CHAPTER II

REVIEW OF RELATED LITERATURE

A careful search of related literature was made through the studies of books, periodicals, journals and other relevant material in the library of the Lakshmibai National College of Physical Education, Gwalior. Abstracts of related studies thus on "Relationship of selected psychological variables to selected motor components and sports skills of high and low fitness group are presented in this chapter as background material for the concerned research work.

The review of related literature is divided into three Sections that is Studies pertaining to psychological Variables are included in Section I; Psychological Studies related to the motor components are included in section II; and Section III covers those psychological studies which are related to the sports skills.

SECTION - I

Studies pertaining to psychological Variables

Zwart\textsuperscript{1} studied attentional and anxiety responses of athletes to mental training techniques. This study explores the change in competition anxiety, attentional direction and

\textsuperscript{1} Elizabeth Fell Zwart, "Attentional and anxiety responses of athletes to mental training technique" Dissertation Abstract International, 49.7 (January (1987) : 2504-A.
focus, and performance in 13-15 year old swimmers (n=30) after exposure to the superlearning mental training programme. The experimental treatment consisted of engaging the subjects in a six week (two on hour sessions per week) programme of (i) relaxation-training, (ii) positive affirmation statements synchronized to breathing exercises and music, and (iii) and visualization for mental rehearsal.

The sports competition anxiety test (SCAT) was employed as a measure of competition anxiety, and the test of attentional and interpersonal style (TAIS) was used as a measure of attentional direction and focus.

The results of the statistically analysed data indicate that there was a statistically significant (a) increase in performance outcomes, (b) change towards effective attentional direction and focus, and (c) reduction in competitive anxiety in athletes after exposure to the super learning mental training programme. There was also a marked improvement in competitive swimming performance in athletes who reported low competition anxiety than in those athletes who reported higher levels of competition anxiety.

Adedoja² conducted a study "The relationship between anxiety and level of aspiration among college Physical

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Education male students: 31 college Physical Education male students at Eastern Illinois University were administered the anxiety scale questionnaire designed by the Institute of Personality and Anxiety Testing. The level of aspiration (Loa) scores were obtained from each subject's estimation of performance on the grip strength test. The r of -.16 indicated there is no relationship between level of aspiration and anxiety. There is a difference between high and moderate or moderate and low anxiety subjects, High, moderate, and low anxiety groups did not differ in estimating the achievement scores to be above or below their actual scores on the strength test.

Jones studied the effect of anxiety and need for achievement on the performance of high school wrestlers. Data were obtained from the matic appreciation test, the test anxiety questionnaire, expectancy ratings by the individuals and by their coaches. Performance data were obtained from match score books and observations. It was concluded that the personality traits of anxiety and need for achievement had a tendency to influence both the expectancy and the actual performance of these High School wrestlers. Subjects who measured low in anxiety level performed better than those who measured high anxiety. The

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group scoring highest in performance was that of low anxiety and high need for achievement.

Adams⁴ conducted the study titled "the relationship between children's diabetic control and self-concept internal and external locus of control and trait anxiety". This study investigated the relationship between degree of diabetes management and internal external locus of control, perceived control, self-concept, and anxiety in children. Subjects were 57 children ranging in age from 8 to 17 years, attending a residential summer camp for children with insulin-dependent diabetes mellitus. The subjects completed the Nowicki-Strickland locus of control scale, the Peers-Harris children's self concept scale, the Spielberger State - Trait Anxiety scale and the Adams perceived control scale. The subjects regulation of their diabetic condition was based upon the percentage of glycosylated hemoglobin in the blood.

Results of this study did not confirm the hypothesis that predicted a relationship between diabetes management and locus of control and self-concept. However the subjects with better diabetes management perceived themselves as having more control over day-to-day diabetes related activities. In the age group of 13 and above, subjects with

poor diabetes management were found to have higher levels of trait anxiety than those with good diabetes management. In the age group of 12 and under, a correlation was not found between glycosylated hemoglobin level and trait anxiety for children with diabetes, despite their diabetes management displaying a developmental trend in their locus of control orientation. Male subjects of 12 and under displayed higher levels of state anxiety than females of 12 and under. No sex differences were found between males and females of 13 years and above on state anxiety.

Kaiser\(^5\) conducted a study on pain tolerance. The purpose of this study was to determine any relationships or differences in pain tolerance and mental toughness with in collegiate football players. Subjects for this study were sixty-five varsity football players at Idaho State University who competed in at least on varsity play during the 1980 Football season. The study employed the use of an adaptation of Poser's mechanical gross pressure stimulator to measure pain tolerance and the athletic motivation inventory as the measuring tool for mental toughness. The statistical analysis included correlation coefficients for all variables and an inspection of unit and position means. The conclusion of this study was evident between the pain

tolerance and mental toughness within collegiate football players.

Ladouceur and Carrier\(^6\) conducted a study of awareness and control of pain.\(^6\) 60 volunteer subjects (30 Male and 30 female) participated in the study. To obtain a baseline measure, they were asked to keep one hand for as long as possible in cold water. They then rated the intensity of the pain they had experienced on a 10 point scale. Each subject was then assigned to one of the six experimental or control groups in a 3 x 2 Experimental design. The three treatments were (1) instructing the subjects to use positive and pleasant imagery while a hand was placed in the apparatus and (2) asking subjects to keep track of their performance by looking at a stop watch kept in front of them. (3) Controls receives the same instructions used in the pretest. In each condition, half of the subjects were provided a specific performance criterion (to keep one hand immersed for 5 min.); the other half were not aware of such a criterion. After the immersion, each subject rated the pain he had experienced on a 10 point scale. An analysis of Variance performed on the duration of ice-water tolerance at pre-test gave significant differences among groups \((F = 1.99, p > .05)\). A 3 x 2 factorial analysis of variance was then applied to the different scores between post-test and

pre-test. The second variable (provision of a specific performance criterion) was significant ($F = 5.35, p < .05$). Neither the treatment ($F < 1.00$) nor the interaction ($F < 1.00$) yielded any significant effect. Also, no significant differences were observed in the ratings of pain.

