Chapter II

REVIEW OF RELATED LITERATURE

This chapter describes the reviews of related research conducted both in India and Abroad. The researcher finds out some of the reviews of literature which could be very supportive and strengthen this study. After analyzing the available literature, the researcher has presented some of the observations and findings of the experts.

To have a thorough understanding and an insight deep into the development of a discipline, the researcher must be thoroughly familiar with both previous theory and research. The literature related to any problems helps the researcher to discover information which would enable to have a deep insight, clear prospective and a better understanding of a chosen problem and various factors connected to the study. Hence a number of books, journals and websites were referred and reviews were collected. In the following pages, an attempt has been made to present briefly a few of the important researches and studies conducted abroad and in India, as they have significant bearing on the present study.

The literature in any field forms the foundation upon which all the other future works will be built. If the researcher fails to build upon the foundation of knowledge provided by the review of literature, it may result in missing some of the works which have already conducted on the same topic.
Abdelalim et al., (2012) identified in their research the association between childhood obesity and student academic performance in the classroom setting. A multi-stage cluster random sampling was used to select a representative sample of 1,213 fifth-grade students in male public schools. Height and weight were measured using a standard protocol. Overweight was defined as BMI ≥85th but <95th percentile, while obesity as ≥95th BMI percentile, using growth charts provided by the Centre for Disease Control and Prevention (2000). Data on each student's academic performance and socio demographic factors were extracted from school records. Of the 1,213 students, 147 were absent on the day the survey was conducted. Therefore, the analysis was based on 1,066 students. Of the 1,066 students, 67 did not have previous school records because they were new in the school; hence the association between school performance and obesity was based on 999 students. The prevalence of obesity was 186 (17.4 percent, 95 percent CI: 15.2-19.9 percent) while the prevalence of overweight was 232 (21.8 percent, 95 percent CI: 19.3-24.4 percent). There was no significant association between obesity and academic performance after adjusting for socio demographic factors. Parental education was the most important predictor for high academic performance in the classroom setting. There is no association between obesity and academic performance in the classroom setting among boys in Kuwait. With the lack of evidence of a relationship between childhood obesity and academic performance, using high performance as a measure of success in prevention initiatives cannot be justified.

Singh and Uijtdewilligen (2012) in the study analysed the prospective relationship between physical activity and academic performance. Studies were
selected by screening the titles and abstracts for eligibility, rating the methodological quality of the studies, and extracting the data. Studies had to report at least one physical activity or physical fitness measurement during childhood or adolescence. Studies also had to report at least one academic performance or cognition measure during childhood or adolescence. This systematic review identified 10 observational and 4 intervention studies. The quality score of the studies ranged from 22 percent to 75 percent. Two studies were scored as high quality. Methodological quality scores were particularly low for the reliability and validity of the measurement instruments. Based on the results of the best-evidence synthesis, there was evidence of a significant longitudinal positive relationship between physical activity and academic performance. Participation in physical activity is positively related to academic performance in children. Because only 2 high-quality studies were found, future high-quality studies are needed to confirm our findings. These studies should thoroughly examine the dose-response relationship between physical activity and academic performance as well as explanatory mechanisms for this relationship.

**Alicia. Fedewa and Soyeon, Ahn (2011)** examined the effects of physical activity and physical fitness on children's achievement and cognitive outcomes: a meta-analysis. It is common knowledge that physical activity leads to numerous health and psychological benefits. However, the relationship between children's physical activity and academic achievement has been debated in the literature. Some studies have found strong, positive relationships between physical activity and cognitive outcomes, while other studies have reported small, negative associations. This study was a comprehensive, quantitative synthesis of the
literature, using a total of 59 studies from 1947 to 2009 for analysis. Results indicated a significant positive effect of physical activity on children's achievement and cognitive outcomes, with aerobic exercise having the greatest effect. A number of moderator variables were also found to play a significant role in this relationship. Findings are discussed in light of improving children's academic performance and changing school-based policy.

**Basch (2011)** studied the Physical activity and the achievement gap among urban minority youth. To outline the prevalence and disparities of physical activity among school-aged urban minority youth, causal pathways through which low levels of physical activity and fitness adversely affects academic achievement, and proven or promising approaches for schools to increase physical activity and physical fitness among youth. A large proportion of youth is insufficiently physically active. Estimates of population-wide levels of physical activity indicate that Black and Hispanic youth are less physically active than White youth, with disparities particularly evident for females. The population segments of youth with lowest levels of physical activity and fitness also have least access to school-based physical activity opportunities and resources. Physical activity affects metabolism and all major body systems, exerting powerful positive influences on the brain and spinal cord and, consequently, on emotional stability, physical health, and motivation and ability to learn. The cornerstone of school-based physical activity programs should be a high-quality physical education program based on national standards. Such programs are strongly recommended by the Task Force on Community Preventive Services as a way to increase physical activity and physical fitness among youth. Physical inactivity is highly
and disproportionately prevalent among school-aged urban minority youth, has a negative impact on academic achievement through its effects on cognition, and effective practices are available for schools to address this problem. Increasing students' physical activity and physical fitness can best be achieved through a comprehensive approach that includes physical education, wise use of recess and after-school times, co-curricular physical activity opportunities, and bicycling or walking to and from school.

Catherine, Davis, Tomporowski, Phillip and Dowell (2011) in their study analysed that exercise improves executive function and achievement and alters brain activation in overweight children. Experiment tested the hypothesis that exercise would improve executive function. Design: Sedentary, overweight 7- to 11-year- [old children (N = 171, 56 percent girls, 61 percent Black, M ± SD age = 9.3 ± 1.0 years, body mass index BMI] = 26 ± 4.6 kg/m², BMI z-score = 2.1 ± 0.4) were randomized to 13 ± 1.6 weeks of an exercise program (20 or 40 min/day), or a control condition. Main Outcome Measures: Blinded, standardized psychological evaluations (Cognitive Assessment System and Woodcock-Johnson Tests of Achievement III) assessed cognition and academic achievement. Functional MRI measured brain activity during executive function tasks. Results: Intent to treat analysis revealed dose-response benefits of exercise on executive function and mathematics achievement. Preliminary evidence of increased bilateral prefrontal cortex activity and reduced bilateral posterior parietal cortex activity attributable to exercise was also observed. Conclusion: Consistent with results obtained in older adults, a specific improvement on executive function and brain activation changes attributable to exercise were observed. The cognitive and
achievement results add evidence of dose-response and extend experimental evidence into childhood. This study provides information on an educational outcome. Besides its importance for maintaining weight and reducing health risks during a childhood obesity epidemic, physical activity may prove to be a simple, important method of enhancing aspects of children's mental functioning that are central to cognitive development. This information may persuade educators to implement vigorous physical activity.

