CHAPTER 2

REVIEW OF LITERATURE

2.1 Introduction

The thrust of this chapter is review of literature related to this study. The chapter addresses three distinct themes, which are relevant to the current study. The reviewed literature focuses on themes as outlined below:

a) Students’ motivational beliefs components and self-regulated learning components and academic achievement.

b) Research studies on gender differences in motivational beliefs and self-regulated learning components.

c) The influence of parents’ education on their children

2.2 Previous Research on motivational beliefs and self-regulated learning components and academic achievement

2.2.1 Previous Research on Self-efficacy

1) Studies abroad

Ample empirical evidence exists on the relationship and influence of self-efficacy and academic outcomes. Researchers have also shown that self-efficacy mediates the effects of skills, previous experience, mental ability, and other self-beliefs on subsequent achievement. In other words, self-efficacy acts as a filter between these prior determinants and academic indexes. Bandura (1997) provides extensive evidence to suggest that perceptions of self-efficacy are
powerful determinants of achievement outcomes in varied fields. In a meta-analysis, Stajkovic and Luthans (1998) found that the average weighted correlation between self-efficacy and work-related performance was $r = 0.38$, which transforms to an impressive 28 percent gain in task performance.

In education, a meta-analysis of studies published between 1977 and 1988 revealed that self-efficacy beliefs were positively related to academic achievement (Multon, Brown, & Lent, 1991). Self-efficacy related to academic outcomes ($r = 0.38$) accounted for approximately 14 percent of the variance. The effects were stronger for high school and college students than they were for elementary students. Effect sizes also depended on the characteristics of the studies, such as the competence perceptions types of self-efficacy and performance measures used. Researchers who compared specific efficacy judgments with cognitive skill measures of performance or classroom-based indexes such as grades, than with global, standardized achievement tests obtained stronger effects. Effect sizes were also stronger in studies in which researchers developed highly concordant self-efficacy/performance indexes and administered them at the same time.

Correlations between self-efficacy and academic performances in investigations in which self-efficacy is analyzed at the item or task-specific level and corresponds to the criteria task have ranged from 0.49 to 0.70. In addition, direct effects in path analytic studies have ranged from $\beta = 0.349$ to 0.545 (Pajares, 1996b, 1997). Results tend to be higher in studies of mathematics than of other academic areas such as language or arts, but even in these areas relationships are considerably higher if the criteria by which students judge self-efficacy are used as the criteria for scoring essays or assessing reading comprehension (Pajares, 2003).

Self-efficacy is also related to self-regulated learning variables and use of learning strategies. Zimmerman and his associates have traced the relationships
among self-efficacy perceptions, academic self-regulatory processes, and academic achievement. This line of inquiry has demonstrated that self-efficacy influences self-regulatory processes such as goal setting, self-monitoring, self-evaluation, and strategy use (Zimmerman, 1994; Zimmerman & Bandura, 1994; Zimmerman & Martinez-Pons, 1990). Confident students embrace more challenging goals (Zimmerman, Bandura, & Martinez-Pons, 1992), and they engage in more effective self-regulatory strategies to include enhanced memory performance through increased persistence (Bouffard-Bouchard, Parent, & Larivée, 1991).

In studies of college students who pursue science and engineering courses, high self-efficacy influences the academic persistence necessary to maintain high academic achievement (Hackett, 1995; Lent, Brown, & Larkin, 1984; Lent & Hackett, 1987). Students who believe they are capable of performing tasks use more cognitive and meta-cognitive strategies and persist longer at those tasks than those who do not.

Academic self-efficacy influences cognitive strategy use and self-regulation through use of meta-cognitive strategies, and it is correlated with in-class seatwork and homework, exams and quizzes, and essays and reports. Pintrich and De Groot (1990) suggested that self-efficacy facilitates cognitive engagement such that raising self-efficacy is likely to lead to higher achievement by increasing use of cognitive strategies.

Chemers, Hu & Garcia (2001), in their work on mathematical problem solving, have shown that children with higher self-efficacy tried for longer periods on their task and used more effective problem solving strategies than students with lower self-efficacy.

Students with similar previous achievement and cognitive skills may differ in subsequent achievement as a result of differing self-efficacy perceptions because these perceptions mediate between prior attainments and academic
achievement. As a result, performances often are better predicted by self-efficacy than by prior attainments. Collins (1982) identified children of low, middle, and high mathematics ability who had, within each ability level, either high or low mathematics self-efficacy. After instruction, the children were given new problems to solve and could rework those they had missed. Collins reported that ability was related to performance but that, regardless of ability level, children with high self-efficacy completed more problems correctly and reworked more of the ones they missed.

Pajares and Kranzler (1995) tested the joint contribution of self-efficacy and mental ability (the variable typically acknowledged as the most powerful predictor of academic outcomes) to mathematics performance and found that, despite the influence of mental ability, self-efficacy beliefs made a powerful and independent contribution to the prediction of performance.

Studies on goal setting have demonstrated that self-efficacy and skill development are stronger in students who set proximal goals than in those who set distal goals, in part because proximal attainments provide evidence of growing expertise (Bandura & Schunk, 1981; Locke & Latham, 2002). In addition, students who have been verbally encouraged to set their own goals experience increases in confidence, competence, and commitment to attain those goals (Schunk, 1995).

Self-efficacy also is increased when students are provided with frequent and immediate feedback while working on a task (Schunk, 1983b). Moreover, when students are taught to attribute this feedback to their own effort, they work harder, experience stronger motivation and report greater efficacy for further learning (Schunk, 1987). Self-efficacy explains approximately competence perceptions 25 percent of the variance in the prediction of academic outcomes beyond that of instructional influences. Self-efficacy is responsive to changes in
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instructional experiences and plays a causal role in students’ development and use of academic competencies (Schunk, 1995).

Tuckman and Sexton, (1991), found that encouraging feedback increased self-efficacy on the task and subsequent performance on the task. Statistical analyses showed that when performance was held constant, encouragement was seen to affect self-efficacy, but when self-efficacy was held constant; encouragement had no effect on performance. Hence, self-efficacy functioned as a mediator of performance.

A growing number of findings support Bandura’s contention that self-efficacy mediates the effect of possessed skills or other self-beliefs on subsequent performance by influencing effort, persistence and perseverence. Schunk (1981) used path analysis to show that modeling treatments increased persistence and accuracy on division problems by raising children's self-efficacy, which had a direct effect on skill (r= 0.46). He later demonstrated that effort attribution feedback for prior performance (e.g., "You've been working hard") raised children’s self-efficacy and this increase was, in part, responsible for increased skill in performance of subtraction problems (Schunk, 1982a). In subsequent experiments, he found that ability feedback (e.g.," You're good at this") had an even stronger effect on self-efficacy and subsequent performance (Schunk, 1983b; Schunk & Gunn, 1986).

Not only do children learn from the actions of models, but also much research shows that modeling practices affect self-perceptions (Schunk, 1981, 1987, 1999; Schunk & Gunn, 1985; Schunk & Hanson, 1985; Schunk, Hanson, & Cox, 1987; Zimmerman & Ringle, 1981). When peer models make errors, engage in coping behaviors in front of students, and verbalize emotive statements reflecting low confidence and achievement, low-achieving students perceive the models as more similar to them and develop greater skills and self-efficacy. Social cognitive theorists recommend teachers’ engagement in effective modeling practices and that they should select peers for classroom models
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judiciously so as to ensure that students view themselves as comparable in learning ability to the models.

It is noteworthy that academic achievement is too complex to be reduced to the conclusion that it is due to differences in any competence belief. Such beliefs are neither the primary causes of achievement in all cases nor magic elixirs that can make all learners work to their full potential. Students perform differently in school because of differences in aptitudes, general mental competence perceptions, abilities, interests, perceived values, effort, and perseverance, use of self-regulatory strategies, teaching and instruction, and availability of materials (Gustaffson & Undheim, 1996; Keogh & MacMillan, 1996; Snow, Corno, & Jackson, 1996). Social and familial variables such as peer influence, family income, and parental expectations also play a hand in students’ academic outcomes (Steinberg, Brown, & Dornbusch, 1996). It needs to be borne in mind that no amount of confidence can produce success when requisite skills and knowledge are absent. As illustrated by research findings, however, there is good reason to believe that many differences in achievement can be better explained by students’ perceptions of their academic capabilities than by constructs often thought to be the key determinants of achievement.

The causal influence of self-efficacy on students’ academic achievement-related behaviors has been effectively demonstrated in a series of studies (Schunk, 1982a, b, 1983a, b, 1984a, b; Schunk et al., 1987; Schunk & Swartz, 1993), Students’ self-efficacy beliefs were raised by providing them with instructional strategies designed to enhance their competence, such as modeling, strategy training, goal setting, rewards for progress, attributional feedback, and progress feedback. The increase in self-efficacy also resulted in improved performance. Research also shows that self-efficacy for learning new skills predicts subsequent motivation and achievement during instruction.