Daniels conducted a study on pain tolerance and cardiac responses to pain of low and high anxious subjects before and after exercise. It was the purpose of this study to investigate the effects of anticipating pain and experiencing pain upon resting heart rates and exercise heart rates of low and high anxious college women. The subjects for this study were 40 college women who scored in the fifteenth percentile or below and the eight-fifteenth percentile and above on the Spielberger Trait Anxiety Scale.

Subjects meet individually with the experimenter for three different sessions. The first session was an orientation in which the equipment and apparatus used in the study were shown and demonstrated. The second and third session were for measurement purpose and were conducted under conditions of rest and exercise. At each of the two measurement sessions, 3 thirty-second heart rate responses and subject's pain tolerance were recorded. The heart rate measurement included baseline, anticipatory to pain, and

heart rate while pain was experienced. The pain tolerance of each subject was measured with a mechanical presser device and was recorded in millimeters of mercury.

The conclusions of this study were:

1. The heart rate of women of different anxiety levels is approximately the same at rest, during anticipation of pain, and during pain.

2. Anticipation of pain and actual pain produce an increase in the heart rate of women.

3. The increase in the heart rate in response to anticipation of pain and to pain is approximately the same during rest and during exercise.

4. Pain tolerance of women is approximately the same during rest and during exercise.

Booth, Somervile and Gilgen\(^8\) determine the Relationship among Locus of Control, Academic Achievement, and perception of Autokinetic Movements. The relationship among scores on locus of control (Rotter's I.E. Scale), Autokinetic movement, and the American College Test (ACT) were investigated. I-E Scores and ACT composite scores were obtained for 90 University students (45 Male and 45 Female)

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\(^8\) Steven B. Booth, John W. SomerVill and Albert R. Gilgen, "Relationship among Locus of Control, Academic Achievement, and perception of Auto kinetic movements Perceptual and Motor skills 50 (1980) : 1263."
in introductory psychology. All subjects were tested for 5 minutes in the Autokinetic test situation. It was predicted that subjects with an external locus of control would be more associated to lower scores on the ACT and perceive more Autokinetic movement than subjects with an internal locus of control. Partial support was obtained for this prediction, perception of Autokinetic movement was significantly more associated with externally oriented subjects than with internally oriented subjects. Externality was not more associated with lower scores on the ACT than internality.

Mckelvie and Huband\(^9\) determine locus of control and anxiety in college athletes and non-athletes. 92 athletes (members of University and college teams) completed the Illinois competition questionnaire measuring trait anxiety in competitive sports situations and the Rotter's I-E scale measuring Locus of Control. No differences between the groups were found on either test, and scores on the tests did not correlate for either group. Further research on sports participation, Locus of control and anxiety is suggested.

Abdullah\(^10\) determined the relationship among Internal-


\(^10\) Adam Abdullah, "Relationship among Internal-External Locus of Control, Drive, Manifest anxiety, and Creativity in college students" Dissertation Abstract International 39 : 1 (July 1978) : 189-A.
External Locus of Control Drive, Manifest anxiety, Creativity in College students. The purpose of this study was to investigate relationships among Internal-External locus of control drive, manifest anxiety, self reported creativity, and assessed actual creative productivity. 93 students in a creativity class were involved in assessment of these personality variables along group-administered self report inventories originally developed to discriminate the personality dimensions being studied. The internal reliabilities of the measure were evaluated and the means were compared for significant sex differences. Correlation matrices among the different variables, including the HDTY subscales, were obtained. Finally, multiple regressions were performed to identify the best predictors of assessed creative production of college students.

The Internal-External locus of control scale and creativity ratings showed the lowest correlations of all the major Variables. Creativity and drive showed some positive relationships that did not reach significance. The relationship between manifest anxiety and creativity was negative and significant as hypothesized.

Hofmann, Klein and Steele\textsuperscript{11} conducted a study on Locus of Control: Its stability across distinctly different

\textsuperscript{11} Richard J. Hofman Charles M. Klein and Joe M. Steele, "Locus of control: Its stability across distinctly different subgroups of College freshmen "Perceptual and Motor skills 51 (1980)1184.
subgroups of College freshmen. A Modified Version of the Nowieki-Strickland locus of control scale is investigated. Utilizing four distinct subgroups (ns = 101) of college freshmen, education and noneducation majors from a Bible college and a State University, a discriminant structure for the locus of control statements was defined. Two statistically significant discriminant functions showed a very clear external orientation for all four groups. The construct locus of control was less bipolar than anticipated.

