CHAPTER-II

REVIEW OF LITERATURE

The review of related literature acts as a guideline for identifying general trends in the research work already done in the concerned field or area. The review also helps the investigators in formulating the problem and in providing direction to the research undertaken. The present investigator has made sincere attempts to conduct a comprehensive and thorough survey of the related literature with respect to the variables under investigation. It is also necessary to acquaint oneself with the result of the research which helps the investigators to formulate his/her objectives and hypothesis.

In this chapter, the investigator has quoted some research studies which are important for understanding self-concept, somatotype, sensation seeking and anxiety state in relation to sports performance. The careful review of related literature enlisted in this chapter based on various sources vis-a-vis journals, periodicals, encyclopaedia, unpublished thesis, etc. which were available in different libraries. The relevant literature pertaining to the present study has been abstracted in this chapter to provide the background material to evaluate the significance of this study as well as to interpret its findings. The chapter has been divided into four sections, namely; Self-Concept, Somatotype, Sensation seeking and Anxiety state. The first section takes appraisal of studies, which deals with self-concept of the players. The second section summarizes studies that analyse somatotype among players. The third section deals with the review of studies that measure the sensation
seeking among players and the fourth and last section examined the anxiety state among the players.

Kearney (2010) carried out the differences in self-concept, racial identity, self-efficacy, resilience, and achievement among African-American gifted and non-gifted students. Specifically, the study evaluated if gifted students are more resilient, report higher self-efficacy and self-concept, express differing attitudes of racial identity, and achieve at higher rates, compared to non-gifted students. Previous literature in this area has been limited to college-aged students and further studies are needed with school aged population. The study utilized a causal-comparative Ex-Post Facto design and separate t test and Mann Whitney tests of independent samples to examine if there were significant differences between the scores of 37 gifted (n=37/15 males and 22 females) students and 38 non-gifted students (n=38/16 males and 22 females) students on the four measures: self-efficacy, resiliency, self-concept and racial identity. Analysis of data indicated that students in the gifted sample scored higher on indexes of resilience, self-concepts and self-efficacy, as well as different racial identity levels. As expected, findings also indicated students in the gifted sample reported higher grades and GPA's than did the non-gifted sample. These findings are discussed in terms of implications for educational policy and service practices for school psychology to improve the retention and persistence in gifted programs.

Renee (2010) concluded that in recent decades much has been revealed regarding children’s self-perceptions and sense of worth. Children engage in social comparisons to gauge their strengths and weaknesses relative to those around them. Thus one’s environment plays a critical role in impacting one’s perceptions of self. Other variables
suggested as contributing to children’s formulation of self-worth include academic achievement, perception of victimization by peers, and academic placement. However, findings have been inconsistent in regard to the extent to which these variables relate to self-worth. The present study sought to discern if these variables relate to children’s self-perceptions. Results revealed a positive correlation between students’ scholastic competence, self-perception scores and cognitive skills and academic achievement in reading, language arts, and mathematics. Findings also suggest that the children’s self-perceptions and sense of worth were significantly different, depending upon their academic group. Moreover, children in Learning Support demonstrated more pervasive negative self-perceptions across non-academic domains of competence, whereas the opposite effect was not evident for students in the gifted program. A significant, negative relationship was revealed between each domain of self perception and perceptions of victimization. In addition, children in Learning Support perceive themselves to be more frequently victimized by their peers than students in either Regular Education or in Gifted Support. Educational implications, recommendations for future research, and study limitations are discussed.

Azizi, Jamaludin, Yusof, Ghaffar and Zakariya (2009) investigated relationship between the dimensions of personality, self-concept and family influence. The sample consists of 214 students from two secondary schools in the FELDA settlement in Johor. Random cluster sampling was carried out. A pilot test was carried out to determine the internal consistency of the questionnaire. The assessment instrument used in this study was the Malay version of the Junior Eysenck Personality Inventory (JEPI) which has a reliability level of 0.5739. The Malay version of the Tennessee Self-concept Scale which has a reliability level
of 0.8657 was also used. The family influence questionnaire which has a reliability level of 0.7913 was also used in this study to identify the effects of family influence in the aspects of family cohesiveness, religious and moral aspect and freedom aspect. Descriptive statistic and Pearson's Correlation were used to analyze the relationship between the dimensions of personality, self-concept and family influence. The results show a weak relationship between the dimensions of personality and self-concept, and between the dimensions of personality and family cohesiveness. However, there is no relationship between the dimensions of personality and the religious /moral and freedom aspect. The results also show that there is a strong relationship between self-concept and family cohesiveness and a moderate relationship between self-concept and the religious/moral aspect. However, there is no relationship between self-concept and freedom.

Marte and Wilde (2008) carried out research that focused on the relationship between self-concept, self-esteem, and relational aggression in relation to preadolescent girls’ participation in a ten-week empowerment program. This empowerment group was based on team building, healthy assertiveness, and safety for girls, bullying, conflict resolution, peer relations, body image, leadership, and career development. The author also discusses counseling needs and strategies, and implications and recommendations for further research on empowerment intervention efforts.

Konstantinos (2008) investigated the Physical Self-Perception Profile (PSPP) is widely used to measure self-evaluations in the physical domain and its validity has been supported in a wide range of samples. The purpose of this research was to examine the factor structure of PSPP and its factorial invariance across gender. Participants were 315 (131
males, 184 females) college students. Exploratory factor analyses showed that PSPP assessed four distinct aspects of physical self-concept. However, confirmatory factor analyses provided only partial support for the male sample. Finally, factorial invariance analysis indicated that there were differences on the latent constructs of PSPP between males and females.

Juan, Eduardo, Jose, and Luis (2007) examined the psychometric properties of the Spanish version of the C-PSQ, as well as the effect of gender, the practice of physical activity and sport and the extent of physical activity and sport practice outside of school hours in relation to the physical self-concept of older primary schoolchildren in Physical Education classes. The sample was comprised of 1086 participants, 570 boys and 516 girls ranging in age from 10 to 11 years. Each student completed Fox and Corbin’s (1989) Physical Self-Perception Profile (PSPP) as it had been modified for the Spanish context by Moreno and Cervello (2005). The Spanish language version of the PSPP constituted a valid measure of the physical self-concept of these youth and was comprised of four factors. The construct validity of the measure was supported by findings that revealed that individuals who engaged in sport practice outside of school hours, and who engaged in a greater frequency of sport practice outside of school hours, had more favourable self-perceptions of competence and confidence in physical activities than did those engaged in less physical activity outside of school. Results in relation to gender indicated that boys had higher levels of perceived competence and greater self-confidence that did the girls in relation to sport activities, whereas the girls had a more favourable perception of their physical appearance and physical strength than did boys. These
differences may reflect underlying growth and developmental influences for boys and girls in this age range.

Moreno and Cervello (2005). Analyzed the effects of gender and level of physical activity involvement on physical self-perceptions in Spanish adolescents. Participants were 2,372 Spanish students. Results showed an effect of interaction between gender (males vs. females) and physical activity practice (practice vs. non-practice), indicating that males that did sport had higher scores in Sport Competence, Attractive Body, Physical Condition and Physical Strength than females that did sport and females that did not. Females that did sport had higher scores in Sport Competence, Physical Condition and Physical Strength than females that did not do any sport. Results also showed differences between physical self-perceptions and the level of physical activity involvement. Those that participated in physical activity once a week or less had lower scores in Sport Competence, Physical Condition and Physical Strength than those that participated in physical activity more than 3 times a week. Those that participated in physical activity more than 3 times a week had higher scores in Sport Competence, Attractive Body, Physical Condition and Physical Strength than those that participated in physical activity 2 to 3 times a week. The implications of these findings on the development of physical activity programmes are discussed in the document.

Lauren (2004) investigated the predictive qualities of physical self-concept and body image dissatisfaction for competitive trait anxiety in female aesthetic and non-aesthetic athletes. Female athletes from gymnastics and diving represented aesthetic athletes (n=52) and female athletes from swimming, volleyball, basketball, cross country, track, and golf represented non-aesthetic athletes (n=45). All participants competed at Division I universities located in the South eastern United States and
participants completed a survey comprised of three questionnaires that assessed: (1) physical self-concept, (2) body image dissatisfaction, and (3) competitive trait anxiety.

Results indicated no significant difference between the sport types regarding physical self-concept and body image dissatisfaction, however, aesthetic athletes reported significantly higher levels of competitive trait anxiety than non-aesthetic athletes. A moderate negative correlation was found among the five subscales of physical self concept, body image dissatisfaction, and competitive trait anxiety in aesthetic athletes. This indicated that low physical self-concept is associated with high body image dissatisfaction and high competitive trait anxiety in aesthetic athletes. A significant positive correlation between body image dissatisfaction and competitive trait anxiety was found in aesthetic athletes, meaning, a dissatisfied body image is associated with high levels of competitive trait anxiety. Physical self-concept was shown to have stronger causal paths to competitive trait anxiety, as well as body image dissatisfaction in aesthetic athletes than in non-aesthetic athletes.

