GENDER DIFFERENCES IN THE MOTIVATION TO LEARN

by

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Abstract

This paper analyzed the relationship between motivation and learning, as well as gender's impact on motivation to learn. The history of society's belief's about women's thinking, of educational opportunities for women, and of research regarding gender differences in academics revealed a consistent trend toward equality of potential for thinking, schooling, and achievement of men and women. Thirty research articles revealed a strong relationship between motivation and learning, but only small, domain specific gender differences in motivation to learn. These findings indicated a need to use teaching strategies that promote the motivation to learn in both sexes. Specific strategies supported by research are outlined.

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CHAPTER ONE: RELEVANCE AND RATIONALE

Introduction

Throughout history, many people assumed that males and females were just as different in their minds as they appeared biologically different on the outside. For many years this resulted in different opportunities for men and women and for boys and girls. More recently, the United States and other parts of the world passed laws and perceptions changed such that it is now a commonly held belief that men and women are of equal status. Does this mean there are no differences in the two besides the obvious physical makeup? What does it mean for the education of boys and girls in schools?

Statement of Question and Relevance

One major goal of public education is to support the learning of each student. In fact, the most recent major national education reform is called "No Child Left Behind." Learning is the connection with, refinement, and expansion of an individual's prior knowledge. The development, use, and strengthening of mental frameworks for understanding the world is all learning. Because that growth ultimately occurs within the individual, one's motivation is a major determinant of the extent to which learning will occur. If no child is to be left behind, motivation to learn must be a focus of teachers.

Zull (2002) argued from a brain-science perspective that motivation to learn comes from learning itself. A student does not need extrinsic rewards to create true motivation for learning. Rather, s/he needs emotional support and a structure that supports success in facing challenge (p. 238). Exerting effort in the face of challenge suggests the importance of student interest in the subject of study, perceived self-efficacy to succeed in the subject, and end-goal of learning; all aspects of the construct of

motivation to learn that this paper examines. Similarly, Dewey (1938) indicated the importance of motivation in arguing that a truly educative experience will connect with the students in two important ways: it will be both presently "agreeable" and must have influence on future experiences (p. 27). Dewey's construct differentiated the two measures of interest that are examined in this paper: initial interest (present) and perceived task-value (future) of the experience. Dewey and Zull believed one's motivation to learn is a fundamental determinant whether a learning experience will be lasting or fleeting.

Students in America's classrooms are diverse in both genetic makeup and life experience. Diversity in interests is influenced by both social forces and by one's inherent inclinations. A teacher's goal should be to get to know each student in his/her class individually, developing an idea of the interests and goals of each. It is useful, however, to have a starting point to understand our students. One very common form of diversity found in American classroom is gender diversity. Nearly all schools and classes include both boys and girls. In this paper, I examine the potential implications of gender differences in student motivation for learning.

The answers to the question "What are gender differences in motivation and what is the effect of those differences on learning?" are important for every teacher's practice for two reasons. First, they clarify the relationship between motivation and learning. And second, they indicate the extent to which motivation to learn is mediated by gender. In the second chapter, this paper will analyze the historical context in which the question of sex differences in motivation arises. Chapter three will examine research literature to describe the relationship between motivation and learning first. If these two factors

significantly correlate, then it behooves a teacher to examine what types of motivation are most important for which students and determine classroom practices that support those types of motivation. Assuming motivation is connected with learning, chapter three will examine the research literature on gender differences in student motivation to determine what challenges around motivation each gender faces for learning. In the final chapter, this paper outlines some strategies for teachers to adjust their practice in an attempt to motivate both groups equitably with a specific focus on the high school social studies classroom.

Personally, a clear understanding of the relationship between motivation and learning and how it may differ across gender will inform my practice in a high school social studies classroom. Social studies historically focused on topics related to important political figures, major conflicts, and major political movements. The presence of men dominated each of these areas. Does the study of major historical figures that overly represent males have a detrimental effect on female motivation? How about teaching practices? Are more analytical aspects of the social sciences such as economics more interesting to one gender? How about the more emotionally driven study of cultures and peoples? In what ways might my organization of classroom experiences (whole group lecture, small group investigation, discussion, etc) effect student motivation differentially based on gender? I hope to begin to answer these and other questions in my discussion in chapter four based on a thorough analysis of the research. This study helps me begin to make the classroom an equitable and more motivating place for both genders to be. It also gives direction to other instructors who face similar concerns.

Rationale

Wigfield, Battle, Keller, and Eccles (2002) reviewed historical trends in the research on gender differences in education. They pointed out that historically research focused on differences in achievement, particularly in mathematics and verbal areas. Recent government reports (Freeman, 2004) and literature reviews (as cited in Wigfield et al.) showed trends of diminishing difference in school achievement. Other studies indicated growing concern that gender gaps may be reversing. Whereas past research focused on the failure of girls to achieve as strongly in math and science courses, recent research showed a disadvantage for boys across academic achievement measures (as cited in Wigfield et al.). An article by Whitmire (2006) entitled "Boy Trouble" which highlighted a government report on the decreasing achievement of boys in many areas of school provided one example of such ideas surfacing even in the popular press.

While I find these reports encouraging for girls and young women whose achievement has historically been measured as a two-digit percentage of that of boys, I also question the value of lauding achievement as if it equaled learning. Even recent researchers used achievement measures as a solitary measure of learning (Lynch, 2006; Pomerantz, Altermatt, & Saxon , 2002). Others used it as one of multiple measures of learning (Bergin, 1995; Brookhart & Durkin, 2003; Grant & Dweck, 2003; Greene, DeBacker, Ravindran, & Krows, 1999; Pintrich & De Groot, 1990; Wolters & Pintrich, 1998). I propose that multiple measures of learning offer more meaningful information about relationships to learning. The experience of taking a course, doing well on exams and getting good grades, but forgetting much of the content soon after completing it is a

common one. What happens to the learning? Does achievement actually represent learning? Achievement is one indicator of learning, but it is not the equivalent of it.

Learning, as defined by various developmental psychologists, philosophers, educational theorists, and brain scientists, is building new knowledge onto the foundation of prior knowledge in such a way that makes it useable into the future. Zull (2002), argued from a brain science perspective that new information must connect with existing neuronal networks (p. 92, 103). Piaget argued essentially the same thing from a developmental psychology perspective, but he used the term schema for the growing networks of knowledge (Miller, 1993, p. 69). If students are to learn something long-term, they must connect it with something they already know. The use of deep cognitive strategies is an evidence of this, as they require students to connect new information with prior knowledge to be able to summarize it, organize it, draw inferences about it, or think critically about it. Simple recall, a surface level learning strategy, does not require connecting with prior knowledge (existing neuronal networks/schema) or encourage transfer of information beyond short-term memory.

The second aspect of learning as defined above is its usefulness into the future. If a student cannot use the information anew in the future, then he/she has not truly learned it. Socrates argued one had no new knowledge until it was “tied down” in such a way that it would be permanently available in one’s mind into the future (Plato, trans. 1976, p. 30). Dewey (1938) referred to the need to use new knowledge as the continuity of experience: using previously learned information as the basis for future learning (p. 35). Use of learned information could take various forms. One example is learning to ride a bike, then having the ability to ride a bike into the future. When analyzing evidence of the use

of new learning, there are a few measures that touch on the idea. In some ways performance, or achievement, is a measure of student use of knowledge. Therefore, I use achievement as an evidence of learning, not a synonym. Other measures also evidence the use of learned information. Deep learning strategies, while requiring connection with one's prior knowledge, are also in themselves as use of the new information. Effort is also a measure of using new information to some degree, as you have to be doing something with the info if facing a challenge regarding it. If new learning requires no effort or offers no challenge, then the student is not learning anything new, but already knows it.

In short, measures of achievement are not enough to indicate true learning, though they are an evidence of learning. Combined with other evidences, including the use of deep cognitive strategies and effort exerted in the face of a challenge, a stronger case can be made that learning connecting with student's prior knowledge and used into the future is occurring.

The recognition that more than achievement can measure learning enables a broader examination of the motivational constructs that lead to these measures of real learning to see how the genders measure up. A broad array of professionals studied relationships between learning and motivation because they recognized the importance of a student's motivation to the amount of true learning that comes out of a given learning experience. Pintrich and De Groot (1990) argued that students' "knowledge of cognitive and metacognitive strategies is usually not enough to promote student achievement; students also must be motivated to use the strategies…" (p.33). They meant that students may know how to learn, but it does little for them if they are not motivated to learn.

Research examining the relationship of motivational constructs and learning constructs (defined below) explored many relationships between measures of motivation and measures of learning. Researchers found the motivation measure interest related to effort exerted in the face of challenge (Farman, Natriello, & Dornbusch, 1978; Greene et al., 1999; Pintrich & De Groot, 1990; Sungur & Tekkaya, 2006; Wolters & Pintrich, 1998), the use of deep cognitive strategies (Pintrich & De Groot; Sungur & Tekkaya; VanZile-Tamsen, 2001; Wolters & Pintrich), and performance (Dam & Teekens, 1997; Greene et al.; Lynch, 2006; Pintrich & De Groot; Wolters & Pintrich). Researchers also found self-efficacy related to learning constructs: effort in the face of challenge (Meyer, Turner, & Spencer, 1997; Pintrich & De Groot; Sungur & Tekkaya; Wolters & Pintrich), use of deep cognitive strategies (Brookhart & Durkin, 2003; Meyer et al.; Pintrich & De Groot; Sungur & Tekkaya; Wolters & Pintrich), and performance (Lynch; Pintrich & De Groot; Pomerantz et al., 2002; Wolters & Pintrich). Additionally, researchers found learning goal orientations related to effort in the face of challenge (Greene et al.; Grant & Dweck, 2003; Meyer et al.; Shim & Ryan, 2005; Sungur & Tekkaya; Wolters et al., 1996), use of deep cognitive strategies (Bergin, 1995; Brookhart & Durkin; Grant & Dweck; Meyer et al.; Nolen, 1988; Sungur & Tekkaya; Wolters et al.), and performance (Bergin; Grant & Dweck; Greene et al.; Lynch; Wolters et al.). In short, relationships exist between learning constructs and motivation. The exact nature, significance, and effect of these relationships are explored in chapter three.

This large body of research that included relationships between measures of motivation and measures of learning strengthens the assertion made by Pintrich and De Groot (1990) regarding the importance of motivation to learn. Researchers recognized the

importance of measuring both the variables indicating learning and indicating motivation. They, too, wanted to describe this relationship more precisely. Teaching strategies that connect with student motivation should be based in evidence of the relationship between particular aspects of motivation and of learning.

If motivation mediates what children learn, then differential motivation across gender could mediate differences in learning for boys and girls presently and into their futures. Eccles, Wigfield, Harold, and Blumenfeld (1993) worried that different valuing (part of the motivational construct interest) of certain domains could mediate adolescent participation in those domains (p.831). McTeer (1986) argued that knowing student interest inclinations could help teachers plan curriculum that connects with those interests (p.263). Differentiated self-efficacy across domains through secondary school could easily impact the direction of study into college and careers (Wigfield et al., 2002). Even if these students' learning measures are equal, a difference in motivation could have a large impact on life decisions. Some of the same researchers as above, and others, recognized this importance and studied gender's influence on the three motivational constructs of interest to this paper: Interest (Eccles et al.; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Lightbody, Siann, Stocks, & Walsh, 1996; Martin, 2004; McTeer; Shim & Ryan, 2005; Wolters & Pintrich, 1998; Wolters et al., 1996), perceived self-efficacy (Cole et al., 2001; Eccles et al.; Jacobs et al.; Martin; Patrick, Ryan, & Pintrich, 1999; Pomerantz et al., 2002; Vispoel & Forte Fast, 2000; Wolters & Pintrich; Wolters et al.), and learning goal orientation (Giota, 2002; Greene et al., 1999; Martin; Meece & Holt, 1993; Patrick et al.; Ried & Cohen, 1974; Shim & Ryan). The educational

community as a whole will benefit from a look at the importance of gender in determining how students are motivated to truly learn.

In summary, it is important to me and to the academic community at large to determine the relationship between motivation and true learning (not only achievement). This should inform practice regarding motivating students to learn. Additionally, research regarding gender differences in the motivation to learn will inform the educational community of challenges they may face to motivate their students equitably.

Scope and Definitions

For the purposes of this critical review of the research, I have limited the scope to three common measures of motivation and three common measures of learning. I use the following definitions that roughly correspond with various quantitative researchers' definitions. The definitions described below are both consistent with aspects of true learning outlined above as well as useful for analyzing quantitative research available on the topic.

Motivation to learn includes one's interest in the learning experience, one's perceived self-efficacy to succeed in the experience, and one's goal orientation for participating in the experience. (These three constructs also require defining, see below)

Interest includes both the initial interest one brings to a given experience, sometimes called intrinsic interest, and the long-term value one perceives it having, usually labeled task value.

Self-efficacy is one's perceived academic ability to succeed in learning a subject or accomplishing a task, alternatively labeled as one's academic self-concept or competence in the given area.

Goal orientations are students' internal reasons for participating in the learning experience. Common labels for the most positive goal orientation for promoting learning include 'mastery,' 'task,' 'learning,' and 'intrinsic.' Students with these learning goals desire to participate for the purpose of learning, growth, or improvement. A 'competitive,' 'performance,' 'ego,' or 'extrinsic' orientation generally means that students are interested in getting good grades, doing better than their peers, or impressing the teacher, and is less positively associated with learning. 'Work avoidance' or 'performance-avoidance' goals mean that students are interested in getting done with the least amount of work or interested in not trying hard so that they can avoid getting upset about their grades.

Learning is measured by students' effort exerted in the face of a challenge, their use of deep cognitive learning strategies, and by their performance.

Effort exerted in the face of a challenge is indicated by students maintaining levels of effort when facing a challenge to succeed in school, and sometimes measured within a construct called regulatory strategies.

Use of deep cognitive strategies is a measure that includes reported use of elaboration (i.e. putting in own words), organization (i.e. outlining or creating visual maps), and/or critical thinking. Sometimes it is measured within a group called 'cognitive strategies' that includes the surface strategy of rehearsal (for rote memorization).

Performance is measured with student semester grades, grade-point averages, scores on standardized tests, or scores on individual assignments.

Summary

This chapter presented the focus question for this investigation: What are gender differences in motivation and what are the effects of those differences on learning? The importance of answers to this question ranges from informing the educational community about the relationship between motivation and learning to specifically informing educators how to promote a more gender equitable classroom.

The question of gender differences in the educational realm has existed for centuries. Chapter two presents an overview of that historical context and prepares the reader for the critical review of the current research presented in chapter three. Finally, chapter four discusses implications of findings.

CHAPTER TWO: HISTORICAL BACKGROUND

Introduction

This paper is focused around the topic of gender differences in motivation and their effect on learning. I discussed the importance of the topic for educators in chapter one. Analyzing gender differences in education assumes that both genders are being educated and that there is an interest in the different ways in which the two genders may think related to the learning process. Historically, females and males did not always receive education in the same fields. This chapter first quickly traces the evolution of thought regarding women's capacity for thinking/learning from shortly before the current era (B.C.E) to the present. I do not focus specifically on thoughts concerning man's ability to think, as it has been assumed to be the benchmark against which women are measured and is not often questioned. The second section begins to focus geographically, and includes a basic history of the education of boys and girls in the United States from the time of the American Revolution to the present. Finally, the third section brings the focus to the purpose of this paper by highlighting the evolution of research about motivation and specifically sex differences in motivation.

Women's thinking

In January 2005, Lawrence Summers, president of Harvard University, sparked controversy in the popular press and among social scientists when he voiced the possibility that innate gender differences account for the small number of women in high level positions in science and engineering (Bombardieri, 2005). Many of those who reacted strongly to this suggestion may find the history of such thinking surprising.

People (often European and American men) have weighed in on the debate about women's capacity for thinking in much of recorded history.

In connection with Summers' statements, Russett (2005) outlined a brief synopsis of the thinking of various western thinkers about women thinking. In the 4th and 5th centuries BCE, Plato and Aristotle both had clear leanings on the issue. Plato felt that men were the ideal, superior to women in both body and mind. He did leave open a little caveat in *Republic*, indicating that in an ideal society both men and women could be Guardians. Aristotle was less ambiguous in his assessment. He clearly believed that women were inferior, even indicating that female children were inherently suffering from a birth defect that was their lack of maleness.