Rebecca London and Sebastian Castrechini (2011) examined the link between youth physical fitness and academic achievement through a longitudinal examination. Childhood obesity has been linked with other persistent health problems, but research is just the beginning to examine its relationship with academic performance. This article tracks students longitudinally to examine the physical fitness of the students and changes in fitness align with school performance. Using matched administrative data and individual growth modeling, the relationship between academic achievement and overall physical fitness has been examined longitudinally from fourth to seventh and sixth to ninth grades for students in a California community. Comparing those who are persistently fit to those who are persistently unfit, we find disparities in both math and English language arts test scores. These academic disparities begin even before students begin fitness testing in fifth grade and are larger for girls and Latinos. Overall physical fitness is a better predictor of academic achievement than obesity as measured by body mass index. Socioeconomic status acts as a buffer for those who have poor physical fitness but strong academic performance. The findings indicate the presence of a physical fitness achievement gap that has consequences
for potential students' future educational and health outcomes. This gap begins as early as fourth grade, which is before physical fitness testing begins in California.

**Donnelly and Lambourne (2011)** in this study proves that there is increasing evidence for the association between physical activity, cardiovascular fitness, fatness, and cognitive function during childhood and adolescence. Evidence also suggests that these variables are linked to academic achievement. Classroom-based physical activity provides a viable approach to improve fitness, body mass index (BMI), cognitive function, and ultimately academic achievement. Studies examining the relation between physical activity, fitness, fatness, cognitive function, and academic achievement are described. The results of a large-scale, longitudinal, cluster randomized trial to examine the impact of classroom-based physical activity on body mass index and academic achievement will be presented. Overall, the data support the link between physical activity, cognitive function, and academic achievement. The role of physical activity in the classroom was also supported by the Physical Activity Across the Curriculum (PAAC) project. Physically active academic lessons of moderate intensity improved overall performance on a standardized test of academic achievement by 6 percent compared to a decrease of 1 percent for controls (p<0.02). Body mass index increased less from baseline to 3 years in students with greater than 75 minutes of PAAC lessons per week (1.8 BMI) compared to students with less than 75 minutes of PAAC per week (2.4 BMI), p<0.00. Future research examining the effects of physically active academic instruction is warranted. The impact of physically active academic lessons of greater intensity may provide larger benefits for body mass index and academic achievement.
Davis and Cooper (2011) this study examined the associations of fitness and fatness with cognitive processes, academic achievement, and behavior, independent of demographic factors, at the baseline of an exercise trial. Overweight, sedentary but otherwise healthy 7–11 year olds (N = 170) participated in a study of health, cognition and achievement in the Augusta, GA area from 2003–2006. Children underwent evaluations of fatness and fitness, psychological assessments of cognition and academic achievement, and behavior ratings by parents and teachers. Partial correlations examined associations of fitness and fatness with cognitive and achievement scores and behavior ratings, controlling for demographic factors. Fitness was associated with better cognition, achievement and behavior, and fatness with worse scores. Specifically, executive function, mathematics and reading achievement and parent ratings of child behavior were related to fitness and fatness. Teacher ratings were related to fitness. These results extend prior studies by providing reliable, standardized measures of cognitive processes, achievement, and behavior in relation to detailed measures of fitness and fatness. However, cross-sectional associations do not necessarily indicate that improving one factor, such as fatness or fitness, will result in improvements in factors that were associated with it. Thus, randomized clinical trials are necessary to determine the effects of interventions.

Edwards, Mauch and Winkelman (2011) studies the relationship of nutrition and physical activity behaviors and fitness measures to academic performance for sixth graders in a mid west city school district. To support curriculum and policy, a mid west city school district assessed the association of selected categories of nutrition and physical activity (NUTR/PA) behaviors,
fitness measures, and body mass index (BMI) with academic performance (AP) for 800 sixth graders. Students completed an adapted Youth Risk Behavior Surveillance Survey (NUTR/PA behaviors), fitness assessments (mile run, curl-ups, push-ups, height, and weight) with results matched to standardized scores (Measures of Academic Progress [MAP]), meal price status, and gender. Differences in mean MAP scores (math and reading) were compared by selected categories of each variable utilizing 1-way analysis of variance. Associations were determined by stepwise multiple regression utilizing mean MAP scores (for math and for reading) as the dependent variable and NUTR/PA behaviors, fitness, and BMI categories as independent variables. Significance was set at α = 0.05. Higher MAP math scores were associated with NUTR (more milk and breakfast; less 100 percent fruit juice and sweetened beverages [SB]) and PA (increased vigorous PA and sports teams; reduced television), and fitness (higher mile run performance). Higher MAP reading scores were associated with NUTR (fewer SB) and PA (increased vigorous PA, reduced television). Regression analysis indicated about 11.1 percent of the variation in the mean MAP math scores and 6.7 percent of the mean MAP reading scores could be accounted for by selected NUTR/PA behaviors, fitness, meal price status, and gender. Many positive NUTR/PA behaviors and fitness measures were associated with higher MAP scores supporting the school district focus on healthy lifestyles. Additional factors, including meal price status and gender, contribute to AP.

Efrat and Erav (2011) this study explores an innovative strategy for battling the obesity epidemic. The strategy involves demonstrating to policy makers and education leaders the value of promoting physical activity in school as
a way of enhancing academic-related outcomes to narrow the current achievement gap. A literature review was conducted to ascertain the feasibility of this strategy. Seven studies that examined the relationship between physical activity or fitness and academic-related outcomes were reviewed. Although more research is needed in this area, the majority of the articles reviewed found that regardless of socioeconomic status or ethnicity, a positive relationship exists between physical activity and academic-related outcomes. These findings suggest that integrating more physical activity into the school day may be an effective strategy to reduce both health disparities and the achievement gap.

Megan Hylok (2011) examined the study of exploring student perceptions to explain the relationship between physical activity and academic achievement in adolescents: A mixed methods study. A nationwide survey conducted by the Center for Disease Control in 2007 reported 65 percent of high school students did not meet the recommendation that youth participate in at least 60 minutes of physical activity most days of the week (CDC, 2008). While research has focused its attention primarily on bodily health, growing evidence supports the benefits of physical activity on brain health (Ratey & Hagerman, 2008). Physical activity is important and many adolescents are not meeting the recommendation, therefore, it is important to explore the adolescent perceptions to understand which factors influence physical activity participation. The significance of this study is to gain a better understanding of adolescent perceptions to explain the role physical activity plays on academic achievement. The intent is to provide additional insight into improving educational and community programs and policies to increase physical activity among adolescents. A two-phase explanatory mixed methods design was
used. In the first quantitative phase, descriptive statistics, correlations, and two-way ANOVAs were conducted. Results from the study of 208 secondary adolescents from a Midwestern setting indicated that physical activity does not have a significant relationship with academic achievement. However, two-way ANOVA results did provide support for the existence of differences in ecological factors influencing physical activity and academic achievement. In the second qualitative phase, extreme case sampling was used to select participants for focus group interviews. Analysis of the third research question did reveal substantive differences in perceptions of physical activity and academic achievement between each of the four extreme groups. Themes included: enjoyment, motivation, self-efficacy, perceived feelings, health, social influences, support, environment, academics, and barriers. A connection of the quantitative and qualitative results found social influences, self-efficacy, support, environment, academics, and motivation the greatest influences statistically and substantively on physical activity influences. The fourth analysis suggested more students feel there is a relationship between physical activity and academic achievement. The fifth analysis provides suggestions for adolescents, parents, schools and the community how to increase physical activity participation among adolescents.