Xiaoli and Laurie (2003) found that physical activity can contribute to the development of children’s self-concept. However, the impact of the quality of school physical education programs on children’s self-concept has not been properly examined. This research was designed to answer the key question: is the quality of school physical education programs correlated with the self-concept of children in grades four to six in Australian provincial schools. The sample comprised 1,149 children, from grades 4 to 6 (10-12 year olds), at 12 selected Australian provincial schools. The 1,149 children answered the Self-Description Questionnaire I (SDQ I) which identifies the levels of children’s self-concept. A program evaluation was also conducted in the 12 schools, to assess the
quality of their physical education programs. Results indicated that there was no positive relationship between the quality of school physical education programs and the levels of children’s self-concept. The variations in the quality of the physical education programs implemented at the 12 selected primary schools did not affect the children’s self-concept levels as assessed by the SDQ I. Previous studies that demonstrated an improvement in self concept were based on interventions in addition to the normal physical education curriculum. This suggests that specially designed additional programs are needed in order to improve children’s self-concept. The current physical education curriculum does not have the capacity to achieve a significant change.

Jeanne (2003) quantitatively examined the self-concept of amateur bodybuilders. Using the membership of the National Amateur Bodybuilding Association, obtained via mail survey, three hypotheses were advanced concerning the self-concept of amateur bodybuilders: (1) The more important the bodybuilder identity is to the respondent, the higher the degree of authenticity felt for that identity. (2) The more important the bodybuilder identity is to the respondent, the higher the degree of authenticity felt for that identity, and the higher the degree of self-efficacy experienced by the individual. (3) The more important the bodybuilder identity is to the respondent, the higher the degree of authenticity felt for that identity, and the higher the degree of global self-esteem experienced by the individual. Employing bivariate correlation and ordinary least squares (OLS) regression the data indicate support for hypothesis 1 ($p < .01$) and partial support for hypotheses 2 and 3. For hypothesis 2, authenticity and the importance of the bodybuilder identity are both significant predictors of self-efficacy ($p < .01$ and $p < .05$ respectively), but the importance of the bodybuilder identity is negatively
related to self-efficacy. For hypothesis 3, authenticity and the importance of the bodybuilder identity are both significant predictors of global self-esteem ($p < .01$ and $p < .05$ respectively), but the importance of the bodybuilder identity is again negatively related to self-esteem.

Kimberly, Leadelle and Andrea (2001) carried out Ninety-five African American undergraduate females who were attending three predominately Caucasian universities were evaluated for body dissatisfaction and drive for thinness as well as on four dimensions of self-concept (physical, social, academic, and personal competence). The participants were largely middle class, with 78% reporting parental education levels between high school to college graduation. Results indicated body dissatisfaction and drive for thinness at levels commensurate with Caucasian samples. A hierarchical multiple regressions found a combination of physical self-concept, drive for thinness, and personal competence to be highly predictive of body dissatisfaction in this sample. Using this model, an effective psychosocial prevention program that focused on reduction of risk factors (e.g., drive for thinness) and enhancement of protective factors (e.g., satisfaction with physical appearance and abilities, personal efficacy) would be advantageous. It is suggested that prevention programming with African American women occur within a cultural context that may provide further support. That is, it may be beneficial to facilitate a critical evaluation of current social mores, encourage personal value clarification, and enhance individual resilience within a context of cultural pride.

Ali (1996) studied the influence the self-concept, body image and adjustment on the performance of hockey players. For this purpose 224 intervarsity players participated in this study. He concluded that the players who achieved a high level of performance have higher self –
concept, body image and adjustment than the players with a low level performance. He assumed that high performing hockey players have high self concept, positive attitude towards their body and are well adjusted. The product-moment coefficient of correlation was used to determine the relationship of each variable. Subsequently for analysed the data “Multiple regression Analysis was used to find out the influence of several independent variables on the dependent variables.

Marsh (1993) carried out the relationship on physical fitness, self concept and academic achievements for a large national representative sample of more than 6000 Australian boys and girls. Correlation between self-concept and corresponding external criteria increased steadily with age in both the physical and academic domains. Findings suggest that fitness and self–concept were strongly related to some individual measures such as 1.6Km. run, 50 mts. dash, Push – ups, skin fold thickness, long jump and body girth scores and some components of physical fitness such as cardiovascular endurance, power dynamic strength and body composition than others. The findings of the above mention study indicates that self – concept and athletic performance are related.

Gill and Rao (1992) assessed the relationship between self – concept and physical fitness among 169 secondary school boys aged between 13-18 years. The physical fitness of each subject was measured by AAHPER Youth Fitness Test (1973). Self-Concept was measured by administering the written test of self-concept in Hindi standardized by Sharry, Verma and Goswami. Data was analysed statistically by computing correlation co-efficient and applying the test of “least significance difference”. Results showed no significance correlation between scores on physical fitness and self – concept except a low
correlation between the scores of health and physical dimensions of self – concept with composite physical fitness scores. The group having very good self – concept was found to be much superior in physical fitness as compared to the group having lower degree of self – concept. The low Correlation might have been obtained due to sample characteristics.

Singh, Singh and Singh (2010) carried out a comparative study was conducted to determine the anthropometric measurements and body composition of field hockey teams of India, Pakistan and Sri Lanka. A total of 53 field hockey players from three teams were studied. The participants’ height was measured using the standard anthropometric rod, while their weight was measured with a portable weighing machine. Widths and diameters of body parts were measured using digital caliper. Girths and lengths were taken with a steel tape. Grip strength was measured with a hand dynamometer. Skinfold thickness measurements were taken using the Harpenden caliper at 4 sites (biceps, triceps, sub-scapular and suprailliac). The percentage of fat was calculated from the sum of 4 measurements of skin fold thickness. It was found that there were no significant differences in height and weight among the three teams, with the Pakistani players recording a slightly higher weight. The Pakistan team had a significantly higher upper arm length (p<0.05) and bi-humerus diameter (p<0.05) as compared to the India and the Sri Lanka teams. The Sri Lanka team had significantly less wrist circumference (p<0.05), hand width (p<0.05) and lean body mass (p<0.05) as compared to the India and the Pakistan teams. The India team had significantly less % body fat (p<0.05) than the other two teams. More data would be of interest to document the changes in anthropometry and body composition during the season and out of season and also to attempt an analysis of characteristics specific to field positions.
Singh, Singh and Kumar (2010) investigated the physique and body composition of male weight lifters at different levels of competition. To achieve this one hundred thirty two weight lifters comprising state (N=66) and national level (N=66) of different weight categories were taken as the subject. Each subject has been measured anthropometrically by following the technique of Tanner et al (1969). Percentage of body fat has been estimated by applying the method of Brozek., Grandes., F., Andresson, J.T. and Keys, A (1963) to the body density obtained from the formulae given by Durnin and Womersley (1974). Somatotype was assessed by using the method of Heath and Carter (1967). The data was treated by applying t-test. The result revealed that the weight lifters having national participation to their credit were found to possess significantly (p<05) high mesomorphic rating, lower percentage of body fat and have bulky thighs than state level participants. It is also worth recording that higher representation level weight lifters were shorter in height and large girth measurements than the lower representation group of weight lifters. It was concluded that higher representation weight lifters differ from the lower representation group in the parameter which are correlated with the performance.

Keogh, Hume, Pearson and Mellow (2009) sought to compare the anthropometric profiles of 17 weaker and 17 stronger Australasian and Pacific powerlifters who had competed in a regional-, national-, or international-level powerlifting competition in New Zealand. Stronger lifters were defined as those having a Wilks score greater than 410, whereas those in the weaker group had a Wilks score less than 370. Each powerlifter was assessed for 37 anthropometric dimensions by International Society for the Advancement of Kinanthropometry (ISAK) level II and III accredited anthropometrists. Because all powerlifters were
highly mesomorphic and possessed large girths and bone breadths, both in absolute terms and when expressed as Phantom-Z scores compared through the Phantom, relatively few significant anthropometric differences were observed. However, stronger lifters had significantly greater muscle mass and larger muscular girths in absolute terms as well as greater Brugsch Index (chest girth/height) and "Phantom"-normalized muscle mass, upper arm, chest, and forearm girths. In terms of the segment lengths and bone breadths, the only significant difference was that stronger lifters had a significantly shorter lower leg than weaker lifters. Because the majority of the significant differences were for muscle mass and muscular girths, it would appear likely that these differences contributed to the stronger lifters' superior performance. Power lifters may therefore need to devote some of their training to the development of greater levels of muscular hypertrophy if they wish to continue to improve their performance. To better understand the anthropometric determinants of muscular strength, future research should recruit larger samples (particularly of elite lifters) and follow these subjects prospectively.