Adame and Johnson\textsuperscript{12}, conducted the study on physical fitness, body image and locus of control in college freshman men and women. This study examined the relations among physical fitness, body image, and locus of control. The Hall physical fitness Test profile, the Winstead and Cash body self relations Questionnaire (BSRQ) and the Nowicki Strickland locus of control scale were administered to 243 freshmen. Women were significantly more positive about their physical appearances than men. Men were more positive about their physical fitness than women. Men were more physically fit than women. Men and women scoring in the internal direction viewed the physical fitness domain of their body image positively. Unlike men, internally oriented women had more positive perceptions of the health aspect of their body

\textsuperscript{12} Daniel D. Adame and Thoma C. Johnson "Physical fitness, body image and locus of control in college freshman Men and Women" \textit{Perceptual and motor skill} 68 (April 1989) P.400.
image. Physically fit men and women had positive attitudes toward the physical fitness components of their body image. Physically fit men differed from physically fit women in that men were more internal and held more positive attitude toward the physical wealth dimensions of their body images.

Johnson and Thorn\textsuperscript{13} conducted a study on locus of control and effects of perceptual tasks on heart rate. The hypothesis was tested that the relationship, found in prior research, between heart rate changes, produced in biofeedback settings, and locus of control scores derives from the heart brain relationship, described by the Lacey's in 1967, as well as from "expectances for control". 48 subjects were tested on two perceptual tasks known to elicit changes in heart rate. Significant heart rates changes were observed in response to both tasks, but those changes did not correlate with locus of control as measured by scores on the Rotter's I-E scale and the Multidimensional Health locus of control scale.

Sherman and Hofmann\textsuperscript{14} conducted a study on "Achievement as a momentary event, as a continuing state, locus of control: A clarification". The relationship between locus of

\textsuperscript{13} Patrick R. Johnson and Beverly E. Thorn "Locus of control and effects of perceptual tasks on Heart rate" \textit{Perceptual and Motor skills} 60 (1985) P : 311.

\textsuperscript{14} Lawrence W. Sherman and Richard J. Hofman, "Achievement as a momentary event, as a continuing state, locus of control: A clarification" \textit{Perceptual and Motor skills} 51 (1980) 1159.
control and achievement is clarified by disaggregating achievement into a momentary event (standardized test result) and continuing state (grade-point average) utilizing a path diagram approach. Although there are no substantial correlation among socioeconomic status, sex, and locus of control in this study the three variables predict school achievement as a continuing state \( R = .83 \) considerably better than they do as a momentary event \( R = .56 \) of 174 students in grade 8.

Bump\(^{15}\) conducted a study on Locus of Control, competitive anxiety, and level of aspiration in Children. Subjects were 53 students (30 Female, 23 Male) of 5th standard at a Middle class school in Saugerties, NY, the interaction between Locus of control and the Variables of competitive anxiety and level of aspiration was studied. The Nowicki - Stickland Locus of control scale, the sport competitive anxiety test, and a target throwing task were used to assess each variable, respectively. By one way ANOVA, it was concluded that those rating high in internality had lower competitive anxiety levels. No differences based on internality were found with level of aspiration or types of shift in aspiration. A \( X^2 \) was utilized to analyses type of shift. Level of aspiration was found to decrease as anxiety level increased by Person’s analysis. Sex differences were

\(^{15}\) Lenda A. Bump, "Locus of control, competitive anxiety, and level of aspiration in children" Completed Research in Health, Physical Education and Recreation :21 (1979) 171.
not found with respect to locus of control or competitive anxiety. Males appeared to have higher levels of aspirations than females. Data were analyzed by 3 independent one way ANOVA. It was concluded that the 3 variables were related.

Sinha\textsuperscript{16} conducted a study on "Need Achievement, Locus of control and Task-Persistence as related to Athletic success". The sample for the present study comprised of 50 successful athletes and 50 unsuccessful athletes studying in DEI, Dayalbagh, Agra. The unsuccessful athletes were those students who have lost their events and by successful athletes is meant those who have won their events. TAT measure as prepared by McClelland (1953) was used to measure level of need achievement. Rotter's I-E scale was used to measure Locus of control. The scale consisted of 29 items and 6 of them were the filler items and the remaining were the paved items. One is related to Internal and other is related to External locus of control. To measure task persistence five line-drawing figures as used by Glass, Singer and Friedman (1969) were used, which were actually insolvable. The results of the present study showed that successful athletes scored higher on need achievement than their unsuccessful counterparts. The mean for the two groups were 8.00 and 6.91 respectively. Locus of Control Variable

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mean scores for successful and unsuccessful groups were 6.73 and 12.80 respectively. The successful athletes show greater task persistence than the unsuccessful athletes. The means was 1050.15 sec and 477.90 sec respectively.

Trice and Shuman\(^\text{17}\) conducted a study on Locus of control and performance on a perceptual task under Maximal or Normative instructions 147 enrollers in extension courses were screened with Rotter’s I-E scale. The 30 Most external scores (17-22) and the 30 Most internal scores (1-8) were selected from the pool. Then each Locus of control group was divided into half randomly, with the stipulation that each group would be the same composition by sex (67% female) and have the same mean age composition. Subjects age ranged from 24 to 45 Yr, with a mean age for each group of 34 Yr. Subjects were given a 20 x 20 better matrix in which 20 words of three or more letters were embedded. One of each locus of control group was told that the average subject found 10 words, while the other group was told that there were 20 hidden words. Subjects were tested individually and given unlimited time for solutions.

Under the normative instructions, internal scores found a mean of 14.2 (SD, 1.5) words and persisted for a mean of 6.6 min (SD, 1.9). With maximal instructions, internal

\(^{17}\) Ashton D. Trice, and SHerrywood. Shuman, "Locus of control and performance on a perceptual Task under maximal or normative instructions" Perceptual and Motor skills 56 (1983) : 830.
scores found 19.1 mean words (SD, 0.2) and persisted for a
mean of 13.2 min (SD, 2.1) While external scores found 6.4
words (SD, 1.3) and persisted for 4.0 min (SD, 0.8). A 2 x 2
Analysis of variance yielded significant main effects and
interactions for both measures. While Locus of control
affected persistence across instructions, Maximal
instructions seemed to have increased persistence among
internal scores and discouraged external scores.