Kibbe et al., (2011) in this research evaluated the link between physical activity (PA) or fitness and a child's ability to achieve academically; however, little structured activity time is incorporated into elementary school classrooms. This paper explores the impact of a classroom-based PA program, TAKE 10!, and health-academic integration through existing state and federal policy and programming. Evidence from journal articles, published abstracts, and reports
were examined to summarize the impact of TAKE 10! on student health and other outcomes. This paper reviews 10 years of TAKE 10! Studies and makes recommendations for future research. Teachers are willing and able to implement classroom-based PA integrated with grade-specific lessons (4.2 days/wk). Children participating in the TAKE 10! program experience higher PA levels (13 percent), reduced time-off-task (20.5 percent), and improved reading, math, spelling and composite scores (p<0.01). Furthermore, students achieved moderate energy expenditure levels (6.16 to 6.42 METs) and studies suggest that BMI may be positively impacted (decreases in BMI z score over 2 years [P<0.01]). TAKE 10! demonstrates that integrating movement with academics in elementary school classrooms is feasible, helps students focus on learning, and enables them to realize improved PA levels while also helping schools achieve wellness policies.

Rasberry et al., (2011) the purpose of this review is to synthesize the scientific literature that has examined the association between school-based physical activity (including physical education) and academic performance (including indicators of cognitive skills and attitudes, academic behaviors, and academic achievement). Relevant research was identified through a search of nine electronic databases using both physical activity and academic-related search terms. Forty-three articles (reporting a total of 50 unique studies) met the inclusion criteria and were read, abstracted, and coded for this synthesis. Findings of the 50 studies were then summarized. Across all the studies, there were a total of 251 associations between physical activity and academic performance, representing measures of academic achievement, academic behavior, and cognitive skills and attitudes. Slightly more than half (50.5 percent) of all
associations examined were positive, 48 percent were not significant, and 1.5 percent were negative. Examination of the findings by each physical activity context provides insights regarding specific relationships. Results suggest physical activity is either positively related to academic performance or that there is not a demonstrated relationship between physical activity and academic performance. Results have important implications for both policy and schools.

Van Dusen, Kelder, Kohl, Ranjit and Perry (2011) examined the associations of physical fitness and academic performance among schoolchildren. Public schools provide opportunities for physical activity and fitness surveillance, but are evaluated and funded based on students' academic performance, not their physical fitness. Empirical research evaluating the connections between fitness and academic performance is needed to justify curriculum allocations to physical activity programs. Analyses were based on a convenience sample of 254,743 individually matched standardized academic (TAKSTM) and fitness (FITNESSGRAM (®)) test records of students, grades 3-11, collected by 13 Texas school districts. We categorized fitness results in quintiles by age and gender and used mixed effects regression models to compare the academic performance of the top and bottom fitness groups for each test. All fitness variables except body mass index (BMI) showed significant, positive associations with academic performance after adjustment for socio-demographic covariates, with standardized mean difference effect sizes ranging from .07 to .34. Cardiovascular fitness showed the largest interquintile difference in TAKS score (32-75 points), followed by curl-ups. Additional adjustment for BMI and curl-ups showed dose-response associations between cardiovascular fitness and academic
scores (p < .001 for both genders and outcomes). Analysis of BMI demonstrated limited, nonlinear association with academic performance after socio-demographic and fitness adjustments. Fitness was strongly and significantly related to academic performance. Cardiovascular fitness showed a dose-response association with academic performance independent of other socio-demographic and fitness variables. The association appears to peak in late middle to early high school. We recommend that policymakers consider physical education (PE) mandates in middle high school, school administrators consider increasing PE time, and PE practitioners emphasize cardiovascular fitness.

**Wing field. Robert, Granziano, Narmara and Janicka (2011)** investigated the relationships between body mass index (BMI), physical fitness, and academic performance in elementary school students. Specifically, BMI and scores on the President’s Challenge Physical Activity and Fitness Awards Program, a physical fitness test, were compared to reading and mathematics scores on the Florida Comprehensive Assessment Test (FCAT), a standardized norm referenced academic achievement measure. Participants included 132 4th and 5th grade students from a k-12 school located in North Central Florida. Results revealed that BMI and physical fitness were correlated with academic performance for 5th grade females. In addition, there was a significant and negative association found between BMI and physical fitness across grade level and sex.

**Kuo Yi-Lung (2011)** this study investigated the roles of the psychosocial factors (PSFs) of motivation, social control, and self-regulation, in the prediction
of 10th grade academic achievement for a large sample of 8th grade students. The differential effects of PSFs for male and female students with different levels of 8th grade achievement were also examined. Of the 4,660 middle-school students in the ACT database, 1,384 8th grade students were included in the study. The Student Readiness Inventory-Middle School (SRI-MS) was used to assess three broad PSFs based on ten scales, which were named motivation (consisting of Academic Discipline, Commitment to School, and Optimism), social control (consisting of Family Attitude toward Education and Family Involvement, Relationships with School Personnel, and School Safety Climate), and self-regulation (consisting of Managing Feelings, Orderly Conduct, and Thinking before Acting). The students’ EXPLORE and PLAN Composite scores served as measures of initial and later academic achievement, respectively. Multiple regression models were constructed for each PSF to test the hypotheses. Post hoc probing techniques were used if significant interaction terms were found. If no significant interaction terms were found, the effects of PSFs on achievement gains were examined using a psychosocial mediation model. The results showed that 8th grade females demonstrated greater motivation, social control, and self-regulation than 8th grade males. Also, motivation and social control each interacted significantly with sex and 8th grade achievement when predicting 10th grade achievement. Specifically, among female students, effects were positive for females with higher prior achievement and negative for females with lower prior achievement for both motivation and social control. For male students, neither motivation nor social control added significantly to the prediction of later achievement. There were no interactions between self-regulation and either sex or
prior achievement. Instead, self-regulation partially mediated the effects of initial achievement when predicting later academic achievement.