Wadhwa, Koley and Sandh (2008) studied body building, like other sports judged by human observation continues to use old model of officiating and judging and there is always been a search for better ways to judge sports. To compare judges score of the Anthropometric measurements of competitive body builders and to see if there is any correlation between judges’ score. Fifty (50) Male bodybuilders participated in light, middle and heavy weight classes each in the National Interuniversity Bodybuilding Competition held at Guru Nanak Dev University, Amritsar. There were two judges to evaluate the body builders. Height, weight, skin folds, muscle girth, biepicondylar diameter
of the bodybuilders were measured to compute fat mass, fat percent, fat free mass. Judges’ scores (muscularity and symmetry) were given on the basis of these Anthropometric variables. Highly significant positive correlations were found between judges’ total score (muscularity and symmetry) and height, weight and fat free mass. Highly significant negative correlation were found between judges’ total score (muscularity and symmetry) and fat percentage. A significant positive correlation is found between judges’ scores. Judges’ score correlate with anthropometric measurements of competitive bodybuilders. Judges scores are helpful for confirming and justification of bodybuilding ranking.

Cristobal, David and Mikel (2007) investigated the study were describe the anthropometric characteristics, body composition and somatotype of elite male and female junior tennis players, to compare the anthropometric data, body composition and somatotype of the first 12 elite junior tennis players on the ranking with the lower ranked players, and to establish an anthropometric profile chart for elite junior tennis players’ total of 123 (57 males and 66 females) elite junior tennis players participated in this study. The athletes were divided into two groups, the first 12 and the lower ranked players, according to gender. A total of 17 anthropometric variables were recorded of each subject. There were no significant differences in height and weight between the first 12 and the lower ranked boys, while the first 12 girls were significantly taller than the lower ranked girls (p = 0.009). Significant differences were found for humeral and femoral breadths between the first 12 and the lower ranked girls (p = 0.000; p = 0.004, respectively). The mean (SD) somatotype of elite male junior tennis players could be defined as ecto-mesomorphic (2.4 (0.7), 5.2 (0.8), 2.9 (0.7)) and the mean (SD) somatotype of elite female junior tennis players evaluated could be
defined as endo-mesomorphic (3.8 (0.9), 4.6 (1.0), 2.4 (1.0)). No significant differences were found in somatotype components between the first 12 and the lower ranked players of both genders.

Dau Dayal (2007) conducted a study on selected anthropometrical characteristics of Indian elite male athlete of different throwing events. Purpose of the study was to find the anthropometrical differences among four type of throwers (shot put, discus, javelin and hammer throwers). For this purpose 100 Indian elite male throwers 25 each were selected from various national level tournaments. The analysis of variance were applied on gathered data of selected anthropometrical variables, where the value were found significant, the LSD test were used for critical mean difference of different anthropometrical variables among four throwing groups. Results of the study had shown that the shot putter were greater in weight, Femur Biepicondylar, Humerus Biepicondylar, Hip Breadth, Shoulder Breadth, wrist breadth, skin folds, biceps muscle girth, calf muscle girth, thigh muscle girth, chest girth, chest depth, endomorphy, mesomorphy, upper arm length – lower arm length index, hip breadth stature index and fat percentage than other throwing groups. And the discus throwers were greater in height, forearm muscle girth and total leg length than the other throwers groups. Whereas the javelin throwers were greater in total arm length, ectomorphy and ponderal index than the other throwing groups and the hammer throwers were greater in shoulder breadth- stature index than the other throwing groups.

Bayios, Bergeles, Apostolidis, Noutsos and Koskolou (2006) defined the aims of the present study were: a) to determine the anthropometric profile, body composition and somatotype of elite Greek female basketball (B), volleyball (V) and handball (H) players, b) to compare the mean scores among sports and c) to detect possible
differences in relation to competition level. A total of 518 female athletes, all members of the Greek first National League (A1 and A2 division) in B, V and H sport teams participated in the present study. Twelve anthropometric measures required for the calculation of body composition indexes and somatotype components were obtained according to the established literature. Volleyball players were the tallest (P<0.001) among the three groups of athletes, had the lowest values of body fat (P<0.001) and their somatotype was characterized as balanced endomorph (3.4-2.7-2.9). Basketball players were taller (P<0.01) and leaner (P<0.001) than Handball players, with a somatotype characterized as mesomorph-endomorph (3.7-3.2-2.4). Handball athletes were the shortest of all (P<0.01), had the highest percentage of body fat (P<0.001) and their somatotype was mesomorph-endomorph (4.2-4.7-1.8). In comparison with their A2 counterparts the A1 division players were taller (P<0.001) and heavier (P<0.01), but at the same time leaner (P<0.001), and exhibited higher homogeneity in somatotype characteristics (P<0.05).

Bahram and Shafizadeh (2006) examined the effects of regular participation in physical activities on body image and its relationship with body composition and somatotype. One hundred and twenty men and women (25-65 years) were randomly selected and then divided into two active and inactive groups through the Median split technique based on the physical activities index scores. Physical Self-Description Questionnaire (PSDQ), which consisted of body fat, global physical and appearance sub-scales, were used. 2x2 MANCOVA (gender x group) with covariates of body fat percent and Body Mass Index (BMI) was used to analysis the data. The results show significant interaction (F = 3.55, p<0.01) for gender and group in body image sub-scales. Also, the results revealed inverse significant relationships between body image and body
fat percent \(r = -0.49, p<0.01\), BMI \(r = -0.38, p<0.01\), endomorphy \(r = -0.48, p<0.01\) and mesomorphy \(r = -0.38, p<0.01\) and direct relationship with ectomorphy \(r = 0.39, p<0.01\). In conclusion, one’s attitude toward his/her body stems from his/her physical ability and size. In addition, active men have more positive body-image than women.

Kumar (2005) conducted an anthropometric study on 130 Inter College level gymnasts, 130 Inter-Varsity level gymnasts and 130 non-sportsman. He reported that the typical physique of gymnast is shorter in stature, lighter in body weight, longer and stronger upper extremities and lesser body fat. He found significant different in linear measurements, girth measurements, diameter measurements, skin fold measurements and body composition among all three groups.

Kumara, Sandhu, Singh, Singh, Singh, (2004) made an attempt to find the relationship of selected volleyball skills, i.e. attack, block and service, with the selected independent variables such as stature, age, spike jump and reach, block jump and reach, experience and weight of 24 volleyball players of four national women teams. The results indicate that there is highly significant relationship between success rate in attack with spike jump reach \(0.453\), and block jump reach \(0.488\) service success with block jump reach \(0.415\), age with experience \(0.456\), stature with weight \(0.498\) and block jump reach with spike jump reach \(0.748\).

Chauhan (2003) conducted a study on relationship between anthropometric variables and middle running performance and concluded that age, linear measurements i.e. height, leg length, thigh length, total arm length, shoulder, chest, abdomen, hip, thigh, knee girth, ankle diameter, and calf skin fold have positive and significant correlation with
middle distance running performance. Lean body mass also has positive and significant correlation. The multiple correlation of combination of anthropometric variables i.e. height, thigh girth, bicromial, thigh skin fold with middle distance running performance is significant at 1% level, multiple correlation is not of sufficient size, so the regression equation cannot be put into prediction of the running performance.

Paulo, Rafael, and Henrique (2003) investigated bodybuilding is a sport that mainly emphasizes physical appearance, body configuration and shape, trying to achieve aesthetic perfection. Kinanthropometry is a fundamental tool to lead training follow-up in bodybuilding. In spite of that, there are few scientific papers on the subject. The purpose of the paper was to describe body composition, somatotype and proportionality of 23 bodybuilders in the 2000 Brazilian Bodybuilding Championship. The subjects were evaluated moments before the competition according to the following specific variables: total weight, stature, nine skinfolds (tricipital, subscapular, bicipital, chest, medium axillary, suprailiac, abdominal, front thigh, medium calf), muscle girths (flexed biceps and calf-standing), and three bone breadths (elbow, ankle and knee), in accordance with ISAK methodology. The athletes were between 20 and 56 years old, with body weight between 57.4 kg and 105.8 kg. The sum of the nine skinfolds varied between 38.4 mm and 70.2 mm. The somatotype was 1.8-8.1-0.7, which can be classified as a balanced mesomorphic one. The average of body fat was 9.65%, using the Faulkner protocol, proposed by the Brazilian Group of Kinanthropometry. Fat weight was 7.29 kg. When compared to Phantom, the athletes showed higher body weight (Z = +1.66), elbow girth (Z = +5.26), and calf girth (Z = +1.91). This group of Brazilian elite bodybuilders showed lower body fat percentage and bigger muscular...
weight when compared to the Ross and Wilson model (1974), with their body structure similar to the elite international bodybuilders.