Curtis¹⁸ investigated the differences between positive
and negative self-concept groups in the learning and
subsequent performances of a gross motor task. He also
investigated: the differences between positive and
negative body concept (body cathexis) groups in the learning
and subsequent performance of a gross motor task, the effect
of bogus personality information upon performance of a
learned gross motor task, and the relationship of body-
concept and self-concept. The 126 experimental subjects were
selected from 250 junior high school boys on the basis of
their scores on the self concept inventory. 63 subjects who
scored in the upper quarter on the self concept test were
assigned to the positive self concept group and 63 who
scored in the lower quarter were selected for the negative
self concept group. Subjects within each group were
systematically assigned to the positive or negative

¹⁸ Bruce Richard Curtis, "Differences in self-concept and
performance of a gross motor task". Dissertation Abstract
International 30 : 1 (July 1969) : 154 - A.
treatment group. Within the scope of this study, it was concluded that:

1. There was no significant difference between the positive and negative self-concept group during the learning of the gross motor task. There was an observable trend for the positive self concept group to achieve higher scores than the negative group during this learning phase.

2. The positive body-concept group achieved significantly better scores than the negative body-concept group during the learning of the motor task.

3. The presentation of bogus, success-failure, personality information did not significantly affect performance of any of the self concept treatment groups.

Burnelt conducted a study of self-concept and decision-making style in college students. The purpose of this study was (a) to investigate the relationship between the self-concept and decision making style (b) to investigate Jains and Mann’s (1977) assumption that Vigilant decision makers have high self concept and ineffective decision makers have low self-concept, and (c) to evaluate the reliability and validity of the instruments used to

assess the two construct. A sample of 475 College students were administered the 180-item self-questionnaire. 7 items obtained demographic information, 136 items assessed 13 facets of self concept using Marsh and O’Neill’s (1984) SDQ III, and 37 items assessed six decision-making styles using Mann’s (1982).)

A canonical correlation analysis revealed three significant relationships. The first canonical correlation indicated a strong linear relationship between 10 of the 13 facets of self concept and the six decision making styles. Students with high self concept had effective decision making behaviours, while students with low self concept had ineffective decision making behaviors. Janis and Mann’s (1977) assumption was confirmed. The reliability and validity results indicated that both instruments were psychometrically sound.

Clark20 determined the relationship between self-concept and reading ability in a selected group of ninth-eleventh, and twelfth-grade students, as measured by the Tennessee self-concept scale and Nelson-Denny Reading test. Also of concern was this relationship compared according to the variables of gender and ethnicity.

From the findings in the study, it may be concluded

that there is a very low relationship \( r = .19 \) between self concept and reading achievements in a selected group of secondary students. Furthermore, there is a low relationship between self concept and reading achievement for male \( r = .21 \) and female \( r = .20 \) students. The relationship, however, is slightly higher for male students than for female students. Finally, there is a low relationship between self-concept and reading achievement for Black \( r = .17 \), Caucasian \( r = .31 \) and Mexican-American \( r = .21 \) students. The relationship however, between self concept and reading achievement is slightly higher for Caucasian students than for Mexican-American or Black students.

Wagman\(^2\) conducted a study of self-concept, attribution, motivation and perception of control in elementary school students. The purpose of this study was to determine whether or not high achieving students differ from low-achieving students in their attributions for success and failure, self-concept motivational orientation and perception of control. In addition, the relation of achievement, self concept motivational orientation and perception of control to "learned helplessness" was also examined.

120 high and low-achieving students in grades three through six completed questionnaires measuring self concept: attributions for success and failure in Mathematics, reading and Science. Motivational orientation and perception of control. The low achieving students were selected because they were suspected to be learning disabled and 70% were later classified as such.

Data were analysed using multivariate analysis variance and multiple regressions. The results showed that the high achievers had higher academic self-concept; were more internally motivated and attributed their success and failure differently than low achievers. In addition, some weak grade differences were found on the self concept, motivation and attribution measures. The best predictors of a "learned helpless" achievement orientation were self concept and academic history in the specific subject areas.

Tyler\(^\text{22}\) investigated the relationship between self-concept and motor performance of second-grade children. The 109 subjects who participated in this study selected from four classes of second grade students enrolled in Whittier Elementary school in Westerville, Ohio. All students enrolled in the four second-grade classes were individually given the Peers, Harris self opinion test.

Following the administration of the self-concept test the students were given five selected items of the Peacock achievement scales in Physical Education activities. The five items selected were: Forty yards run, soccer punt for distance, soft ball throw for distance, standing broad jump and side stepping. Pearson Product Moment Correlations were computed for the total self-concept scores, the total motor performance scores and with each of the five motor performance test items.

The findings of this study do not appear to indicate any particular pattern of relationship between self concept and motor performance. This does not imply that no such pattern exists only that none were revealed in this study. Findings of this particular investigation regarding the negative self concept with the low motor performance lend credence to this assumption.

McCaughan^23 determined the effects of Achievement Motivation and success/Failure on attributions, expectancies, and performance on a psychomotor Task. Groups of male high school students \(N = 420\) classified a high and low need achievers by the Mehrabian scale used a lever-positioning task to determine performance differences success and failure feedback was administered after

successive blocks of trials and both attribution and expectancy date were collected. No differences were found between the motive groups for performance, attributions or expectancy. However, success/failure feed back did produce significant differences for attribution and expectancy, evidences for a situational rather than dispositional effect.