**Aktop (2010)** the goal was to analyze the physical fitness, self-concept, attitudes toward physical education, and academic achievement of Turkish elementary school children by socioeconomic status. 198 (101 boys, 97 girls) students from Grades 7 and 8 completed the Children's Attitude Inventory towards Physical Education, the Piers-Harris Children's Self-concept Scale, and Eurofit Physical Fitness Test Battery. Significant differences were found between the groups of Low and High socioeconomic status (SES) in terms of physical fitness and academic achievement. While the Low SES group had higher mean scores on physical fitness, mean academic achievements of the High SES group were higher. Mean differences in height, self-concept, and children's attitudes toward physical education by socioeconomic status were not statistically significant. Particular attention should be paid to physical fitness in children of high socioeconomic status and the academic achievement of children with low socioeconomic status.

**Cottrell Lesley (2010)** examined the student’s physical fitness associated with academic achievement. The body mass index percentiles, fitness levels and standardized academic test scores of 725 fifth grade students in Wood County, W.Va. The researchers focused more on the children's fitness level than their weight. They then compared that data to students' fitness and academic performance two years later, in the seventh grade. They separated the participants into four groups of students who were in high physical fitness levels in fifth grade
and remained so in seventh grade; fit in fifth grade but had lost their fitness by seventh grade; not fit in fifth grade but were physically fit by seventh grade; not physically fit at the beginning of the study, in fifth grade, nor at the end of the study, in seventh grade. Children who had the best average scores in standardized tests in reading, math, science and social studies were fit at the start and end of the study, researchers found. The next best group, academically, in all four respondents, was made up of children who were not fit in fifth grade but had become fit by seventh grade. The children who had lost their fitness levels between fifth and seventh grades were third in academic performance. Children who were not physically fit in either the fifth or seventh grades had the lowest academic performance. The study suggests that focusing more on physical fitness and physical education in school would result in healthier, happier and smarter children.

Calvez – Tami Gurley and Amy Higginbotham (2010) examined whether the childhood obesity affects student achievement and whether these effects differ by family income level. Although childhood obesity is a national concern, the issue is even more urgent in West Virginia where obesity rates for fifth graders are near 30 percent. Using a 2003-2007 panel of school district data, the authors find evidence that obesity negatively affects reading proficiency in high poverty districts, but obesity rates have little effect in lower poverty districts. The authors estimate that it would require a substantial increase in instructional education spending to offset the obesity effects on academic achievement in high poverty districts.
Einstein, Reed, Hahn, Hooker, Gross and Kravitz (2010) examined the impact of integrating physical activity with elementary curricula on fluid intelligence and academic achievement. A random sample of 3rd grade teachers integrated physical activity into their core curricula approximately 30 minutes a day, 3 days a week from January 2008 to April 2008. Noninvasive fluid intelligence cognitive measures were used along with State-mandated academic achievement tests. Experimental Group children averaged close to 1200 pedometer steps per integration day, thus averaging 3600 steps per week. Children in the Experimental Group performed significantly better on the SPM Fluid Intelligence Test. Children in the Experimental Group also performed significantly better on the Social Studies State mandated academic achievement test. Experimental Group children also received higher scores on the English/Language Arts, Math and Science achievements tests, but were not statistically significant compared with Control Group children. Children classified in Fitnessgram’s Healthy Fitness Zone for BMI earned lower scores on many of the SPM Fluid Intelligence components. This investigation provides evidence that movement can influence fluid intelligence and should be considered to promote cognitive development of elementary-age children. Equally compelling were the differences in SPM Fluid Intelligence Test scores for children who were distinguished by Fitnessgram’s BMI cut points.

Fox et al., (2010) examined the associations between sports team participation, physical activity, and academic outcomes in middle and high school students. Data were drawn from Project EAT (Eating Among Teens), a survey of 4746 middle and high school students. Students self-reported their weekly hours
of physical activity, sports team participation, and academic letter grades. For high school girls, both physical activity and sports team participation were each independently associated with a higher GPA. For high school boys, only sports team participation was independently associated with a higher GPA. For middle school students, the positive association between physical activity and GPA could not be separated from the relationship between sports team participation and a higher GPA. Regardless of whether academic success was related to the physical activity itself or to participation on sports teams, findings indicated positive associations between physical activity involvement and academic achievement among students.

**Hollar Danielle and Sarah Messiah (2010a)** examined the effects of a school-based obesity prevention intervention that included dietary, curricula, and physical activity components on body mass index (BMI) percentiles and academic performance among low-income elementary school children. The study had a quasi-experimental design (4 intervention schools and 1 control school; 4588 schoolchildren; 48 percent Hispanic) and was conducted over a 2-year period. Data are presented for the subset of the cohort who qualified for free or reduced-price school lunches (68 percent Hispanic; n = 1197). Demographic and anthropometric data were collected in the fall and spring of each year, and academic data were collected at the end of each year. Significantly more intervention than control children stayed within normal BMI percentile ranges both years ($P = .02$). Although not significantly so, more obese children in the intervention (4.4 percent) than in the control (2.5 percent) decreased their BMI percentiles. Overall, intervention schoolchildren had significantly higher math
scores both years ($P < .001$). Hispanic and White intervention schoolchildren were significantly more likely to have higher math scores ($P < .001$). Although not significantly so, intervention schoolchildren had higher reading scores both years. School-based interventions can improve health and academic performance among low-income schoolchildren.

**Hollar Danielle and Michello Lombarado (2010b)** examined the study of elective multi-sector, School-based obesity prevention programming improves weight, blood pressure and academic performance, especially among low-income minority children. Successfully addressing childhood onset obesity requires multilevel (individual, community, and governmental), multi-agency collaboration. Healthier Options for Public Schoolchildren (HOPS)/Organ Wise Guys® (OWG) quasi-experimental controlled pilot study (four intervention schools, one control school, total N=3,769; 50.2 percent Hispanic) was an elementary school-based obesity prevention intervention designed to keep children at a normal, healthy weight, and improve health status and academic achievement. HOPS/OWG included the following replicable, holistic components: modified dietary offerings, nutrition/lifestyle educational curricula; physical activity component; and wellness projects. Demographic, anthropometric (body mass index [BMI]), blood pressure, and academic data were collected during the two-year study period (2004–6). Statistically significant improvements in BMI, blood pressure, and academic scores, among low-income Hispanic and White children in particular, were seen in the intervention versus controls. Holistic School-based obesity prevention obesity prevention interventions can improve
health outcomes and academic performance, particular among high-risk populations.