Shamim (2002) carried out a study to ascertain the difference in physical and physiological characteristics of high and low performance. Basketball players found that the high performance basketball players had greater weight, height, sitting height, femur biepicondyle diameter, humerus biepicondyle diameter, shoulder width, hip width, upper arm length, thigh length, lower leg length, biceps muscle girth, calf muscle girth, and hip width, stature index than low performance basketball players. High performance basketball players had more mesomorphy-ectomorphic rating and have better segmental proportionality than low performance basketball players. There was no significant difference in ponderal index, thigh length-lower leg length index, upper arm length-lower leg length index and shoulder width-stature index of high and low performance basketball players. High performance basketball players had lower heart rate and greater vital capacity than low performance basketball players. However there was no significant difference in systolic and diastolic blood pressure of high and low performance basketball players.

Rodney (2001) conducted a study on body builders. This research compared physical characteristics of bodybuilders to judges’ rankings, and compared the judges’ rankings across three levels of judges: Elite, Trained, and Untrained. Twenty-nine male and nine female bodybuilding athletes consented to anthropometric and circumference measurements. The independent variables in this study were bodyfat, fat-free weight, and proportionality of muscle. Three groups of judges ranked male and female athletes in the Open, Novice, Collegiate, and Masters divisions. The measurements of proportionality of muscle, bodyfat, girths, and fat-
free weight were analyzed using simple and multiple regression. The judges’ rankings in each class were compared using reliability coefficients, correlation, repeated measures analysis of variance, and the generalized theory for inter-rater reliability. There were significant correlations between the Elite judges’ rankings and body fat in the Men’s Open lightweight class. The Trained and Elite judges’ rankings were significantly correlated with body fat in the Women’s Novice class. Fat-free weight was significantly correlated with the Untrained and Elite judges’ rankings in the Women’s Novice division. Proportionality of muscle was significantly correlated with the Elite and Trained judges’ rankings in the Men’s Open lightweight class. Elite and Trained judges’ rankings were significantly correlated with body fat and proportionality of muscle. All three groups of judges’ were significantly correlated with the Overall rankings. The Trained judges’ rankings were more correlated and more reliable with the Elite judges. The inter-rater reliability scores were higher for the Elite and Trained judges than for the untrained judges. When fat-free weight was substituted for body weight in the calculation of proportionality of muscle, prediction of ranking was enhanced. The education session led to a significant disparity in judges’ rankings between trained and untrained judges. Body fat appears to be a better selection variable when comparing physical measurements to judges’ rankings in women. Proportionality of muscle is a better selection variable in predicting judges’ rankings in men. Prediction models developed from this investigation need further testing.

Reilley, Bangsbo and Franks (2000) this review is focused on anthropometric and physiological characteristics of soccer players with a view to establishing their roles within talent detection, identification and development programmes. Top-class soccer players have to adapt to the
physical demands of the game, which are multifactorial. Players may not need to have an extraordinary capacity within any of the areas of physical performance but must possess a reasonably high level within all areas. This explains why there are marked individual differences in anthropometric and physiological characteristics among top players. Various measurements have been used to evaluate specific aspects of the physical performance of both youth and adult soccer players. The positional role of a player is related to his or her physiological capacity. Thus, midfield players and full-backs have the highest maximal oxygen intakes (> 60 ml.kg\(^{-1}.\text{min}^{-1}\)) and perform best in intermittent exercise tests. On the other hand, midfield players tend to have the lowest muscle strength. Although these distinctions are evident in adult and elite youth players, their existence must be interpreted circumspectly in talent identification and development programmes. A range of relevant anthropometric and physiological factors can be considered which are subject to strong genetic influences (e.g. stature and maximal oxygen intake) or are largely environmentally determined and susceptible to training effects. Consequently, fitness profiling can generate a useful database against which talented groups may be compared. No single method allows for a representative assessment of a player's physical capabilities for soccer. We conclude that anthropometric and physiological criteria do have a role as part of a holistic monitoring of talented young players.

Ridder, Monyeki, Amusa, Toriola, Wekesa, and Carter, (1998) carried out a study on world-class female African athletes. Data were collected on 178 female athletes with a mean age of 21.7 years. The athletes were from 18 countries with Zimbabwe (n = 45), South Africa (n = 38), Namibia (n = 25), Botswana (n = 24) and Zaire (n = 10)
having many more subjects. The majority of the subjects were black (65.7%) with Caucasians (29.8%) the second largest group. Females from 11 different sports were measured with track and field (n = 52), netball (n = 48), swimming (n = 15) and handball (n = 14) the sports with the many competitors, the anthropometrical variables and techniques selected were primarily those described in Carter and Ackland (1994). Data analysis was performed using Statistica 5.0 (Stat Soft, Inc. 1984-1996). Heath – Carter somatotypes were calculated using equations in Carter and Heath (1990). Endomorphy was calculated with a height correction. Results indicate that the average Somatotype for the female athletes (n = 178) was 3.3-3.6-2.8, that was a central Somatotype with slightly more mesomorphy and endomorphy than ectomorphy. The four-Somatotype categories, to the left of center on the somato-chart (in which endomorphy and mesomorphy combinations were high and ectomorphy was low) accounted for 40.5% of all female athletes. Another 33.1% were in the central and balanced mesomorphy categories and 26.4% were to the right of the center in ecto-mesomorphy through balanced mesomorphy categories. Finally, none of the female athletes were in the lower sector of the somato-chart where mesomorphy was lower than both endomorphy and ectomorphy. Somatotype comparisons were made of female athletes in each of the 11 sports by event or by playing position and performance level. Differences in somatotypes were found between events or positions within sport categories. There was for example a significant difference between track and field athletes in the 9 different events in the endomorphic (F = 7.19; p < 0.05), the mesomorphic (F = 5.42; p < 0.05) as well as the ectomorphic (F = 4.10; p < 0.05) components.
Carter (1991) found the body composition and somatotype of 16 trained female triathletes aged 18.8-32.8 years were measured. All of the subjects were engaged in a competitive training programme and participated in the same triathlon. Anthropometric variables included height, mass, selected diameters, girths and skinfolds, and a Heath-Carter anthropometric somatotype. Body composition was determined by hydrostatic weighing procedures and skinfold patterns. Comparisons were made with Olympic swimmers and runners. The triathletes had a mean body mass of 55.2 kg and a mean height of 162.1 cm. When compared to swimmers, the triathletes were somewhat shorter and significantly (P <0.005) older. On most other measures, including a balanced mesomorph somatotype of 3.1-4.3-2.6, they were similar to swimmers. This group of triathletes were generally heavier, less lean, more mesomorphic and

Orvanova (1990) studied on the body shape of weight lifters. The differences between the somatotype ratings of weight lifters studied using the Sheldon and the Heath-Carter methods, and the differences between performance levels and age groups of weight lifters are discussed. The differences in mean somatoplots among the weight lifters studied as a whole group, weight lifters divided into two, three or four groups according to body weight, and weight lifters considered according to the official weight classes, are assessed. Weight lifters in the lighter weight classes are found to be ectomorphic or balanced mesomorphs, while those in the heavier weight classes tend to be endomorphic mesomorphs. Ectomorphy decreases, whereas mesomorphy and endomorphy increase with weight class. When three age groups of weight lifters were compared within each weight class, the same pattern of differences between ages occurs. The younger lifters in each weight class have higher endomorphy and lower mesomorphy than the senior lifters. Ectomorphy
is higher in the younger lifters below the weight class of 82.5 kg. Since significant differences in all three somatotype components between 10 weight classes of weight lifters and also within three age groups were noted, it will be necessary in future studies to consider the somatotypes of weight lifters according to the official weight classes.

Fry, Cisar and Housh (1987) carried out that numerous anthropometric equations have been developed to estimate body density (BD) for various populations. The purpose of this study was to examine the use of 20 existing equations for estimating BD in 12 competitive male bodybuilders (24.0 +/- 3.0 yrs.: X +/- SD). Actual BD was determined by underwater weighing corrected for residual Lung volume. Anthropometric measures taken in duplicate included skinfolds (SF), circumferences, and diameters. Measurements were taken one to two days prior to actual competition. The bodybuilders were characterized by a body weight of 81.24 +/- 13.96 kg, BD of 1.0812 +/- 0.0099 g [middle dot] ml^{-1}, and relative fat of 8.48 +/- 3.90 percent. Comparisons of the 20 equations revealed 12 equations with similar predicted BD when compared to actual BD. Pearson r values for these 12 equations ranged from .62 to .81. With the additional considerations of number of measures, intertester variability, and preference for quadratic equations, the equation of Lohman, BD = 1.0982 - 0.000815 (triSF + scapSF + abdSF) + 0.0000084 (triSF + scapSF + addSF)^2, was found to be particularly appropriate for the estimation of BD in extremely muscular and lean body builders. The use of these equations may also be appropriate for estimating BD in male athletes with similar physical characteristics, such as wrestlers, weight lifters, gymnasts, and certain football players, as well as others.
Castanier, Carole, Scanff, Christine, Woodman and Tim (2010) investigated the risk-taking behaviours of 302 men involved in high-risk sports (downhill skiing, mountaineering, rock climbing, paragliding, or skydiving). The sportsmen were classified using a typological approach to personality based on eight personality types, which were constructed from combinations of neuroticism, extraversion, and conscientiousness. Results showed that personality types with a configuration of low conscientiousness combined with high extraversion and/or high neuroticism (impulsive, hedonistic, insecure) were greater risk-takers. Conversely, personality types with a configuration of high conscientiousness combined with low extraversion and/or high extraversion (skeptic, brooder, entrepreneur) were lower risk-takers. Results are discussed in the context of typology and other approaches to understanding who takes risks in high-risk domains.