Weinberg\textsuperscript{24} compared the resultant achievement motivation of athletes and non athletes. The study included male athletes and non athletes from three small colleges and two large colleges. The instrument used to assess resultant achievement Motivation (N. Ach) was the male from of Mehrabian achievement scale (M.A.S). The M A S was administered to all subjects under relaxed condition. Subjects were classified as athlete if they earned a college-varsity award and as a non athlete if they had failed to earn an athletic award in high school as well as college. Based on this criteria 857 athletes and 673 non-athletes were included in this study. The athletic sample consisted of individual representing 13 different sports. The resultant N. Ach level of athletes and non-athletes were analysed by a two factor fixed effect analysis of variance. The results were: (1) athletes demonstrated a higher level N. Ach. than non-athletes (2) The individual sports athletes

demonstrated a higher N. Ach. level than team sports athletes. (3) The large college athletes and small college athletes demonstrated similar resultants N. Ach levels.

Maxson\textsuperscript{25} conducted a study to find relation between achievement motivation and performance in competitive swimming. The Mehrabian measure of achievement tendency and a survey of a swimming achievement instrument designed by investigator were given to 44 college swimmers (29 males, 15 females) from four Universities. The results obtained were as follows:

(1) There were significant positive 'r' between the scores of achievement motivation questionnaire and the swimming success survey.

(2) College swimmers achieve significantly higher scores on Mehrabian measurement of achievement tendency than the norm for college students in general.

(3) Female swimmers obtained significantly higher level of achieving tendencies than the level of the male swimmers.

Mesug\textsuperscript{26} conducted a study to determine whether a relationship existed between an athlete’s level of achievement motivation and gymnastic meet performance. A


secondary purpose was to determine if the level of achievement motivation differed between male and female gymnasts. The McClelland thematic appreciation test (MTAT) was administered to measure the levels of achievement motivation among male and female members of the SDSU intercollegiate gymnastics team. Subject’s gymnastic meet scores were taken as the measure of proficiency in gymnastics. Using Pearson 'r' it was found that no significant relationship existed between achievement motivation and gymnastics meet performance among men and women (P.05). Through the use of a t-test it was found that a significant difference existed between scores attained by men and women on the MTAT (P .05).

Mc Caughan27 studied the role of attribution expectancy and achievement Motivation included by two feed back conditions on the learning of a naval psycho-motor task. 60 high and 60 low need achievers were randomly placed into success and failure feed back condition. Following each block of performance trial's, fictitious feed back in the form of success and failure information was given and then each subject rated attribution and expectancy questionnaires. Expectancies for future performance were found to improve more following success than later failure.

27Lindsay R. McCaughan, "Performance as a function of attribution expectancy, and Achievement Motivation induced by two feed back conditions during learning of noval motor task" Completed Research in Health, Physical Education and Recreation 19(1977).
Although trends were noticed, performance scores were unaffected by feed back type.

Shoji, Sumi and Fujita\(^{28}\) conducted a study on depth perception in moving line patterns. By means of a computer system, the two-dimensional projection of a three-dimensional random wire figure, rotated clockwise (CW) or counter clockwise (CCW) about the Vertical axis, were produced and displayed on a CRT. Generally the stimulus display appeared as an object rotating in depth, changing the direction of movement frequently from clock wire rotation to counter clockwise, and vice versa. In the experiment, the three subjects observed the display of three different types of projection, two polar projections and a parallel one. They were instructed to judge the direction of the seen motion and asked to report it using the button switches. Both duration of the rotation perceived in either direction and frequency of the apparent reversals between those two were measured from the output sheets of a pen-recorder. The results showed the effects of the type of projection in the following manner:

(1) The Vertical motions were perceived more continuously and durably in the polar projections than in the parallel one.

the opposite relation was found with the non-vertical motions and

the reversals of moving direction were seen more frequently in the parallel projection than in the polar ones.

Schwartz\(^\text{29}\) placed 30 male college subjects in two groups to discover if varying degrees of general muscular fatigue had any effect on the depth perception. The Experimental group pedalled a bicycle ergometer under condition of increasing work loads until a heart rate of 170 BPM was reached or until unable to pedal was required. The depth perception scores and heart rate were recorded simultaneously at pre-selected time during the experimental period. All the subjects in the experimental group were actively exercising during the time these data were collected. The data from the control group were collected following the same procedure concept that they did not perform any physical work. ANOVA indicated no significant differences between the depth perception scores of the experiment and control group, no significant changes occurred in depth perception scores during the experimental period, and no significant interaction effects. These findings were confirmed by the paired 't' test that indicated no significant differences between initial and final depth perception scores of either group.

SECTION II

PSYCHOLOGICAL STUDIES RELATED TO MOTOR COMPONENTS

Floyd determined the relationship between Physical performance and self-concept. This study was designed to determine if there was a relationship between self-concept and physical performance among selected college female students. The study was limited to the university female students enrolled in WP III - Body Mechanics, a course required of all female students at Washburn University, Topeka, Kansas. The total number of students who completed the testing programme was 323. Correction coefficients were computed for the scores derived from the Scott Motor Ability test and the index of adjustment and values. The results of this study indicate that there was not a significant (.05 level) linear relationship between physical performance and self concept among the group tested. The results also indicated that there was not a significant (0.5 level) relationship between physical performance and self-description, physical performance and self acceptance, physical performance and ideal concept, and physical performance and discrepancy score.