Jumping well into the current era, Russett (2005) continued her synopsis in Europe of the middle ages. Thomas Aquinas did not differ from Plato or Aristotle in his assessment, arguing that males were inherently superior to females both physically and intellectually, the latter due to a more ordered intellectual operation. In the 15th century, Christine de Pisan began a three-century European debate about the nature of females with her *Book of the City of Ladies*. Within the book, the three goddesses Reason, Rectitude, and Justice were given female gender for the purpose of refuting traditional thought that women were less capable of these qualities than men.

In the 18th century, Russett (2005) continued, a difference between men and women was assumed and the debate turned more specifically to the source of these differences: nature or nurture. In *Emile,* Rousseau came down firmly on the side of nature, saying it was not in the female capacity to reason abstractly so their education should prepare them for the home life. In the same century, Baron d'Holbach argued that

the environment and schooling shaped females into that which Rousseau perceived as innate. As the century ended, Mary Wollstonecraft argued along the same lines in *Vindication of the Rights of Woman*: that women are educated and socialized into frivolous pursuits and away from serious education (as cited in Russet). Her arguments provided a foundation for European and American feminism.

Russett (2005) pointed out that as the western world entered the 19th century, it seemed the question was to be answered once for all. The science of phrenology offered what appeared to be a clear answer about the capabilities of men and women through examination of the head that revealed the inner faculties of the brain. Spurzheim was one example of a phrenologist who believed that head examinations consistently revealed women had faculties that led them to be guided by feelings, while men were superior in intellectual concentration. Despite this conclusion, the new science/belief in faculties of the mind did offer some hope for the education of females, as it was commonly believed that faculties of mind were malleable with exercise and practice. Other similar movements, such as brain weighing or brain topography, came and went through the 19th and early 20th century. The measurements consistently measured women's capacities against men's and found them lacking.

Russett (2005) indicated that after WWI, a new technique for measuring mental capacities developed that is still in common use today: the IQ test. This left little doubt about the potential mental capacities of men and women, as there have consistently been no measured differences in mean scores between genders. One interesting caveat that continues to the present is a measured difference in the spread of the bell curve between men and women (Witt, Dunbar, & Hoover, 1995). It seems that men tend to spread more,

giving them the highest and lowest scores, while women cluster more tightly into the middle, one of the points Summers spoke about (Bombardieri, 2005). Summers used this fact as an explanation for why men tend to reach the upper echelons of the science world more often than do women. Russett did not draw clear conclusions, but leaned toward socialization as an explanation for gender differences.

Gurian (2001) did make some pretty clear conclusions in his book about differences in the ways boys and girls learn. Basing his conclusions on the results of brain-based research, he indicated a number of different biological differences between boys' brains and girls' brains that affected not only their learning (particularly styles), but also their behavior. He did not dismiss socialization's role in creating or maintaining some differences, but he argued that ignoring the large number of truly biological differences between boys and girls leads teachers to waste a lot of time dealing with behavior issues with boys and enables many of the gaps in achievement, dropout rates, behavior problems, and others to widen. He did not argue a hierarchy of gender, nor did he argue all girls are one way and all boys are another, rather his argument was simply that gender generally plays a biological role in determining boys' and girls' strengths.

As this paper moves forward, I do not try to add to the debate about socialized vs. biological gender differences. Rather, I assume that both genders are equally capable of learning. If a difference in motivation to learn appears it should not limit what teachers perceive as student learning capabilities, but rather direct teachers toward more equitable teaching that helps incite motivation to learn in both female and male students.

Education In The United States

The establishment of the new nation in the late 18th century made philosophical bickering and supposed scientific demonstrations of difference seem less important. Realities of the revolution and the needs of the new nation led to new opportunities for girls and women in education immediately following the war for independence. Reading, writing, music, dancing, drawing, needlework, and handicrafts were the standard educational fare for colonial females lucky enough to get an education. The revolution brought with it a revolutionary spirit for women; a special role for making the new nation a successful one. Spring (2005) called women's important new role "Republican Motherhood:" raising children in such a way that ensured they would be good republican citizens. This required more education than they had traditionally received, and opened the academic subjects of geography, history, philosophy, and astronomy to girls (p. 136-137).

Spring (2005) argued that the combination of a need for teachers and the fact that more women completed school, led many into the profession of educators (p. 137). Women numerically dominated the teaching profession since then, especially at the lower grade-level. Despite the fact that educational opportunity opened to women, socialization at home and school reinforced gender-determined roles and possible attainment levels. One example was the McGuffey Readers, popular literacy instruction tools in the second half of the 19th century. Girls were less likely to be the main character and the range of activities shown to be open to boys was much larger than that of the girls in the stories of the Readers (p. 157-159).

The movement in the early 20th century to include home economics courses in public education was largely seen as a way to increase opportunity for women to participate more directly in aspects of society outside the home. In these courses, girls and women learned how to be consumers of household goods, rather than producers, thereby freeing time for more public engagement (Spring, 2005, p. 214). While this did little to change the relatively determinist social roles of men and women, it did open up opportunity for other academic endeavors. In this same period, 1920, women were given full citizenship rights, including the vote (p. 428). Political participation led to a more direct movement regarding equity in educational opportunities.

Beginning with the work of the National Organization of Women (NOW) in the mid '60s, the differing opportunities for boys and girls in schools became a focus. A major outcome of the work of NOW and other groups was the passage of Title IX of the 1972 Higher Education Act, providing for gender equality in educational institutions and programs (Spring, 2005, p.428). Armed with that legislation, groups began winning court cases aimed at tearing down institutional walls to equality. Segregation of home economics and industrial arts classes was ended in 1972, gender inequality in sports programs was addressed in 1976, gender bias in high stakes tests was countered in 1986, and other advancements were made through legislation and voluntary means (p. 429). Female graduation from medical schools increased, their representation in doctoral and professional degrees soared, and discrimination in vocational programs virtually ended by 1996 (p. 429).

In the 1990s, two reports surfaced that raised concerns about the current experience of girls in American schools. *Shortchanging Girls, Shortchanging America*,

sponsored by the American Association of University Women (AAUW, 1991), reported the findings of a nationwide stratified cluster sample of students from grades 4 to 10 which asked students about their general self-esteem, their feelings of competence and liking as well as perceived skill in science and mathematics. The report found large and significant differences in all measures that favored boys. Girls' self-esteem, competence in the subjects, and performance dropped at a faster rate than boys. Similarly, Sadker and Sadker published a report in 1995 summarizing current research entitled *Failing at Fairness: How America's Schools Cheat Girls*. It indicated that girls are equal to or ahead of boys in measures of academic achievement and psychological health in elementary school, but by the time they finish high school and are beginning college they have fallen behind boys (as cited in Spring, 2006, p. 85). Also, even if girls' achievement stays on track with boys, they perform lower on standardized tests, with females scoring 50 points lower on the math section (p. 87).

AAUW released a follow-up report in 1998 indicating many gains for girls, including advances in algebra, trigonometry, pre-calculus, and calculus. They included the caveat, however, that a new gap had emerged in the area of technology. The follow-up report indicated that girls do outperform boys in some areas of school as well, including English, foreign language, and arts courses (as cited in Spring, 2006, p. 87). Gurian (2001) supported many of the findings of this follow-up report, indicating that since 1999 studies began to show more gender bias in schools against boys (p. 54). Gurian listed 8 advantages for boys in schools: athletics, the amount of teacher attention received, math/science scores, SAT scores, they're less prone to psychological disorders, don't 'have' to deal with pregnancy, are less commonly sexually abused, and are

receivers of cultural privileges. Girls got an equal number of advantages in their list: more participation in extracurricular activities, better academic performance, better readers and writers, higher educational aspirations, are less likely to have learning or behavioral disorders, fewer discipline problems and dropouts, less often victims of violence, school culture is overwhelmingly girl-friendly (p. 54-64). Gurian strongly highlighted a concern for disadvantages that each gender may be experiencing in schools.

Much of this brief history of the education of females in America is promising. A fairly consistent process of opening doors occurred, but we must wonder what doors remain unexamined. Many girls perform equal to or better than their male counterparts, yet they do not enter the same fields of study or careers. What is it that underlies the achievement numbers that could account for this? One area that has received some increasing focus since the 1970s is the underlying motivation to learn and face challenges. If girls' self-esteem falls throughout school at a greater rate than boys, might that underlying factor have to do with their choices into the future? Do the achievement numbers tell the whole story, or might we be measuring something other than one's growth in learning?

History of Research

Inglehart, Nyquist, Brown, and Moore (1987) outlined the development of research on gender differences in the academic domain. They argued it developed in three stages. First, a stage that argued the inferiority of women. Second, a stage of research focused on expectations for and attributions of success or failure as the explainers for gender differences in academic achievement. Finally, they indicated that they were

writing at the beginning of a third stage in which affective and value factors were considered important to understand gender differences in academic achievement (p. 3).

Much like the historical context Russett (2005) weaved for us, Inglehart et al. (1987) indicated research on gender differences began in an era when women were still considered intellectually inferior to men. Thus, the findings of researchers mirrored the gender stereotypes of the time (p. 4). The 'science' of phrenology indicated the inferiority of female skulls.

Inglehart et al.'s (1987) second stage began in the context of increased opportunities for girls and women, particularly in education. Girls and women enrolled in university at similar rates by the 1970s, but continued to be left out of certain fields such as engineering and the physical sciences. Researchers thus presumed that men and women had the same potential, but women were socialized to have lower expectations of success in traditionally male areas (p. 5). Cognitive notions of motivation included ideas surrounding self-efficacy.

Schunk and Pajares (2005) summarized the research surrounding self-efficacy perceptions. They highlighted Bandura's concept of self-efficacy and researchers' wide use of that model for predicting achievement. Bandura defined perceived self-efficacy as one's perceived capabilities to learn or perform behaviors at designated levels. They also highlighted the relationship between self-concept and self-efficacy, and how both relate to self-perceptions of competence (pp.87-89).

Inglehart et al.'s (1987) third stage in research about gender differences carried on with the cognitive focus of self-efficacy and expectations for success, and added to it. Internal factors of personal interests and value attached to different areas were woven

into the research fabric (p. 5). Within this framework fits the motivational constructs of interest and goal orientation.

According to Elliot's (2005) synopsis of its emergence, researchers began independent work on achievement goal orientations in the later 1970s. Dweck conceptualized the two orientations as having learning or performance goals. Nichols conceptualized the two orientations as "task involvement" and "ego involvement". Ames and Archer argued for the integration of Dweck, Nichols, and others' concepts of achievement orientations into two groups called Mastery and Performance. Since then, researchers generally recognized this integration of the different strands of theory. Many researchers took on the division of performance goals into two constructs suggested by Elliot: performance-approach and performance avoidance. Performance-approach indicated a desire to do well to impress others or gain extrinsic rewards, whereas performance-avoidance indicated a desire to avoid working hard for a grade and falling short. Most achievement goal research to the present followed these general themes (pp 53-60).

Inglehart et al. (1987) summarized how interest in motivational factors underlying achievement differences between males and females emerged. Students' interests, self-efficacies, and goal orientations are now a large topic of concern within the educational research community.

Summary

Analysis of the historical trend showed a move away from the notion of female inferiority toward increasing opportunities for females to be educated and participated in society. Education for women in America began in earnest after the Revolution when the

role of ‘Republican Motherhood’ emerged. Up to the present day, legislation like Title IX and changing social norms consistently brought the roles of males and females in America closer together. The same trend occurred in gender difference research. The notion of natural mental inferiority of women gave way to other cognitive and affective explanations for found gender differences. In the spirit of these two latter stages of research in the area of gender differences, the cognitive motivational factor of competencies and the affective motivational factors of interests and goals will be analyzed against achievement (as measured by performance) and against other measures of learning in chapter three. Conclusions are offered in chapter four.

CHAPTER THREE: CRITICAL REVIEW OF THE LITERATURE

Introduction

This chapter contains a critical review of research literature related to the question "What are gender differences in motivation and what is the effect of those differences on learning?" As shown in Figure 1, the chapter proceeds through two major steps in the process of determining an answer. It begins by analyzing literature regarding the relationships between motivation and learning using the definitions outlined in chapter one for motivation and for learning. It then proceeds to analyze gender differences in motivation with the goal of determining if gender differences in motivation differentiate the opportunities for learning that males and females in American schools receive. Finally, within the second step this chapter considers some studies that present possible confounding variables when studying the topic of gender differences. Following consideration of each step, conclusions are drawn.

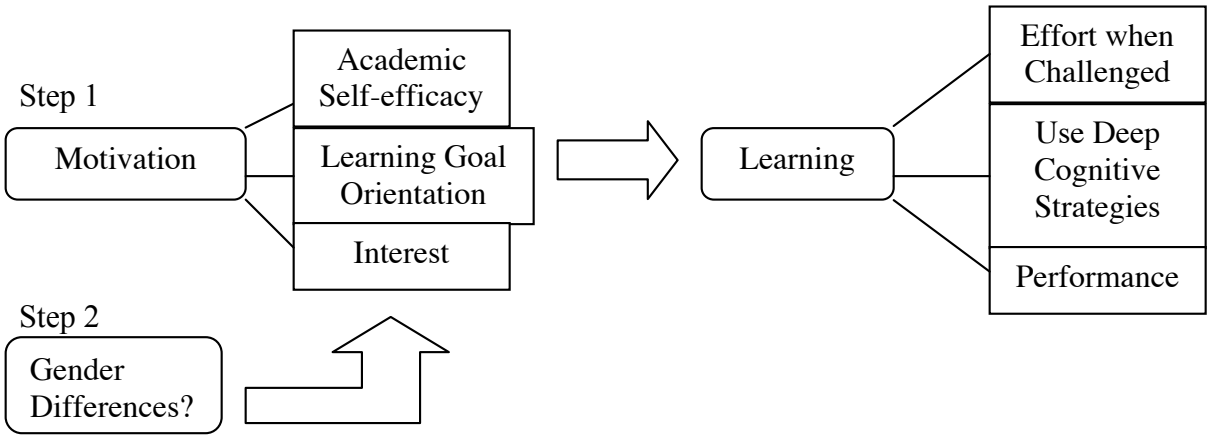

Figure 1. Visual representation of the process through which chapter three will analyze data and determine the answer to the question: "What are gender differences in motivation and what is the effect of those differences on learning?"

Before diving into the studies in this chapter I briefly discuss a few themes of critique that will become apparent as the chapter proceeds. First, I examine the benefits and shortcomings of using self-report/survey research methods. Almost all of the studies critiqued within this chapter used self-reports as their principle method for data collection. It is relatively simple and less time consuming to obtain data for high numbers of participants than are methods such as interviewing, detailed observation, case-studies, etc. Meltzoff (1998) explained that self-reports have two principle potential pitfalls: those surveyed could fall into intentional self-serving bias (that is, reporting falsely on purpose because it makes them look good) and/or have (and truthfully report) distorted self-perceptions. The first of these is (hopefully) diminished by the general practice of anonymity on self-reports. It is preferable to have self-reports accompanied by a secondary method, whether observations or interviews, measuring some of the same variables as the self-reports. Some researchers discussed in this chapter used verification methods, but in each case the anonymity of subjects must be replaced with confidentiality, as respondents must be identified in order to check their responses against their observed behavior. It seems to be a give and take of the two potential biases. Another important quality of pure survey research to keep in mind is that it only describes a relationship. Surveys alone cannot show which of two or more variables cause the change in the other (Lips, 2005, p. 107). When included as part of experimental research, surveys can be more useful in determining causation. All this being said, surveys are useful and efficient when trying to describe relationships across large populations. As I critique each study, I will make quick reference back to these concerns and will determine what can be taken from the study as it was done.

The second theme for critique regards my analysis of studies for generalizability. I often refer to the demographics of the sample used as a strength or weakness. When I look at a study, I primarily look for representation of different groups that are prominent in American society. I look for numbers that might represent the different racial and ethnic groups somewhat according to their representation within the United States. According to the 2000 census (US Department of Commerce), the racial/ethnic makeup in this country was as follows:

White (non-Hispanic) – 69.1%

Hispanic – 12.5%

Black – 12.3%

Asian – 3.7%

Multiracial – 2.7%

Native (including Pacific Islanders)– 1%

I would also like to see a variety of studies that represent different ethnic groups to a greater/lesser extent. If one study represented a largely white sample and showed a strong relationship between two variables, I cannot be sure that relationship is true across groups or only for the largely white portion of the sample. If another study, however, represented mostly black respondents and showed the same relationship, then I can be more confident of the first one's findings' generalizability. This same kind of checking can also occur within one study with heterogenous respondents if researchers break down responses and make statistical comparisons across groups. Most studies analyzed through chapter three failed to make these kinds of connections and checks across racial and ethnic groups. More do across gender groups.