Frank, Sulloway, Richard, Zweigenhaft (2010) carried out according to expectations derived from evolutionary theory, younger siblings are more likely than older siblings to participate in high-risk activities. The authors test this hypothesis by conducting a meta-analysis of 24 previous studies involving birth order and participation in dangerous sports. The odds of laterborns engaging in such activities were 1.48 times greater than for firstborns (N = 8,340). The authors also analyze performance data on 700 brothers who played major league baseball. Consistent with their greater expected propensity for risk taking, younger brothers were 10.6 times more likely to attempt the high-risk activity of base stealing and 3.2 times more likely to steal bases successfully (odds ratios). In addition, younger brothers were significantly superior to older brothers in overall batting success, including two measures associated with risk taking. As expected,
significant heterogeneity among various performance measures for major league baseball players indicated that older and younger brothers excelled in different aspects of the game.

Martha, Cecile, Laurendeau and Jason (2009) examined how risk sports practitioners, compared with those of the average sports participant, perceive their abilities to manage risks (AMR) and their vulnerability to a serious injury (VSI) whilst participating. We also examined which variables influence perceived comparative VSI. High-risk and moderate-risk sports participants (n = 432) completed measures of perceived personal AMR, perceived comparative AMR and VSI, and motive of playing to the limit. Results showed that high-risk sports practitioners perceived their VSI as being higher than the average sports participant, while moderate-risk practitioners perceived their VSI as being lower. Perceived comparative VSI was negatively related to perceived personal AMR and positively related to past injury episode, sporting experience, and playing to the limit. In conclusion, perceived comparative risks were similarly realistic amongst high-risk sports practitioners. Future research is needed to further examine the role that perceived comparative risks play in the risk-taking decision-making process.

Stojan, Snezana and Tanja (2008) studied differences in sensation seeking between male and female athletes who engage in high risk sports. There are several studies (Cox, 1994; Tusak & Tusak, 2001; Erjavec, 2002), which indicate that male and female athletes are more similar than males and females in the general population, female athletes thus show more “traditionally male” characteristics. These studies mainly focus on personality, anxiety and aggression; we wanted to address these issues in the area of sensation seeking. Sensation seeking has been well researched
in the area of high risk sports – males seem to have higher sensation seeking needs, but gender differences in high risk sports have been quite poorly investigated. Of 33 mountain climbers who participated in our research, 15 of them were male and 18 female and differences in age were not significant. We used Zuckerman’s Sensation seeking scale IV, which examines sensation seeking in terms of 5 factors – a general factor, factors of adventure and risk taking, an experience seeking factor, a disinhibition factor and a boredom susceptibility factor. There were no differences found between male and female mountain climbers, except for a tendency toward statistical significance in the factor of disinhibition, which is consistent with some previous research. We conclude that male and female mountain climbers in Slovenia are equal in sensation seeking needs and can be treated as a homogenous sample.

Demet and Ongen (2007) studied relationships between sensation seeking and gender role orientation were examined among 325 Turkish university students. The Sensation Seeking Scale Form V Zuckerman (1994) and Bem Sex Role Inventory (1974) were used for data collection. The dimensions of the SSS-V were Thrill and Adventure Seeking, Disinhibition, Experience Seeking, and Boredom Susceptibility. The ANOVA and MANOVA revealed main effects for gender and gender role orientation. As predicted, men reported higher levels of overall sensation seeking and Disinhibition than women did. Androgynous and masculine groups reported higher levels of overall sensation seeking, Disinhibition and Experience Seeking than the feminine group did. The effect of gender role orientation on Thrill and Adventure Seeking and Boredom Susceptibility was insignificant.

Deborah and Buswell (2006) examined students who were attending a mid-size university and majoring in health, physical
education, recreation, and elementary education concerning their sensation seeking behaviour interests and preferences. Three hundred thirty-two students completed a written survey consisting of a set of 10 demographic questions and 40 forced choice items from the Sensation Seeking Scale V (Zuckerman, 1994). Females accounted for 57.1% of the population, 69.5% were Caucasian, and 74.6% were between 21-25 years of age. Analysis, completed using a two-way mixed model ANOVA, indicated that males scored significantly higher than females on the total scale score and on the disinhibition and boredom susceptibility subscales but not on, the thrill and adventure seeking or experience seeking subscales. All majors scored highest on the thrill and adventure seeking subscale and lowest on the boredom susceptibility subscale. These scores indicate that students make choices that may involve physical danger and high levels of risk and they do so, not because they have nothing better to do but because they want to expand on their experiences. Analysis of specific questions on the instrument related to unhealthy behaviours raises a number of concerns for universities and demonstrates a need to provide alternative experiences for students to meet the needs of sensation seeking in more healthy ways.

Desire, Janita and Barend (2006) examined the relations between sensation seeking, gender and preferences in viewing televised sport. The reason being that the sensation seeking theories can offer media researchers a valuable approach to understanding why and how people use television to create their own excitement and entertainment. The survey methodology was used in this study. The questionnaire included the Sensation Seeking Scale (SSS), which is a standardised psychological test, as well as a questionnaire that categorises a variety of sport in three major groups. Group A consists of violent combative sport, group B of
aggressive combative sport and group C consists of non-aggressive stylistic sport. Ninety two (N=92) respondents were randomly selected to complete the Sensation Seeking Scale and to indicate their preferred sport programmes in terms of the three groups that range from extreme combative aggressive to more stylistic and artistic sport programmes. Results in this study indicated a direct relation between high sensation seeking and viewing violent combative sport (Group A). Low sensation seeking viewers also tend to view more stylistic sport on television (Group C). The hypothesis on gender differences was also supported. The male population is more attracted to violent combative sport, while the female population prefers to view more stylistic and artistic sport on television.

Rebekah and Christine (2004) studied whether the personality characteristics of sensation seeking and openness to experience and participation motives differ between participants in the high-risk sport of surfing (n=41) and participants in a low-risk sport (golf; n=44) was investigated. Multivariate analysis indicated that surfers are characterised by higher levels of sensation seeking, as measured by the Sensation Seeking Scale-V (Zuckerman, 1983) and openness to experience, as measured by the NEO-Personality Inventory Revised (Costa & McCrae, 1992). Surfers also demonstrated higher levels of intrinsic motivation, measured by the Sports Motivation Scale (Pelletier et al., 1995) than golfers did, while both groups demonstrated similar levels of Extrinsic Motivation. These results suggest that personality factors, together with types of participation motives, may be useful in discriminating between participants in low- and high-risk sports, which in turn could be used to promote surfing as a positive risk-taking pursuit.
Tanja, Matej and Renata (2004) investigated personality traits of high-risk sports athletes. The aim was to investigate the personality dimension and compare the results to the results of the non-risk sports athletes and non-athletes. Thirty-eight high-risk sports athletes participated in the research (alpinists, skydivers, para-gliders, white-water kayakers, downhill mountain-bikers, motocross riders, downhill skiers, and ski jumpers). The non-risk sports athletes consisted of 38 swimmers, track athletes, sailors, flat-water kayakers, rowers, Nordic skiers, sports climbers, and karatekas. The non-athletes were equalled with both groups in age, education, and included 76 non-athletes. The Big Five Observer Scale was used. It was found that high-risk sports athletes scored highest in emotional stability, the non-athletes followed them and non-risk sports athletes achieved the lowest scores. The same order of groups was shown in conscientiousness and energy. Openness was highest in the non-risk sports athletes, followed by the non-athletes and the high-risk sports athletes achieved the lowest score. The differences in acceptability were not significant. Four out of five hypotheses were accepted.