Various studies carried out since 1980s have showed that self-efficacy does indeed play a role in mathematics performance. Norwich (1987) found a
moderate correlation between self-efficacy and previous math performance in subsequent performance (he did not, however, find that self-efficacy by itself had a significant effect). Pajares and Miller (1994) found in a study on first year university students that there was a direct relationship between math self-efficacy and motivational variables such as high school experience, math performance, and self-concept.

A later study by Pajares and Graham (1999) determined that a students’ mathematics self-efficacy was in fact, more predictive of math performance than other motivational variables.

Researchers have shown that children with high self-efficacy (a) try more difficult activities, (b) do better on different achievement activities, and (c) persist even if they have trouble in completing the activities (Bandura, 1997; Schunk & Zimmerman, 1997).

Schunk and Rice (1993) studied children’s self-efficacy for reading and found that children who received training to enhance their reading self-efficacy and strategy use were higher achievers in reading.

2.2.2 Summary of the studies on self-efficacy

All research on self-efficacy and performance has shown that self-efficacy influences numerous academic outcomes such as effort, persistence and perseverance. Hence, self-efficacy functions as a mediator of performance. This motivational component was powerful determinant for high school and college students than for elementary students. Results of correlation between self-efficacy and academic performance tend to be higher in studies of mathematics than of other academic area. Self-efficacy also is related to other variables such as self-regulated learning and cognitive strategy use. Confident students embrace more challenge goals and they engage in more effective strategy, through increased persistence. Students’ self-efficacy beliefs can be raised by
providing them with instructional strategies such as modeling, strategy training, goal setting, and rewards for progress.

2.2.3 Previous Research on Intrinsic value

1) Studies abroad

Is attitude about one’s capability alone enough to account for motivation to achieve? Stipek (1988:73) believes that “students are more intrinsically motivated to complete tasks that are moderately challenging, novel and relevant to their own lives than they are to complete tasks that are …perceived to be irrelevant”.

Ames (1992:261) states, “Establishing linkages between the environment, goals, and student motivational outcomes has been very important”. Ames goes on to explain differences between contrasting achievement goal constructs of mastery goals and performance goals. She proposes attempting to establish classroom structures to enhance motivation by valuing effort-based strategies. She recommends that entire programs be designed to focus students’ attention to effort rather than social comparison or competition with others. She suggests that educators choose learning tasks that include variety and diversity to promote interest, that students perceive meaningful reasons for doing tasks, and that tasks include challenge, interest, and student perceive control. She recommends a variety of motivational accompaniments. Perception of self-efficacy and task value often is correlated positively, and both have proved effective predictions of a variety of academic outcomes (Eccles, Wigfield, Schiefele, 1998; Meece, Wigfield & Eccles, 1990; Multon, Brown, & Lent, 1991).

Armstrong (1980) demonstrated that perceived usefulness was consistently, if moderately related to mathematics performance.

Some researcher have demonstrated that the perceived importance of a task is related to more meta-cognitive activity, more cognitive strategy use, and
Wolter and Pintrich (1998) found that knowing task value was a predictor of cognitive and regulatory strategy use, but not a predictor of performance. Wolter and Pintrich found that self-efficacy beliefs were predictor of achievement in mathematics. They suggest that task value may enable students to begin to engage in the learning tasks, but that efficacy beliefs help students persist to the point overcoming obstacles and more important for controlling performance.

Tuckman and Abry (1998) included measures of three constructs for prediction academic achievement. Attitudes (self-efficacy), drive (intrinsic value, test anxiety, student goals, parent goals), and strategy (self-regulation). It also included a somewhat skill-based variable, prior Grade Point Average. The model shows that all seven predictors were represented in the causal path, with significant loadings.

Pintrich and Schunk (1996) recommend that teachers discuss the importance and utility value of school work with students. One of the reasons that teachers do not discuss this value extensively with their students may be that they did not receive direct instruction in the utility value of learning themselves.

According to Klinger (1977:308),"affect is the human’s ultimate artiber of value" and although “part of the humans value system is innate…many of the adult humans values are learned”. Students can learn that mathematics is relevant to their lives and that it adds important value to their futures. Teachers can teach that mathematics is connected to life outside of the mathematics classroom and useful in many areas of life.

Garcia and Pintrich (1996) explored the effects of classroom autonomy (i.e. the degree to which students report having the opportunity to participate in decision making concerning course policies) on motivation and performance in college students. No explicit hypotheses were formulated. Four motivation
subcales of the MSLQ (Motivated Strategies for Learning Questionnaire) were included, namely intrinsic goal orientation, task value, perceived self-efficacy and test anxiety. The results indicated that motivational beliefs, intrinsic goal orientation, task value and perceived self-efficacy were positively affected by the experience of classroom autonomy. Classroom autonomy was more closely related to motivational factors than to performance.

Children’s goals and achievement values affect their self-regulation and motivation (Ablard & Lipschultz, 1998; Wigfield, 1994) because goals influence how children approach, engage in, and respond to achievement tasks (Hidi & Harackiewicz, 2000). When students value the goals of the school, they will be more likely to engage in academics, put more effort on their schoolwork, and become achievers (Wigfield, 1994).

Peterson (2000) followed achieving and underachieving gifted high school students into college and found that achievers’ sureness and earlier determination of career direction suggested that direction may be a factor in successful achievement. Emerick (1992) reported that underachieving high school gifted students were able to reverse the underachievement pattern by developing goals that were both personally motivating and directly related to academic success. Students’ motivation to complete tasks stems from the attainment value, utility value, and intrinsic value associated with the task (Wigfield, 1994).

Eccles et al. (1993) find that children’s value of interest for different subject areas formed distinct factors. Similarly, Gottfried (1990), by using her Children’s Academic Intrinsic Motivation Inventory to measure intrinsic motivation, found that 7 to 9 years old children’s intrinsic motivation differentiated into reading, mathematics, and general intrinsic motivation factors. Thus, it appears that young children’s competence beliefs and intrinsic motivation are differentiated across subject areas.
Another way that children’s motivation can vary across domains is in its strength. Children may be more strongly motivated in one particular area (e.g., mathematics) than they are in another area (reading). There are likely to be individual differences in such patterns, but regarding interest, elementary and middle school age children say that they are most interested in social and sports activities, and less so in mathematics and reading, a finding that is not especially surprising (Wigfield et al., 1997).

When individuals are intrinsically motivated, they complete activities for their own sake and out of interest in the activities. Their motivation comes from inside themselves rather than from external sources. In the reading area, Wigfield and Guthrie (1997) identified dimensions of intrinsic motivation such as reading curiosity and preference for challenge. Individuals who are intrinsically motivated to learn become deeply involved in their activity and devote much time and energy to it (Ryan & Deci, 2000a; Wigfield & Guthrie, 1997). Wigfield and Guthrie found that students who were intrinsically motivated to read, defined by their reading curiosity and preference for challenge (and some additional dimensions), were much more likely to report that they engaged frequently in reading both in and out of school. Intrinsically motivated students also seek to improve their skills and build on what they know, thereby increasing their capabilities. Intrinsic motivation thus can have strong cognitive as well as motivational benefits.

Extrinsically motivated individuals perform activities to receive some benefit such as a reward. Their motivation comes from what they will receive for performing the activity rather than from the activity itself. We identified recognition for reading and reading for grades as important aspects of extrinsic motivation to read. Although extrinsic motivators are powerful forces in children’s lives and often can be used effectively to engage children in different learning activities, there is concern that an over reliance on them can interfere with children’s intrinsic motivation under certain conditions (Ryan & Deci, 2000b).
Intrinsic and extrinsic motivation has been portrayed in contrasting terms. It is important that we acknowledge that many children perform activities such as reading for intrinsic and extrinsic reasons (Lepper & Henderlong, 2000). It would be unreasonable for educators to expect children to be always intrinsically motivated to read or to perform different activities in school (Brophy, 1998). Because intrinsic motivation helps the growth of reading skills and can lead to long-term engagement in reading, however, educators should foster intrinsic reading motivation in the classroom. We defined separately aspects of motivation that we believe are crucial to reading engagement; relations exist among those different aspects of motivation (see Harter, 1982; Meece, Blumenfeld, & Hoyle, 1988; Watkins & Coffey, 2004). For instance, students with high self-efficacy to read are more likely to be intrinsically motivated to read. Thus, the different aspects of motivation operate together and influence one another. Along with those relations, there likely is an optimal pattern of motivational characteristics. Students who are intrinsically motivated to read and efficacious about their reading will be more engaged in reading than will those students who fare lower on these variables (Guthrie & Wigfield, 2000; Wigfield & Tonks, 2004).