Karen Rodenroth (2010) studied the effect of weight on children’s educational achievement. The fourth and fifth grade students’ physical fitness levels were compared to their academic achievement based on the idea that health and physical fitness have an impact on the ability to achieve academically. Because of the recent pressures of No Child Left Behind, many schools have opted to limit the amount of time students spend in physical education classes and recess. With the increased percents of students who suffer from diabetes and other health related risks, eliminating or reducing physical activity from the school day is not the answer. Data was collected from 90 students (46 males and 44 females) during the 2009-2010 school year by using the President’s Challenge Physical Fitness Test, STAR Reading Percentile scores, and Grade Point Averages (GPA’s). Through multiple regressions, the researcher did not find statistically significant relationships between physical fitness levels and STAR Reading Percentiles or between physical fitness levels and Grade Point Averages. When physical fitness levels were combined with STAR Reading percentile scores, a significant correlation was found between these two variables and Grade Point Averages. A significant correlation was found between physical fitness levels and mathematics. Lastly, another significant correlation was found between STAR, Grade Point Averages, and sit ups. With these varying results, the researcher decided to retain the following null hypotheses of this study: there will not be a significant relationship between physically fitness scores based on the President’s Challenge Physical Fitness Test and academic performance based on STAR
Reading Percentile scores for fourth and fifth graders at the participating school, and there will not be a significant relationship between physical fitness scores based on the President’s Challenge Physical Fitness Test and academic performance based on Grade Point Averages for fourth and fifth graders at the participating school. This study does not prove causality; therefore, the results should be interpreted with caution.

Welk, Jackson and Morrow (2010) evaluated the demographic and geographic variability in aggregated school-level data on the percent of students achieving the Fitness gram Healthy Fitness Zones (HFZ). Three-way analyses of variance were used to examine differences in fitness achievement rates among schools that had distinct diversity and socioeconomic status profiles. The results revealed age-related declines in the percent of youth who achieved the HFZ standard for cardiovascular fitness (elementary school: 70 percent; middle school: 46 percent; high school: 34 percent). Interestingly, there was little evidence of age-related declines in other fitness dimensions. School-level attainment of fitness was consistently higher in schools categorized as low diversity and high socioeconomic status. Clear spatial patterns in fitness achievement were also evident when data were analyzed at the region and county level using geodemographic information system software.

Brandi Eveland – sayers and Richard Farley (2009) examined the relationship between fitness and academic achievement in elementary school children. Data were collected from 134 third, fourth, and fifth-grade children. One-mile run time, body mass index, curl-up, and sit-and-reach data were
collected from physical education instructors in Middle Tennessee. The percent of questions answered correctly for the mathematics and reading/language arts sections of the Terra Nova achievement test was taken as a measure of academic achievement. A negative association (P<.01) was noted between 1-mile run times and mathematics scores (r=-.28), whereas a positive relationship (P<.05) was observed between muscular fitness and mathematics scores (r=.20). Relative to sex differences, inverse relationships (r=-.31 and -.36, respectively), but no significant associations were evident in boys. Results from this study support a link between specific components of physical fitness and academic achievement in elementary school children.

**Donnelly et al., (2009)** investigated the physical activity across the curriculum (PAAC): A randomized controlled trial to promote physical activity and diminish overweight and obesity in elementary school children. Physical Activity Across the Curriculum (PAAC) was a three-year cluster randomized controlled trial to promote physical activity and diminish increases in overweight and obesity in elementary school children. PAAC promoted 90 minutes/week of moderate to vigorous intensity physically active academic lessons delivered by classroom teachers. Results indicated that the PAAC approach may promote daily physical activity and academic achievement in elementary school children. 75 minutes of PAAC curriculum activities may attenuate increases in body mass index.

**Kwak Lydia and Stef Kremers (2009)** investigated the association between physical activity, fitness and academic achievement. To explore the
associations between objectively assessed intensity levels of physical activity and academic achievement and test whether cardiovascular fitness mediates the association between physical activity and academic achievement. Cross-sectional data were gathered in Swedish 9th-grade students (n = 232; mean age = 16 years; 52 percent girls). School grades, pubertal phase, skin fold thickness, cardiovascular fitness, and physical activity were measured objectively. Mother's education, family structure, and parental monitoring were self-reported. Data were analyzed with linear regression analyses. After controlling for confounding factors, academic achievement was associated with vigorous physical activity in girls (β = .30, P < .01; explained variance of the model 26 percent), which remained after inclusion of fitness (β = .23, P < .05; explained variance 29 percent). The association was not mediated by fitness. In boys, academic achievement was associated with pubertal phase (β = .25, P < .05). After inclusion of fitness, it was only associated with fitness (β = .25, P < .05; explained variance of the model 30 percent). In girls, academic achievement was associated with vigorous physical activity and not mediated by fitness, whereas in boys only fitness was associated with academic achievement. Further studies are necessary to investigate the potential longitudinal effect of vigorous physical activity on academic achievement, the role of fitness herein and the implications of these findings for schools.

Roberts Linam Theresa (2009) This study compared the fifth grade students’ physical fitness levels to academic achievement based on the premise that health and physical fitness has an effect on one’s ability to learn and achieve academically. Due to No Child Left Behind and the mounting pressures to reach
Adequate Yearly Progress, many school officials view non-assessed activities like physical education and recess as unnecessary, consequently creating a case for the elimination of any respondents that is not directly measured through standardized testing. Finding a link between fitness and academic achievement may cause educational leaders to reevaluate time spent during the school day. Data was collected for 113 students during the 2008-2009 school year by using the Fitness Gram, STAR Reading and Math Percentiles, and Grade Point Averages (GPA’s). Through multiple regression, the researcher found statistically significant relationships between physical fitness and two of the three measures used for academic achievement: STAR Math Percentiles ($p = 0.0063 < 0.05; R = 0.26 > 0.195$) and GPA’s ($p = 0.0124 < 0.05; R = 0.23 > 0.195$). Therefore, the hypothesis was accepted, validating a link between fitness and academic achievement. This study does not prove causality; it is more probable that physical fitness and academic achievement influence each other in ways that are still vague.

Chomitz, Virginia, Meghan and Slonong (2009) examined the relationship between physical fitness and academic achievement. This cross-sectional study used public school data from 2004 to 2005. Academic achievement was assessed as a passing score on Massachusetts Comprehensive Assessment System (MCAS) achievement tests in Mathematics (fourth, sixth, and eighth grade, n = 1103) and in English (fourth and seventh grade, n = 744). Fitness achievement was assessed as the number of physical fitness tests passed during physical education (PE). Multivariate logistic regression analyses were conducted to assess the probability of passing the MCAS tests, controlling for
students’ weight status (BMI z score), ethnicity, gender, grade, and socioeconomic status (school lunch enrollment). The odds of passing both the MCAS Mathematics test and the MCAS English test increased as the number of fitness tests passed increased (p < .0001 and p < .05, respectively). Results show statistically significant relationships between fitness and academic achievement, though the direction of causation is not known. While more research is required, promoting fitness by increasing opportunities for physical activity during PE, recess, and out of school time may support academic achievement.