Llewellyn (2003) investigates the psychology of risk taking behaviours, and in particular, the psychological profiles associated with different physical risk taking behaviours. It was hypothesised that there may be three fundamental approaches to risk: "Risk avoiders" avoid activities they perceive to contain risk, "risk reducers" participate in high risk activities in spite of the risks involved, and "risk optimisers" who are motivated by the exposure to risk. An appropriate measure of subjective risk assessments was not identified in the existing literature, and the 27-item "Physical Risk Assessment Inventory" or "PRAI" psychometric measure was therefore developed. After initial piloting, the PRAI was administered to 407 subjects. Subsequent analyses revealed that two
oblique factors accounted for much of the variance in physical risk assessments, and these were initially identified as "Sports" and "Health" factors. A wide-ranging test battery (including Eysenck’s Revised Personality Questionnaire) was then administered to 113 subjects, and further analyses suggested that high-risk sports and health risk behaviours were associated with independent psychological profiles. Health risk behaviours were associated with an "Antisocial" factor that was identified by high social and physical risk propensity, sensation seeking and psychoticism. The participation in high-risk sports loaded on a second "Venturesomeness" factor that was associated with high confidence, physical risk propensity, sensation seeking, peer behaviours and being male. A third "Physical Risk Assessment" factor was associated with high sports and health risk assessments, being female, and low Addiction scores. Multiple regression analyses suggested that 38% of health risk behaviours, and 60% of sports risk behaviours could be predicted by the variables included in this study. Convergent qualitative data provides additional support for the validity of these findings. The notion of a universal physical risk taking personality therefore appears to be limited to the role of sensation seeking and physical risk optimization.

Jon, Rosenblitt, Hosanna, Stacey and Johnson (2001) examined the relationship between sensation-seeking behaviours and two hormones, testosterone and cortisol, in male and female college students. The sample was predominantly white non-Hispanic sample consisted of 68 males and 75 females. All participants were students at a large university in a medium-sized city in northern Florida and were recruited from various classes on campus. Hormone levels were hypothesized to contribute to the variability of individual scores on Zuckerman’s sensation-seeking scale. As expected, males scored higher on the scale than females, but the
data failed to support the generally accepted positive relationship between testosterone and sensation seeking for either sex. Instead, our results support the existence of a significant inverse relationship between cortisol and sensation seeking in men, but not in women, even after adjustment for testosterone levels and age. The study contributes to the current literature by (a) supporting the association between risky behaviour and a hormone other than testosterone, (b) being the first to examine the association between cortisol and sensation seeking in women, and (c) identifying a possible effect of gender on the association between hormones and sensation-seeking behaviours. Gendered social norms and expectations are likely to be partly responsible for this effect. Theory-guided interdisciplinary research is needed to improve understanding of the biological influences on human behaviour, and special attention must be paid to social context, women’s perceptions of their expected behaviour, and gendered socialization regarding norm-breaking or risky behaviours, which may obscure biological links to female behaviour.

Ellen and Gunnar (2001) examine the relationship between sensation seeking and risk-taking behaviour among adolescents. Risk behaviour is defined as positive risk behaviour (activities like climbing, kayaking, rafting etc.) and negative risk behaviour (crime and socially unacceptable activities like shoplifting, drug use etc.) Perceived challenges and influences from school, parents, friends and social background are examined as contributing factors. Three hundred and sixty adolescents between 12 and 16 years of age from a school in Trondheim, Norway, answered the tests. The test consisted of My Opinion II, a Swedish version of the sensation seeking scale, which measures sensation seeking among adolescents around the age of 14. Three other questionnaires developed especially for this study were also
used; one measuring risk behaviour, one measuring challenges from school, parents and friends, and one measuring social background. The results indicate a strong relationship between sensation seeking and both types of risk behaviour. Negative risk behaviour correlates negatively with challenges from both school and parents, and a similar relationship exists between negative risk behaviour and social background. It seems that few challenges and a poor social background could result in more negative risk behavior.

Schrader and Wann (1999) examined numerous variables to determine if high-risk recreation involvement could be predicted in 169 college social science students. Perceived physical self-efficacy, internal versus external locus of control, level of sensation seeking, socioeconomic status, gender, death anxiety, and social complexity were among the variables investigated. Although death anxiety and gender were hypothesized to be the best predictors of high-risk recreation involvement, neither of these variables either alone or in combination was strongly supported. The most highly predictive combination of factors reported in this study was gender, level of sensation seeking, and social complexity, defined as joining and maintaining membership in various groups.

Dennis, Sullivan, Zuckerman and Michael (1998) involved male members of two college teams, baseball and football, and female members of two teams, field hockey and lacrosse (combined) and equestrians, were compared on the five scales of the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ). All teams were significantly higher on the Activity and lower on the Neuroticism-Anxiety scales than the general college population of the University of Delaware. Lacrosse and field hockey athletes were higher on activity than equestrians and
baseball players were higher than football players on this scale. Contrary to predictions, football players scored lower than the general university male population on Impulsive Sensation Seeking and the lacrosse and field hockey players did not differ from the general college females on Impulsive Sensation Seeking. The baseball players also scored lower on this scale. The hypothesis that body contact sports attract high sensation seeking and aggressive participants was not supported. Sensation seeking is more characteristic of participants in high risk sports offering unusual sensation and personal challenges.

Predrag, Iris and Sanja (1998) examined by the AISS (Arnett, 1994) and Zuckerman's SSS scales were administered to 94 pairs of males between 17 and 47 yr of age (M = 29.6 yr) from Zagreb, capital of Croatia. Pairs were equivalent in age and education. The independent variable is the risk level of the sports they are engaged in (high risk sports were parachuting, diving, gliding, speleology and alpinism, while low risk sports were athletics, rowing, bowling and table tennis). The aim was to find out which of these two scales is better at discriminating the two groups of athletes, since this is an important test of criterion validity for these two operationalizations of sensation seeking construct. Univariate F ratios show that all six predictors significantly differentiate the criterion groups on p < 0.05 level. In the discriminant analysis almost all of the valid discriminant variance is accounted for by three of Zuckerman's subscales — ES, TAS and BS. This finding is even clearer in stepwise regression analysis, where only ES and TAS remain as significant predictors.

Malkin and Rabinowitz (1998) examined the relationship between high-risk recreational activities (i.e., extreme sports) and levels of sensation seeking. They concluded that high sensation seekers
demonstrate more participation in high-risk activities such as scuba diving, rock climbing, kayaking, and skiing. They also proposed that there may be some cultural and economic differences between high and low sensation seekers. Economic means may preclude individuals of low socioeconomic status from participating in certain culturally appropriate methods of satisfying the sensation seeking drive simply because the cost is too high.

Jonathan (1996) examined the various characteristics of 29 (20 females and 9 males) undergraduate participants interested in forensic identification. Participants completed a basic demographics questionnaire, History of Psychosocial Stressors (HPS: Scotti, 1992, 1999), Sensation Seeking Scale (SSS-V; Zuckerman, Eysenck, & Eysenck, 1978) and Zuckerman-Kuhlman Personality Questionnaire (Zuckerman, Kuhlman, Joirement, & Kraft, 1993). Salivary cortisol samples and perceived distress were assessed before and during exposure to an acute psychological challenge. Participants self-reported having had moderate experience with psychosocial stressors. Compared to published normative data on the SSS-V and ZKPQ, males had lower scores on disinhibition, boredom susceptibility, impulsive sensation seeking, aggression-hostility, and sociability. Females had lower scores on the scales of disinhibition, impulsive sensation seeking, and sociability and higher on activity. No significant differences were found between males and females participants on the SSS-V or the ZKPQ, with the exception of the neurotic-anxiety subscale. Assessing salivary cortisol responses, main effects for time and gender but no main effect for sensation seeking or interactional effects were found. Participants had high anticipatory salivary cortisol and lowered salivary cortisol during exposure to the acute psychological challenge. Furthermore, no relation existed between
self-reported levels of perceived distress and salivary cortisol responses. Associations with pre-exposure salivary cortisol and experience seeking and exposure salivary cortisol with experience seeking and impulsive sensation seeking were found for males.

Marvin (1995) compared the sensation seeking needs of different groups of athletes and non-athletes of both sexes. Athletes from four male sport teams (lacrosse, rugby, crew, and soccer) and five female sport teams (soccer, Volleyball, softball, tennis, and golf) from a local university participated in the study. Male and female non-athletes also served as subjects. All subjects were administered the Sensation Seeking Scale V (SSS). A major finding in contrast to study was that male athletes scored higher on sensation seeking than male non-athletes. In another departure from previous findings, contact sport athletes (rugby and lacrosse) scored higher on SSS than non-contact male sport athletes (crew and soccer). In other results, female athletes had significantly higher SSS scores than female non-athletes and both groups of males (athletes and non-athletes) exhibited stronger SSS needs than their female counterparts. The discrepancies in findings, reported above, are explained by the different methods of measuring SSS and different groups of athletes involved in the studies.

Maqbool (1995) studied the Sensation seeking and Anxiety States test and death Sensitivity Scale were administered on 120 smack addicts and 120 alcoholics to determine: (a) the differences between the mean scores of low sensation seeker smack addicts and high sensation seeker smack addicts, and low sensation seeker alcoholics and high sensation seeker alcoholics on state anxiety and death sensitivity; (b) the difference between the mean scores of low sensation seeker smack addicts and low sensation seeker alcoholics on state anxiety and death sensitivity. Data
were analyzed by means of t-test. The main findings of the study were:
(1) significant differences were found between low and high sensation seeker smack addicts, and low and high sensation seeker alcoholics on state anxiety, (2) low and high sensation seeker smack addicts scored significantly higher than the low and high sensation seeker alcoholics were on death sensitivity.

