental toughness. In doing so, the authors sought to (a) raise awareness of the key conceptual and methodological issues, and (b) stimulate research activity in this area. Populist texts, anecdotal evidence, and personal accounts have defined mental toughness as a personality trait, a decisive factor accounting for successful performance, and a defense mechanism against adversity. These accounts have resulted in a vast array of terms and positive psychological characteristics being associated with mental toughness which have contributed to the inconsistency and ambiguity in the literature. Methodological issues have also added to the confusion surrounding the overall understanding of mental toughness. Recent studies which have tried to address the concept of mental toughness in a more scientific manner are discussed.

Mack and Ragan (2008) the assessment of an individual's mental toughness would assist clinicians in enhancing an individual's performance, improving compliance with the rehabilitation program, and improving the individual treatment program. However, no sound measure of mental toughness exists. To develop a new measure of mental toughness the Mental, Emotional, and Bodily Toughness Inventory (MeBTough) were assessed. Participants were invited to complete a 45-item questionnaire in University research laboratory. A total of 261 undergraduate students were recruited to complete the questionnaire. The Rasch-calibrated item difficulties, fit statistics, and persons' mental toughness ability estimates were examined for model-data fit of the MeBTough. Forty-three of the 45 items had good model-data fit with acceptable fit statistics. Results indicated that the distribution of items was fittingly targeted to the people and the collapsed rating scale functioned well. The item separation index (6.31) and separation reliability statistic (.98) provided evidence that the items had good variability with a high degree of confidence in replicating placement of the items from another sample. Results provided support for using the new measure of mental, emotional, and bodily toughness.

Sheard (2009) the relation between nationality and selected indicators of psychological performance in rugby league football was examined. Mental toughness was assessed using the alternative Psychological Performance Inventory (PPI-A) and hardiness using the Personal Views Survey III-R (PVS III-R). Participants (N = 49, M age = 21.7 yr., SD = 2.3) were male elite-level university rugby league footballers representing Australia and Great Britain. Participants completed the questionnaires in training camp in Sydney, Australia, one week prior to the commencement of an international tournament there in 2006. Multivariate analyses revealed that the Australian Universities players had
significantly higher mean scores on Positive Cognition, Visualization, Total Mental Toughness, and Challenge than their opponents from Great Britain. The Australian Universities players were also the tournament winners. The findings concur with previous research indicating superior mental toughness and hardiness are related to successful sport performance. Practical implications focus on the potentiality of ameliorative cultural environments.

Kaiseler (2009) investigated the relationship between mental toughness, stressor appraisal, coping strategies and coping effectiveness among a sample of athletes. Participants were 482 athletes (male $n = 305$; female $n = 177$), aged between 16 and 45 years ($M$ age = 20.44 years, $SD = 3.98$). In support of a priori predictions, mental toughness was associated with stress intensity and control appraisal, but not the type of stressor experienced by athletes. Total mental toughness and its six components predicted coping and coping effectiveness in relation to the self-selected stressor. In particular, higher levels of mental toughness were associated with more problem-focused coping, but less emotion-focused and avoidance coping. Coping effectiveness was influenced by the coping strategy employed by the athletes.

Gucciardi et al. (2009) evaluated the effectiveness of two different psychological skills training (PST) packages in enhancing mental toughness among three youth-aged (under 15 years old) Australian football teams. We compared a program targeting the keys to mental toughness identified previously (Gucciardi, Gordon, & Dimmock, 2008) with a more traditional PST program targeting self-regulation, arousal regulation, mental rehearsal, attentional control, self-efficacy, and ideal performance state as well as a control group. Overall, both intervention groups reported more positive changes in subjective ratings of mental toughness, resilience, and flow than the control group. Similar ratings for mental toughness were reported by the parents and coaches. Both PST packages appeared to be equally effective in enhancing mental toughness.

Twenty one English Premier League academy football players gave self-ratings of mental toughness two times during the competitive season in a study conducted by Crust, Nesti and Littlewood (2010). Two senior academy coaches also rated the player’s levels of mental toughness using the same scale. Three important findings emerged: first, both player and coach ratings of mental toughness were found to be highly stable over a three-month period. Second, the players’ self-ratings of mental toughness were found to be
significantly higher than the ratings of one of the two senior coaches. Finally, there were very low levels of agreement between the two coaches, and between coach and player ratings of mental toughness. These results suggest that even amongst elite level professional soccer coaches, there are considerable differences in interpreting the behaviors and attributes of mentally tough performers.

Gucciardi (2010) the aim of this study was to identify the mental toughness profiles of adolescent Australian footballers and to explore the relations between the mental toughness clusters and achievement goals and sport motivation. A total of 214 non-elite, male Australian footballers aged 16-18 years (mean = 16.8, s = 0.7) provided self-reports of mental toughness, achievement goals, and sport motivation. Cluster analysis supported the presence of two-groups in which players evidenced moderate and high levels of all four mental toughness subscales. Significant multivariate effects were observed for achievement goals and sport motivation with the high mental toughness group favoring both mastery- and performance-approach goals and self-determined as well as extrinsic motivational tendencies. The results suggest those adolescent Australian footballers' self-perceptions of mental toughness fall within two clusters involving high and moderate forms of all four components, and that these profiles show varying relations with achievement goals (particularly mastery-approach) and sport motivation.