Finally, when analyzing data I report statistical significance and attempt to interpret it in terms of having real meaning in the classroom. As a guide for determining if a relationship is statistically significant or significant and meaningful for my practice as a teacher I use the idea of effect size. Effect size is essentially the extent to which the relationship measured has a meaningful effect, to be redundant about it. In other words, if I find that motivation and learning are significantly related, but with a miniscule effect size, then motivation does not explain much about learning (and vice-versa). On the other hand, if the effect size of the relationship is large, then I can be confident that a finding regarding a measure of motivation also tells me something about the strongly related learning measure. I use a chart that summarized Cohen's standard interpretation of effect size. Cohen argued that a finding of an r, r^2, or d could be interpreted to be a small, medium, or large effect size. A d of .2, r of .1, or r^2 of .01 all equaled a small effect size, a d of .5, r of .243, or r^2 of .059 equaled a medium effect size, and a d of .8, r of .371, or r^2 of .138 equaled a large effect size (as cited in Becker, 2000). These values form the basis for my discussions of effect size (ES).

Motivation and Learning

The research articles in this section all either directly or indirectly measured the relationship between interest, perceived academic self-efficacy, and/or goal orientation with the three indicators of student learning: willingness to exert effort in the face of a challenge, use of deep cognitive strategies, and measured performance. Although many studies measured more than one of these constructs, I loosely grouped them into smaller sections based on the motivation construct that is the biggest focus (interest, academic self-efficacy, or goal orientation). The section in which self-efficacy is the focus includes

many studies that include interest and/or goal orientation as variables, hence the 'loosely grouped' explanation. This first half of the chapter will demonstrate either the presence or absence of relationships between these measures of motivation and these measures of learning. Assuming that relationships are found, I can then analyze the effect of possible gender differences in motivation on learning. If the research critiqued in this section indicated a strong positive relationship between initial interest in a subject and the use of deep processing strategies, one could argue that the gender with lower initial interest in the subject would be at a disadvantage for learning in that area. That sort of finding could inform me that reaching out to the interests of students of the disadvantaged gender would be important in the initial days of teaching my subject. The first construct of motivation to be analyzed is interest.

Interest and Learning

Farman et al. (1978) examined the relationship between students' willingness to exert effort to learn in a social studies course and their perceptions of the subject under study's relevance to their future goals. Definitions of variables paralleled definitions used for this paper. The measure of students' willingness to face challenge (how hard they try to learn when challenged, do better, or get better grades) paralleled the definition in use for effort exerted in the face of challenge. The measure of perceived importance of learning a subject paralleled the idea of perceived task value within the interest variable. This study was a re-analysis of the data from a previous study by Fernandez, Massey, and Dornbusch. A 5% random sample of students from 8 high schools in the San Francisco Unified School District was selected (students were paid $2 to complete a questionnaire).

772 students (9-12 grades) participated (183 Asian Americans, 209 Blacks, 133 with Spanish surnames, 184 other whites, 63 not classified).

The original study asked students to complete a questionnaire that included questions about the importance of learning a subject, its relation to the students' future careers, the importance of learning to important peers and family members, and a self-assessment of effort to learn the subject. The strongest predictor of effort exerted to learn a subject was the perceived importance of learning the subject ($\beta = .306$, $p<.01$).

Because this finding is based on a re-analysis of a previous study that was not focused on the exact same relationship, its construct validity is suspect. The variables of interest to Farman et al. (1978) were clearly measured in the previous study, however, strengthening the case for construct validity. Another limitation to the validity of the study was the use of a one-time survey instrument. It would be useful to see another study measure the same relationship and verify it with a secondary method (besides self-report). The sample was heterogeneous and the students were selected in a random way within the San Francisco Unified School District. This study indicated a relationship between perceived task value (a measure of motivation) and willingness to exert effort when challenged.

Perceived task value is one measure of interest in this paper. The finding of a relationship between task value and effort exerted begins to explain the relationship between one measure of motivation and one measure of learning of interest in this paper. The population under study in this instance was demographically diverse and representative allowing me to conclude that a relationship between task value and effort exerted to learn exists for high school social studies students in the San Francisco area.

Similar findings in other contexts are needed to support wider generalizability of this relationship. It would also be useful to see other studies employ other methods than the self-report survey to validate the accuracy of reported relationships.

Dam and Teekens (1997) studied the relationship between student interest in a social studies course and student learning of the course material. The study analyzed how girls and boys in secondary education experienced a female-friendly teaching method. Dutch federal educational reforms instated the use of female-friendly teaching methods. Generally, they included three methodological guidelines. First, teachers created a familiar context of the subject material by relating it to student personal experience, analyzing it from multiple perspectives, and using more essays for evaluation. Second, teachers used more concrete examples of the concepts and ideas the curriculum develops. Finally, teachers employed more social and communicatory methods: group assignments, less competition/more cooperation, more speaking and writing about the learning. The participants in this study included 16 teachers from all over the Netherlands. They taught 497 students (291 girls, 206 boys) who were 14-16 yrs. old.

11 women's history courses were studied (five using a female friendly method, six using a regular teaching method- both developed by the researchers). 11 traditional history courses were studied (six using the female friendly method, five using the regular method- again, both laid out by the researchers). All teachers received written instruction and a one-day course about the teaching material they would be using. Students filled in a questionnaire and wrote learning reports after the experiment. Learner reports were written statements that began "I have learnt…" or "I have noticed/discovered that…"

These reports formed the basis for analysis of the findings. They took student sentences and created "collective essays" that represented student learning and discoveries.

The researchers found that both male and female students benefited from female-friendly teaching methods. They found students reported more learning and expressed more interest in the female-friendly teaching method in traditional history classes. This conclusion came from analyzing the learning reports; examples were given of student responses, though no concrete numbers to back up the claims. Some of the expressed advantages included discussion/conversation about the topics, perspective taking, learning about real people (not just politics), etc.

The study was congruent in its goals and method employed, contributing to its construct validity. It set out to see how the students would receive female-friendly teaching methods, and the experiment was set up in such a way to ensure a control group for comparison. No pretest measuring experimental and control groups (of either the teachers or the students) comparability occurred, though random assignment of the teachers should have minimized differences. The measurements of both the learning variable and the interest variable are also important to critique for connection with the variables in use in this paper. The use of compiled learning reports seemed an attempt at objectifying a very subjective analysis of data. Researchers measured interest by counting statements that expressed interest in the content, then comparing their prevalence across teaching methods. The measurement of learning was the number of statements students made regarding what they learned. The measure of interest seems in line with initial interest as defined in chapter one. The measure of learning in this study paralleled the definition of performance, as a score was given for each student's response to the

assignment given. Increased interest led to more writing about the topic seems to hint at a relationship between initial interest and performance. The lack of reported concrete numbers, however, limits the extent to which the findings could do more than indicate a direction for further study.

I hesitate to generalize the study to the multicultural environment of many parts of the US, because although the study did "represent a diverse population" I suspect that the diversity is not similar to the US diversity. This could be argued, as their focus was gender, which is the same anywhere you go (though social influence on it may vary). Until these findings are supported with further study, they should not be generalized.

Little can be concluded from this study, but it does present two ideas that may be relevant to this investigation. First, it proposes a method for increasing both boys' and girls' levels of interest (using 'female-friendly' methods). Second, and more pertinent to this section, it finds a connection between reported interest and reported learning. Due to the shortcomings of the study outlined above (population and lack of concrete data) more research is needed regarding this issue.

At this point, I take a moment to describe in detail a survey instrument commonly used in studies measuring motivation and learning. Many researchers in this paper used a survey instrument called the Motivated Strategies for Learning Questionnaire (MSLQ), which seemed to trace back to at least Pintrich and De Groot (1990). It was a self-report survey instrument that measured four or five of the variables focused on in this paper: interest, perceived self-efficacy, and (sometimes) goal orientation on the motivation side and cognitive strategies and effort management on the learning side. Interest was measured within a slightly larger, but comparable, measure of 'intrinsic value,' which

encompassed ideas of both task value and initial interest as defined in chapter one (i.e. “it is important for me to learn what is being taught in this English class”). The measurements of self-efficacy measured perceived competence/confidence for success in the class (i.e. “I expect to do very well in the class”). Measurements of Goal Orientation seem to have been added to some more recent versions of the MSLQ, and were measured variously as Learning or Intrinsic Goals on the one side and Extrinsic, Ability, or Performance Goals on the other end of the spectrum. Occasionally, the Performance Goal Orientation is broken into more than one variable. Reports of cognitive strategy use were based on responses to statements regarding rehearsal (a surface strategy), elaboration, and organizational strategies (both deep strategies) (i.e. “I outline chapters in my book to help me study”). Some researchers using the MSLQ broke down the reported use of cognitive strategies in a way that responses to statements measuring rehearsal can be differentiated from responses to statements measuring elaboration or organizational strategies, others report all as part of ‘cognitive strategies.’ In cases where grouped, I assume that relationships were significant for the deeper strategies and not just rehearsal. Measurement of effort management (i.e. “when work is hard, I either give up or study only the easy parts”) fell within the broader category of self-regulation that also included meta-cognitive strategies such as planning and comprehension managing. Again, some researchers reported effort management and the other measures separately, while others grouped them all. When grouped, I assume that significant relationships include measures of effort. Relationships reported based on the MSLQ are always useful to this investigation because almost all motivation measures included fit somewhere within my definition of motivation (even if not broken down into individual constructs) and almost

all strategy measures fit somewhere within my definition of learning (even if not broken down into individual constructs).

Pintrich and De Groot (1990) wanted to describe the relationships between many or the constructs used in the MSLQ. To do so, they analyzed the relationships between motivational components (intrinsic value and self-efficacy) and self-regulated learning variables (strategy use and self-regulation). They also analyzed the relationships of each of those components with performance measures collected for each participant through the teacher. 173 seventh-grade students from eight science and seven English classrooms in a predominantly White, middle-class, small city school district in southeastern MI (100 girls, 73 boys). The school district did not track students, so the classes included a range of student achievement levels. Students responded to the self-report MSLQ using a seven-point Likert scale (1 = *not at all true of me* to 7 = *very true of me*). Table 1 outlines zero-order correlations.

Table 1:

Correlations: Motivational Variables with Strategy Use and Performance (Pintrich & De Groot, 1990)

	Strategy use	Self-regulation	Grade: Sem. 1	Seatwork	Exams/ Quizzes	Essays/ Reports	Grade: Sem 2
Intrinsic Value	.63***	.73***	.25**	.21**	.20**	.27**	.30***
Self-efficacy	.33***	.44***	.34***	.19*	.24**	.25**	.36***

*p<.05 **p<.01 ***p<.001

The findings reported in this study begin to show a consistently significant relationship between measures of motivation (intrinsic value and self-efficacy) and measures of learning (strategy use, effort management, and performance). Notably, the measured correlations between intrinsic value and both strategy use ($r = .63$, $p<.001$) and

self-regulation ($r = .73$, $p<.001$) were very strong. The study's goals and methods aligned, giving the findings reported validity. The findings are also clearly reported with data supporting conclusions made. The external validity of the study is limited by various factors including a single homogenous sample and the use of self-report measures. Concerning the issue of using self-reports, the author wrote they "can be used effectively to measure student perceptions of motivation and cognitive engagement… but the results need to be replicated with other measures…" Despite these limitations, the study and the questionnaire have been the basis for many future studies (some of which are reported in this paper) that replicate the findings here and corroborate them using secondary observations and interviews that check the accuracy of student reported perceptions.

Pintrich and De Groot's (1990) findings begin to corroborate the findings of task value's positive relationship to effort exerted (Farman et al., 1978) as well as findings of initial interests' positive relationship with performance (Dam & Teekens, 1997). Additionally, they found a relationship between self-efficacy and measures of learning that will be developed further below in a section focused on perceived competence and self-efficacy variables.

VanZile-Tamsen (2001) studied the relationship between reported task-value and use of self-regulated strategies for learning among undergraduate education majors. The researcher wanted to find out the importance of two motivational factors (expectancy of success and perceived task-value) in predicting planned strategy use (including cognitive strategy use). To do so, the MSLQ was given to 216 undergraduates from a midsize regional state university in the Southeast. Participants were offered extra credit for participating. The sample was 82% female and 82% White. The students were

overwhelmingly juniors and seniors (88%). The survey used a seven point Likert-type scale associated with a series of statements to which the students responded. Task value was defined as the degree to which students value school, for intrinsic or extrinsic reasons, and the degree to which they are interested in learning for its own sake. Cognitive strategy use was defined as the use of rehearsal (surface processing), elaboration, organization, and critical thinking (deep processing). Both definitions are in line with this paper's definition of interest as an aspect of motivation and deep processing strategies as a measure of learning (with the previously mentioned exception of the inclusion of rehearsal in cognitive strategies).

VanZile-Tamsen (2001) found various significant correlations between factors studied, but the most pertinent relationship to this paper had to do with task value and cognitive strategy use. Findings indicated that task value correlated strongly with cognitive strategy use ($r = 0.57$, $p < .001$).

The study was congruent in its goals and methods, lending the findings validity. A strength of the study was the author's willingness to report a finding that went against a hypothesis. Though that finding was unrelated to task-value, it indicated a willingness to report factual findings even if not in line with hopes. The use of an uncorroborated self-report limited the study in the ways outlined previously. The author made a number of suggestions for practice that didn't seem to be in line with the scope of the study (i.e. using peer advisors, active learning, and peer teaching as ways to increase levels of task value). These suggestions were not supported by the findings reported, though some other research is cited as support. The external validity of the study is limited by the overrepresentation of Whites and females in the sample. It may have some

generalizability to groups like that studied (White, female, education majors in the U.S.). In combination with other studies (i.e. Pintrich & De Groot, 1990) the generalizability of the finding of a strong correlation between perceived task value and use of cognitive strategies was strengthened.

In this small section, the relationship between measures of interest (task value and initial interest) and measures of learning (effort exerted, cognitive strategies used, and performance) was consistently positive and usually significant (Dam & Teekens, 1997; Farman et al., 1978; Pintrich & De Groot, 1990; Vanzile-Tamsen, 2001). Specifically, Interest and effort twice measured as positively and significantly related (Farman et al.; Pintrich & De Groot). Interest and the use of cognitive strategies twice measured as positively and significantly related (Pintrich & De Groot; Vanzile-Tamsen). And interest and performance related positively twice, once significantly (Dam & Teekens; Pintrich & De Groot). This consistency supports the idea that gender differences in interest would impact learning. The studies represented a wide range of locations, participant demographics, and participant age. They lack longitudinal studies that could indicate consistency of the relationships over time. Additionally, these studies included little beyond a single data sample collected from self-reports. Patterns of findings will be further analyzed using these studies and others that focused on other variables of motivation, but also included measures of interest within the study.

Academic Self-efficacy (and other measures of motivation) and Learning

Pomerantz et al. (2002) examined how the measured gender differences in academic performance and internal distress during school years related to one another. This study will be revisited regarding its findings of gender differences at a later point in

this paper. The important finding of the study at this point was the relationship between student academic performance (the mean of their grades across the four subjects) and student perceptions of competence (the mean of their ratings across the four subjects).

The researchers administered three waves of surveys at six-month intervals, lasting a total time span of one full year. All students present in the two lower to middle-class school districts in the Midwest on the day of the survey participated unless their parents had contacted the school in disapproval. A total of 932 elementary school children (466 girls, 466 boys) participated. 271 were initially in 4^{th} grade, 450 initially in 5^{th} grade, and 211 initially in 6^{th} grade. The children were 95% European American, 4% African American, and 1% other. The surveys measured five things: the children's self-perceptions of competence in math, science, social studies, and English/language arts, children's perceptions of global self-worth, children's worry about academic performance, children's general anxiety, and children's depression. Student grades were obtained from the school records. Self-competence was measured with a 7-point Likert-scale where students rated how good they were, from 1 (not at all good) to 7 (very good) at each of the four academic subject areas. A second measure was taken that asked students to rate their relative position in the class, from 1 (at the bottom) to 7 (at the top).