Janet (1993) conducted the a study on heterogeneous group of 59 skydivers, hang gliders, rock climbers, ultra light pilots, scuba divers, motorcycle racers, and ocean kayakers. When compared with non-thrill-seeker controls (n=59), the thrill seekers described above were significantly higher than controls on all the SSSV scores. The highest mean sub-score reported for the thrill seekers were on the Thrill and Adventure Seeking scale. Although females in general score lower in sensation seeking than males, in this study, female thrill seekers younger than 30 had mean scores higher than male thrill seekers on all SSS scales except DIS (SSS form IV). After conducting a discriminant function analysis, Blenner concluded that 83.5 percent of participants could be correctly classified as thrill seekers on the basis of SSS scores. The sub-scale Thrill and Adventure Seeking was the most important in differentiating thrill seekers from controls, providing behavioural evidence of the construct validity of the TAS scale. She also further noted that this study confirmed Zuckerman's view that accessibility to sensation-seeking outlets may determine activities pursued. She noted that her study's thrill seekers were all middle class and lived in an area where thrill-seeking sport activities abounded. She concluded that environmental accessibility, coupled with socioeconomic class, might play significant roles in the channelling of sensation seeking.
Mostafa (1993) studied two hundred and fifty four undergraduate students (102 males, and 152 females), were administered the Sensation Seeking Scale (SSS), Arabic version. Significant sex differences were found on the Experience-Thrill and Adventure Seeking, Experience-Disinhibition and Intension-Disinhibition Scales, but there were no sex differences on the Intention-Thrill and Adventure Seeking Scale. The inter correlations of the four scales in males, females and the total group was computed. The differences between findings of this study and that of other countries could be interpreted as evidence of cultural differences in sensation seeking. The results obtained with this Arabic version of the SSS (Form VI) show an acceptable adaption of this scale.

Horvath and Zuckerman (1993) intended to examine sensation seeking as it relates to impulsivity, appraisal of risk, and risky behaviours for college students. Impulsivity did not appear to predict taking physical risks related to dangerous sports. However, the results did indicate a predictor between student’s perception of peer risky behaviours and their own risky behaviours. Appraisal of perceived risk for such health related activities as smoking and STDs did not seem to be predictive of risk behaviours. The results indicated that the level of sensation seeking, as opposed to the level of risk that dictated the behaviour (i.e., high sensation seekers are more likely to engage in high-risk health activities even though they appear to appraise the risk as high). In addition, with increased experience and participation in the activity or behaviour, high sensation seekers tend to show a progressive decline in the perceived risk and are more inclined to continue to participate in the high-risk activity or behaviour than low sensation seekers.

Mikel, Hartman, Harve and Rawson (1992) investigated differences in sensation seeking between male and female varsity and
nonvarsity athletes, using the Sensation Seeking Scale developed by Zuckerman (1984). This revised form separates reports of past experiences from desired or intended future experiences on both Disinhibition (DIS) and Thrill and Adventure Seeking (TAS) factors. This study used volunteers (N=159) from a small, Midwestern liberal arts college. Males scored higher than females, regardless of athletic participation, and athletes scored higher than non-athletes, regardless of gender. There were no interactive effects between gender and athletic participation. In another aspect of this study, the relationships between a number of variables and the sub-scores and total scores were investigated. Age was related to sensation seeking on only one of the subtests. Sensation seeking may be a useful predictor for some of the variables investigated.

Rainey and Amunategui (1992) completed an interesting study in which they compared rodeo riders, hang-glider pilots, college baseball players, and college wrestlers. Analysis indicated that rodeo riders scored significantly higher than baseball players while hang gliders scored higher than the three other groups. These results concerning hang-glider pilots confirm earlier studies of high-risk activities and conform to Zuckerman's model of sensation seeking.

Khan Mohammad and Ahmad (2010) carried out comparative study on competitive anxiety of athletes at different level of competition. The main purpose of their study was to investigate competitive anxiety among the all India intervarsity, national and state level long distance runners from different level of competitions. The age of athletes ranged from 18 to 25 years. For measuring the competitive anxiety Sports Competition anxiety Test (SCAT) by Martens (1977) was used. The analysis of variance was applied to find the difference among the all three
levels. It was found that there was no significant difference between the mean score of athletes on competitive anxiety of all India intervarsity, national and state level long distance runners.

Patsiaouras, Papanikolaou, Haritonidis, Nikolaidis and Keramidas (2008) investigated the effect of the person-centered intervention (reflection, congruence, respect, empathy) on anxiety (state - trait) which athletes have. Seventy-four volleyball players (male and females between the ages of 12 to 15) completed the STAI 1 and STAI 2 questionnaires twice (1st - September, and 2nd phase - May). In the experimental group (E.G.) (male team N = 12; female team N = 11) Roger's person-centered method was applied in 15-20 minutes advising sessions once per week before and after practice for 32 weeks. In the control, group (C. G.) (male team N = 12; three female teams N = 39), the coaches utilized their usual pedagogical - coaching techniques before and after practice. Statistically significant differences were observed between the E. G. and C. G. (females) in the 2nd phase - May of the state anxiety (p = .032), and males in the trait anxiety (p = .023). Significant differences among the 1st - September and the 2nd phase - May of the E. G. (males) in the trait anxiety (p = .023) were observed as well. The results indicate that the person - centered method positively influences the athletes who participated in team sports reducing their state and trait anxiety.

Han, Kim and Lee (2006) conducted a study aimed to conduct basic descriptions of temperamental traits and the level of state and trait anxiety of young male athletes and to compare them by type of sports. Study participants were 277 athletes and 152 non-athletes who were all high school boys. The Korean version of the Temperament and Character Inventory (TCI) was used for checking temperamental traits while the Korean version of the State and Trait Anxiety Inventory form Y (STAI-
KY) was used to estimate anxiety levels. Harm Avoidance score of athletes was higher than that of non-athletes. Harm Avoidance score of golfers was lowest and that of swimmers was highest. The state anxiety score of baseball players was lowest and that of Taekwondo players was highest. The trait anxiety score of baseball players was also lowest and that of golfers was highest. Both trait and state anxieties of the 'winner' group were lower than those of the 'no winner' group. While prior research mainly focused on athletes’ environment and phenotypic characteristics, we studied the pattern of temperaments in athletes along with its potential influence on athletic performance.

Pickett, Lewis and Cash (2005) investigated body image and psychosocial adjustment among competitive bodybuilders, non-competitive weight trainers, and athletically active men. Participants were 40 men in each of the three groups who were assessed on body composition and multiple facets of body image evaluation, investment and anxiety, eating attitudes, and social self esteem. Relative to the other two groups, competitive bodybuilders had greater body mass due to fat-free body mass. Although groups did not differ in their situational body image discomfort, competitive bodybuilders and weight trainers had a more positive global appearance evaluation and were more psychologically invested in their physical appearance. Compared with active controls, men in both weightlifting groups were more satisfied with their upper torso and muscle tone. Competitive bodybuilders reported more mid torso satisfaction than the other two groups. Competitive bodybuilders also wished to be significantly heavier than controls did and reported higher social self esteem but greater eating disturbance. The findings suggest that competitive bodybuilders as a group are not more
“muscle dysmorphic” than either non-competitive weight trainers or physically active men who do not train with weights.

Kais and Raudsepp (2005) examined the relationship between the intensity and direction of competitive state anxiety, self-confidence, and performance in basketball and volleyball players prior to different matches. Male basketball (n=12) and volleyball players (n=12) completed a modified version of the Competitive State Anxiety Inventory-2 (CSAI-2) prior to 11 different matches, and 132 questionnaires overall. The inventory included an intensity subscale as well as direction sub-scale for somatic and cognitive anxiety. The findings revealed a moderate level of state anxiety and very high self-confidence of the players before the matches. The cognitive and somatic anxiety and self-confidence were stable prior to the different matches. Correlation analysis showed that the intensity and direction of somatic and cognitive anxiety and self-confidence of the players were not related to their athletic performance. However, the intensity of cognitive anxiety was positively.

Richard, Bruce, David and Collins (2000) investigated psychological correlates of exercise dependence in experienced and inexperienced bodybuilders and weightlifters. Secondary objectives included measuring social physique anxiety, bodybuilding identity, and social support among bodybuilders and weightlifters. Thirty five experienced bodybuilders, 31 inexperienced bodybuilders, and 23 weightlifters completed the bodybuilding dependence scale, a bodybuilding version of the athletic identity measurement scale, the social physique anxiety scale, and an adapted version of the social support survey-clinical form. A between subjects multivariate analysis of variance was calculated on the scores of the three groups of lifters for the four questionnaires. Univariate F tests and follow up tests indicated that
experienced bodybuilders scored significantly higher than inexperienced bodybuilders and weightlifters on bodybuilding dependence ($p<0.001$), social identity and exclusivity subscales of bodybuilding identity ($p<0.001$), and social support scales ($p<.001$), and significantly lower on social physique anxiety ($p<0.001$). Experienced bodybuilders exhibit more exercise dependence, show greater social support behaviour, and experience less social physique anxiety than inexperienced bodybuilders and weightlifters.