2.2.4 Summary of the studies on intrinsic value

Research on intrinsic value shows that if the students have a mastery of goals (they strive to master a particular task and their primary goal is to obtain knowledge and improve their skills) they pay attention to effort rather than comparison so; they perceive meaningful reasons for doing tasks and better challenge in the task. Students are intrinsically motivated to learn, then they involve a long time engagement in their task, but sometimes students need to be extrinsically motivated to perceive some benefit such as rewards. It is important to know many students perform some activities for intrinsic and extrinsic reasons. Therefore, it is imperative for teachers to acquire this aspect of knowledge.

Most of the research on intrinsic motivation shows that this component of motivation is a strong variable in motivational beliefs, and this value enables
students to involve in the learning tasks and have a better academic performance. However some researchers disagree with this point and indicated that this variable did not have a direct relationship with academic performance (Wolter and Pintrich, 1998) and could not predict of performance.

2.2.5 Previous Research on Test anxiety

1) Indian studies

Sassenrath (1967) examined the relationship between anxiety, aptitude and academic achievement. Findings showed a significant negative correlation between test anxiety and academic achievement.

Gupta’s research studies (1984) indicated that anxiety does not have any significant effect on motivation for improving of education.

Gupta (1992) reported that test anxiety influences performance negatively on moderately difficult tasks among the high-test anxious high intelligence group. Systematic rational restructuring improved performance of the former group (high school subject).

Ramachandran (1990) carried out a study on the relationship between performance and other psychological variables like reasoning, anxiety and adjustment. The objective of the study was to determine the relationship between academic performance and reasoning, anxiety, and adjustment, and the variables influencing academic performance, reasoning, anxiety and adjustment. The major findings of the study indicated that: 1) Academic performance was better among a) girls than boys b) children of educated than uneducated parents. There was a low negative correlation between academic performance and anxiety.
Purandare (1984) found that low anxious subjects were better in performance in the serial verbal learning task as compared to high anxious subjects.

Sharma (1970) conducted a study to find out the nature of relationship between manifest anxiety and school achievement. The results indicated a strong relationship between manifest anxiety and school achievement for both sexes.

In another study by Gyanoni (1984) on achievement, motivation and anxiety, results showed that the students with a high level of anxiety were found to be more intropunitive and obstacle dominant, whereas the low level anxiety students were more impunities and need-persistent.

1) Studies abroad

The relationship between exam anxiety and exam performance on those exams was first investigated by Sarason (1958a, 1960, 1961, 1965) who found a negative relationship and higher test anxiety was observed to the positively correlated to lower exam performance. Sarason also observed that highly exam anxious individuals were more self-critical and more likely to experience performance-interfering worry during examinations than were individuals who were observed to be low in exam anxiety (Chinta, 2005). Furthermore, Spilberger (1966) observed that highly exam-anxious individuals were three times more likely to drop out of college.

As noted by Sarason (1988) anxiety is a basic human emotion consisting of fear and uncertainty that typically appears when an individual perceives an event as being a threat to the ego or self-esteem.

In some instances, such as avoiding dangerous situations, anxiety can be helpful. However when taken to extremes, it may produce unwarranted results. One of the most threatening events that causes anxiety in students today is
testing. When students develop an extreme fear of performing poorly in an examination, they experience test anxiety. Test anxiety is a major factor contributing to a variety of negative outcomes including psychological distress, academic underachievement, academic failure, and insecurity (Hembree, 1988). Many students have the cognitive ability to do well in exams but may not do so because of high levels of test anxiety. Because of the societal emphasis placed on testing, this could potentially limit their educational and vocational opportunities (Zeidner, 1990).

In the case of a child sitting a test, a degree of arousal or anxiety would be seen as beneficial for performance. Without any fear of failure or encouragement to perform well on the test, a child is unlikely to put adequate effort into preparation or be sufficiently motivated when actually taking the test, and so will not perform to their fullest potential. If before or during a test a child's level of anxiety is above the optimum level, they may also fail to demonstrate their true abilities. Under these circumstances fear of the actual test may disrupt preparation and cause sufficient distress during the test to impair performance. Alternatively, the child may take an avoidant approach to the test, failing to prepare adequately by denying its importance or missing preparation lessons and, in extreme cases, failing to appear for the test itself (McDonald, 2001).

The correlation approach to the study of test anxiety has been most frequently adopted. Here the link between continuous scores on a measure of test anxiety or groups divided on the basis of such scores, and attainment scores have been studied. In relation to compulsory examination performance, higher levels of test anxiety have been associated with lower test scores or grades in a number of studies (e.g. Sarason, 1963; Cox, 1964;; O'Tuel & Terry, 1979; Sharma & Rao, 1983; Crocker et al., 1988; Horn & Dollinger, 1989; Prins et al., 1994). This effect has been observed across a range of academic subjects, such as science, French and social studies, in addition to the more frequently studied subjects of math and English. Similar results have also been observed when non-scheduled ability tests have been used (Hill & Sarason, 1966; Szetela, 1973;
Young & Brown, 1973; Pintrich & De Groot, 1990; Turner et al., 1993). In overall, most studies have reported negative correlations between test anxiety and performance, with coefficients of up to -0.5 and -0.6 being observed (e.g. Sarason, 1963).

Test anxiety has also been observed to have a detrimental impact on aggregate ability measures, rather than isolated assessments (e.g. Payne et al., 1983; Zeidner & Safir, 1989; Araki, 1992; Comunian, 1995; Call et al., 1994; Newbegin & Owens, 1996), although not all researchers have supported the foregoing findings (e.g. Walter et al., 1964). However, the use of aggregate attainment measures presents difficulties for interpretation, as components of aggregate grades have not been adequately specified by researchers; that is, the extent to which they are composed of exams, essays, reports, etc. The conditions under which these assessments are conducted vary considerably and, as will be seen below, these conditions can interact with test anxiety.

Pintrich & De Groot’s (1990) work empirically demonstrated this difficulty, as they found test anxiety to significantly predict overall grades and exam performance, but not performance on class work and essays. Walter et al. (1964) and O’Tuel & Terry (1979) had previously presented similar results. A limited number of longitudinal studies have investigated how test anxiety affects change in academic ability over time. In one of the earliest, Lighthall et al. (1959) found anxiety levels to be related to change in scores on two ability tests between fifth and seventh grade in American children. On what was considered to be a more ‘traditional’ group ability test, low anxiety children showed a greater gain than high anxiety children, whereas this pattern was reversed for a more ‘game-like’ test. From this, the authors suggested that test characteristics interact with anxiety level, but noted that further work was required to identify what specific test characteristics were important.
A later work by Sarason et al. (1964) supported the view that higher levels of test anxiety were related to smaller learning gains, although more recent work by Fincham et al. (1989) has failed to replicate this.

However these results on the relation between test anxiety, strategy use and effort management are not always consistent. As Pintrich and De Groot (1990) illustrated, in some studies highly anxious students appear to be as effortful and persistent or are even avoiding tasks. Furthermore, highly anxious students might not use the appropriate cognitive strategies.

In an increasingly more technical society, math proficiency is a necessity. As math anxiety is most prevalent in developmental mathematics students, their successes in college are some indication of the negative effects of math anxiety. Blackington (2002 in McKee 2002) conducted a study at Weber State University over a ten-year period in which graduation rates for students who entered the university at a remedial level were examined. The two developmental courses offered there were Pre-Algebra and Elementary Algebra. In the ten-year study of 781 Pre-Algebra students, only 89 (11.4 percent) finished their college experience with a degree. For Elementary Algebra students, out of 6255 students, 1388 (22 percent) completed their degrees. In addition, Blackington found that students who did not take math continuously throughout high school fell increasingly behind in college. If a student was able to enter college with a fundamental knowledge of Algebra, he or she was 44 percent more likely to graduate. Clearly, if math anxiety is limiting a student’s success in math, their career and life options may be severely diminished. However, with a successful program to decrease math anxiety such as Zopp (1999), career goals can be and are changed, with an overall increase of general confidence.

2.2.6 **Summary of the studies on test anxiety**

Most of the research on test anxiety in India revealed the negative relationship between anxiety and academic performance. Furthermore, the
finding is in contrast to the finding of Gupta (1984) that demonstrated anxiety had no effect on motivation for improving of education.

Most of the abroad research on test anxiety matches the findings of Indian that showed test anxiety had a negative relation with academic performance. Although McDonald (2001) believe that degree of arousal or anxiety is beneficial to performance. This effect has been observed across academic subjects such as math and English even in non-scheduled ability test. Although the other two motivational components (self-efficacy and intrinsic value) generally show simple, positive and linear relations with the components of self-regulated learning, the result for test anxiety are not as straightforward.

Research in both India and abroad indicated that test anxiety has been associated with low performance in the students.