Crust, Nesti, and Bond (2010) in this study investigated the relationship between mental toughness and coping in an ultra-endurance (100km walk/run) event. A two-stage procedure was adopted: First, ‘in situ’ data was collected during the early, middle and later stages of the Trail walker UK event, with 12 participants asked to report how they were coping, and the personal attributes that were enabling them to persist. The second stage consisted of a follow-up focus group, which was attended by three men and four women who successfully completed the event. Participants were questioned on the demands of the event and how they coped with these demands. Participants were also asked to describe the attributes of the ideal mentally tough Trailwalker. Data was transcribed, and themes were identified using an inductive content analysis and agreed with the participants. Results suggest that successful participants were stubborn / bloody-minded (tenacious), totally committed to their goals, objective, had a sense of humor, thrived on challenges, were able to maintain perspective in adversity and possessed humility. The attributes identified as
key components of mental toughness in the present study appear relatively consistent with previous mental toughness research using elite athletes. Participants generally possessed a large variety of coping strategies that were used interchangeably during the event. Further research is encouraged to compare differences between elite and non-elite athletes in relation to mental toughness.

Crust and Azadi (2010) in this study, the researcher assessed the relationship between mental toughness and athletes’ use of psychological performance strategies. Sixty-seven male (mean age 22.6 years, s=5.0) and 40 female (mean age 21.1 years, s=2.8) athletes, who competed at club/university to national standard in a variety of sports, participated in the study. Participants completed the MTQ48 (Clough et al., 2002) to measure mental toughness, and the Test of Performance Strategies (TOPS; Thomas et al., 1999) to measure the use of psychological strategies in practice and competition. Results of Pearson correlations and linear regression analyses revealed that self-talk, emotional control, and relaxation strategies were significantly and positively (r=0.26 to 0.37, P<0.01) related to mental toughness in both practice and competition. Of the MTQ48 subscales, commitment was found to load most frequently against performance strategies and thus it is possible that the results of this study reflect highly committed performers seeking performance enhancement strategies. Consistent with theoretical predictions, athletes of county standard and above reported significantly higher mental toughness than club/university athletes (t 105=-2.25, P=0.03).

Gary et. al. (2010) a developmental approach to the acquisition of mental management skills for use by teachers and coaches who wish to meet the needs of beginning and elite performers is outlined. The natural linkage of psychological skills training with the learning and instructional process is discussed, and a case is presented for the teaching of mental skills by teachers and coaches in the practice setting. A learning and an action cycle model are used both to illustrate how mental skills are embedded in the learning process and to identify the appropriate learning phase where each of the fundamental mental skills would be most effectively introduced. A practice session oriented protocol that enables learners to develop the ability to mentally manage their own physical performance is presented. This "mental management" view recognizes that a response is more easily taught, learned, understood, and remembered if it is developed along with the other responses with which it naturally occurs.
Coulter, Mallett and Gucciardi (2010) explored mental toughness in soccer using a triangulation of data capture involving players (n = 6), coaches (n = 4), and parents (n = 5). Semi-structured interviews, based on a personal construct psychology (Kelly, 1955/1991) framework, were conducted to elicit participants' perspectives on the key characteristics and their contrasts, situations demanding mental toughness, and the behaviors displayed and cognitions employed by mentally tough soccer players. The results from the research provided further evidence that mental toughness is conceptually distinct from other psychological constructs such as hardiness. The findings also supported Gucciardi, Gordon, and Dimmock's (2009) process model of mental toughness. A winning mentality and desire was identified as a key attribute of mentally tough soccer players in addition to other previously reported qualities such as self-belief, physical toughness, work ethic/motivation, and resilience. Key cognitions reported by mentally tough soccer players enabled them to remain focused and competitive during training and matches and highlighted the adoption of several forms of self-talk in dealing with challenging situations. Minor revisions to Gucciardi and colleagues' definition of mental toughness are proposed.

Adrian Eagleson (2011) has discussed about the impact of a 3 month mental toughness training program directed at 28 athletes. Data was collected via the Mental Toughness Questionnaire (MTQ48) before and after the program to assess the measure of difference from the training. A control group of 23 athletes were also used. The development program involved 3 parts. In the first part participants described current stressors, challenges and pressures that they found based on four criteria of individual, team, organizational and extra-organizational. A model of mental toughness (Clough et al., 2002) was presented and feedback given on the results of the MTQ48 scores and development of the key concepts around the four C’s model. For the second part, participants practiced a range of psychological skills techniques for developing mental toughness. These included attention control (Maddi, 1987), REBT (Ellis, 1980), visualization and relaxation techniques and the development of psychological capital (Luthans et al., 2008). The final part of the program consisted of one session where a number of case studies were used to highlight the 4 C’s model and embed learning and concluded with a series of action-planning activities so that participants had a clear personal development path to engage in post training. A mixed measures factorial ANOVA
was carried out. The results show that mental toughness can be developed over time (p = .016), and there was a main effect for those who undertook the training in comparison with those who did not (p = .045). This suggests that the training program had a marked positive effect on developing mental toughness. This study shows that overall that mental toughness can be developed over time by the use of structured training programs, and underlines the importance of such structured programs and the use of applied psychological skills training.