Researchers found a significant relationship between perceptions of competence and academic performance ($\beta = .67$, $p < .01$). This is one indication that a student's self-competence is related to that student's learning (as indicated by performance in this case).

The large size of Pomerantz et al.'s (2002) sample and the longitudinal nature of the data collection contribute to the generalizability of the findings, despite the largely homogenous demographics of the sample. Three collections of data help to minimize

confounding explanations for results of a self-report (i.e. having received grades the day before could skew reported self-competence). Issues surrounding self-reporting are not totally accounted for, however, as no corroborating methods were used. The clear articulation of the measures and the congruence between the goals of the study and the method employed contribute to the validity of the findings. The fact that the relationship between self-competence and achievement was not the direct focus of the study, but rather one step along the way to an analysis of gender differences of these measures, means that little discussion of this finding is included in the article. One item not reported in the findings was domain specific relationships between competence and performance. The study did use younger participants than I plan to teach, but it still informed about the relationship between motivation factors and learning factors that may be generalizable across ages.

Pomerantz et al. (2002) began to shine light on the nature of the relationship between perceived self-self-efficacy and performance. When combined with the findings regarding the same variables of Pintrich and De Groot (1990) reported earlier (r ranged from .19 to .36, $p<.05$), a stronger case for the generalizability of the relationship could be made. Both studies, however, focused on largely white samples from the Midwest.

Wolters and Pintrich's (1998) quantitative study had three measurement goals:

1- Do differences in the students' level of motivation and self-regulated learning for the subject areas of mathematics, social studies, and English exist?

2- Do the relations between these motivational and self-regulated learning constructs vary as a function of subject area?

3- Does gender have a main or interactive effect on students' motivation and cognition in these three different subject areas?

Similar to Pomerantz et al. (2002), Wolters and Pintrich (1998) collected their data through the use of a self-report questionnaire administered to all students present that day at a Junior High School in a working class suburb of a Midwest city. In this study, however, there was only one collection of data. A total of 545 $7^{th}/8^{th}$ graders present on day of the study participated. 280 (51%) were female and 265 were (49%) male. The age ranged from 11 to 15 years (mean age = 12.6 yrs). 95% of the students were Caucasian. Only students who had complete data for the whole study were included in final analysis. All students took all three subjects. six math teachers, six English teachers, and five social studies teachers participated, none taught more than one subject.

Subjects completed a self-report questionnaire that assessed different facets of student motivation and cognition (a modified version of the MSLQ). Three motivational beliefs were measured: task value, self-efficacy, and test anxiety. Two cognitive components were measured: cognitive strategy use and self-regulated strategy use. A seven-point Likert-scale was used ranging from (1) "not at all like me" to (7) "very much like me." Classroom academic performance was measured using teacher reported grades.

For the purposes of this section of the paper, the findings related to correlations between task value and self-efficacy (measures of motivation as outlined in chapter one) with student strategy use and performance (measures of learning) are highlighted. The next section will analyze the pertinent gender difference findings of this study. Wolters and Pintrich (1998) defined task value as the perceived usefulness, interest, and importance of a given subject. Self-efficacy was defined as perceived ability to learn and

understand the material being taught in class and to perform well in class. Cognitive strategy use was defined as any strategy used to help in the learning process, such as underlining while reading, rehearsal, or elaboration. Self-regulated strategy use was defined as planning, monitoring, and controlling learning. Beta (β) relationships between the motivation measures and the measurements of learning are found in Table 2. Unlike some studies reported on so far, relationships reported here were domain (content-area) specific. This method of reporting can be useful for me as a teacher to know what relationships are strongest within my own domain.

Table 2:

Correlations: Motivational Variables with Strategy Use and Performance (Wolters & Pintrich, 1998)

Variable	Mathematics	English	Social Studies
	Cognitive Strategy Use		
- Task Value	0.49***	0.39***	0.40***
- Self-efficacy	0.13**	0.30***	0.25***
	Regulatory Strategy Use		
- Task Value	0.47***	0.36***	0.39***
- Self-efficacy	0.11*	0.19***	0.16***
	Academic Performance		
- Task Value	N/S	N/S	N/S
- Self-efficacy	0.23***	0.25***	0.26***

Note. Correlations measured in standardized betas (β)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Wolters and Pintrich (1998) found differences in mean levels of motivational aspects and self-regulated learning across academic domains (question 1). Interrelations among the variables were highly consistent across domains (ranging from .55-.59 in self-efficacy to .85-.90 in regulatory strategy use, suggesting little variation in interaction of motivation and learning variables across domains (question 2). This informs us that the importance of motivation to learning is largely consistent across domains (an important insight for content area instructors).

Both task value and self-efficacy significantly correlated with the learning measurements of cognitive strategy use and regulatory strategy use across academic domains, though the effect sizes of students' reported task values were larger than those of reported self-efficacy. Interestingly, no significant relationship was found between reported task value and academic performance, while a significant relationship was found between self-efficacy and academic performance. This may indicate a weak correlation between the amount a student is learning and that student's actual performance in the course. I stated my hesitance to see performance as equivalent to learning in chapter one. The learning strategies and effort exerted seemed more highly driven by a perceived long-term value of the content, while the performance had much more to do with one's current belief about intelligence in the area. On the other hand, the measures of learning strategies and effort exerted were student self-reports, whereas performance numbers were collected from the school. Students may be more likely to report relationships than to actually implement/do what they claim. This goes back to the concerns with self-deception inherent in survey research. In contrast, Pintrich and De Groot (1990) did find

significant relationships between intrinsic value (a measure that includes task value) and performance (ranging from $r = .20$ to $r = .30$, $p<.01$).

In this study, Wolters and Pintrich's (1998) goals and method were largely congruent. This, combined with a very clear articulation of the variables measured, contributed to the validity of the study's findings. The study was limited in external validity for two principal reasons. First, the sample was largely homogenous and therefore may not be generalizable to other populations. Second, the population of only one school was included in the sample, a serious limitation of geographical representation. It is important, then, to combine the findings of this study with others with similar findings in other areas and with other samples in order to establish strong external validity of the findings.

When combined with Pomerantz et al. (2002) and Pintrich and De Groot's (1990) findings that competence related with performance ($\beta = .67$, $r = .19$-$.36$), Wolters and Pintrich's (1998) finding of a relationship between self-efficacy (competence) and performance ($\beta = 0.23$-0.26 across domains, $p<.001$) takes on a much higher degree of generalizability. All three, however, were largely White samples in the Midwest. Other relationships measured in this study also paralleled relationships measured by Pintrich and De Groot, though they will be discussed more completely, along with other parallel findings, in a later summary paragraph.

Lynch (2006) studied relationships between motivational factors and course grades of students at a mid-Atlantic private university. 501 freshman and upper class under-graduates completed a version of the MSLQ. 264 filled out the questionnaires in their freshman seminars (127 males, 137 females). 237 upper level students (300 level

courses in a wider range of curricular subjects) also completed the self-report (109 males, 127 females). The survey was administered near the mid-point of the semester, after students had received considerable feedback about course performance.

Correlations were analyzed between data from completed surveys and semester course grades. An internal goal orientation (learning worthwhile to satisfy thirst for knowledge), task value (extent to which student finds a course useful), and self-efficacy (confidence in mastering course materials) all significantly and positively correlated with course grades for freshman ($r = .16$, $p<.01$;$r = .14$, $p<.05$;$r = .33$, $p<.01$), upper level students ($r = .26$, $p<.01$;$r = .21$, $p<.05$;$r = .32$, $p<.05$), and the combination of all participants ($r = .18$, $p<.01$;$r = .13$, $p<.05$;$r = .31$, $p<.01$). The study indicated that self-efficacy had the strongest relationship with performance as measured by semester grades, though an intrinsic goal orientation and a perceived value in the content also consistently predict course grade. Extrinsic goals did not significantly predict course grade for any grouping.

This finding reveals a consistent significant relationship between motivational factors and performance. Performance is only one indicator of learning, but factors of motivation significantly correlated with it, especially self-efficacy which fell into the medium range regarding effect size. This study's external validity is limited due to the lack of demographic data. It may be reasonable to assume some diversity on a college campus, but one cannot know. The one-time survey data collection method also necessitates comparison with other studies to strengthen the reliability and validity of the findings. Lynch (2006) parallels other consistent findings of positive relationships between self-efficacy and performance (Pintrich & De Groot, 1990; Wolters & Pintrich,

1998). The study also adds to the mix reporting divergent findings regarding the relationship between interest and performance (Pintrich & De Groot; Wolters & Pintrich). Results regarding goal orientation and learning will be further developed in the next section of this chapter.

Brookhart and Durkin (2003) studied student reported self-efficacy, goal orientations, cognitive strategy use, and achievement levels for students in a variety of classroom assessment events in social studies classes in an urban high school. They were particularly interested in the ways in which these variables fluctuated related to the type of assessment done (paper/pencil vs. performance assessments), though I focus on the relationships between the motivational and learning dependent variables listed above. They studied classes of one social studies teacher in a large urban high school (1,500 students, 42% low income). Minority students composed a range of 0%-32% of the make-up of each class. The classes were two regular sections of 10th grade world cultures, two honors sections of 11th grade US history, and one section of a philosophy elective. The total sample was 96 students. Sample sizes in each class ranged from 11 to 39.

In this descriptive case study, 12 classroom assessment events were studied. Students were given a pretest and posttest measuring perceived levels of self-efficacy, goal orientation, and strategy use for each assessment event. Student responses were compared across tests and classes to determine how assessment strategies were associated with student performance and perceptions. Active learning was measured with student responses to statements such as “I went back over my work when I was done.” Superficial learning was measured by student responses to statements such as “I looked

around to see what others were doing." Active learning is therefore in line with my definition of deep cognitive strategies.

Student perceived self-efficacy significantly and positively correlated with active learning strategies in three of 12 assessment events ($r = .64, .51$, and $.47$, $p<.05$), while significantly correlating with superficial learning strategies in only one of 12 ($r = -.45$, $p<.05$), and that relationship was negative . Perceived self-efficacy also positively correlated with student achievement in two of 12 assessment events ($r = .51$ and $.72$, $p<.05$). A reported mastery goal orientation positively correlated with active learning strategies in six of 12 assessment events ($r = .49, .80, .60, .44, .75$, and $.70$, $p<.05$), whereas no significant correlation with Superficial learning strategies was measured. A performance goal orientation related positively with active learning strategies in four of 12 assessment events ($r = .63, .53, .63$, and $.61$, $p<.05$), and also measured no significant correlations with surface learning strategies. Given that the sample size ranged from only 11 to 39 students, correlations that reached a level of significance were quite large in effect size.

There are a number of aspects in Brookhart and Durkin's (2003) study that limit its external validity. The participants selected represent the students of only one teacher from one school in one part of the country (and the report fails to make known where that might be). With such a small n it is more difficult to find consistently significant relationship. Those relationships that showed up in multiple (even up to 6/12) assessment events are worth noting. The relationship between self-efficacy and active learning strategies (ranging from $r = .47$ to $r = .64$) increases the body of evidence regarding that

relationship (Pintrich & De Groot, 1990; Wolters & Pintrich, 1998). The relationships regarding goal orientation will be further explored in the coming section of the chapter.

Meyer, Turner, and Spencer (1997) performed another study that focused on students' attitudes toward academic challenge and their use of strategies. They looked for correlations between a number of motivation variables and one's attitude toward challenge, including both self-efficacy and achievement goals. The most pertinent research question was "how were students attitudes toward risk taking or challenge seeking related to their perceived goal orientations, self-efficacy, and strategy use in math class?"

The sample for the study was small: 14 Caucasian fifth- and sixth- grade students from an average ability math class. seven were boys, seven girls. The teacher selected the students from a list of students who had returned a permission slip allowing them to participate. The teacher was asked to choose students in gender-matched pairs of boys and girls whose risk taking in math class and mathematics abilities were similar. The teacher was a Caucasian female with six years teaching experience.

Students completed two surveys. The first was the School Failure Tolerance Scale (SFT) which measures, among other things, students' constructive responses to failure and their preferred levels of difficulty (i.e. "I like to try difficult assignments even if I get some wrong"). Students responded by circling yes or no, each of which was printed in three different fonts with the largest yes and no acting as anchors. The second survey was the Patterns of Adaptive Learning Survey (PALS) which measures learning focused academic goals ("the main reason I work hard in math is to learn new things"), ability-focused goals ("doing better than other people in my class is important to me"), student

self-efficacy (“I can do almost any problem if I keep working at it”), use of surface learning strategies (“If I don’t understand my work, I let other group members do it for me”), and use of deeper learning strategies (“I spend some time thinking about my math before I start it”). Students responded to the statements using a five-point Likert scale with the anchors “not at all true of me” and “very true of me.” All definitions and measurements are within the working definitions in use for this paper.

In addition to the implementation of the surveys, researchers returned six weeks later to interview students throughout the completion of a geometry project. Interview questions followed up in a more personal way as to how the students were reacting to the challenge of the project. This was an example of what Meltzoff (1998) described as reports from another vantage point that test the accuracy of survey results. In order to do so, however, students did identify themselves on the surveys. The pertinent info for this paper (see Table 3) came from the surveys, though the correlations indicated in the results were supported and personalized in the follow-up interviews.

Table 3

Correlations: Motivational Variables with Strategy Use and Challenge (Meyer et al., 1997)

	Face challenge	Surface strategies	Deep strategies
Learning goals	0.65*	N/S	0.54*
Ability goals	N/S	N/S	N/S
Self-efficacy	0.69**	-0.70**	0.60*

*p< .05 **p< .01 N/S = not significant

Findings indicate positive correlations between a desire for motivation (self-efficacy and learning goals) and learning (face challenge and use deep strategies). They also reveal a strong negative relationship between reporting the use of surface learning strategies and reported self-efficacy.

The methods employed in this study aligned with its goals, lending it construct validity. The quantitative nature of the first step was enhanced by a series of qualitative follow-up interviews with students in a challenging situation. Researchers asked students doing a Kite project questions that related to their challenge seeking, goals, and self-efficacy. The student's responses and observed behaviors were then compared with previously collected self-report data. While the reliability of the findings is strong, its external validity is weakened by a small number of participants as well as their homogenous makeup. The generalizability of the findings is enhanced by similar findings regarding self-efficacy and the use of deeper learning strategies (Brookhart & Durkin, 2003; Pintrich & De Groot, 1990; Wolters & Pintrich, 1998).

In a study which combined all three aspects of motivation of interest to this paper with two measures of learning, Sungur and Tekkaya (2006) examined the differing effects of Problem-Based Learning (PBL) and traditional instruction on students' self-reported motivation (including goal orientation, task value, and self-efficacy) and self-reported use of learning strategies (including rehearsal, elaboration, organization, critical thinking, and effort regulation). The variables of interest each parallel the definitions in use for this paper. Goal orientation was divided in two: intrinsic (learning or mastery focused) and extrinsic (focused on performance or demonstrating ability). Task value had to do with judgments about how interesting, useful, or important course content is. Self-

efficacy had to do with the students' beliefs about their capability to learn or perform effectively. Three of the four measures of Self-regulated learning (elaboration, organization, and critical thinking) all fit into the general framework of deep cognitive strategies for learning (with the exception of rehearsal). The final learning variable, effort regulation, measured students' willingness to persist in the face of challenge.

Sungur and Tekkaya (2006) used a quasi-experimental design to answer the three following research questions: Does PBL affect students' self-reported motivation? Does PBL affect students' self-reported use of Learning strategies? And, is there a relationship between students' self-reported motivation and self-reported use of learning strategies? The most pertinent of the three questions for the purposes of this paper is the third one about the relationship between motivation and learning strategies. The experiment was set up so that two approximately equal biology classes taught by the same teacher were administered the MSLQ before the teacher began a new unit. The teacher then taught one class using a traditional, teacher-centered, lecture-focused class while teaching the other class using a PBL technique. The teacher and students were monitored to ensure that the techniques were done according the research outline. After the unit, both classes were administered the MSLQ a second time.

The subjects participating in the experiment were 61 high-school students (39 boys, 22 girls) from a large urban district of Ankara, Turkey. The students came from middle- to upper class families. Results from the first round of self-reports indicated that no significant differences on any variable existed between the two biology classes. Results of the experiment did reveal a benefit in both motivation measures and self-regulated learning measures using a PBL approach to learning. Table 4 shows the

pertinent correlations for the goal of this section, to determine the relationship between motivation and learning.