2.2.7 Previous Research on Cognitive strategies and Self-regulation

1) Indian studies

Kumari (1991) studied the problem solving strategies of ten to twelve years of age children and examined their relationship with certain capability (e.g., conservation, combinational thinking, proportionality and probability reasoning). The findings revealed that overall problem-solving ability and the success on different types of problems was significantly and positively related to each cognitive ability, separately as well as globally. There was also evidence for some sequential steps in problem-solving, and for different forms of responses to be associated with the tactics used by children. A wide range of variations in the strategies appeared to be related to the nature of problems.

Doshi (1989) has studied the possible relationship between achievements in mathematics and cognitive preference styles. For all questioning style is the last, while for majority of arts and commerce students, the recall style is the first. No significant relationship is found between cognitive preference style and mathematics. It is an open question worth investigation whether by changing
teaching strategies we can change the cognitive preference style, and whether this can lead to significantly improved learning of mathematics.

Viney (1992) carried out a study to investigate effectiveness of different models of teaching on achievement in mathematical concepts and attitude in relation to intelligence and cognitive style. The objectives of the study were: i) to compare the effectiveness of the concept Attainment (CAM) and the computer model in terms of mathematical concepts, ii) to study the effect of intelligence an attainment of concepts in mathematics, and iii) to study whether the two models of teaching affect the attitude of the students towards mathematics. Major findings were that: 1) the Computer Model of teaching was found to be superior to the concept Attainment Model for teaching concepts in mathematics and for inculcating positive attitude 2) high-ability students required better mathematical concepts and more positive attitude than average and low-ability students 3) cognitive style and level of intelligence were found to be interacting 4) high-ability field-independent student developed high attitude and achieved significantly higher scores on mathematical concepts than average and below average ability field-independent student 5) high-ability and field-independents students scored higher and showed better attitude towards mathematics than high-average and low-ability field-dependent students.

2) Studies abroad

A review of the literature revealed numerous theoretical and empirical studies on self-regulation and its components in traditional classroom environment. Garcia (1995) found that students use their self-efficacy beliefs to fuel their self-regulatory motivational strategies. Pintrich and De Groot (1990) examined the relationship of academic performance among seventh-graders to their self-efficacy, intrinsic value, test anxiety, cognitive strategy use and self-regulation tendency, and found that self-regulation tendency, self efficacy, and test anxiety were the best predictors. Tuckman (1993) obtained similar results for
college students with the addition of grade importance as another strong predictor variable.

Zimmerman and Martinez-Pons (1990) found that self-regulated learning depends on available cognitive learning strategies. The actual use of cognitive learning strategies depends upon additional motivational factors.

Neber and Schommer-Aikins (2002) in their research examined the issue of self-regulated learning among highly gifted elementary (n=93) and high school students (n=40) in science. Self-report measures assessed self-regulatory strategy use in science and a spectrum of environmental (perceiving level of investigation) and individual prerequisites (motivational beliefs, goal orientation, epistemological beliefs and intentions). Firstly, high school students were experiencing less investigation in science, and test anxiety and work avoidance were more pronounced than with elementary students. Secondly, highly gifted girls’ science-related motivational beliefs were less positive than those of boys. Thirdly, path analysis indicates that the level of investigation in the science-learning environment strongly determines motivational and epistemological prerequisites of self-regulatory strategy use.

Educational psychologists have compared successful and less successful students of similar intellectual ability. When given a learning task, successful learners monitor and control their behavior as they set goals, manage their study time, use their prior knowledge, consider alternative strategies, develop a plan of attack, and consider contingency plans when they run into trouble. In contrast, less successful students have little awareness of the factors affecting learning and are less likely to take charge of their own learning. Researchers have demonstrated that it is possible to teach self-regulatory behaviors which increase students’ achievement and enhance their sense of efficacy (Boekaerts, Pintrich, & Zeidner, 2000; Zimmerman, Bonner & Kovach, 1996). Schunk (1997) also recommends that learning strategies be integrated with regular instruction.
In another study, VanderStoep et al. (1996) examined college students’ knowledge, motivation and self-regulatory learning strategies in three different disciplines, English, psychology and biology. It was hypothesized that high achieving students would have better knowledge, more adaptive motivation and report more use of self-regulatory strategies than low achieving students. No explicit hypothesis was formulated concerning the possibility of generalizing the results across the disciplines. Students’ motivational beliefs (i.e. intrinsic orientation, task value and self-efficacy) and self-regulated learning (i.e. rehearsal, elaboration, organization and meta-cognition) were again assessed using the MSLQ. Their domain-specific knowledge concerning the course material, on the other hand, was assessed with an ordered three technique based on students’ sorting important concepts from their course. The results confirmed the hypothesis in that knowledge, motivation and self-regulation distinguished high and low achieving students. However, this result was observed only in psychology and biology. It was suggested that the method be adjusted to better represent the nature of learning and instruction in English.

Zimmerman & Martinez-Pons (1990) used SRLIS (self-regulation learning in students) to examine the relationship between students’ use of self-regulated learning strategies and their perceptions of both verbal and mathematical self-efficacy. The results revealed, as hypothesized, that both self-efficacy measures were correlated with the use of self-regulated strategies in grade (5th, 8th and 11th), giftedness (gifted versus regular), and gender further specified the results. Older students’ self-efficacy surpassed that of younger students; giftedness was related to high-perceived self-efficacy; boys’ verbal self-efficacy was significantly higher than that of girls. There were no gender-related differences in mathematical self-efficacy.

Zusho and Pintrich (2003) studied the role of motivation and cognition in the learning of college students. Results showed an overall decline in students' motivational levels over time. There are also a decline in students’ use of
rehearsal and elaboration strategies over time; students’ use of organizational and self-regulatory strategies increased over time. These trends, however, were found to vary by students’ achievement levels. In terms of the relations of motivation and cognition to achievement, the motivational components of self-efficacy and task value were found to be the best predictors of final course performance even after controlling for prior achievement.

2.2. Summary of the studies on cognitive strategy and Self-regulation

Although Indian findings were not straightforward on cognitive and meta-cognitive strategies and academic achievement, they showed problem solving ability and success positively related to cognitive ability.

Most of research about self-regulation and cognitive strategy imply that these variables were positively related with self-efficacy and intrinsic value and also academic achievement of students. Also, some researches demonstrated that it is possible to teach self-regulatory behavior and cognitive strategy to the students.

Findings of Indian research and research abroad revealed that strategies facilitate the processing of information and that students who use better strategies often have better cognitive performance. Cognitive and meta-cognitive strategies are related to some motivational components such as self-efficacy.

2.3. Previous Research on Gender Difference

2.3.1 Gender difference on self-efficacy

1) Studies abroad

Early studies suggested that boys were more confident in their mathematics skills than were girls. For example, in a study of over 1200 high school students, Fennema and Sherman (1977) reported that boys had more positive attitudes toward mathematics, including greater confidence in their ability
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to learn mathematics. In a subsequent study of 1320 middle school students, they again found boys more confident. When they compared their middle and high school results, they found that these differences in confidence increased as students progressed from grade 6 to 11. Early studies also showed that, by middle school, boys began to rate mathematics as more useful than did girls (Fennema & Sherman, 1977; Hilton & Berglund, 1974) and that girls' perceptions of usefulness decline throughout high school (Sherman, 1980).

More recently, studies in the math domain showed male students had higher perceived ability or self-efficacy (both variables being proxies for expectancy) than female students (Eccles, 1984; Miller et al., 1996; Pajares, 1996; Wigfield and Eccles, 1992).

Greene et al. (1999) found that, in required math classes, male students had higher perceived math ability than female students, but this was not true in elective math classes.

Investigations that included the domains of mathematics, English, Sports and instrumental music showed gender differences in perceive ability and perceived task difficulty in line with gender stereotypes regarding these domains: that is male students had higher expectancies than female students in math and sports, whereas female students had higher expectancies than male students in English and music (Eccles et al., 1983, 1993; Wigfield et al., 1997). These gender differences were detected in students as young as the first grade, and appeared to increase with age.

Similarly, Eccles et al. (1983) reported no gender differences in expectancies for success in the then current math class, but found that male students had higher expectancies than female students for success in future math classes.

Research on gender differences in self-efficacy and related competence beliefs typically shows that girls hold lower competence beliefs than boys on
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tasks perceived as masculine (Meece, 1991). Boys and girls report similar confidence in their mathematics ability during the elementary years, but reliable differences begin to emerge following children’s transition to middle or junior high school (Eccles & Midgley, 1989; Midgley, Feldlaufer, & Eccles, 1989; Pajares & Valiante, 2002). By high school, boys are more confident and girls more likely to underestimate their capability (Pajares & Kranzler, 1995; Pajares & Miller, 1994, 1997; Pajares & Valiante, 1999, 2001). Gifted girls are especially likely to be under confident about their capabilities (Pajares, 1996a).