Teagardin conducted a study of self-concept in

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31 Steffani Spilman Teagardin "A study of self-concept in relation to physical fitness and motor ability among elementary, middle and high school girls 'Dissertation Abstract International' 44 : 6 (December 1983) " 1726-A.
relation to physical fitness and motor ability among elementary, middle and high school girls. The purpose of the study was to compare self-concept among students in relation to their physical fitness, motor ability, and an over all physical performance.

A total of 665 subjects was used for this study. The population comprised of fifth, seventh and tenth graders. The subjects were female students enrolled in regular physical education classes and those who participated in athletics. The subjects were classified into groups according to grade level, high or low physical fitness level, high or low motor ability level, and high or low composite level.

The analysis of data revealed that no significant difference was identified when comparing self-concept among students in relation to their physical fitness, motor ability, and composite score in fifth, seventh, and tenth grade girls.

Clower\textsuperscript{32} determined the relationship of self-concept, Movement concept and physical fitness for college women. The primary purpose of the study was to determine the interrelationship of Physical fitness movement concept and

\textsuperscript{32} Mary Alice Clower,"The relationship of self concept, movement concept and physical fitness for college women", \textit{Completed research in Health, Physical Education and Recreation} 21 (1980) 168.
self concept, subjects were college freshmen women (N = 258). Secondly, the effects of an 8 week activities curriculum on self-concept, Movement concept, and physical fitness were examined. Differences in the interrelationship were also investigated with regard to high and low fitness subgroups. The AAMPER Physical fitness test Battery, Doulah’s Q-sort for movement concept, and the Tennessee self-concept scale (TSCS) were the test instruments.

Pearson’s r’s, partial r’s, factor analysis, Multiple regression and ANOVA were employed. Results of the study indicate that for low physical fitness subjects, there is a moderate positive correlation for Mc-self easteem. The r’s also indicate that self integration, as well as self esteem, is improved by an enhanced Movement concept. Movement concept is related to several TSCS subscores for the low Physical fitness subjects, but high physical fitness subjects exhibit a correlation only with the physical self item. There is apparently some threshold level of physical fitness above which there is a positive r for Movement concept and physical fitness. The only significant (P<.05) r for physical fitness and self esteem was observed for the post-treatment group. Factor analysis results define 3 Major dimensions: self esteem-certainty, variability or the inverse of self integration, and physical movement. The relationship of self-esteem-certainty and physical fitness is strengthen, while self integration is less dependent on the physical-Movement domain after treatment. Physical
fitness average and Movement concept may be used in linear combination as predictors of overall self esteem.

Tucker\textsuperscript{33} determined the relationship of the self concept and selected physical fitness variables of adolescent females. Subjects (n=76) were female in grade 7, 8, and 9 at Schuyler Co JHS in Queen city MO. Subjects were pretested and posttested for Physical fitness and self-concept after a six-month physical education programme.

The AAHPER youth fitness test was used to test different fitness variables. An average fitness percentile was also calculated. The Piers-Harris self-concept scale was used to measure self-concept variables. Paired t-test revealed that subjects improved (P < .01) in total self-concept and average fitness (P < .01). Average fitness and total self concept were related to the pretest (r = .30, P < .01) and the posttest (r = .37, P < .01). The best predictors of self-concept were average fitness, 50 Yd dash, Flexed arm hang, 40 Yd shuttle run and sit ups combining for a multiple R = .39, which accounted for only 15.56\% of the Variance in total self concept.

Weinberg\textsuperscript{34} conducted a study to examine the effects of


\textsuperscript{34} William T. Weinberg, "The effect of resultant achievement motivation on the efficiency of motor performance" \textit{Abstracts of Research paper} (1978) : 64.
resultant achievement motivation (NACH) on the efficiency of the motor performance. More specifically an attempt was undertaken to account for the constant finding that under achievements-oriented conditions, persons with high achievement needs perform better than persons with low achievement needs. Based on the sources from the Maharabian achievement scale, 20 male college students were classified a low in resultant NACH. The 20 participants within each motive group were than randomly assigned to either relaxed or achievement-oriented conditions. In each condition participants performed 27 trials, each of 10 sec duration, on a pursuit motor task. Each trial was followed by a 10 sec result interval. After a 10 min rest period participants completed an additional 27 trials. Each session of 27 trials was then grouped in to nine blocks, each consisting of the three trials for purposes of analysis. Statistical analysis included both exponential curve and three factors (Motive classification (2) X Experimental condition (2) X block of trials (a) ANOVA for each session with repetition on the final factors. The results are as follows:

(1) During the first session high NACH participants performed significantly better than low NACH participant under achievement oriented conditions with the pattern of results being reserved for relaxed condition F (8,288) = 3.47, (P<.01) (2) the anymptotic value for the high NACH group was significantly greater than that of the low NACH group under achievement-oriented condition (3) following the
10 min rest period no performance differences were found among the motive groups and (4) the low NACH group demonstrated significantly more reminiscence than the high NACH group under achievement oriented conditions. It was concluded that Atkinson's resultant achievement motivation theory accounts for motive group differences during the initial stage of motor performance. However, these differences dissipate during rest interval so that the subsequent performance of low NACH persons is hindered.