Table 4:

Correlations: Motivational Variables with Strategy Use and Effort (Sungur & Tekkaya, 2006)

Variable	Intrinsic goal orientation	Extrinsic goal orientation	Task Value	Self-efficacy
Elaboration	.712**	N/S	.740**	.571**
Organization	.618**	N/S	.574**	.445**
Critical Thinking	.644**	N/S	.668**	.558**
Effort Regulation	.504**	N/S	.705**	.542**

**p<.01 N/S= not significant (p>.05)

This study indicated a very clear and strong relationship between the motivational factors of learning goals, task value, and self-efficacy with both the use of cognitive strategies and persistence in the face of challenge. Though the focus of this experiment was not on these correlations in particular (it was only one of the three research questions), it made a strong case for a positive relationship between motivation and learning. The case was made stronger because the correlations were compilations of four different data collections, two for each class. The study is congruent in its focus and methods used, contributing to the validity of reported findings. The researchers observed the implementation of the teaching methods to ensure all planned aspects of the experiment were followed and extra-experimental factors were as controlled as possible, contributing to the internal validity of the study (though the causational relationship examined in the experiment is not the relationship focused on in this paper).

The external validity to the US may be suspect, however, due to the location of the experiment and the likely (though unreported) homogeneity of the sample. On the other hand, this finding of strong connections between factors of motivation and factors of learning in Turkey may actually widen the scope of generalizability of other similar findings by researcher in other places. Task value's correlation with the use of cognitive strategies ($r = .574, .740$, and $.668$, $p<.01$) and effort regulation ($r = .705$, $p<.01$) paralleled reported findings in the United States (Pintrich & De Groot, 1990; VanZile-Tamsen, 2001; Wolters & Pintrich, 1998). Self-efficacy's positive relationship with deep cognitive strategies ($r = .571, .445, .558$, $p<.01$) and effort regulation ($r = .542$, $p<.01$) also paralleled domestic findings reported throughout this section (Meyer et al., 1997; Pintrich & De Groot; Wolters & Pintrich). Findings regarding goal orientation will be analyzed in the next section.

Greene et al.'s (1999) study focused on the relationship between motivational factors and two measures of learning in high school math classes: reported effort and achievement. They hypothesized that both gender and choice would mediate the relationships found between motivational measures and achievement measures. Motivational measures included a values category (within which were measures of intrinsic value and utility value) and a goals category (within which were measures of learning goals, performance goals, future goals, and goals to please the teacher). Some of these variables paralleled definitions for variables focused on in this paper. Intrinsic value paralleled initial interest. Utility value paralleled task-value. Learning and performance goals were the same labels and definitions. Future goals refer to attempting to succeed for some future goal such as a job, to graduate, or being eligible for sports. Pleasing the

teacher was a relational goal of living up to the hopes of the teacher. In a dual definition of goal orientations, both future goals and goals to please the teacher would be included in performance, or extrinsic, goals. The dependent variables of achievement and effort also paralleled learning definitions for performance and willingness to face a challenge.

366 student volunteers from a large Midwest high school in a middle-class suburban city participated. School student population had a racial/ethnic composition of 81% Caucasian, 8% Native American, 5% Hispanic, 4% African American, and 2% Asian. Students were in grades 10 through 12. 146 were males, 212 females, and 8 did not report their gender. 83 males and 108 females were enrolled in required math classes. 63 males and 104 females were in the elective classes. 11 teachers were involved in teaching the classes (10 females, one male). Willing students responded to a 92-item survey instrument with five subscales, including ones measuring the variables above, during one class in March. Students self-reported their motivation levels, effort exerted, and biographical data. Researchers collected grades from the teachers at the end of the semester.

Responses were analyzed and Betas indicate some significant relationships between achievement, effort, and the motivational factors. Learning goals, but not performance goals, significantly related to achievement ($\beta = .22$, $p<.01$) and effort reported ($\beta = .40$, $p<.01$). Utility value significantly related to only effort reported ($\beta = .03$, $p<.01$), but with a very small effect size. Intrinsic value, on the other hand, significantly related to both achievement ($\beta = .27$, $p<.01$) and effort reported ($\beta = .23$, $p<.01$).

These numbers show consistent significant positive relationships between learning goals and learning constructs, as well as between intrinsic value and learning constructs. This indicated the important role of learning goals and an intrinsic interest in determining both effort exerted to learn and eventual achievement. The study also indicated some gender differences reported regarding motivational constructs that will be analyzed in the second major section of this paper. The construct validity, congruence in goal and method, of Greene et al.'s (1999) study strengthened the credibility of their findings. They recognized a possibility for type 1 errors, and so used a higher requirement for significance ($p<.01$ instead of .05). The generalizability of the findings was limited to suburban locations similar to the location of the sample. One interesting aspect of their sample was the large size of the Native American population included (8%), something not seen in other studies analyzed thus far. Finding correlations between motivational and learning constructs that parallel other studies strengthens generalizability (i.e. interest connected with effort: Pintrich & De Groot, 1990; Sungur & Tekkaya, 2006).

Summary of Findings Regarding Interest and Self-efficacy

This section completes report of data related to two relationships focused on in this first stage of this paper. The first relationship is that between interest and measures of learning that began in the previous section. I summarize findings regarding interest's relationship with the three measures of learning below. Then I summarize the findings regarding self-efficacy and the three measures of learning that were examined in the previous section. Many of the critiques are similar across relationships, so the next few pages may seem somewhat repetitive.

Five studies included measures of the relationship between interest and a willingness to exert effort to learn (Farman et al. 1978; Greene et al., 1999; Pintrich & De Groot, 1990; Sungur & Tekkaya, 1997; Wolters & Pintrich, 1998). All five found significant positive relationships between the two variables. Most findings were within a medium to large effect size. The one exception was Greene et al.'s finding regarding Utility Value's relationship with effort ($\beta = .03$, $p<.01$). Three of the studies represented samples taken from suburban secondary schools in the Midwest (Greene et al.; Pintrich & De Groot; Wolters & Pintrich). One was a highly heterogeneous high school sample from the San Francisco Public School District (Farman et al.). And one sample represented high school students from Ankara, Turkey about whom we know little demographically (Sungur & Tekkaya). Relationships between interest and effort exerted were consistently evident for secondary (7^{th}-12^{th} grades) students from a broad range of ethnic/racial backgrounds in urban and suburban settings. More research is needed in rural regions to expand generalizability outside urban and suburban areas. All of these five studies used survey research methods, which indicates another area for expansion of the study. Researchers need to check self-report findings from another vantage point to minimize effects of bias. Critiques regarding the lack of data from rural regions and non-self-report data apply across the remainder of this findings summary. All data available indicated a positive relationship between interest and reported effort exerted to learn.

Four studies included measures of the relationship between interest and use of deep strategies for learning (Pintrich & De Groot, 1990; Sungur & Tekkaya, 2006; VanZile-Tamsen, 2001; Wolters & Pintrich, 1998). All four found significant, positive relationships between the two variables. The effect size of the correlations measured were

all quite large with r ranging from .57 to .74, $p<.01$ (Pintrich & De Groot; Sungur & Tekkaya; VanZile-Tamsen). Two samples represented White middle-school students from the Midwest (Pintrich & De Groot; Wolters & Pintrich). One sample represented largely White female University students from the Southeast (VanZile-Tamsen). And one sample represented high school students from Ankara, Turkey (Sungur & Tekkaya). All five relied on results of a survey. So, consistent relationships between interest and the use of cognitive strategies for learning were evident for secondary (7^{th}-12^{th} grades) and college students from urban and suburban locations. The US samples represented mostly White students and the Turkish sample was unclear on demographics, therefore more research is needed to confidently generalize these findings to all ethnic backgrounds. Except where explicitly stated otherwise, this critique applies across all relationships summarized here. All data available do indicate a strong relationship between interest and reported use of deep strategies.

Five studies included measures of the relationship between interest and performance (Dam & Teekens, 1997; Greene et al., 1999; Lynch, 2006; Pintrich & De Groot, 1990; Wolters & Pintrich, 1998). Findings regarding the relationship between interest and performance varied. Four of the five found positive relationships between the two variables (Dam & Teekens; Greene et al.; Lynch; Pintrich & De Groot), though only three of those included statistical data (Greene et al.; Lynch; Pintrich & De Groot). The effect sizes of the significant data ranged from small ($r = .13$, $p<.05$, Lynch) to medium ($r = .30$, $p<.001$, Pintrich & De Groot). One study found no significant correlation between task value and academic performance (Wolters & Pintrich). The reported samples for three studies were mostly white secondary students from the Midwest (Greene et al.;

Pintrich & De Groot; Wolters & Pintrich), though one of those included a meaningful representation of Native American, Hispanic, and Black students (Greene et al.). One sample represented students from the Netherlands about whom little was reported demographically, and no statistical data accompanied the report (Dam & Teekens). And one sample represented students at a Mid-Atlantic private University about whom little was reported demographically (Lynch). The relationship between interest and performance was consistent across four of five tests. There is no obvious explanation for the non-finding, but four findings remain that point toward some measurable relationship between the two variables.

All relationships measured regarding interest as a measure of motivation were done with only a self-report. Self-serving and self-deceptive biases call into question the validity of the findings. With that shortcoming in mind, and the gaps in the samples mentioned above, results pointed to significant positive relationships between interest and measures of learning. The strongest relationship was with the reported use of deep strategies. A firm relationship was found with effort. And finally, fairly consistent evidence was found regarding interest's relationship with performance. Regarding the focus of this paper, I conclude that interest (one measure of motivation) is generally positively related (to different degrees) with learning. That is, when interest levels are high, so are measures of learning.

Significant relationships between self-efficacy (competence) and all three measures of learning also existed. Four studies measured the relationship between self-efficacy and effort (Pintrich & De Groot, 1990; Meyer et al., 1997; Sungur & Tekkaya, 2006; Wolters & Pintrich, 1998). All four measured positive and significant correlations

between the two variables, lending very strong reliability to the results. Correlations measured were large (r ranged from .44 to.69, $p<.01$) in effect size (Pintrich & De Groot; Meyer et al.; Sungur & Tekkaya). Domestic samples represented mostly white middle school students (Pintrich & De Groot; Meyer et al.; Wolters & Pintrich). One sample from Turkey represented high school students with unreported demographic data (Sungur &Tekkaya). All four studies relied on the use of self-report measures, but one followed the self-report with interviews and observations that verified the validity of reported relationships (Meyer et al.). In conclusion, reliable, valid, and large correlations between self-efficacy and effort existed in each setting studied.

Five studies measured relationships between self-efficacy and the use of deep cognitive strategies (Brookhart & Durkin, 2003; Pintrich & De Groot, 1990; Meyer et al., 1997; Sungur & Tekkaya, 2006; Wolters & Pintrich, 1998). All five measured significant, positive relationships between the two variables, giving the findings reliability. Effect sizes of measured correlations ranged from medium ($r = .33$, $p<.001$, Pintrich & De Groot) to large ($r = .64$, $p<.05$, Brookhart & Durkin). Additionally, two studies found a significant and negative relationship between self-efficacy and surface/superficial learning strategies (Brookhart & Durkin; Meyer et al.). The age range of participants included in studies was fifth grade to high school. The four studies performed in the U.S. included mostly White urban and suburban participants (Brookhart & Durkin; Pintrich & De Groot; Meyer et al.; Wolters & Pintrich). All five researchers relied on self-reports as the principle data source, though one did 12 different data collections (Brookhart & Durkin) and one did follow up interviews with and observations of students that verified the validity of the self-reports (Meyer et al.). In conclusion, reliable and valid research

showed a medium to large effect size of relationships between self-efficacy and the use of deep cognitive strategies for learning.

Four studies measured the relationship between self-efficacy and performance (Lynch, 2006; Pintrich & De Groot, 1990; Pomerantz et al., 2002; Wolters & Pintrich, 1998). All four found significant, positive relationships between self-efficacy and performance. There was a range of correlations (from $r = .19$, $p<.05$ to $r = .36$, $p<.001$) and of Beta measurements (from $\beta = .23$, $p<.001$ to $\beta = .67$, $p<.01$). The effect sizes of these measures range from relatively small to fairly large. In three studies, participants were mostly White 4th through 8th grade students from the Midwest (Pintrich & De Groot; Pomerantz et al.; Wolters & Pintrich). The other sample contained students from a private University in the Mid-Atlantic region, but no demographic data was reported (Lynch). Research focused on the presence of this relationship for high school students is needed. In conclusion, self-efficacy and academic performance were consistently positively and significantly related in all settings measured.

As was the case with interest, most studies of self-efficacy's relationship with learning constructs relied on self-reports and surveys. This increases the chances of self-serving and self-deceptive biases, which in turn lowers the validity of the findings. Unlike the case with interest, however, one researcher did perform secondary interviews and observations and compared results with self-reported results. They concluded that self-reported results in their case lined up with what they heard and saw in the classroom with the students. Samples also generally lacked representation across demographics. Bearing that shortcoming in mind, large, reliable, and significant relationships between self-efficacy and all three learning constructs were found in every study reported. With

regards to the focus of this paper, I conclude that self-efficacy (one measure of motivation) is generally positively related with learning (with a meaningful medium to large effect size). That is, when measured self-efficacy levels are high, so are measures of learning.

At this point, I make two conclusions regarding the focus of the paper. First, interest and learning are positively related. Second, self-efficacy and learning are positively related. The last five studies analyzed also began to hint at another relationship: that between learning goals and learning. Lynch (2006) found that an internal goal orientation positively correlated with course grades ($r = .16, .26, .18, p<.01$). Brookhart and Durkin (2003) found a mastery goal orientation and a performance goal orientation to be positively related with the use of active learning strategies (from $r = .44$ to $r = .80$, $p<.05$). Meyer et al. (1997) found learning goals positively related to a willingness to face challenge ($r = .65$, $p<.05$) and reported use of deep strategies ($r = .54$, $p<.05$), but ability goals did not significantly relate to either learning variable. Sungur and Tekkaya (2006) found an intrinsic goal orientation positively related to elaboration ($r = .712$, $p<.01$), organization ($r = .618$, $p<.01$), critical thinking ($r = .644$, $p<.01$), and effort regulation ($r = .504$, $p<.01$), but an extrinsic goal orientation did not significantly relate to any of those factors. And finally, Greene et al. (1999) found learning goal related positively with achievement ($\beta = .22$, $p<.01$) and effort ($\beta = .40$, $p<.01$). In short, a consistent positive relationship between a learning/mastery goal orientation and measures of learning emerged. Some varying results regarding performance/ability goal orientations also emerged. Much more regarding goal orientations and learning is developed in the coming section.

Goal Orientation and Learning

Wolters et al. (1996) studied the relationships between students' goal orientations, their motivational beliefs, and self-regulated learning. Specifically, they stated their questions as follows:

1- What is the relation between adoption of a learning goal orientation and students' self-efficacy, task value, anxiety, cognitive strategy use, self-regulation, and academic performance?
2- What is the relation between adoption of a relative ability goal orientation and the same set of outcomes?
3- What is the relation between adoption of an extrinsic orientation and the same set of outcomes?
4- What are the interactions between these different goal orientations and the outcomes?
5- How do grade, gender, and subject area as controls affect these interactions?

The sample was made up of 434 7^{th} and 8^{th} grade students from a junior high school in a working class suburb of a city in the Midwest (225 females, 209 males, 11-15 years old). 95% of the subjects were white. All students were enrolled in classes for mathematics, English, and social studies.

Data was collected twice, once at the beginning of the school year (October, time 1) and once at the end (June, time 2). Students completed an adapted version of the MSLQ that assessed student motivation and cognition including task value, self-efficacy, test anxiety, cognitive strategy use and regulatory strategy use. All definitions were consistent with outlined earlier for MSLQ. Questions measuring student goal orientation

were added. They were based on the Patterns of Adaptive Learning Survey (PALS). Goal orientation was operationalized into three distinct orientations: Learning goals (student is focused on learning and understanding the course material), Relative ability goals (student is focused on doing well to demonstrate ability to outperform others), and Extrinsic goals (student's focus is on attaining high grades, rewards, or approval from others). The latter two measures were traditionally grouped into one measure called Performance goals. Classroom academic performance was compiled by collecting student grades through school records.

The students' responses were compiled and relationships between goal orientations, strategy used, and self-regulation reported. Learning goal orientation (a focus on mastery) positively related to both cognitive (β ranged from 0.38 to 0.51, $p<.001$) and self-regulatory (β ranged from 0.32 to 0.46, $p<.001$) strategy use across subjects and data collection periods. It was not always related to students' classroom grade.