Among adolescents, gender differences in self-efficacy should not be expected when students are able to derive clear performance information about their capabilities or progress in learning. Schunk and Lilly (1984) had middle school students judge their self-efficacy for learning a novel mathematical task, after which students received instruction and opportunities to practice. Students received performance feedback by checking answers to alternate problems. Although girls initially judged their self-efficacy for learning lower than boys, following the instructional program girls and boys did not differ in achievement or self-efficacy. The performance feedback conveyed to students that they were learning and raised girls’ self-efficacy to that of boys.

Other research shows that gender differences in self-efficacy can arise from the linkage of skills with contexts (Bandura, 1997). Women typically judge self-efficacy for scientific occupations lower than do men, but gender differences disappear when women judge self efficacy for performing the same skills in everyday activities (Matsui & Tsukamoto, 1991). Women also typically judge self-efficacy lower than men for occupations requiring quantitative skills but differences disappear when self-efficacy judgments for the quantitative activities are made in stereotypically feminine tasks (Junge & Dretzke, 1995).

Gender differences can arise as a function of home, cultural, educational, and mass media influences. Developmental research shows that parents often
under-estimate their daughters’ academic competence and hold lower expectations for daughters (Phillips & Zimmerman, 1990). Parents also act differentially with respect to mathematics and science, often portraying them as male domains (Meece & Courtney, 1992). As girls enter junior and senior high school, the perception of mathematics as a masculine domain may further weaken their interest in it.

In a series of studies focusing on students’ self-efficacy to solve mathematics word problems, Pajares and his colleagues have obtained inconsistent results regarding gender differences. Pajares and Miller (1994) found that male undergraduates reported stronger self-efficacy in their capabilities than did female undergraduates, but the men also obtained higher scores on the mathematics performance measure, suggesting that their higher self-efficacy was warranted.

Pajares and Kranzler (1995) investigated the mathematics self-efficacy of 329 high school students and found that boys and girls did not differ either in their capability to solve mathematics word problems or in the strength of their self-efficacy beliefs. Moreover, boys and girls displayed similar overconfidence.

Pajares and Graham (1999) assessed the mathematics problem-solving self-efficacy of entering middle school students and found they were no differences in anxiety, self-concept, and self-efficacy for self-regulation between start and end of the year. They were no gender differences in any of the motivational constructs.

Gender differences in students’ academic self-efficacy and in their self-efficacy to employ self-regulatory strategies are often reported. For example, Wigfield, Eccles, & Pintrich (1996) pointed out that boys and girls report equal confidence in their mathematics ability during the elementary years, but, by middle school, boys begin to rate themselves more efficacious than do girls.
Conversely, Pajares (1996) in study areas related to language or arts showed that male and female students exhibit similar confidence despite the fact that the achievement of female students is typically greater.

Some researchers have also reported that girls express greater self-efficacy for self-regulation than boys during elementary school (Pajares et al., 1999) and middle school (Pajares & Valiante, 2001). Girls express greater confidence in their capability to use strategies such as finishing homework assignments on time, studying when there are other things to do, remembering information presented in class and textbooks, and participating in class discussions.

According to Pajares (1996) it is possible, of course, that boys and girls show differences in self-efficacy and self-regulation as a result of factors unrelated to these variables. For example, many gender differences in academic self-beliefs disappear when previous achievement is controlled. In other words, when researchers analyze the self-beliefs of students at the same level of academic competence, fewer differences in self-belief emerge.

One of the factors that may be responsible for gender differences in self-efficacy and in confidence to use self-regulated learning strategies is the tendency of boys and girls to respond to self-report instruments with a different "mind set". Wigfield et al. (1996) have observed that boys tend to be more "self-congratulatory" in their responses whereas girls tend to be more modest. In other words, boys are more likely to express confidence in skills they may not possess and to express overconfidence in skills they do possess. Noddings (1996) suggested that boys and girls may well use a different "metric" when providing confidence judgments, adding that these sorts of ratings may represent more of a promise to girls than they do to boys. If this is the case, actual differences in confidence are masked or accentuated by such response biases.
A second factor potentially at play in creating differences between boys and girls has to do with the manner in which gender differences in self-efficacy and self-regulation beliefs are typically assessed. Traditionally, students are asked to provide judgments of their confidence that they possess certain academic skills or, in the case of self-efficacy for self-regulation, that they can engage specific self-regulatory strategies. Differences in the average level of confidence reported are interpreted as gender differences in self-efficacy. Pajares and his colleagues (Pajares et al., 1999; Pajares & Valiante, 1999) asked elementary and middle school students to provide self-efficacy judgments in the traditional manner but also to compare their academic ability versus that of other boys and girls. Although girls outperformed boys in language arts, girls and boys reported equal writing self-efficacy and self-efficacy for self-regulation. When students were asked whether they were better writers than their peers, however, girls expressed that they were better writers than were the boys in their class and even in their school. That is, regardless of the ratings that boys and girls provided on the self-efficacy measures, it was clear that girls considered themselves better writers than were the boys.

The relationship between gender and self-efficacy has not been explored as thoroughly as that between gender and academic performances. Whereas recent findings suggest that gender differences in mathematics achievement are either diminishing or practically nonexistent (Eisenberg, Martin, & Fabes, 1996), some contemporary researchers have found that gender differences in the mathematics confidence of American students may still be prevalent (Betz & Hackett, 1983; Hackett, 1985; Lapan, Boggs, & Merrill, 1989; Lent et al., 1991; Matsui, Matsui, & Ohnishi, 1990; Pajares & Miller, 1994, in press; quoted by Wigfield, Eccles, & Pintrich, 1996). It seems that boys and girls report equal confidence in their math ability during the elementary years, but, by high school, boys are more confident and girls more likely to underestimate their capability (Eccles, 1983). Even by middle school, boys rate themselves more efficacious than do girls (Pintrich & De Groot, 1990; Wigfield, Eccles, Maclver, Reuman, &
Gifted girls are especially likely to be biased toward underconfidence in mathematics (Pajares, 1996b). These findings are consistent with those from the United Kingdom, where men consistently expect better grades on university examinations than do women (Erkut, 1983; Vollmer, 1984, 1986a, 1986b).

As noted by Slavin (2006) there are no significant differences in intellectual ability between girls and boys. However, the gender disparities that are visible are caused by cultural expectations and norms. Slavin’s believes, females have traditionally been discouraged from studying mathematics and science, but this is slowly changing in our society today. There are also differences in how females and males view their own academic ability, which can impact their test scores and achievement as well. In high school, males tend to overestimate their abilities, while females tend to underestimate their abilities.

To determine the degree to which gender differences in motivation and achievement may be a function of gender stereotype beliefs rather than that of gender, Pajares and Valiante (2001) asked students to report how strongly they identified their characteristics stereotypically associated with males or females in American society. A feminine orientation was associated with writing self-efficacy and rendered non-significant gender differences favoring girls in self-efficacy for self-regulation. These results point to the possibility that some gender differences in academic motivation and in self-regulated learning may be accounted for in part by differences in the beliefs that students hold about their gender rather than by their gender per se.

Some researchers have failed to find gender differences in mathematics self-efficacy indexes. For example, Middleton and Midgley (1997) detected no gender differences in the mathematics self-efficacy of Grade 6 students. Similarly, Fouad and Smith (1996) found that the mathematics self-efficacy beliefs of middle school boys and girls did not differ in a path model that included age, interest, outcome expectations, and intentions to enroll in a mathematics-

Research into the link between gender and writing is mixed. While it appears that teachers, and students, generally believe that girls are better than boys are at writing, the findings regarding differences in writing self-efficacy have not been consistent (Pajares, Miller, & Johnson, & 1999). Some researchers have found no gender differences in writing self-efficacy, while others have reported modest differences favoring girls (Pajares et al., 1999). However in a study of secondary school students in Nigeria, it was found that there was no significant difference between gender and academic motivation at all (Jegede, 1994). Other studies have not explicitly analyzed gender differences were they may have existed. Kearney (1997) carried out a study into passive writers, which does not explicitly mention any gender differences. The study’s findings however appears to point some differences between girls and boys in their attitudes towards writing tasks. This is in line with conclusions reached by Bruning and Horn based on research they read (Bruning & Horn, 2000).

Smith & Elley (1997:37) mention New Zealand studies carried out in 1945, 1955 and 1984 which all asked children to rate their liking for writing at school. Each of these studies found that boys placed writing close to the bottom in interest out of 7-10 school subjects with girls only slightly better. Similar results were also found in the UK and USA.
2.3.2 Summary of gender differences on self-efficacy

In summary, findings on gender differences exist on self-efficacy in mathematics coincide on four points. First, most researchers have found that male students report stronger self-efficacy beliefs in mathematics than do female students, although it bears emphasizing that a number of researchers have failed to find differences such as Pajares and Graham (1999), Middleton and Midgley (1997), Fouad and Smith (1996), Lopez and Lent (1992), Busch (1995). In most cases, results strongly depend on the variables included in regression models. Second, when differences are detected, it seems that they start during middle school and accentuate as students grow older. Third, gender differences in mathematics self-efficacy do not favor female students at any level of schooling. And fourth, the differences favoring boys are often found when girls and boys have similar mathematics achievement indexes or even when girls have higher achievement than do boys.