Kaestner Robert and Michael Grossman (2008) identified the association between weight and children's educational achievement, as measured by scores on Peabody Individual Achievement Tests in math and reading, and grade attainment. Data for the study came from the 1979 cohort of the National Longitudinal Survey of Youth (NLSY), which contains a large, national sample of children between the ages of 5 and 12. We obtained estimates of the association between weight and achievement using several regression model specifications that controlled for a variety of observed characteristics of the child and his or her mother, and time-invariant characteristics of the child. Our results suggest that, in general, children who are overweight or obese have achievement test scores that are about the same as children with average weight.

Sachs Shore, Ligicker Brett and Wright (2008) investigated whether overweight students achieved a lower relative degree of scholastic achievement compared to non overweight students. Respondents consisted of 6th and 7th grade students enrolled in a large public middle school in a suburb of Philadelphia,
Pennsylvania. We compared grade point averages (GPAs), nationally standardized reading scores, school detentions, school suspensions, school attendance, tardiness to school, physical fitness test scores, and participation on school athletic teams among non overweight, at risk for overweight, and overweight students. Overweight students achieved lower grades (P < 0.001) and lower physical fitness scores (P < 0.0001) than their non overweight peers. Overweight students demonstrated a 0.4 letter grade lower GPA (on a 4.00 scale) and 11 percent lower national percentile reading scores than their non overweight peers. The overweight students also demonstrated significantly more detentions, worsened school attendance, more tardiness to school, and less participation on school athletic teams than their non overweight peers. Our study suggests that body mass is an important indicator of scholastic achievement, attendance, behavior, and physical fitness among middle school students, reiterating the need for healthy lifestyle intervention and prevention measures.

Tomporowski, Davis and Miller (2008) analyzed the relationship between the exercise and children’s intelligence, cognition and academic achievement. The contemporary cognitive theory development directed towards exercise and recent research demonstrating the salutary effects of exercise on adults cognitive functioning and studies conducted with animals that have linked physical activity to changes in neurological development and behavior. Similar to adults, exercise facilitates children’s executive function (i.e., process required to select, organize and properly initiate goal directed). Exercise may prove to be simple, yet important, method of enhancing those aspects of children’s mental functioning central to cognitive development.
Trudeau François and Roy Shephard (2008) examined physical education, school physical activity, school sports and academic performance. The relationship of academic performance and some of its determinants to participation in school-based physical activities, including physical education (PE), free school physical activity (PA) and school sports. Linkages between academic achievement and involvement in PE, school PA and sport programmes have been examined, based on a systematic review of currently available literature, including a comprehensive search of medline (1966 to 2007), psychinfo (1974 to 2007), scholar.google.com, and ERIC databases. Quasi-experimental data indicate that allocating up to an additional hour per day of curricular time to PA programmes does not affect the academic performance of primary school students negatively, even though the time allocated to other respondents usually shows a corresponding reduction. An additional curricular emphasis on PE may result in small absolute gains in grade point average (GPA), and such findings strongly suggest a relative increase in performance per unit of academic teaching time. Further, the overwhelmingly majority of such programmes have demonstrated an improvement in some measures of physical fitness (PF). Cross-sectional observations show a positive association between academic performance and PA, but PF does not seem to show such an association. PA has positive influences on concentration, memory and classroom behavior. Data from quasi-experimental studies find support in mechanistic experiments on cognitive function, pointing to a positive relationship between PA and intellectual performance. Given competent providers, PA can be added to the school curriculum by taking time from other respondents without risk of hindering
student academic achievement. On the other hand, adding time to "academic" or "curricular" respondents by taking time from physical education programmes does not enhance grades in these respondents and may be detrimental to health.

Abadie and Standley Brown (2007) examined the study of physical activity promotes academic achievement and a healthy lifestyle when incorporated into early childhood education. The detrimental effects of physical inactivity within children have enormous personal health consequences. These health conditions have the potential to impact the economic vitality of society as a whole. Studies have indicated that inactive children are far more likely to suffer from obesity, type II diabetes and hypertension than their physically active peers. Research also indicates that these health problems tend to follow the individuals into adulthood. Seventy percent of obese adolescents will become obese adults (Reilly, 2007). In addition to the health benefits of physical activity has also been positively correlated to academic achievement. When integrated into early childhood educational programs. This paper will primarily review the evidence that demonstrates the positive influence of physical activity on academic achievement in early childhood education. This paper will further provide basic guidelines for developing an early childhood education program.

Hillman and Castell (2007) examined the relationship between physical fitness and academic achievement has received much attention owing to the increasing prevalence of children who are overweight and unfit, as well as the inescapable pressure on schools to produce students who meet academic standards. This study examined 259 public school students in third and fifth
grades and found that field tests of physical fitness were positively related to academic achievement. Specifically, aerobic capacity was positively associated with achievement, whereas BMI was inversely related. Associations were demonstrated in total academic achievement, mathematics achievement, and reading achievement, thus suggesting that aspects of physical fitness may be globally related to academic performance in preadolescents. The findings are discussed with regards to maximizing school performance and the implications for educational policies.

Murray, Low, Hollis, Cross and Davis (2007) examined the coordinated school health programs and academic achievement. Few evaluations of school health programs measure academic outcomes. K-12 education needs evidence for academic achievement to implement school programs. This article presents a systematic review of the literature to examine evidence that school health programs aligned with the Coordinated School Health Program (CSHP) model improve academic success. A multidisciplinary panel of health researchers searched the literature related to academic achievement and elements of the CSHP model (health services, counseling/social services, nutrition services, health promotion for staff, parent/family/community involvement, healthy school environment, physical education, and health education) to identify scientifically rigorous studies of interventions. Study designs were classified according to the analytic framework provided in the Guide developed by the Community Preventive Services Task Force. The strongest evidence from scientifically rigorous evaluations exists for a positive effect on some academic outcomes from school health programs for asthmatic children that incorporate health education
and parental involvement. Strong evidence also exists for a lack of negative effects of physical education programs on academic outcomes. Limited evidence from scientifically rigorous evaluations support the effect of nutrition services, health services, and mental health programs, but no such evidence is found in the literature to support the effect of staff health promotion programs or school environment interventions on academic outcomes. Scientifically rigorous evaluation of school health programs is challenging to conduct due to issues related to sample size, recruitment, random assignment to condition, implementation fidelity, costs, and adequate follow-up time. However, school health programs hold promise for improving academic outcomes for children.