Relative ability orientation (a focus on social comparison and competition with others) was positively related with both cognitive (β ranged from 0.16 to 0.26, $p<.01$) and self-regulatory (β ranged from 0.09 to 0.13, $p<.05$) strategy use in most measures across subjects and data collection periods. It also positively related to student grades (β ranged from 0.18 to 0.22, $p<.001$) in the first, but not the second, data collection period. Relative ability orientation's relationships with cognitive and regulatory strategies were not as strong as learning goal orientation's.

Extrinsic orientations (a focus on grades and rewards) were negatively related to self-regulated learning (β ranged from -0.19 to -0.28, $p<.001$), and performance (β ranged from -0.12 to -0.21, $p<.01$) across most subject areas and data collection periods.

These three findings taken together indicate Performance goals should not be measured as one lump, but separated into at least two groups (relative ability and extrinsic). Extrinsic goals seem very negative for learning outcomes, while relative ability goals seem useful for promoting motivational and cognitive processes, though to a lesser degree than Learning goals. Most important to the current purposes is the strong relationship that is shown between students' goal orientation and their choices regarding learning measurements (cognitive strategies, regulatory strategies, and performance).

Wolters et al. (1996) highlighted the strong connection between a learning goal as a part of the motivation construct and learning as measured by cognitive and self-regulatory strategies. It also highlighted that not all performance goals necessarily preclude positive learning outcomes, as shown by the relationships between relative ability goals and use of strategies and performance.

The author's goals matched well with the design of the study, giving it construct validity. The multiple data collections that yielded parallel results contributed to the study's reliability, though no secondary method to verify self-reports was implemented. The external validity is limited by the homogenous sample (both in location and ethnicities included). Wolters et al. (1996) did not hesitate to generalize their findings despite the sample issues. It seems this is because of the huge body of research in the area that preceded this study. In fact, the findings of this study support the growing body of evidence in this paper regarding the relationship between goal orientation and constructs

of learning. Specifically, that learning goals positively relate to use of cognitive strategies (Brookhart & Durkin, 2003; Meyer et al., 1997; Sungur & Tekkaya, 2006) and regulatory strategies (Greene et al., 1999; Meyer et al.; Sungur & Tekkaya). The author also found that dividing extrinsic goal orientations up made sense.

Grant and Dweck (2003) took on the task of clarifying the different labels given to achievement goals in a more extensive fashion, and in doing so found various correlations between achievement motivation and learning. Many different theorists have studied essentially the same idea surrounding one's goals when facing an achievement situation, but they have defined the variables slightly differently and that has resulted in apparently different results. Grant and Dweck hypothesized that differentiating between various types of achievement goals within the two larger categories, commonly labeled learning goals and performance goals, the variety in the findings could be explained. The achievement goals they measured are listed and defined below:

- Learning goals: strive to constantly learn and improve
- Challenge mastery goals: it is important that my coursework offers me challenges
- Ability goals: important to validate intelligence
- Outcome goals: important to get good grades
- Normative outcome goals: important to get better grades than others
- Normative ability goals: important to be more intelligent than others

Grant and Dweck (2003) went through a process of five different studies to ensure the validity and reliability of their findings. The first three studies measured the importance of differentiating among all types of learning goals, test consistency over time, and the construct validity of the goal item questions as measured against previously

used items in research respectively. The latter two studies of the three indicated a high level of validity for the test questions and consistency over time. The first indicated that the six achievement goals loaded on only four different groupings, which narrowed the differentiation of goals to four: Learning (with challenge now included in it), Outcome, Ability, and Normative (with normative outcome and normative ability combined). Armed with this data indicating a high degree of confidence in their constructs, the fourth and fifth studies measured some data more pertinent to the interests of this investigation.

Grant and Dweck's (2003) fourth study included 92 participants (40 men, 52 women) recruited for pay from the Columbia University community. Of them, 61% were Caucasian, 21% African American, 12% Asian, and 6% other/unidentified. Participants completed the goal items, then after a five minute word-completion filler task, they received one of two randomly assigned scenarios in which they read about a failure experience in a college classroom and imagined it happening to them. They were then asked to agree/disagree with statements about how they would feel. These statements measured loss of intrinsic motivation, help-seeking, planning, time and energy withdrawal, attributions for the failure, loss of self-worth, and rumination. Finally, after another filler exercise, participants completed the Ways of Coping Scale measuring the ways in which individuals have coped with difficulties when they have arisen. Subscales of this measure include Active Coping, Planning, Positive Reinterpretation, Denial, and Behavioral Disengagement. Pertinent findings from study four are presented in Table 5.

Table 5:

Correlations: Goal orientations, effort, and planning (Grant & Dweck, 2003)

	Withdrawal of time and effort	Planning
Learning goals	-.40***	.57***
Outcome goals	N/S	N/S
Ability goals	.32**	N/S
Normative goals	N/S	N/S

**p<.01 ***p<.001 N/S = not significant (p>.05)

Learning goals correlated positively with planning and negatively with withdrawal of effort. Ability goals positively correlated withdrawal of time and effort. Overall, learning goals consistently correlated with positive learning related reactions to failure, whereas ability goals were negative. Both outcome and normative goals lacked correlation with measures of interest to this paper.

In Grant and Dweck's (2003) 5th and final study reported, participant numbers varied depending on occasion from 78 to 128. 85% were freshmen, 50/50 male/female taking a General Chemistry course that was highly important for their future career goals. In the largest sample, 59% of students were Caucasian, 7% African American, 26% Asian, and 8% Latino. The average exam grade was C+, suggesting that this course was one in which many participants experience challenges and setbacks. Data was collected at four points during the semester. Twice two to three weeks before the first midterm, once immediately after the midterm, and again two weeks before the final. In each collection period, the type of data collected varied:

Session 1: goal items, demographic information.

Session 2: intrinsic motivation, perception of chemistry ability

Session 3: general study strategies

Session 4: intrinsic motivation

Learning goals positively correlated with course grade ($\beta = .20$, $p<.05$) and with grade improvement from exam 1 to final ($\beta = .25$, $p<.01$). They were the only goals to correlate with either type of performance. Outcome goals predicted surface level processing of course material ($r = .29$, $p<.01$). Learning goals predicted deeper processing of course material ($r = .31$, $p<.01$). Normative goals were negatively correlated with deep processing ($r= -.21$, $p<.05$).

Table 6:

Summary of Relationships Between Goal Orientations and Learning (Grant & Dweck, 2003)

Goal	Study 4	Study 5
Learning	-less time and effort withdrawal -planning	-higher grades -greater improvement over time -deeper processing
Ability	-time and effort withdrawal	-lower grades after repeated poor performance -higher grades after repeated good performance

Both study four and study five in Grant and Dweck's (2003) report indicate clear connections between one's achievement orientation and indicators of learning, including

strategy use, planning, and change in performance over time (See Table 6). Learning goals seem most beneficial for learning. As highlighted in the above chart, they correlate with planning (strategy use), spending more time and effort in the face of challenge, and increased performance over time, all connected with my constructs defining learning.

Taken as a whole, the method used aligned with the aim of the studies. It is admirable how the researchers planned each stage to build the case for reliability and validity of the measures one study at a time. The findings that there are four distinct goal orientations were well laid out with a diverse group of students. The only thing about the sample that makes me hesitant is its location on a pretty prestigious University campus, possibly mediating any generalizability to students who are not already the cream of the crop. However, as the author points out, this may be another strength of the study, because if these differentiations are born out in a relatively competent group of students, then a more diverse sample may make the differences more apparent as opposed to disconfirming them. Despite reliance on self-report measures throughout, the crosschecking of the question items with other similar studies, the check for consistency over time, and the diverse cultural demographics of the samples contribute to the validity of the project. Additionally, parallel findings regarding learning goal's positive relationship with effort exerted (Greene et al., 1999; Sungur & Tekkaya, 2006), the use of deep cognitive strategies (Sungur & Tekkaya; Wolters et al., 1996), and performance (Greene et al.; Lynch, 2006) strengthen generalizability of the findings.

Nolen (1988) investigated the connection between goal orientations and one's valuing and use of study strategies. She focused on three orientations: task (learning), ego (competitive), and work avoidance. Task orientation involved a commitment to learning

for its own sake. Ego orientation aimed to perform better than others or to establish that one's ability is superior. Work avoidance involved a desire to put forth as little effort as possible and get away with it. And, she focused on two levels of study strategies: surface level and deep processing. Deep processing strategies included discriminating important information from unimportant information, figuring out how new information fits with what one already knows, and monitoring comprehension. Surface-level strategies included reading a whole passage over and over, memorizing all the new words, and rehearsing information. All definitions were consistent with working definitions for this paper. Before carrying out the study, Nolen hypothesized that students' motivational orientations influence both their beliefs about the value of strategies and their strategy selection when engaged in independent study of complex, meaningful prose. She expected task orientation to be positively related to learners' use and perceptions of the value of deep-processing strategies. Ego orientation was expected to be positively related to learners' use and valuing of surface-level strategies. Finally, work avoidance was expected to negatively relate to the valuing and use of either kind of strategy.

62 eighth graders from three junior high schools in two Midwest towns volunteered and received parental permission to participate. Data from 12 students were incomplete, so data from 50 students made up the data for use in analysis. Among them, 29 were female and 21 male. No further demographic data was reported. Students filled out the General Motivational Orientation scales (based on the Motivational Orientation Questionnaire, 18 items reflecting the three orientations – task, ego, and work avoidance), the General Strategy Value scales (5-point Likert-scale of agreement/disagreement

related to usefulness of a strategy), and Perceived Ability Items (two items to rate science-studying ability on 7-point scales).

Four to six weeks later Nolen (1988) asked students to read from an interesting article from popular science until they felt able to explain the article to someone else. An experimenter recorded overt studying strategies. Then, students completed the Task-Specific Strategy Use (asking students to list strategies, of the 7 options, that they used while studying), the Task-Specific Strategy Value (a 5-point Likert scale of agreement regarding value of a strategy for use in another instance), and the Task-Specific Motivational State scales (a task specific version of the general motivational scale). Students were monitored while studying the article and any overt strategy use was recorded. These records were checked against the student self-reports of strategy use to ensure consistency (agreement between student notes/behavior and their self–report ranged from 70% to 96%). Students were also asked to complete a free-recall followed by a prompted recall of info from the text and their recall was measured against previously identified idea units from the passages.

Nolen (1988) found that general task orientation significantly correlated with all levels of deep processing (general, r = .44; task specific value, r = .48; and task specific use, r = .31) while task-specific task orientation was highly significant at all three measures of deep processing (r = .40, r = .68, and r = .49 respectively). Each significantly correlated with surface level processing as well, though to a lesser extent (r = .25, r = .29, NS; r = .33, r = .59, r = .58). General ego orientation lacked significant correlation with any measure of strategy use. Task-specific ego orientation significantly correlated with two measures of surface-level strategies (task specific value, r = .35 and task specific use,

r = .58). General work avoidance significantly negatively correlated with two measures of deep processing (general value, r = -.32 and task specific use, r = -.34). Task-specific work avoidance negatively correlated with two measures of deep processing (task specific value, r = -.42 and task specific use, r = -.39) and one measure of surface level strategies (task specific use, r = -.26). No values significantly correlated with the numbers related to recall of information because recall averaged between 9 and 11%, a very low number. This finding calls into question the value of the study related to measurement of learning. Overall, general task orientation and task-specific task orientation consistently correlated with deep processing. Ego orientation correlated with only task-specific surface strategies.

Nolen's (1988) study used methods that aligned nicely with its goals. Checking students' general self-reports against an actual task-specific learning situation lent more validity to the findings than using simple survey methods. Additionally, researchers compared overtly observed use of strategies and student reported use of strategies and found large agreement. The connections between goal orientation (both generally and task-specific) and the associated strategy valuing and use are demonstrative of the importance of a student's interest in learning versus competing. Two aspects of the study limit its external validity. The sample was location specific. It studied students in towns only in the Midwest, so may not be generalizable. Also, it included little in the form of demographic data about the sample that would strengthen its generalizability. Second, the achievement measures of recall were too low to use, indicating that strategies used may not have been effective for learning. The findings regarding goal orientation and strategy use, however, paralleled a mounting body of similar findings (Brookhart & Durkin, 2003;

Grant & Dweck, 2003; Meyer et al., 1997; Sungur & Tekkaya, 2006; Wolters et al., 1996). They indicated a link between goal orientation and strategy use for learning. Even if the study demonstrated no learning, the fact that students who were measured to be task oriented had a greater correlation with strategy use implied that a learning goal was connected with strategies that improve learning. This study also highlighted the fact that goal orientation helps determine strategy value and use, both in a general way and in a task-specific way.

Bergin (1995) measured mastery (learning) and competitive (performance) motivations in a slightly different way. He attempted to create a mastery or competitive situation and measure the difference in performance for the two. Specifically, he asked how students' levels of interest, learning strategy use, and performance differ when placed in a mastery versus a competitive situation? He hypothesized that students in a mastery situation would report more enjoyment in reading the passage and greater use of learning strategies. Additionally, when compared based on reported GPA, students with high GPA would perform about the same in either mastery or competitive situations, whereas lower-performing (lower GPA) students would differ in their performance based on which situation they are put in, with the mastery situation performing better.

Participants included 51 pre-service teacher-education students (59 started, but eight were absent on the second day of data collection). Seven males and 44 females participated. No ethnic or socioeconomic data was reported for the students. All were enrolled in two undergraduate education classes: ed-psych and child development. The students were randomly assigned either to a mastery situation (n=26) or a competitive situation (n=25) and grouped in separate rooms. They were all asked to read a 978-word

text concerning children's writing. No time limit was given for reading the text, and most took four or five minutes.

The mastery subjects were read the following:

> The purpose of this study is to investigate how college students learn from text. We have chosen a reading passage that is relevant to your future work as a teacher. We would like you to study the following reading passage in such a way that you could use it in your own teaching and so that you could also explain it to another person. We have found that the insights contained in the reading are helpful to beginning teachers. We will administer a series of questions on Thursday. We would like you to study this passage as though you were really trying to learn the material so you could use it.

The competitive situation subjects were read the following:

> The purpose of this study is to investigate how college students learn from text. We will administer a series of questions on Thursday that will allow us to rank you in terms of your ability on this type of task. We want to know who is best and who is worst at learning and remembering from this type of reading. We would like you to study this passage as though you were trying to beat all the other students in the class.

Immediately after the reading, researchers asked both groups to rate their enjoyment of the passage, the degree to which they used learning strategies, and whether they had adopted the assigned goal. Two days after the reading, the participants completed a free-recall task and a multiple-choice test on the reading. Students self-reported their GPAs (Mean = 3.07). Researchers divided students between GPA</= 3.0

and GPA>3.0 to represent high achievers and low achievers. Researchers measured interest with a 5-item scale that asked students to rate statements on a five-point scale (strongly agree to strongly disagree). One example of a statement was "This reading passage engaged my interest." They measured learning strategies with a 16-item scale that was a five-point scale ranging from 'not at all' to 'a lot'. The questions were adapted from the Learning and Study Strategies Inventory (LASSI). Researchers measured adoption of the assigned goal by asking students what they most focused on while reading the passage: a) just get done b) do better than others c) learn the material d) other (describe). They measured achievement two ways. Students completed a free-recall task that asked them to write everything down they remembered from the passage. Students also completed a multiple-choice test regarding the information in the passage.

Pertinent findings indicated that there were no significant differences between the groups in reported goal adoption, nor were there significant differences related to student adoption of learning strategies. There was no significant interaction between situation and achievement in the free-recall exercise, though there was a significant difference between high achieving students (M = 10.96) and low achieving students (M = 5.62), p= .01. On the multiple-choice test, low ability students who were in the competitive situation performed significantly worse than low ability students in the mastery situation, p = .03 (see Table 7).

Table 7:

Test Performance as Mediated by Ability and Situation Orientation (Bergin, 1995)

(M =)	Mastery	Competitive
High Ability	8.69	8.83

Low Ability	8.46	6.31

Note. M = mean test score

In this study, the type of achievement situation directly influenced some students' learning. The lower ability students learned more when given a mastery goal. A mastery goal did not help all students to learn more, but did correlate with higher performance for lower ability students.