2.3.2 Gender difference on intrinsic value

1) Studies abroad

Gender differences were found in regard to all three aspects of valuing proposed in the expectancy-value theory (Eccles and Wigfield, 1995). Some evidence indicates that, as early as the middle school years, male students perceived math courses as being greater in utility value than did female students (Fennema and Sherman, 1977, 1978). This was found for both basic and advanced mathematics courses. Moreover, male students rated future goals as more important in their decisions to enroll in mathematics courses than did female students, implying greater perceived utility value of math (Eccles et al., 1983).

Feather (1988) found gender differences in subjective valuing of math and English among college students. Using a measure of value that included aspects of attainment, utility, and intrinsic value as described by Eccles et al (1983), he
found that men reported higher valuing of math, and women reported higher valuing of English.

Using a measure of subjective valuing that tapped attainment and utility value, Eccles and colleagues (Eccles et al., 1993; Wigfield et al., 1997) reported gender differences in subjective valuing of reading, instrumental music, and sports in children as young as first grade. Girls were higher in subjective valuing of reading and instrumental music, whereas boys were higher in subjective valuing of sports. These differences were in line with sex role-stereotypes and were stable over a three-year period. Interestingly, these investigations did not find gender differences in subjective valuing of mathematics. Similarly, no gender differences in utility, attainment, or intrinsic value were found in studies of high school students enrolled in math (Greene et al., 1999) or science (DeBacker and Nelson, 2000) classes.

Pajares and Miller (1994) pointed out that boys and girls did not differ in perceived usefulness of maths.

In an investigation of course enrollment patterns, Eccles (1984) found that subjective task valuing mediated gender differences in both intention to take advanced courses in English and math, and in actual enrollment in advanced math courses. It appears that, for young men, task valuing is more closely related to performance history than it is for young women. For example, among young men, past performance was the sole predictor of enrollment in advanced math classes. Among young women, past performance predicted enrollment in advanced math classes, but subjective task valuing was a second important unique predictor. Female students who valued math were more likely to enroll in advanced math classes regardless of performance history than those who did not value math.

Feather (1988), using path analysis, found that subjective valuing of English mediated the relationship between sex of students and enrollment in English courses. Similarly, valuing of math mediated the relationship between
sex of student and enrollment in math courses, although the mediating role of perceived math ability was greater.

According to Russilo and Arias (2004) Gender differences were not found in academic self-concept and in intrinsic motivation in secondary students in 9th and 10th grades.

Several studies have shown that boys show a greater degree of extrinsic motivational orientation (Anderman & Anderman, 1999; Midgley & Urdan, 1995; Urdan et al., 1998), while girls show a greater intrinsic motivation (Meece & Holt, 1993). However, other studies have not found differences in the type of goal pursued as a function of gender (Ryan & Pintrich, 1997).

Students’ attitudes are just as or even more important for effective educational experiences as achievement measures. Gentry et al. (2002) in their study showed consistent findings that girls usually find classroom activities more enjoyable than boys. However, a trend of growing dislike for school was found from elementary to middle school years in both girls and boys. Overall interest in school and choices given to students regarding classroom activities are crucial aspects to creating effective and engaging lessons for all students. I thought it was interesting that this article pointed out that "contrary to much of the literature that discusses the risks for adolescent girls, it may be that male middle school students are also at risk for disliking school in general, which may thereby contribute to other problems (e.g., declining achievement, behavior problems, lack of engagement in learning)" (Gentry et al., 2002). More research needs to be done on this issue because if disliking school underlies behavior problems, then making lessons more enjoyable could help in this area.

Gender differences can arise as a function of home, cultural, educational, and mass media influences. Parents often underestimate their daughters' academic competence and hold lower expectations for them (Phillips & Zimmerman, 1990). Parents also often portray mathematics and science as male
domains (Meece & Courtney, 1992). As girls enter middle and high school, the perception of mathematics as a masculine domain may further weaken their interest in it.

Flockton & Crooks (1998:61) found several differences between boys and girls in writing. For example, in the year 4 samples of students, girls performed better than boys did in 19 out of 24 writing tasks. They also indicated greater enjoyment in writing, greater frequency in writing and higher self-perception as writers. In year 8 girls scored higher than boys in 24 out of 28 tasks, and greater enjoyment in writing at home than boys. While liking for a subject is not directly related to self-efficacy or achievement, it may be indirectly related through topic interest and knowledge and the value placed on the subject. This is an area for further research to unravel the real issues on topic interest and writing.

2.3.4 Summary of gender difference on intrinsic value

The pattern of gender differences in subjective valuing also parallels historical changes in sex role conceptions. Findings that male students value math more than female students were published in the 1970s and 1980s. In the 1990s, researchers were still reporting differences that reflected gender stereotyped attitudes about some achievement domains, with girls or young women reporting higher valuing of English, reading, and music, and boys or young men reporting higher valuing of sports and maths. The most recent investigations, however, were no longer reporting gender differences in valuing of math such as Russilo and Arias (2004), Green et al., (1999), Pajares and Miller (1994), Ryan & Pintrich (1997), although some research disagree with them (Fennema and Sherman, 1977, 1978; Eccles et al., 1983).
2.3.5 Gender difference on Test anxiety

1) Indian studies

Saraladevi and Devaraj (2001) in their study about gender differences in examination stress and manifest anxiety of class X, XII, MSc, and vocational students showed that examination stress and anxiety were related to each other. Girls were having more examination stress and anxiety.

Sharma and Mahajan (2001) conducted a study to know the gender personality in stress as a result of different personality variables on staff nationalized banks. It was observed that both extrovert and introvert females experienced more stress than their male counterparts on most of the stress parameters. Also, both Neurotic and stable females felt significantly more stress than males on different types of role stress.

Barinder (1985) studied on “General Anxiety with reference to the environmental factors and extraversion of Delhi student”. The study aimed at finding out the general anxiety level of Delhi students so as to make out how it was affected by environmental factors and extraversion and introversion. In addition, the study sought to determine the test anxiety level of Delhi students and find out how it was affected by environment factors, general anxiety and extraversion and introversion. The research focused on “200” College going students (boys and girls). The findings showed that sex was significantly related to anxiety, but general and test anxiety. Girls exhibited more general anxiety, as well as test anxiety than the boys. There was a positive relationship between general anxiety and test anxiety. Socio-economic status did not play any role in the case of boys, neither on their general anxiety nor on their test anxiety. There was a significant relationship between general anxiety and test anxiety of girls and boys.

Singhal (2004: 124) claimed that “The female are found more stressed than males as examinations represent to them physical danger, pain and
academic failure. They perceived pressure for achievement, and the related probability of failure induced in them test anxiety. The parents, teachers and peers tend to evoke expectations of academic demands of students and put pressure directly and indirectly as well”.

Khosravi (2005) in cross-cultural study of relationship between self-concept and anxiety among adolescence students found school anxiety was negative correlated with self-concept in Iranian and Indian students. No significant difference found between Iranian and Indian students on overall school anxiety. She concluded that in both samples of Iranian and Indian students, girls were higher than boys on overall school anxiety.

2) Studies abroad

Comparisons between males and females have revealed consistent sex differences in test anxiety levels, with females scoring higher than males in levels of anxiety. This effect of sex parallels the differences in the prevalence of anxiety related disorders seen in adults. It has been suggested that this difference is due to girls being more willing to report experiencing anxiety, and has resulted in the use of different cut-of scores to identify significant levels of test anxiety in boys and girls. Using this approach, test anxiety was seen to be approximately equally prevalent in boys and girls by Turner et al. (1993).

As mentioned by Pajares and Graham (1999) there was no gender differences in maths anxiety. They were no gender differences in any of the motivation constructs.

The evidence that anxiety may also play a role in explaining sex differences in college entrance exam score is growing. As early as elementary school, girls report that they are more worried than boys about their school performance. In research with fourth, fifth and sixth grade students, for example, (Pomerants, Altermatt and Saxon, 2002) found that girls were more likely than boys to agree with statements such as “I worry about whether I am really smart”
and “I worry about doing well in tests at school”. Similar sex differences in anxiety have been found among high school, college and adult populations (Feingold, 1994).

One might argue that females’ greater levels of worry could be beneficial if it leads them to take important test like the SAT (Standard Attitude Test) more seriously and to study diligently for them; however, Eccles, Wigfield and Schiefele, (1998) results do not support this idea. Their finding showed, Girls who worried frequently did not perform better in school than girls who worried infrequently. Worrying was, however, related to a number of negative outcomes for girls, including low levels of academic confidence and high levels of uncertainty about how to be successful. Low confidence and high uncertainty are likely to interfere with females’ ability to perform at their best in testing situations. In particular, females may be focusing so much attention on their negative thoughts about the test and their fears that they may not succeed, that little energy is left for focusing on the test itself. Indeed, many studies show that students with high levels of test anxiety perform more poorly in cognitive tasks than students with low levels of test anxiety, even when levels of ability are similar.