Crust and Clough (2011) it reviews recent evidence concerning the development of mental toughness in young athletes, from first involvement in sport through to early adulthood. The role and importance of genetics, environmental factors, and psychological-skill training in the development of mental toughness is discussed. In particular, environmental factors that can be manipulated and influenced by coaches and parents are emphasized to aid the transfer of knowledge from scientific research into applied practice. Of central importance is the development of independent problem-solving and personal responsibility through a challenging yet supportive learning environment. We argue that to develop mental toughness, young athletes must be gradually exposed to, rather than shielded from, demanding situations in training and competition in order to learn how to cope. Also, as athletes become more emotionally mature, they should become increasingly involved in making decisions regarding their own development. Athletes should be encouraged and supported in reflecting upon setbacks and failures that occur as a natural part of the developmental process. Negative experiences, as well as the confidence-boosting outcomes of achieving goals, provide opportunities for personal growth, and allow important lessons to be learned. Various practical suggestions are provided.

Dewhurst et. al. (2012) the concept of mental toughness has been found to be related to outcome performance measures in sport and other competitive situations. Despite this, little attention has been devoted to understanding the cognitive mechanisms that underlie mental toughness. The current study attempted to identify the cognitive underpinnings of mental toughness using the directed forgetting paradigm, in which participants are given a surprise memory test for material they were previously instructed to forget. Regression analyses showed that mental toughness, as measured by the MTQ48
(Clough, Earle, & Sewell, 2002), did not influence the recall of a to-be-forgotten list, but participants with high mental toughness showed better recall of a to-be-remembered list following instructions to forget the previous list. The superior recall of the to-be-remembered list suggests that mentally tough individuals have an enhanced ability to prevent unwanted information from interfering with current goals. These findings support the proposal that cognitive inhibition is one of the mechanisms underpinning mental toughness.

Perry et. al. (2013) the purpose of this study was to assess the factorial validity of the Mental Toughness Questionnaire-48 (Clough, Earle, & Sewell, 2002). In total, 8207 participants (male n=4019, female n=3922, unspecified=266) aged between 16 and 68 years (M=37.00, SD=12.09) completed the MTQ48. Model fit was assessed using confirmatory factor analysis (CFA) and exploratory structural equation modeling, in addition to the robust maximum likelihood estimator. Overall, our results support the factorial validity of the MTQ48 and indicate that the MTQ48 is a robust psychometric measure of mental toughness. Along with previous data, which supports the internal validity of the MTQ48 in addition to results of this study, it would appear that the MTQ48 is an acceptable method of assessing mental toughness.

OVERVIEW OF THE REVIEWS

Sport psychologists (researchers and practitioners), coaches, sports commentators, sports fans, and athletes acknowledge the importance of Psychological Skill Training, Mental Toughness and Anxiety Management in sporting performance. Over the last few years there has been a considerable increase in research related to these in sports. An increased amount of high quality research was however reviewed and these studies were conducted on various topics. The review also revealed that there were a significant number of qualitative and quantitative researches.

During the past years, researchers have sought to examine mental skills, psychological skills training that athletes use to cope with stress in competitive situations. In general, these investigations have found that athletes employ a variety of psychological skills, often in combination, simultaneously trying to manage the person/stressor environment and to regulate anxiety.
Aufenanger (2005) worked on relationships between mental skills and competitive anxiety interpretation in open skill and close skill athletes. Researchers have garnered interest in the directional component of anxiety in addition to the intensity level, where athletes may view anxiety symptoms as facilitative or debilitative towards performance. Further, athletes in different types of sport may utilize specific mental skills in order to assist in their interpretation of anxiety symptoms. The purpose of this study was to examine the relationship between mental skills and interpretation of anxiety in athletes participating in open versus close skill sport. Eighty-eight open skill athletes and 40 close skill athletes completed the modified CSAI-2 and OMSAT-3. The results indicated that open and close skill athletes differed in intensity, but not interpretation, of somatic anxiety and self-confidence. Several mental skills were predictive of athletes' interpretation of anxiety and self-confidence as facilitative to their performance. Also, open and close skill athletes differed in how their mental skills related to intensity of anxiety and self-confidence.

Based upon the above review, the purpose of this study was to psychologically profile the Indian track and field athletes. A secondary purpose of this study was to compare the difference between junior and senior male and female athletes.