SECTION III

Psychological studies related to sports skills

Sampson\(^3^5\) conducted a study on "Attention and learning selected Motorskills". Three separate studies were included in the investigation. The task included the kip on the horizontal bar (relatively a difficult skill), the forward hip circle on the horizontal bar (a skill of medium difficulty), and the hand spring (relatively an easy skill). The subjects (299 College Males) in each study were divided into seven groups with each group receiving a different set of instructions. It was found from an examination of general, specific and self directed groups, that learning seemed to be facilitated when the instructions given in

\(^3^5\) Orwyn Sampson, "Attention and learning selected motor skills" Completed Research in Health Physical Education and Recreation 10 (1968) : 82.
earlier practice sessions were "generalized" (simplified) as contrasted with the giving of greater detail in early instructions. The value of simplifying instructions later to learning appeared in increase with task difficulty.

Burke\textsuperscript{36} conducted a study on male and female, advanced tennis playing youth and adults (N = 24, 13-44 years old). The study investigated effectiveness of a concentrational training technique enhancing attentional skills related to the tennis service and as a means of reducing sport competition anxiety in advanced tennis players. The effects of attentional training on the performance of a tennis serving accuracy task was also observed. Experimental and control group subjects were pretested and twice posttested on the tennis test of Attention and Interpersonal Styles (T-TAIS), the sports competition anxiety test (SCAT), and a service accuracy task. A concentration training intervention based on meditational procedures, but made tennis -specific, was introduced to the experimental group between the first and second posttest. The intervention was employed for two weeks (28 sessions maximum).

An attentional training questionnaire was given to the experimental tennis subjects to analyze their perceptions of the effectiveness of the cognitive technique. In conflict

\textsuperscript{36} Kevin Lamar Burke, "The effect of a perceptual cognitive training program on attention/concentration style and performance of the tennis service". Dissertation Abstract International 49 : 12 (June 1989) : 3654-A.
with the ANOVA analyses, 75% of the trained subjects reported that the concentration training technique helped their tennis game. Implications of findings in this investigation indicate that the proposed benefits of cognitive attentional training interventions should not be proclaimed or disclaimed until further research in this area has been performed.

A motor skill accuracy task involving fine muscle coordination, putting a golf ball, was utilized to study the effects of two different cognitive interventions on sports competition anxiety and performance. 61 under-graduates participated in the study, 19 of whom were highly anxious in competitive sporting situation. Subjects were randomly assigned to one of three experimental conditions: (a) a cognitive behavioral relaxation group, (b) a (Psyching -up) arousal group, and (c) a control group. All subjects completed a putting task pre- and post-intervention. The cognitive behavioral group showed significantly greater reduction in anxiety during performance than did the other two groups. A non significant trend emerged on performance scores such that only subjects in the (psyching-up) arousal group failed to significantly improve their performance pre- to post test. The findings are discussed in the context of existing theories describing the relationship between
arousal and performance.  

Peck divided 32 students in a Volleyball class into two matched groups on the basis of the IPAT 8 - parallel from anxiety test to 13 class meetings, during which the French and Cooper Serve and Repeated Volleyball Test's were given at the beginning, middle and end of meeting. Induced anxiety was attempted by verbal and written suggestions that inadequate test performance would result in a low final grade. Performance improved significantly on the skill test but the correlations between anxiety and test performance were not significant. Induced anxiety produced significant changes in anxiety but the changes were not uniform in the same direction.

Hollingsworth conducted study to determine the effect of special performance and encouragement on the acquisition of gross motor skills. She also investigated relationship between trait anxiety, state anxiety and the performance of


this same task. 90 Male and female junior high school students who had scored either "high anxious" or "Low anxious" on Speilberger’s Trait Anxiety Inventory (STAI) were randomly divided into a "performance goal group", a "verbal encouragement group", and a control group. The subjects practiced a two ball, one hand juggling for five minutes on 12 consecutive school days. They took the STAI just before each practice session. The average number of counts per trial was recorded for each subject and each session. All subjects were given knowledge of results. Subjects in the "Verbal encouragement groups" were told to do their best. Subjects in the "performance goal group" were given a goal based on their previous trial. Apart from data on anxiety, no significant differences in performance level occurred, and strong relationship was found to exist between state and trait anxiety. It was also found that, as the performance level increased with practice, the anxiety level tends to decrease.

61 Male students with scores more than I.S.D. above (high anxiety) and below (Low anxiety) the means on the Pittsburgh Revision of the manifest anxiety scale were used as subjects and assigned randomly in each category to experimental and control groups. The test consisted of matching a specified foot pattern while walking at 2 MPH on a treadmill for 1.5 minutes, with total missteps constituting the error score. The experimental groups received shock at predetermined intervals. Subjects had two
trials with pulse rate recorded before and after each trial. Following each trial, the subjects rated themselves on the anxiety during the test. The findings supported the hypothesis that stress inhibited efficient functioning of high anxiety subjects and facilitated the performance of low anxiety subjects.40

Lacey41 studied 85 female athletes: 34 individual-sports participant and 51 team-sports participants. The team sports group activities were Lacrosse (n=23), Softball (n=18), and Basketball (n=10). The individual sports group activities were swimming (n=11), Gymnastics (n=10) and track and field (n=13). Competitive trait anxiety levels were assessed through the use of the SCAT. Locus of control (LOC) factors were measured by use of Rotter’s LOC Inventory. Pearson r was used to determine relationship, one way ANOVA, and the Scheffe Multi-comparison follow-up test were used to compare the individual and team sports athletes on trait anxiety and Locus of control. No relationship, were found between the competitive trait anxiety levels and the LOC factors. Athletes competing in Track and field had significant higher scores on the SCAT than athletes participating in basketball and in softball.