**Sigfusdottir, Kristjansson and Allegrante (2007)** examined the health behavior and academic achievement in Icelandic school children. Interest in the relationship between health behaviors and academic achievement has recently intensified in the face of an epidemic of childhood and adolescent obesity and converging school reforms in the United States and other nations with advanced economies. Epidemiologic research has demonstrated that poor diet and lack of adequate physical activity place children at risk for being overweight and obese and thus influence future health status. Additional research has also shown that children and adolescents whose diets are nutritious and whose participation in physical activity is high tend to perform better on various measures of cognitive performance and academic achievement. We analyzed cross-sectional survey data from 5810 Icelandic school children to explore the relationship between selected health behaviors and academic achievement. Body mass index, diet and physical activity explained up to 24 percent \((P < 0.01)\) of the variance in academic
achievement when controlling for gender, parental education, family structure and absenteeism. Variance explained increases to 27 percent when depressed mood ($P < 0.05$) and self-esteem ($P < 0.01$) are added to the model, but confounds the role of physical activity. Although not robust, these findings are consistent with previous work and affirm the complexity of the relationship of health to academic achievement.

**Dawn Podulka and Pivarnik James (2006)** investigated the effect of physical education and activity levels on academic achievement in children. Participants were 214 sixth-grade students randomly assigned to physical education during either first or second semesters. Moderate and vigorous physical activity (MVPA) (number of 30-min time blocks) outside of school was assessed using the 3-d physical activity recall (3DPAR). The 3DPAR time blocks were converted to ordinal data with scores of 1 (no activity), 2 (some activity), or 3 (activity meeting Healthy People 2010 guidelines). Academic achievement was assessed using grades from four core academic classes and standardized test scores (Terra Nova percentiles). Grades were similar regardless of whether students were enrolled in physical education during first or second semesters. Physical education classes averaged only 19 min of MVPA. Students who either performed some or met Healthy People 2010 guidelines for vigorous activity had significantly higher grades ($P \leq 0.05$) than students who performed no vigorous activity in both semesters. Moderate physical activity did not affect grades. Standardized test scores were not significantly related to physical education class enrollment or physical activity levels. Although academic achievement was not significantly related to physical education enrollment, higher grades were
associated with vigorous physical activity, particularly activity meeting recommended Healthy People 2010 levels.

Eddie Comeaux (2005) examined that the present study was predictors of academic achievement among student-athletes in the revenue-producing sports of men's basketball and football. Researchers have examined input or precollege and individual characteristics of student-athletes and on this basis have attempted to predict the student-athletes academic success. Much of this work has attempted to relate these predictions to demographic factors. Some studies suggest that differences in academic performance are influenced by academic criteria, while other studies reveal that psychological factors have a greater impact on the variation in academic achievement among student-athletes. Although these studies yield a considerable amount of relevant information with regards to selected predictors of academic performance among college student-athletes, few scholars have examined how student-athletes are impacted by the environmental influences within their college experience. The present study examines interaction with faculty measures as predictors of college Grade Point Average (GPA) for male student-athletes in revenue-producing sports. Data are drawn from the Cooperative Institutional Research Program's 2000 Freshman Survey and 2004 Follow-Up Survey. The sample includes 459 football and basketball players attending predominantly white institutions. Regression results indicate that the impact of the contact or interaction between faculty and student-athletes is to some extent contingent upon the specific nature of the interaction. For example, faculty who provided help in achieving professional goals makes a relatively strong contribution to student success whereas faculty who provided
encouragement for graduate school did not benefit male student-athletes equally for this study. Finally, the implications of these findings should be discussed among student-athletes, faculty, and advisors in order to improve the communication between faculty members and male student-athletes, enrich student-athletes' academic productivity as well as their overall college experience.

Uguak, Uget Apayo (2005) in his study investigated the relationship between psychological factors and students' academic achievement among foreign students in an international school in Kuala Lumpur. The academic achievement of the students in the target international school was unevenly distributed among the students. This uneven distribution was studied to identify the psychological factors that best predicted the students' academic achievement. The research employed an ex post facto design and the data was collected through a set of questionnaires. One hundred and fifty respondents were randomly selected out of seven classes based on Kerlinger and Pedhazur (1973); Cohen's (1988) principles and formula respectively. Both descriptive and inferential statistics were used to analyze the data in the study using SPSS. The statistical techniques used were Descriptive Statistics, Independent-Sample t-test, Analysis of Variance (ANOVA), Pearson Product Moment Correlation (r), and Multiple Linear Regression. The research findings showed that there was no statistical significant difference between female and male students on psychological factors (adjustment, motivation, and attitude, locus of control, self-efficacy, and attribution). The findings also revealed that the primary and secondary levels were significantly different only on locus of control. A positive and significant relationship was also found between psychological factors and academic
achievement with strengths ranging between moderate and low. The results of the multiple regression analysis showed that attribution, adjustment, self-efficacy, and attitude were significant predictors of academic achievement. The R² .547 implies that the four predictor variables explain about 54.7 percent of the variance in academic achievement. On the other hand, Locus of control and motivation were not significant but positively related to academic achievement. Generally, the findings indicated that the four psychological factors were the most significant factors in explaining the variance of academic achievement.

Prista Antonio, Jose Antonio and Riberio Maia (2003) examined the anthropometric indicators of nutritional status: implication for fitness, activity and health in school – age children and adolescents from Maputo, Mozambique. The objective of the study was to identify the relevance of anthropometric indexes as indicators of nutritional status. The sample consisted of 2316 respondents (n = 1094 males, 1222 females) aged 6–18 y from Mozambique. Anthropometric variables, maturity stage, physical fitness, physical activity, and metabolic fitness were measured. Samples of blood, urine, and feces were obtained. Respondents were classified in 5 nutritional groups labeled normal, low height-for-age (stunted), low weight-for-height (wasted), low height-for-age and low weight-for-height (stunted and wasted), and overweight, according to cutoffs set by a World Health Organization expert committee. Socioeconomic status was classified according to region of residence. Prevalence rates for males and females, respectively, in the nutritional groups were 3.0 percent and 2.3 percent (stunted group), 21.9 percent and 10.0 percent (wasted group), 3.0 percent and 0.8 percent (stunted and wasted group), and 4.8 percent and 7.7 percent (overweight group).
With control for age, socioeconomic status, and maturity stage, the overweight group performed significantly worse than did the other groups on most of the fitness tests. Compared with the normal group, the 3 undernourished groups performed significantly worse in absolute strength tasks, better in endurance tasks, and equally in flexibility and agility. Very few differences were found in physical activity scores. The three undernourished groups had scores for the biochemical indicators that were similar to those of the normal group and had more favorable profiles for blood pressure and cholesterol. In this population, the cutoffs used to classify overweight status appear to appropriately identify potential health problems. No relevance to health was found for the lower cutoffs identifying undernourished children.