Research confirms the merit of Stereotype Threat Theory. In one study, Spencer, Steele and Quinn (1999) asked high-achieving male and female college students to take a portion of the advanced Graduate Record Examination (GRE) in mathematics. The participants were divided into two conditions. For half of the students, the negative stereotype was salient. That is, students were told that males tend to outperform females on the test. For the other half of students, the negative stereotype was minimized. That is, students were told that males and females tend to perform similarly on the test. Consistent with Steele’s theory, when the negative stereotype was made salient, females performed worse than males. However, when the negative stereotype was minimized, females and males performed similarly. This research suggests that female students are
aware of the negative stereotype and when it is salient, their performance suffers.

According to Zaslavsky (1994), people of all races and economic backgrounds fear math, but women and minorities are most hindered by it. She reported research, which points out that around the seventh grade girls begin to doubt their ability to do math. Since self-confidence and math performance are so closely related, it plays a major role in girls’ choices to continue math into high school.

Preis & Biggs (2001) cited research that women, in particular older women, often experience more math anxiety. However, in a recent CBS News story (May 23, 2003), some people are concerned that boys are not performing as well as girls: “Girls are being told, “Go for it, you can do it. Go for it, you can do it.” They are getting an immense amount of support,” (Dr. Michael Thompson, a noted author on the subject) says. “Boys hear that the way to shine is athletically. And boys get a lot of mixed messages about what it means to be masculine and what it means to be a student. Does being a good student make you a real man? I don’t think so…it is not cool.” Whether this perceived lower performance is attributable to anxiety is questionable, but must be determined.

The activation of negative stereotypes can be extremely subtle and still have negative consequences for student performance. In one study, Inzlicht and Ben Zeev (2000) found that females performed worse on a mathematics test when they took the test in a room in which males outnumbered them than in a room where only females were present. Even asking students to report demographic characteristics such as gender or race may activate negative stereotypes and, in turn, lead to performance declines.

What does internal distress have to do with academic achievement? According to Pomerantz et al., (2002) girls are more vulnerable than boys to internal distress, which is their perceptions of competence in school and worry
over performance in school. They have found that girls actually outperform boys in most areas, but because they are more prone to internal distress and are more concerned with failure, they can become to view themselves negatively in terms of their academic abilities. This can, in turn, cause poorer academic outcomes because girls with deep internal distress may not pursue challenges that can affect their future career choices. This article demonstrates the importance of creating a positive learning environment for both girls and boys. Also, it is critical for teachers to recognize that "boys' poor performance could also have important implications for their life choices. However, the attention to boys' poor performance should not occur at the expense of attention to girls' heightened internal distress, which is equal to or more than twice as large as girls' lead in performance".

2.3.6 Summary of gender difference on test anxiety

All Indian research on test anxiety indicated that sex was significantly related to anxiety and girls show more test anxiety than boys.

Researches abroad on gender differences on test anxiety have shown that girls exhibited more test anxiety than boys. Even if the prevalence of test anxiety in two sexes is parallel, girls are more willing to report whenever they experience anxiety. Only Pajares and Graham (1999) found no gender differences in math test anxiety.

As a general rule research on test anxiety revealed that girls showed more test anxiety than boys. So, it is a need for female that they should learn some skills in coping with test anxiety to function more effectively in school and other situations.
2.3.7 Gender difference on cognitive strategy and self-regulation

1) Indian studies

Swarup & Sharma (2000) examined the effect of cognitive retraining and sex on “on-task” Behavior and level of Aspiration of sixteen fifth class children in Mumbai with learning problems in maths. Subjects’ academic and none academic ‘on-task’ and ‘off task’ behavior and level of aspiration was studied along with the kind of problem the subjects experienced in maths. Results showed that the female subjects’ academic ‘on-task’ time was greater, whereas the male subjects remained more ‘off task’ than ‘on-task’. But both male and female subjects performance in maths, especially word problems was poor. However, the male subjects’ level of aspiration was greater than that of the female subjects.

Verma (2000) in her study explored the differences in cognitive strategies and regulation strategies of learning of male and female distance learners with high and low levels of academic contents. He found that male and female students differed significantly in regard to deep processing, male being more prone toward it.

Panda (1991) carried out a study to investigate effects of certain organismic variables on cognitive style among pre-school children and analysis of its correlates. The study found that: 1) boys and girls did not differ in their disembedding ability, whereas with an increase in age, there was an increase in field independence 2) girls scored higher than boys on the intellectual ability test which showed a progressive decline with increasing age 3) there was no difference in receptive vocabulary associated with sex 4) pre-school boys and girls showed similar autonomous achievement striving, and there was no significant age effect.

2) Studies abroad
In a study on academic achievement among children and adolescents, girls were found to have more confidence in their ability to self-regulate in learning tasks, although this was found to be associated more with the feminine gender role than with biological sex (Pajares & Valiante, 2002).

In study of self-regulated learning in high school, Peklaj and Pecjak, (2002) observed that girls were shown to have greater knowledge about the role of thinking in self-regulation of learning, to use more meta-cognitive and other strategies, to be more intrinsically motivated, and to express more feelings related to learning.

In a similar study of self-regulation of learning among college freshmen, however, males and females were found to be more alike than they were different (Minnaert, 1999). Possibly, the differences found in younger individuals are developmental in nature and vanish in young adulthood. In the Minnaert study, one exception was a sex difference found in the tendency to avoid failure for females. High fear of failure was linked to deficits in regulatory activities (Minnaert, 1999).

When gender differences in the use of self-regulated learning strategies or in confidence to use these strategies have been reported, they typically favor female students. Zimmerman and Martinez-Pons (1990) interviewed students in fifth, eighth and eleventh grades to discover whether gender differences could be detected in their use of 14 self-regulated learning strategies. Girls displayed more goal-setting and planning strategies, and they kept records and self-monitored more frequently than did boys. Girls also surpassed boys in their ability to structure their environment for optimal learning.

Pokay and Blumenfeld (1990) investigated the use of self-regulated learning strategies by high-school students in geometry and found that, as the semester began, girls reported using more meta-cognitive, general cognitive and specific geometry strategies than did boys. Girls also reported stronger effort in
strategy management. At the end of the semester, girls continued to report stronger general cognitive strategy use.

Rusillo and Arias (2004) carried out a study that examined gender differences in various cognitive motivational variables (causal attributions, academic self-concept and use of significant learning strategies) and in performance attained in school subjects of language/Arts and Mathematics. A sample of 521 students was selected from the second cycle of mandatory secondary education (9th and 10th grade). Results showed the existence of gender difference in variables under consideration with girls, showing lower levels of extrinsic motivation, taking more responsibility for their failure, using information processing strategies more extensively, and getting better marks in language Arts. Gender differences were not found in academic self-concept, in intrinsic motivation, in success-related attributions and in performance attain in Mathematics.

According to Zimmerman and Martinez-Pons (1990) highly gifted girls learn in a more self-directed way than do boys. This pattern has been found in other studies and across different subject area, such as Science and Mathematic (Wolter & Pintrich, 1998).

Ablard and Lipschultz (1998) confirmed the findings of the study by (Wolter & Pintrich, 1998). Highly gifted seventh-grade girls used more self-regulated learning strategies than highly gifted boys and at the same time, their mastery of goal-orientation was more positively developed than in the boys. In the Stipek and Gralinski (1996), the mastery or learning of goal-orientation of elementary school girls was at least as strong as that with boys.

2.3.8 Summary of gender difference on cognitive strategy and self-regulation

Results of Indian research about gender difference on cognitive strategy and self-regulation is different and related to different age.
Most of the research on gender differences in abroad indicated that girls used more cognitive and meta-cognitive strategies. Girls in school and college were shown to use more meta-cognitive and other strategies, more planning strategies and to express more feeling related to learning. This pattern was also found in gifted girls students than gifted boys.

Overall, review of both Indian and abroad research about cognitive strategy and self-regulation showed that girls were more advantaged. Some researchers were agreeing with this point such as: Pajares & Valiante, 2002; Peklaj and Pecjak, 2002; Zimmerman and Martinez-Pons, 1990; Ablard and Lipschultz, 1998, although other researcher was disagree such as: Verma, 2000.

2.4. Previous Research on Parents’ education and student achievement

1) Indian studies:

Proxies for household wealth, such as parental education and fathers’ occupations were positively correlated with achievement in many studies. Govinda and Varghese (1993) in their study in Madhya Pradesh, and Saxena et al (1996) study using the data of baseline studies in 43 districts, found that achievement scores increased with higher educational levels of parents. This was so especially if parents were university educated.