Lee\textsuperscript{42} studied on the Locus of contextual interference in motor skill acquisition. Three experiments are reported which investigated contextual variety effects in motor skill acquisition. In experiment 1, result revealed that despite previous methodological confoundings of Contextual Variety with response paradigm manipulations the critical retention advantage, of random over blocked practice scheduled was maintained. In experiment 2 the inclusion of a group which combined attributes from random and block practice schedules produced evidence which implicated the role of event repetitions as the experimental variable from which Contextual Variety effects arise. By changing the task goals in experiment 3 to emphasize the processing of error information as the cognitive effective activity most critical to performance support for a problem-solving approach to event repetition effects was found. These findings were discussed in a theoretical framework which incorporates recently revamped notions of the role of cognition in motor skill acquisition.

On the basis of performance of three tests, the Medicine ball, the standing broad jump and Zigzag running, Black\textsuperscript{43} categorized athlete and non participant as high and

\textsuperscript{42} Timothy Donald Lee, "On the locus contextual interference in motors skill acquisition" \textit{Dissertation Abstract International} \textbf{43} : 8 (February 1983) : 25-96-A.

\textsuperscript{43} Basetly M. Black, "The Relationship of self-concept to physical skill and athletic participation", \textit{Completed Research in Health, Physical Education recreation and Recreation} \textbf{19}(1977) : 220.
low in physical skill. He found no significant difference in self-concept between athlete and non participants but significant difference (P.05) was found between those of high and low physical skill and physical self concept, moral ethical self concept and family concept. In each of these cases individuals of higher physical skill had the higher self concept as measured by Tennesse’s self-concept scale.

Burton44 studied the relationship between state and trait anxiety, two motivational dispositions, and skill attainment in beginning bowling and beginning riflery. Subjects were 212 college women. Results showed a relationship between trait anxiety and the level of state anxiety experienced in the two activities, but no relationship between the two motivational dispositions. There was a significant negative relationship between both state and trait anxiety and the level of skill attained in beginning riflery.

Harvery45 investigated the relative effectiveness of three motivational techniques viz. level of aspiration, team competition and level of aspiration and team completion

44 Carter Elsie Burton, "State and trait anxiety, achievement motivation and skill attainment in college women" Research Quarterly 42 (March 1971) : 139.

45 Dexter, A.A. Harvey; "The effects of level of aspiration and team competition as motivational technique upon children’s performance on selected sports skills test" Dissertation Abstracts International 31 (June 1971); 6383.
combined on the performance of fourth and fifth grade boys and girls on shuttle run, dodging run, Basketball speed pass and over head throw. Scores of 92 boys and 91 girls were subjected to analysis of variance with Duncan’s New Multiple Range test as post-hoc treatment. It was reported that the combined level of aspiration and team competition motivated technique was found to be most effective in improving performance on the shuttle run, dodging run and Basketball speed pass test items.

Ridini conducted a study on 181 junior high school boys (91 athletes and 90 non athletes) who took five psychological functions’ tests and eight sports skills’ tests to determine (a) Whether difference existed in selected psychological functions and selected sports skills between junior high school boy athletes and non athletes, (b) the degree of relationship between psychological functions and sports skills, (c) the implementation of six-multiple variation equation in predicting probable individual sports skill scores, and (d) the degree of relationship between a long and short form psychological functions test and a long and short form sport skills test.

The Stoelting visual reaction timer apparatus was used to test the simple reaction time. The Howard Dolman

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46 Leonard M. Ridini, "Relationship between psychological function and selected sport skills of boys in junior high school" Research Quarterly 39 : 3 (oct 1968) : 674.
apparatus was used to test for depth perception. The McClure perimeter was used to test for peripheral vision left eye, right eye, and total angle. The sport skill tests used were soccer combination skills and Volley; basketball dribble shoot and Volley; Volleyball Volley and serve; and baseball Volley and repeat throws.

Significant differences existed on all psychological function tests and sport skill tests between athletes and non athletes, in favor of athletes. The psychological function tests were independent for each other except for peripheral vision total angle with right eye and left eye. There was a low to moderate relationship between the psychological functions and the sports skills. The six-variable multiple R regression equation had a 70 percent predictive accuracy on individual scores for each sport skill test. The short form psychological functions test and the short form sports skill test could replace their respective long forms. The short form psychological functions test could moderately predict sport skill performance in the sport skill areas selected.

Schiltz and Levitt\(^7\) conducted a study on level of aspiration of high and low skilled boys. The level of

\(^7\) Jack H. Schiltz and Stuart Levitt "Level of aspiration of high and low skilled boys". *Research Quarterly* 39 : 3 (Oct 1968) 696.
aspirations (L/A’s) of high skilled and low-skilled boys were examined to determine if they differed under prearranged conditions of failure in a simple motor task. Subjects were selected on the basis of their performances on a modified form of the Iowa Brace test. The motor task consisted of moving small blocks from one board to another preceding each of three trials, the subject stated how many blocks he reasonably thought he could move in the succeeding 30 seconds trial. After a universal performance level was established failure was induced by systematically stopping the subject before he attained his L/A. A 2X3 factorial design with repeated measures on the second factor was employed. Analysis of Variance indicated that the main effects of skill level and trials were significant at the .05 level. Analysis of simple effects indicated that the L/A of high and Low-skilled groups differed significantly only on the third trial (P = .05) and that failure had a significant effect on both groups (P = .10). High skilled subjects expressed higher L/A’s than did low skilled subjects. All subjects L/A’s lowered significantly over trials. The L/A’s of the high-skilled group as compared to the low-skilled group over the three trials did not indicate differential responses.