Cecil Powell, Kimberly and Jacob Arriola (2003) investigated the relationship between psychosocial factors and academic achievement among African American students. The authors of this cross-sectional study used surveys based on the noncognitive model of W. E. Sedlacek and C. G. Brooks (1976) to determine psychosocial factors associated with African American students' high school achievement. Psychosocial variables explored included community service, academic motivation, social support, and students' methods of handling unfair treatment. Results showed that after gender and absenteeism were controlled for only the method of handling unfair treatment was positively associated with grade point average (GPA), \( p < .05 \). Those findings suggest that students who talk to others about being treated unfairly instead of keeping it to themselves are more likely to have higher GPAs; the findings also have important implications for individuals involved in the counseling and education of high school students. Sedlacek and
Brooks's model provides an effective guide for predicting academic achievement and for developing programs to improve academic achievement among students of color. Further research is needed into psychosocial factors and their effects on academic achievement.

**Fass and Tubman (2002)** this study examined the influence of parental and peer attachment on college students' academic achievement. Relations among attachment to parents and peers, cognitive ability, psychosocial functioning variables, and academic achievement in a multiethnic sample of college students \((n = 357)\). A small subgroup (14.8 percent) of students reported low levels of attachment to both parents and peers. Significant positive correlations were documented between parent and peer attachment and several indices of psychosocial competence. Results from hierarchical multiple regression analyses revealed that indices of cognitive ability were significant predictors of college students' grade point averages, while broader measures of functioning in early adulthood (attachment, intellectual ability, self-esteem) were significant predictors of scholastic competence. Results suggest that perceived attachment to both parents and peers is a component of wider patterns of social competence and adjustment that may function as protective or compensatory factors during key transitions in young adulthood, such as participation in college, and with its attendant demands for academic achievement.

**Sacker, Schoon and Bartley (2002)** examined the Social inequality in educational achievement and psychosocial adjustment throughout childhood: magnitude and mechanisms. The paper examines the hypothesis that social
inequalities in children's developmental resources level off during adolescence against an alternative hypothesis that they continue to exert their influence throughout all of childhood. Using data from the National Child Development Study, the study applies two models. Both are premised on the understanding that the social and physical environments in which children are raised affects their resources in the domains of educational achievement and psychosocial adjustment. A 'class inequalities' model seeks to determine the extent of social class inequalities at three key stages in children's development: the transition from infant to junior schooling at age 7, from primary to secondary education at age 11 and from compulsory education to further education or work at age 16. The second model is a contextual-systems model which seeks to expand our understanding of the pathways from family social class to children's educational achievement and psychosocial adjustment through some more proximal determinants of these resources: material deprivation, school composition, parental involvement and aspirations. Social class inequalities in educational achievement were found to be greater than inequalities in psychosocial adjustment. The same developmental pattern was observed for both outcomes: inequalities increased from age 7 to age 11 and then remained at the same level at 16 yr. The contextual-systems models showed that when social inequalities are interpreted more broadly than a narrow class based definition, they continue to widen in adolescence. In particular, family influences, indicated by parental involvement become less important and social contexts beyond the family, reflected in material conditions and school composition, become more important. At age 16, material deprivation was the strongest determinant of psychosocial
adjustment while school composition was most strongly related to educational achievement. The contextual-systems model provides a more complete account of social inequalities in children's educational achievement and psychosocial adjustment than simple estimates of social class effects.

Jimmy Byrd (2000) investigated the Impact of physical activity and obesity on academic achievement among elementary students. This study compared the effect of physical activity and obesity on academic achievement and was based on the premise that the health of a child has an effect on his or her ability to learn and to achieve academically. Specifically, health-related topics of inactivity and obesity were considered. The participants included 12,607 third grade children entering kindergarten for the first time during the 1998-99 school years. The data were obtained from the National Center for Educational Statistics’ Early Childhood Longitudinal Study (Third Grade), which is a national representative sample of students entering Kindergarten in 1998-99 with the latest wave of individual student, parent, teacher, administrator and school data collected on these same students in third grade. Third grade is a crucial year in elementary school as high stakes exams begin in third grade in most states. The results indicated that the Body Mass Index (BMI) of students, as well as the opportunity for physical activity within the school day affected the students’ performance in both reading and mathematics achievement.

Pedro Portes (1999) examined the social and psychological factors in the academic achievement of children of Immigrants: A cultural history puzzle. The influence of various factors in immigrant students' school achievement was
examined in informing broader discourses on schooling, inequality, and related conceptual issues. The ways in which different types of predictors of school achievement behave in context with factors related to adolescence and cultural adaptation in a sample of children of immigrants were explored. The influence of cultural background remains enigmatic and could not be disaggregated entirely by key demographic and socio psychological factors considered in this study. The latter explained almost 40 percent of the variation in student achievement. The two groups found to excel in American schools (Asian and Cuban) have more established inroads in the community and may be able to provide greater social and cognitive support. The lowest achievers were from groups that have the least support, encounter language problems in school, and felt most unwelcomed by the mainstream. The cultural compatibility between each group and the school context appears to vary in systematic ways and is addressed in a model proposed in the article.

David Crystal, Chuansheng Chen and Andrew (1994) in this study focuses the psychological maladjustment and academic achievement: A cross-cultural study of Japanese, Chinese, and American high school students. Psychological maladjustment and its relation to academic achievement, parental expectations, and parental satisfaction were studied in a cross-national sample of 1,386 American, 1,633 Chinese, and 1,247 Japanese eleventh-grade students. 5 indices of maladjustment included measures of stress, depressed mood, academic anxiety, aggression, and somatic complaints. Asian students reported higher levels of parental expectation and lower levels of parental satisfaction concerning academic achievement than their American peers. Nevertheless, Japanese students
reported less stress, depressed mood, aggression, academic anxiety, and fewer somatic complaints than did American students. Chinese students reported less stress, academic anxiety, and aggressive feelings than their American counterparts, but did report higher frequencies of depressed mood and somatic complaints. High academic achievement as assessed by a test of mathematics was generally not associated with psychological maladjustment. The only exception was in the United States, where high achievers indicated more frequent feelings of stress than did low achievers.

Summary of the Literature

The review of literature helped the researcher to spot the relevant topics and variables. Further the literature helped the researcher to frame the suitable hypotheses. The latest literature also helped the researcher to support the findings with regard to the problem. Further the literature collected related to the study helps the research scholar in understanding the similar areas.

The reviews were presented under the four sections such as anthropometric (n=10), Physical (n=13), Psychological (n=3) and general (n=21) in chronological and alphabetical order.

All the research presented in this section suggested that physical fitness and BMI relate with academic achievement. The researcher in this study suggested that anthropometric, physical, physiological and psychological variables have no significant relation with academic achievement except BMI. In our State, due to lack of physical activities respondents are lacking in their fitness levels. The research studies reviewed from many journals available in various websites.