The study had construct validity: its goals matched the method used. The fact that the post-tests were given two days later and no explicit mention was made of asking the students not to talk about it could have allowed some students to find out they were given different directions. This does not hinder the validity of the findings, however, since the only part of the study that remained for the second day was achievement testing, which would not likely be influenced by that knowledge. It is only a measure of what they learned two days earlier. If the students had reported their adoption of goal the second time, the results would lose validity because they may have talked about the different purposes they were read and realized what was being studied. As is, this study presented evidence that student learning was effected by the type of situation students perceived themselves to be in (competitive/mastery) for low-achieving students, though demographic data for the sample is needed to strengthen generalizability. Findings paralleled other studies finding that a learning goal relates positively with performance, though from a situational rather than personal orientation standpoint (Grant & Dweck, 2003; Greene et al., 1999; Lynch, 2006).

Shim and Ryan (2005) performed a study that focused on the effect of students' goal orientations on challenge avoidance. The study wanted to explain how students'

goals related to changes in self-efficacy, desire to avoid challenge, and intrinsic value in response to grades in the classroom. The researchers focused on three achievement goals: mastery, performance-approach, and performance-avoidance. The Patterns of Adaptive Learning Survey (PALS) was administered to 361 college students from a large Midwest university. Students came from eight different classes, representing a variety of disciplines (i.e. psychology, economics, history, English, and statistics). They were 75% European American, 9% Asian American, 7% African American, and 9% other minority groups. 64% of the sample was female. A first survey was administered during the second week of the semester; the second was administered immediately after students received their first major exam or paper (three to five weeks later). Of specific interest to this section were findings regarding the relationship between goal orientations and challenge. Findings related to gender differences in motivational constructs in this study will be discussed later.

The PALS used a seven-point Likert-style scale in response to statements. Statements related to mastery goal orientations included "I like work I'll learn from, even if I make a lot of mistakes." Statements related to performance-approach goals included "I like to show my professor that I'm smarter than the other students in my class." Statements related to performance-avoidance goals included "One reason I might not participate in class is to avoid looking dumb." Statements related to a preference to avoid challenging work included "I prefer doing work that does not make me think too hard." These measures each corresponded with outlined definitions for Goal Orientations and willingness to face a challenge (opposite of preference to avoid one) that were outlined in chapter one of this paper.

In both administrations of the survey, each of the three achievement orientations significantly correlated with a desire to avoid challenge. A mastery orientation had a significant negative correlation with a desire to avoid challenge in both data collections ($r = -.36$ and $r = -.47$, $p<.01$). A performance-approach orientation had significant positive correlations with a desire to avoid challenge in both data collections ($r = .29$ and $r = .32$, $p<.01$). A performance-avoidance orientation had even larger positive correlations with a desire to avoid challenge in both data collections ($r = .38$ and $.r = 37$, $p<.01$). Inversely stated, the motivation toward mastery (or learning) was most conducive toward a desire to face and grow from challenge.

Shim and Ryan (2005) added to the evidence regarding a willingness to face challenge in the research related to goal orientations (Grant & Dweck, 2003; Greene et al., 1999; Meyer et al., 1997; Sungur & Tekkaya, 2006). Their findings indicated a significant relationship between a mastery orientation and positive reaction regarding learning from challenge. Their study, however, focused only peripherally on that finding. It focused on how people with different achievement orientations responded differently about their motivation after being evaluated. The study was highly congruent in what it set out to find out and the methods used to gain data, giving validity to findings reported. It relied heavily on self-report surveys without substantiating the findings through secondary methods. One portion of the internal nature of the study that differed from the constructs laid out in this paper was its treatment of challenge avoidance as a motivational construct rather than a portion of a learning construct, as this paper does. This doesn't change the relationship measured, as the questions asked still aligned with definitions used herein. The sample was heterogeneous, though not numerically

representative of the nation as a whole (Hispanics, for example, were under-represented). Overall, the study strengthened the body of evidence supporting a relationship between learning goals and willingness to exert effort when challenged (Grant & Dweck; Greene et al.; Meyer et al.; Sungur & Tekkaya; Wolters et al., 1996).

Summary of Findings Regarding Goal Orientation

Six studies measured the relationship between goal orientations and effort in the face of challenge (Grant & Dweck, 2003; Greene et al., 1999; Meyer et al., 1997; Shim & Ryan, 2005; Sungur & Tekkaya, 2006; Wolters et al., 1996). Four of those found significant and positive relationships between a learning (mastery/intrinsic) goal orientation and measures related to facing challenge (Greene et al.; Meyer et al.; Sungur & Tekkaya; Wolters et al.). Those studies each defined the learning variable slightly differently (as willingness to face challenge, effort regulation, effort reported, and self-regulatory strategies), but found consistently large relationships with the learning goal orientation ($\beta = .40$, $p<.01$; $r = .65$, $p<.05$; $r = .504$, $p<.01$; β ranged from .32 to .46, $p<.001$). The other two studies measured the opposite relationship: that of learning goal orientation's relationship with withdrawal of effort or desire to avoid challenge (Grant & Dweck; Shim & Ryan). Each of these studies found large significant negative relationships between the variables ($r = -.40$, $p<.001$; $r = -.36$ and $-.47$, $p<.01$). Interestingly, these same two studies returned weaker, but significant, positive relationships between withdrawal of effort and performance or ability goals, which was not found in the other four studies. The reported findings represented a range of demographic groups, ages ranging from fifth grade through college, and urban and suburban locations in different parts of the U.S. and Turkey. Researchers should try to

study rural areas. All studies relied heavily on self-report data, though a few did perform multiple collections of data. One study used a secondary method that confirmed the accuracy of self-reports. More of that should occur. The diverse representation of the studies, the lack of rural data, and the over-reliance on self-report data apply to each relationship between a learning variable and goal orientations. Overall, the findings were clear. Learning goal orientations have a large, significant, and positive relationship with effort exerted. That is, when students have learning goals, they tend to exert effort to learn when faced with a challenge.

Eight studies measured the relationship between goal orientations and the use of cognitive strategies (Bergin, 1995; Brookhart & Durkin, 2003; two studies by Grant & Dweck, 2003; Meyer et al., 1997; Nolen, 1988; Sungur & Tekkaya, 2006; Wolters et al., 1996). Different types of measures were used to study this relationship, including the various labels for goal orientations. Whichever label used, however, learning goals significantly and positively related to deep, or active, learning strategies in seven of the eight studies. Correlations ranged from medium ($r = .31$, $p<.01$) to large ($r = .80$, $p<.05$) in effect size. Bergin was the one exception, and that was likely due to the fact that the research focused on situations rather than personal orientations. Performance goals, whether divided up or clumped together, inconsistently correlated with deep learning strategies: sometimes non-significantly, sometimes significant and positive, sometimes significant and negative. Two studies backed up survey findings with secondary methods that verified the validity of the self-reported relationships (Meyer et al.; Nolen). Researchers consistently measured significant and positive relationships between learning

goal orientations and reported use of deep learning strategies. That is, when students have learning goals, they are likely to use deep learning strategies.

Five studies measured the relationship between goal orientations and academic performance (Bergin, 1995; Grant & Dweck, 2003; Greene et al., 1999; Lynch, 2006; Wolters et al., 1996). Four of the five found some indication that learning goals relate positively with performance measures (Bergin; Grant & Dweck; Greene et al.; Lynch). Three of those four studies used course grades as their measure of performance (Grant & Dweck; Greene et al.; Lynch). One used a multiple-choice test administered as part of the experiment (Bergin). Relationships found were smaller than those found between learning goals and other measures of learning (r ranged from .16 to.26, $p<.01$ and β ranged from .20 to .25, $p<.05$). I conclude that reported learning goals tend to relate positively with academic performance, though less strongly than with other measures of learning.

All results pointed to significant positive relationships between a learning goal orientation and measures of learning. The strongest relationships were with the reported use of deep strategies. A firm relationship was found with effort. And finally, fairly consistent evidence was found regarding a learning goal orientation's relationship with performance. Regarding the focus of this paper, I conclude that a learning goal orientation is generally positively related (to different degrees) with learning. That is, when learning goals are strong, measures of learning are also strong.

In summary, the studies examined in the first major section of this chapter established a consistent connection between motivational constructs and positive indicators of learning. As for the goals of this paper, interest and self-efficacy were

concluded to relate positively with all three measures of learning. Now it is evident that the final measure of motivation, a learning goal orientation, relates positively with all three measures of learning. I conclude that this investigation can move forward with confidence that all measures of motivation examined in this paper have positive and significant correlations with all measures of learning in use. If gender differences in motivation become apparent, therefore, they are very likely to accompany gender differences in learning.

Gender and Motivation

The articles in the first four sections of this second step in the investigation all directly or indirectly measure for gender differences in motivation. Although some studies measured more than one construct of motivation, they are again loosely grouped into sections to allow for easier navigation through the findings. The fifth part of this section examines studies that propose possible confounds to measured gender differences.

Gender and Academic Self-efficacy

Pomerantz et al. (2002) was expressly concerned with measurements of gender differences. As indicated in the previous section, researchers examined how the measured gender differences in academic performance and self-evaluation (self-efficacy) during school years related to one another. They found gender differences across subject areas. Girls outperformed boys in all four subject areas (all significant to $p<.05$, but small in effect size). Language Arts was the area in which gender difference in academic performance was strongest ($d= 0.28$). In the self-evaluation, by contrast, girls evaluated themselves more negatively than did boys. Only in language arts did their self-evaluation

exceed that of the boys. Social studies had the next strongest self-evaluation for girls, but they still lagged significantly behind the boys' self-evaluations. Although all gender differences reported were significant, the effect sizes varied. The effect sizes for academic performance and self-evaluation were similar (mean d=.18 and .16), but both in the "small" range.

For the purposes of this study, the most significant finding of the study related to differences in self-evaluation (the equivalent of academic self-efficacy). Across academic areas, girls evaluated themselves more negatively than did boys (d = 0.16). Self-evaluations in each subject area revealed the data that follows:

- Language Arts d = 0.16
- Social Studies d = -0.18
- Science d = -0.22
- Math d = -0.26
    - All differences (d) significant ($p < .05$). negative numbers indicate areas where girls self-evaluated more negatively than boys.

These findings are interesting for two reasons. First, girls outperformed boys across the board, yet self-evaluate lower in three of four subject areas. If non-performance aspects of learning grow in part from the motivational factor of self-competence, than performance may not be telling the whole story regarding student learning. Second and somewhat contradictorily, all differences are in the range of what Cohen called "small" effect sizes (as cited in Becker, 2000). So, despite the existence of statistically significant gender differences in self-efficacy measures, the effect sizes of those differences may explain little that is socially significant.

As argued in the previous section, the goals and method of Pomerantz et al.'s (2002) study gave validity to the findings reported, especially the longitudinal nature of it (three data collections). Additionally, the express focus of the study was on gender

differences in motivational factors as they affect performance. It informed about the connection between perceived self-competence and performance. It also indicated a small gender difference across four content areas. More support is needed to draw any general conclusions about gender differences in reported self-competence. Pomerantz et al.'s finding can really only be generalized to White upper elementary students from the Midwest.

Cole et al. (2001) performed a cohort sequential longitudinal study designed in part to tease out which aspects of self-competence were general characteristics of children and which were gender specific. Two cohorts of children and adolescents participated: the younger began in grade three, the older in grade six. Participants attended one of nine public elementary schools, transitioned to one of two middle schools, then to one of two high schools in a midsize Midwest City. The initial sample was 855 children. Eventually, data was gathered from a total of 1,920 students (936 in cohort 1, 984 in cohort 2). Demographically, the sample was diverse: 56.7% European American, 37.5% African American, 3.1% Hispanic American, .4% Multiethnic, and 2.3% other. Annual family income ranged from less than $10,000 to more than $100,000 (median = 37,000).

They collected 12 data samples (two per year for six years). They took the first measurement each year six to eight weeks into the school year, the second six to eight weeks before school let out. They evaluated five domains (academic, social, sports, appearance, and behavior) of self-concept using the Self-Perception Profile for Children and the Self-Perception Profile for Adolescents. The authors defined self-competence generally as beliefs children develop about their abilities based on actual abilities and

feedback received from others. An item on the survey read something like: “some kids feel like they are just as smart as other kids their age, but other kids aren’t so sure and wonder if they are as smart,” to which students responded by selecting one half of the sentence or the other and circling “ Really true for me” or “Sort of true for me,” etc.

The most pertinent measurement for the purposes of this paper was self-perceived academic competence. In elementary school, no significant gender differences were found. In middle school, a small, but significant, gender difference in academic competence was measured ($t = 2.27$, $p<.05$), boys’ intercept at grade seven was 11.87 and girls’ was 11.28. In high school, no significant gender differences were measured.

The goal and design of the study aligned, giving construct validity to findings. The one finding pertinent to this investigation reported that when academic self-competence was measured generally, they found no significant gender differences (with the exception of the transitional period of middle school). The study focused on development of self-competence over time. This paper is interested in whether/if gender differences exist. The findings that they only exist generally in academic self-competence need confirmation with another study. This study implied that even when differences do appear (middle school), they have a small effect size. The study indicated a lack of gender difference in the area of academic self-competence, but the measurement was not specific to academic domains. It could be that the general measurement masked the differences measured by Pomerantz et al. (2002) within academic domains. The study included a demographically diverse sample, which strengthened the case for generalizability. The students represented various ethnicities, socioeconomic groups, and both genders. The longitudinal nature of the study also benefited its generalizability, as

self-reported relationships could be confirmed across time/cohorts. Using a secondary data collection method could confirm the validity of the measures. One drawback was the focus of the study again in the Midwest.

Pomerantz et al. (2002) found small gender differences in self-competence across subject areas for late elementary school students and Cole et al. (2001) found small gender differences in general academic self-competence in middle school students, but not in elementary or high school students. Based on these two studies, I draw no conclusions about the existence of gender differences in academic self-competence. More studies regarding the relationship between these two measures appear below in a section that explores studies with multiple motivation variables. First, however, we take a quick dive into interest's relationship with gender.

Gender and Interest

McTeer (1986) conducted an older study that analyzed fluctuations in student interest across academic domain. The study set the goal to determine student preference toward four academic areas of secondary school: English, mathematics, science, and social studies. 1820 high school seniors in 14 schools in northwest Georgia (including the largest school in the state, urban, suburban, and rural schools) completed a survey wherein they were asked to select the subject area they liked best and the subject area they liked least (out of the four), as well as identify their gender.

McTeer (1986) found various significant relationships between genders and interest in subject areas. The strongest differences were in the subject area of English, in which girls were much more likely to choose English as their most liked subject area ($\chi^2 = 85.21$, $p<.01$). Also, boys were much more likely to choose English as their least liked

subject area ($\chi^2 = 66.50$, $p<.01$). Boys were significantly more likely to choose mathematics as their most liked subject area ($\chi^2 = 20.48$, $p<.01$). Boys were also less likely to choose science as their least liked subject area ($\chi^2 = 9.57$, $p<.01$). Boys were more likely to choose social studies as their most liked subject area ($\chi^2 = 10.3452$, $p<.01$), while girls were more likely to choose it as their least liked subject area ($\chi^2 = 12.7605$, $p<.01$).

McTeer (1986) found significant measures of difference in interest in six out of eight areas measured. Most differences, though significant, were small in their effect size. The major exception was English, where girls were much more likely to like it and boys were much more likely not to like it. The study does not draw conclusions about why these gender differences exist, which would have been outside the realm measured. They used a wide sample, covering 14 schools in urban, suburban, and rural parts of Georgia, strengthening external validity, but they failed to report ethnic/racial demographic data for the participants. The usefulness of the study diminished because it failed to clearly articulate what was meant by 'interest.' It was likely measuring different things (task-value, inherent interest, perceived personal ability, peer group with whom the class is taken, interestingness of teacher, etc.) depending on how the students interpreted the question related to most-/least-liked subject. Of course, both boys and girls may have been misinterpreting the question in similar ways, leaving the measured differences with some degree of credibility. This study left me thinking that boys and girls may find different subjects more or less interesting, but needing a more valid study to back up that idea. Lack of definitions for variables left the study without validity to be applied to the question of this paper.

Lightbody et al. (1996) performed a similar study to measure the levels of interest students reported in various school domains. The study's set the goal to describe gender differences in how much students reported liking school and particular aspects of it, as well as what pupils believed contributed to academic success. 1068 secondary school pupils in a large London comprehensive school participated in the study. All students present the day of data-collection filled out a questionnaire divided into four sections: the first dealt with what students liked about school, the second with how much they enjoyed individual subjects, the third with factors they believed contributed to good academic performance and the fourth with issues relating to career guidance. Although names appeared on the questionnaires, students were assured that no individual responses would be available to school or staff.