Roy, Mitra and Ray (1995) in their study of achievement levels in Bengal, found that mothers’ education to be more conspicuously related to children’s achievement. Wards of manual laborers scored the least while those of in-service occupational had the highest scored.

A number of studies also concluded that a conducive home environment, in terms of provision of facilities for learning, had a positive impact on the learning outcomes of students. Families who are aware of the importance of
education can contribute much to their children’s learning achievement. An analysis in low literacy districts found that families which encouraged children’s schooling by allocating time for study and encouraging reading, had them scoring significantly better on tests of learning achievements (World Bank, 1997; Varghese, 1995; Schukala et al., 1994). Conversely, it was found that the first generation learners, who lacked learning support at home, found learning becoming increasingly difficult (Hassan, 1995).

Jain and Arora (1995) also found performance of girls increasing with higher percentage of female teacher in schools.

Heyman and Loxley (1982) were concerned with examining whether school-related factors were a more important influence on student achievement than home-background characteristics. They found in India, the overwhelming proportion (90%) of variance in students’ science achievement is explained by school and teacher variables and only a small proportion (10%) by home factors.

2) Studies abroad

Hortacsu (1995) examined the relationships between parents’ education levels, parents’ beliefs. Children’s cognitions on how they related to themselves and their relationships and academic achievement were investigated in a sample of Turkish fourth-grade children and their parents. Structural equations were used in data analysis. Level of parents’ education was a significant predictor of parents’ beliefs for both parents. Relationship between parents’ beliefs and child outcomes were somewhat different for mothers and fathers. In addition, mothers’ level of education was directly related to child perceptions of external control, child endorsement of insecure attachment prototype, and child academic achievement; level of fathers’ education was directly related only to child perceptions of efficacy.
Ganzach (2000) carried out a study to examine the interactions between parents' education, cognitive ability and educational expectations in determining educational attainment. The findings indicate that there is an offsetting relationship between the educations of the two parents in the formation of expectations, but not in the determination of attainment; and that, both for expectations and for attainment, the cognitive ability of the child has an offsetting relationship with mother's education but not with father's education. The findings also indicate that there is a synergistic relationship between cognitive ability and educational expectations in determining educational attainment.

Generally, traditional research has revealed that more highly educated mothers have greater success in providing their children with the cognitive and language skills that contribute to early success in school (Sticht & McDonald, 1990). Also, children of mothers with high levels of education stay in school longer than children of mothers with low levels of education.

The National Assessment of Educational Progress (NAEP) data provide some evidence supporting the traditional interpretations of children's academic success that focus on gross measures of parents' educational attainment. A review of the performance of children and young adults across age groups (9 to 25 years of age) and across ethnic groups on various literacy tasks of the NAEP confirmed the importance of mothers' educational levels (Sticht, 1988). Data from the 1990 NAEP reading assessments revealed that the average proficiency among fourth-graders was lower for those students who report that their mothers had not completed high school.

Auerbach’s work also shows that "indirect factors including frequency of children's outings with adults, number of maternal outings, emotional climate of the home, amount of time spent interacting with adults, level of financial stress, enrichment activities, and parental involvement with the schools had a stronger effect on many aspects of reading and writing than did direct literacy activities, such as help with homework" (Auerbach, 1989).
Teale (1986) argues that a frequent shortcoming of research on the effects of family background is its correlational design. Children are tested in, for example, various aspects of literacy development (usually referred to as reading readiness) and their achievement levels are then correlated with particular home background characteristics. Such research provides no direct evidence for cause-effect relations. Yet, frequently, these studies suggest implications for instruction or home intervention programs.

According to Bleeker and Jacobs (2004) parents' beliefs about their children's abilities in school can have great effects on the future choices and self-perceptions of their children. This study looks at the stereotypes mothers' hold and how these stereotypes can change a child's perception of himself. It was found that female adolescents whose mothers reported low perceptions of their abilities to succeed in math careers were 66 percent less likely to choose careers in physical science-computing than in non-science. This study also confirmed gender differences within math and science careers as a result of stereotyping and socialization. Gender stereotypes shape the mothers' beliefs about their children's academic abilities, so it is important for parents to be educated in ways to fix these false beliefs as well as teachers. Gender bias should be avoided at home and can be done so in the same ways they are eliminated in the classroom. Parents must make a clear effort to change the way they think about gender in order to help their children establish better ideas about their gender.

Some parents hold on to the belief that girls have more difficulty with math than boys and are less suited to going into fields involving math, even when performance is the same for both genders. Parents also have gender-stereotyped attributions for success and failure in math and reading. Parents are more likely to attribute their son's math success to ability and their daughter's success to effort, while the reverse is true for reading where ability is attributed to girl's reading success. The parent's gender-typed beliefs and expectations can influence the child's self-competence, and sense of what is appropriate. Children are very adept at picking up gender-typed information as they actively trying to
find out what is normal, what is expected of them. Parents can convey their stereotypes unintentionally. The difference between saying, “You’re so smart” to a son and, “I’m glad to see you’re working so hard” to a daughter can quickly interpreted as the reason behind the children’s own success. Parents with gender-based beliefs also provide different types of learning opportunities to their sons and daughters. This comes up in the choice of toys and materials, where parents who hold gender-stereotypes are much more likely to buy their sons math and science related toys, and buy more math and science books for their sons. Parents are also more likely to encourage and enroll their sons’ honors math classes and push their daughters to excel in reading and writing. Those with gender-typed beliefs are also more likely to spend time helping their sons with math and science homework, and their daughters with reading. (Bleeker et al., 2005; Wigfield et al., 2002)

2.4.1 Summary on previous research on parents’ education and student achievement

Indian research identified the student background factors such as parents’ education especially when parents were university educated, home environment, and also parents who support students for involve their learning, affect on student achievement.

Research on parents’ education in abroad implies that the parents’ levels of education can have influence on self-beliefs, cognitive ability and educational expectations in determining educational attainment. A salient finding from traditional research on both adult education and early childhood intervention programs is that the mother’s level of education is one of the most important factors influencing children’s reading levels and other school achievements. Such factors as maternal relations, emotional climate of the home and even level of financial stress have effect on the children’s activities in school than direct help in homework. Although educated parents can help children progress in their achievement, some parents’ gender-type beliefs and expectations can influence
the gap between girls and boys and provide different types of learning opportunities to their children.

Results of all research on parents’ education, exhibited that this factor is a very prominent factor related to cognitive growth and students' attitude to learning and academic achievement. Common point in these researches was that mothers’ education has more influence on their children’s performance.

2.5 Relevance of the review to the present study

The review of related literature was done in four parts, focusing on:

• Previous research that focused on motivation and self-regulated learning components and their effects on academic achievement

• Previous research on gender differences on motivational beliefs self-regulated learning components and academic achievement.

• Previous research that threw light on influence of parents’ education of their children

The research review included a review of research work done on motivational beliefs and self-regulated learning strategies and academic achievement. It brought out the fact that motivational component and self-regulated learning components are interlinked. Both are useful to bring an improvement in the achievement level of the students. Research has also shown that self-regulation can be effective in influencing educational outcomes if an individual has positive beliefs about his ability to negotiate and achieve optimal learning. This helps in improving the quality of education.

There are some important messages for teachers and developers in high school education. Instructors need to convey to students that mathematics is indeed learnable, and that one can increase ones knowledge and skill of maths
by employing specific strategies. It is also vital for mathematics instructors to focus on task value in their pedagogy and explanations of course materials, as well as relate instruction and assessment to the relevance and utility of mathematics for everyday life. Second, it is important to facilitate strategy use. Instructors might consider modeling specific strategies or ways of thinking for learning mathematics in class, in addition to encourage students to share their own strategies for learning course content.

The review indicates a variety of facilitating variables which impact upon students’ cognitive and motivational processes. The basis of the present study is a general model of motivation and self-regulated learning strategies. In this study certain personal characteristic such as gender along with home factors such as parents’ education help students to engage the task, and which in turn influence students’ motivation, cognition and academic achievement. Thus, the literature reviewed above supports, basic assumptions of the model in a wider theoretical and empirical framework and, in doing so, both support elaborates key aspects of the model guiding the present research.

The review also brought out one important fact that majority of research in this field in India focus on the motivation and cognitive processes separately. The present study not only considered the integration between motivation and cognitive factors, but also it pays attention to the effects of personal characteristics such as gender that shape students’ motivational and cognitive processes. Moreover, this study considered how these processes might be moderated by classroom contexts such as parents’ education.

The review of related literature developed a clear insight to plan the study and focused on the objectives of the present study as outlined:

- Selection of 8th standard for study
- Selection of both of girls and boys and comparison of their personal characteristics
• Selection of parents' education as other variable influencing their children

It is the important study in India that is related to relationships between motivational beliefs and cognitive processes and academic performance that integrated motivation and cognition in learning of school students.