Miia and Yuri (1999) conducted a study on the individual zones of optimal functioning (IZOF) model; an athlete’s performance is successful when his or her pre-competition anxiety is within or near the individually optimal zone. When anxiety falls outside the optimal zone, performance deteriorates. The model also suggests that skilled athletes are aware of, and are able to accurately recall and anticipate, their pre-competition anxiety. A meta-analysis of 19 studies from 1978 to 1997 (146 effect sizes, based on 6387 participants) was conducted to examine the validity of the assumptions regarding the in out of the zone notion and the accuracy of recalls and anticipatory measures of anxiety. The findings provide fairly good empirical support for the IZOF anxiety model, with an overall effect size ($d$) for the in-out of the zone notion of $d = +0.44$ (41 effect sizes, $n = 3175$). In other words, the performance of athletes who were within their individually optimal zones was almost one-half a standard deviation unit better than that of athletes who were outside their zones. Furthermore, both effect sizes ($rw$) for accuracy of pre-competition anxiety measures, recall ($rw = +0.71$, 24 effect sizes, $n = 369$) and anticipatory ($rw = +0.69$, 81 effect sizes, $n = 2843$), exceeded the ‘large effect’ suggested for correlations by Cohen. The implications
for future research extending the IZOF model to a wider range of positive and negative emotions are discussed.

Gaynor and John (1999) conducted a study to consider the influence of competitive anxiety and self-confidence state responses upon components of performance. Basketball players (n = 12) were trained to self-report their cognitive anxiety, somatic anxiety and self-confidence as a single response on several occasions immediately before going on court to play. Performance was video-recorded and aspects of performance that could be characterized as requiring either largely anaerobic power (height jumped) or working memory (successful passes and assists) were measured. Intra-individual performance scores were computed from these measures and the data from seven matches were subjected to regression analyses and then hierarchical regression analyses. The results indicated that, as anticipated, somatic anxiety positively predicted performance that involved anaerobic demands. Self-confidence, and not cognitive anxiety, was the main predictor of performance scores with working memory demands. It would appear that different competitive state responses exert differential exerts upon aspects of actual performance. Identifying these differences will be valuable in recommending intervention strategies designed to facilitate performance.

Nikos and Graham (1996) investigated the 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 groups were the direction scores for cognitive and somatic trait anxiety. The results of the study provide support for the need to assess the direction as well as the intensity of competitive trait anxiety.

Martens, Vealey and Burton (1995) expanded on the inverted U from Yerkes and Dodson to include a multidimensional approach in which they looked at the relationships between cognitive anxiety and performance in addition to somatic anxiety and performance (inverted-U). They found that a strong negative linear relationship exists between cognitive anxiety and performance. That is to say that as cognitive anxiety increases, performance decreases in a linear fashion. They also found that the relationship between somatic anxiety and performance was a less power, curvilinear relationship where both lower and higher levels of somatic anxiety were detrimental to performance.

Tholkes and Benedict (1994) examined the relationship between state anxiety and performance in an outdoor adventure activity, a high ropes course. Two theories, which were examined to determine the type of relationship present, were the inverted U theory and the multidimensional anxiety theory. The results were based on research conducted at the Mankato State University High Ropes Course. During
this study, 217 individuals were administered the Spielberger State Anxiety Inventory (SAI) and observed as they participated in the high ropes course. Pearson product moment coefficient of correlation and stepwise multiple regression were used to examine the relationship between the variables of performance, state anxiety, age, gender, ethnicity, previous experience, and self-efficacy. Two variables, performance and gender, demonstrated a significant relationship with state anxiety. The results demonstrated a linear relationship between state anxiety and performance, as proposed by the multidimensional anxiety theory. Two other theories, which were examined, were Easterbrook’s cue utilization theory, to examine the significance of cue recognition, and Bandera’s theory of observational learning, to examine the concept of modelling.

Krane and Williams (1994) conducted a study to examine the cognitive anxiety, somatic anxiety, and self-confidence in male and female high school and college track and field athletes. Athletes (216) completed the Competitive State Anxiety Inventory-2 (CSAI-2) within 20 minutes of each event in which they competed at a prestigious individual track and field relay meet. Consistent with expectation, a 2x2x2 (gender by competitive level by place) ANOVA revealed male athletes reported lower somatic anxiety and higher self-confidence than female athletes and college athletes displayed lower cognitive and somatic anxiety than high school athletes. A significant three-way interaction was found on the cognitive anxiety subscale. College male non-players displayed the lowest levels of cognitive anxiety while high school male non-placers displayed the highest levels. When examining the hypothesis that sports of differing complexity and duration would have different anxiety and confidence levels, only cognitive anxiety was found to differ in athletes in
events of differing complexity with the high complexity athletes displaying greater cognitive anxiety than the low complexity athletes do. No significant anxiety or confidence difference were found among athletes in events of differing duration.

Swain and Jones (1993) examined intensity and frequency of symptoms of competitive state anxiety. Forty-nine track and field athletes (27 males, 22 females) responded to a modified version of the Competitive State Anxiety Inventory-2 (CSAI-2) on four occasions during the period leading up to an important competition: 2 days, 1 day, 2 h and within 30 min of competing. The questionnaire included the existing CSAI-2 (intensity) scale as well as a frequency scale for each of the 27 items of the CSAI-2. The intensity and frequency dimensions of each of the CSAI-2 sub-scales were then compared between the four conditions by means of two-way analyses of variance (gender x time-to-competition). In the case of cognitive anxiety, time-to-event effects were observed for intensity and frequency for both males and females. The intensity of the response was significantly greater at the final stage of testing than it was 2 days before competition, while the frequency of the response increased progressively throughout the experimental period. This dissociative patterning for the cognitive anxiety dimensions is discussed in the light of multidimensional anxiety theory predictions. For somatic anxiety, the time-to-event effects that emerged for intensity and frequency revealed that both values increased progressively as the time to compete neared, for both male and females. The results for self-confidence revealed no effects for intensity or frequency for either gender. The findings from structured follow-up interviews served to corroborate these quantitative findings by providing information that supported the conclusions drawn from the questionnaire data. In
particular, the athletes reported that they experienced considerable increases in the frequency of intrusive anxiety cognitions. While these findings clearly need to be substantiated, they do provide evidence of the existence of an additional dimension of anxiety that may assist our understanding of this complex concept. The measurement of competitive state anxiety may benefit from this more detailed approach as opposed to the rather limited intensity-alone perspective.

Dietmar, Renan, Sampedro and Sebastiao (1988) investigated the effects of state and trait anxiety on physical performance under both neutral and stressful conditions. They conducted two studies. In Study 1, 43 male and female track athletes answered the State-Trait Anxiety Inventory and twice underwent ergo metric testing in the physiology laboratory after receiving a neutral or a stress-inducing instruction. In Study 2, these 43 runners completed the state scale shortly before a test run in a practice session and once again just before the start in an official competition. Results showed a significant increase in self-reported state anxiety under the stress condition in both the laboratory and the field setting. At the same time, the mean physical performance, measured as physiological performance parameters (maximum oxygen intake, physical work capacity) or as running performance, significantly deteriorated under stress. The induced stress affected the heart rate in addition to the mere physical workload, with no sign of compensation occurring during the entire period of ergo metric testing. Effects of anxiety on performance were tested by separate 2 (trait) x 3 (state) ANOVAs for each situation. For both laboratory situations and for the practice situation as well, no significant relationships, neither linear nor nonlinear, were detected. In the competition situation, however, an inverted-U relationship was found in the low trait-anxious subgroup.
Krohne and Hindel (1988) examined the top 36 table-tennis players, the 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.

Sanderson and Reilly (1983) examined the cross-country runners on sport competition stress and its effects on performance. The purpose of this study was to explore the relationships between state/trait anxiety and competitive cross-country performance for males and females. A-trait and A-state pre- and post-competition were monitored in 38 females and 26 males at major meetings. The females’ A-trait was correlated with pre-race A-state (p < .05) which was itself correlated significantly with race performance (p < .05). A significant post-race A-state reduction occurred only with the better runners. The correlation between A-trait and pre-race A-state was also found in the male athletes (p < .05) while A-trait significantly correlated with race performance (p < .05). A-state was
significantly reduced post-race, the greatest decrease being observed in the top performers. It is concluded that trait as well as transient dispositions are relevant when psychological determinants of performance are considered.