Researchers designed the questions to show which areas of school students most liked based on a self-report. Lightbody et al. (1996) found gender differences in a number of measures of student enjoyment of school in general. These included significant gender differences in six of eight aspects of school life measured (girls like friends, teachers, outings, and lessons more; boys like sports and clubs more). The findings about liking of school subjects reflected sex stereotyping with girls far more likely to report liking English ($p<0.0001$), French ($p<0.0001$), German ($p<0.0001$), history ($p<0.001$), and drama ($p<0.001$); girls more likely to report liking art ($p<0.05$), media studies ($p<0.05$), and personal and social education ($p<0.05$); while boys were far more likely to report liking science ($p<0.0001$), craft and design technology ($p<0.0001$), physical education ($p<0.0001$), and information technology ($p<0.0001$); boys more likely to report liking mathematics ($p<0.05$).

Lightbody et al. (1996) reported a consistent difference in the interest boys and girls report regarding school subjects. Overall, girls reported more interest in school subjects than boys. Areas of difference that seemed consistent with McTeer (1986) included English (favoring girls) and mathematics (favoring boys).

Unlike McTeer (1986), Lightbody et al. (1996) specifically asked students to report their liking based on the "lessons" (or content) of the course. That specificity should narrow answers down much more than the previous study. Responses should not have included student opinions about their abilities, classmates, the teachers, etc, as McTeer's study might have. It is still hard to know whether these findings relate only to an initial attraction to a subject or a more lasting sense of valuing the subject area as important. Either of these definitions, however, fit within the framework of my working definition of interest for this paper (both initial interest and task value). The study focused on only one school in London, so findings cannot be widely generalized. Also, data relied only on one self-report without any sort of secondary method to check validity of self-report. More studies are needed to make any general conclusions regarding gender's impact on student interest across domains.

Task Value, Self-efficacy and Gender

Martin (2004) measured gender differences in interest more specifically as task-value. This study also measured gender differences in student self-belief (approximately self-efficacy) and learning focus (similar to a learning goal orientation). The study sought to determine if differences in motivation between boys and girls are differences in degree or in kind. That is, are boys and girls motivated in similar ways, but just to different degrees or are they motivated by completely different kinds of things? 2,927 students

from 12 high schools in and around the Sydney and Canberra areas of Australia participated in the study, including nine government schools and three independent schools. 38% of participants were in years seven and eight, 43% in years nine and 10, and 19% years 11 and 12. Primarily middle to upper class families attended the schools. Genders included in study divided as follows: 57% male, 43% female.

Teachers administered the Student Motivation Scale to students during class. The ratings scale (a 7-point Likert scale) was explained and a sample presented to each student. Student levels were measured of six "boosters" (motivation enhancers: self-belief; value of schooling; learning focus; planning; study management; persistence) and four "guzzlers" (motivation reducers: anxiety; low control; failure avoidance; self-sabotage). Four questions addressed each booster/guzzler. The results were analyzed for gender differences in degree just by the average strength of response. Three comparative statistical analyses were performed to measure if the differences represented differences in kind.

The three pertinent motivation variables measured for this paper were self-belief, value of schooling, and learning focus. They defined self-belief as "students' belief and confidence in their ability to understand or to do well in their schoolwork, to meet challenges they face, and to perform to the best of their ability," a parallel definition to self-competency for this investigation. They defined value of schooling as "how much students believe that what they learn at school is useful, important, and relevant to them or to the world in general," a definition in line with task-value. They defined learning focus as "being focused on learning, solving problems, and developing skills," a parallel definition to holding a learning goal orientation.

Boys and girls did score significantly different on six measurements out of ten, but all were fairly small effect sizes (learning focus g>b .14; planning g>b .22; study management g>b .28; persistence g>b .26; anxiety g>b .41; self-sabotage b>g -.22). So, while there are significant differences, the effect sizes of those differences are really small in the grand scheme. The cluster analyses and perceptual mapping both indicated that differences were of degree, not kind. In fact, out of the three pertinent measures for this paper, only learning focus revealed any significant difference at all, with girls having the advantage (ES = .14).

This study asked the question, so what? It said, sure there are differences between genders, but do they matter? The results indicated that of the factors of motivation in this paper, there were no significant differences more than a small effect size. Martin (2004) concluded that even gender differences in motivation that do exist are differences of degree, not of kind. This means that boys and girls were motivated in the same ways, just to a different degree.

Martin's (2004) findings grew out of a congruent goal and design. I am hesitant to generalize the findings without question for the reasons that he indicates: the sample used for the research focused on middle to upper class kids that were probably fairly homogenous, though no direct indication is made of that measurement. Another factor in this study's generalizability is the fact that the schools are Australian schools. It is hard to know that the findings in Australia would be generalizable to student in the U.S., where demographics are significantly different. Additionally, the applicability to high school classrooms of the study is suspect because it only measured general responses to the statements, not domain specific responses. It may be that measuring general academic

motivation hides larger gender differences in specific domains (i.e. Pomerantz et al., 2002). The finding of no significant gender differences in general self-efficacy levels supported the finding by Cole et al. (2001). Studies using non-self-report measures are still needed.

Wolters and Pintrich (1998) addressed gender differences in the third part of their study (in previous section). They asked, does gender have a main or interactive effect on students' motivation and cognition in the subject areas of Mathematics, English, and Social Studies? The important part of this question for the purposes of this paper is what they found regarding gender differences in the two aspects of motivation measured: self-efficacy and task value. Table 8 contains the mean (M) scores broken up by gender:

Table 8:

Correlations: Domain Specific Task Value, Self-efficacy, and Gender (Wolters & Pintrich, 1998)

Content Area	Males (M =)	Females (M =)
	Task Value	
Social Studies	5.35	5.11
English	5.32	5.37
Mathematics	5.51	5.51
	Self-efficacy	
Social Studies	5.54	5.33
English	5.64	5.71
Mathematics	5.59	5.36

M = mean

While females and males valued school similarly overall, there were differences between genders in valuation of specific subject areas ($p<.001$). Particularly, the ordering is slightly different. Males reported greater values of task value in math than in either social studies or English ($p < 0.05$), while revealing no significant difference in their valuing of English and social studies. Females reported similarly in that they valued math over English and social studies ($p < 0.05$). They differed by valuing English over social studies ($p < 0.05$). The largest reported mean gender difference within a subject was .24 in social studies, a very small effect size on a 7-point scale.

Analysis of reported self-efficacy revealed the same thing regarding effects: a main effect by subject area ($p < 0.001$), and a significant interaction between subject area and gender ($p < 0.001$), but no effect for just gender. Males reported similar levels of self-efficacy across subject areas (no significant differences), whereas analysis revealed that females reported more self-efficacy in English than in either math or social studies ($p < 0.05$). Again, the largest reported mean gender difference within a content area was .23 in mathematics, a very small effect size on a 7-point scale.

This study did not reveal major differences in either reported self-efficacy or task value between males and females in school generally. The significant gender related finding was the interaction between gender and subject area ordering. Females tend to value English over social studies, whereas males value both equally. Additionally, Females have more self-efficacy in English than in social studies or math, whereas males have no significant differences in self-efficacy. This may be important because despite feeling nearly equally competent in different subject areas, a tendency for females to value English over the other subject areas may contribute to the stereotype that English is

a feminine subject. Overall gender differences in student motivation are not revealed by this study, only subject specific differences in ordering.

As noted earlier, Wolters and Pintrich's (1998) goals aligned with methods used to collect data. In combination with a very clear articulation of the variables measured (which paralleled variables studied in this paper), the validity of the study to inform this paper was strengthened. Its reliance on a single collection of self-report data, however, could be improved. The study was limited in generalizability for the two reasons argued in the previous section: the largely homogenous sample and the geographical limitation of including only one school. The lack of general gender differences in task value or self-efficacy supported the general findings of Martin (2004). The largest mean differences within domains were M = .23 (Math self-efficacy) and M = .24 (Social Studies task value). The small effect sizes of differences measured within domains paralleled findings by Pomerantz et al. (2002) regarding competency.

Wolters et al. (1996) also studied task value and self-efficacy (as outlined in the 'Goal Orientation and Learning' section). They found some gender differences in motivation. They found a significant relationship between gender and task value in only social studies (not math or English) and only in the first of the two sets of data collected ($\beta = -0.08$, $p < 0.05$). Relationships between gender and self-efficacy appeared in half the measures: social studies in data set 1 ($\beta = -0.08$, $p < 0.05$), math in data set 2 ($\beta = -0.20$, $p < 0.001$), and social studies in data set 2 ($\beta = -0.10$, $p < 0.05$). Negative Betas indicate an advantage for males. The largest measurement was that measured in math in data set two, but one has to question the validity if the first data set of the same study failed to reveal

the same significant relation. Male's self-efficacy advantage in social studies appeared most consistently, though still a small beta.

Wolters et al. (1996) did not test for gender related interactions with the goal orientations the study was focused on. It is important to know if gender is related to a choice of a learning or performance goal. As noted earlier, the study had strong construct validity, but may not be generalizable to all populations because of its limited sample. The study relied on two collections of self-report data. The one finding of higher task value for males in social studies paralleled Wolters and Pintrich (1998). Higher self-efficacy for males in math paralleled findings by Pomerantz et al. (2002) and Wolters and Pintrich. Pomerantz et al. also found that males had higher self-efficacy in social studies. Some gender differences, though small in social significance, appeared in student self-reports somewhat consistently across studies.

In a cross-sequential longitudinal study, Jacobs et al. (2002) measured whether domain specific (math, language arts, and sports) self-perceptions and valuing change over time for children in grades one through twelve. 761 students in 10 elementary schools (at the study's inception) in four mostly European American school districts in suburbs of a large Midwest City participated. All students in class were asked to participate. 75% both agreed to do so and received parental permission to do so. Data was collected between 1989 and 1999. 53% of the participants were girls and 47% boys.

Three cohorts of students participated. In year one, the children were in first, second, and fourth grades. They were followed longitudinally through elementary, middle, and high school years. For each outcome measure, students were excluded if they were missing the relevant objective indicator of performance. Children completed

questionnaires measuring competence beliefs and subjective task values about math, language arts, and sports in the spring of each year. Items used 1 to 7 Likert-style response scales. Researchers defined self-competence as a belief in one's ability to accomplish a certain task, and task value as the level of value a child put on accomplishing a certain task. Both of their definitions aligned with definitions in use for this investigation. The youngest students were read the questions. Older students read to themselves.

The researchers divided findings related to competence beliefs into domains. In math, first grade boys had higher competence beliefs than girls, but by 12th grade, competence beliefs became equal for boys and girls. Both genders' math competence beliefs consistently declined year to year. In language arts, first grade boys and girls had equal competence beliefs but by middle school, girls had significantly higher competence beliefs. Gender differences continued through high school. Language arts competence beliefs for both genders declined through school, but the rate decreased into high school. In sports, first grade boys had higher competence beliefs than girls and differences in competence beliefs between genders remained constant through school. Both genders' sport related competence beliefs fell at similar rates throughout school, with higher rates in high school.

Findings related to task values were also divided into domains. In math, task values were similar for boys and girls, though declining throughout school. In language arts, females began and ended with higher task values. Boys' valuation fell more rapidly through schooling. Boys began valuing sports higher, while girls ended valuing sports

higher. The curvilinear forms of the changing values were different (one concave, one convex) for boys and girls, though both generally falling through school.

The authors made four general conclusions. First, gender differences are domain specific, not global. Second, language arts class is gender typed (toward girls). Third, boys' self-perceptions declined more rapidly than girls' in both academic subjects. And finally, competence beliefs and task values are highly related and should be studied together. Although it was not highlighted as a conclusion, the authors seemed to make a fifth: that most gender differences in competence beliefs and values decrease or remain stable, as opposed to the general assumption of gender difference intensification.

Jacobs et al. (2002) were highly consistent in the goal and methods used for the study. They supported the finding of gender differences in both task values and competence beliefs with graphs of the data over time. The longitudinal and domain specific nature of the study offered a lot of information regarding gender differences at different levels and in different classes of school. Unfortunately, they did not report the statistical data, making it impossible to determine the significance or the effect sizes of the differences measured. The study highlighted the trend for both sexes to lose self-competence over time. It also indicated a possible advantage for girls over boys when it comes to these two measures of motivation. The external validity was limited by the homogeneity of the sample. The longitudinal nature of the study, however, strengthens its generalizability, as it is not just a one-time measurement that could be swayed by the current events locally or nationally. Though, a study with data from another source other than self-report surveys would still be nice to see in the area of gender differences.

Jacobs et al.'s (2002) findings, though unsubstantiated by data, did align in a few ways with findings by other researchers. The male advantage in math competency in middle school paralleled Wolters et al. (1996). Other studies also paralleled the finding of girls' advantage in English for both task value (Lightbody et al., 1996) and competency (Pomerantz et al., 2002).

Eccles et al. (1993) measured the existence of clearly defined and measurable beliefs about competence and task-value in elementary school children and whether those beliefs differed between the two sexes. Participants in the study were 865 first-, second-, and fourth-graders in 10 elementary schools in four semi-urban school districts in southeastern MI. 284 first-graders (142 girls, 142 boys), 320 second-graders (169 girls, 151 boys), and 261 fourth-graders (134 girls, 127 boys) participated. The school districts serviced lower-middle class to middle class families. Participants were 95% white, 5% African-American, Asian American, and other ethnic/racial groups. In the spring of 1988 these children completed questionnaires regarding their beliefs about academic subjects (Math and Reading), instrumental music, and sports, as well as other constructs. They measured beliefs about self-competence: defined as perceptions about how good they are, expectations for success, how hard it is, and efficacy to learn new info in activities. They also measured beliefs about subjective task values: defined as how interesting/fun, how important to be good at, and how useful each activity is perceived to be. Both definitions paralleled definitions in use for this paper. Each question used 1-7 Likert-style answer scales. All questions were read aloud to children and they were carefully monitored.

Findings revealed that children's activity related self- and task perceptions were differentiated, even in first grade. Goodness-of-fit indices across age and domain all

measured above or near .90 (indicating good model fit). Boys (M = 5.62) competence self-perceptions exceeded girls' (M = 5.38) in math (p<.000, ES = .02). Girls (M = 5.84) valued reading more than boys (M = 5.34) did (p<.000, ES = .03). No significant gender differences appeared in self-perceptions of reading or value of math (though for girls math was the least valued activity measured while it was second from the top for boys). See Table 9 for a visual of the data.

Table 9:

Gender Differences in Self-perceptions (Eccles et al., 1993)

	Math	Reading
Competence	B>G (ES = .02)	NS
Task-value	NS	G>B (ES = .03)

Note. ES = effect size, B = Boys, G = girls, NS = not significant

Eccles et al. (1993) found gender differences in self-competence beliefs and subjective task value. The study found these differences as early as 1st grade. It studied perceptions about competence and task value as defined in ways highly connected with the definitions of the two for this review of the literature. Findings of sex differences in motivation as early as elementary school indicated that there might be reason for concern regarding student learning. However, effect sizes were overwhelmingly small for all findings of gender differences in motivation. The study had two goals: to see if differentiation between task value and competence beliefs was measurable in early elementary students and to notice changes/differences across grades/genders. The methods used made sense for those goals. The lack of non-survey based research related

to the topic continues, but more themes in gender difference between studies became evident. Higher self-efficacy for boys in math paralleled two other studies (Jacobs et al., 2002; Wolters et al., 1996). Also, assuming the subjects English and reading fit within a broader language arts category, girls' valued it significantly more than boys in multiple studies (Jacobs et al.; Lightbody et al., 1996). The study's sample was limited, but similar findings of other studies increased generalizability.

In the previous three sections, some indication of gender differences in task value and/or self-efficacy were found in almost every study (Cole et al., 2001; Jacobs et al., 2002; Martin, 2004; Pomerantz et al., 2002; Wolters & Pintrich, 1998; Wolters et al., 1996). All differences reported, however, have either had inconsistent results across data collections or consistent but small effect sizes. The next section explores primarily gender differences in goal orientations, but a few expand the data above. A more expansive conclusion regarding the relationships between gender and interest and self-efficacy follows that section.

Gender and Goal Orientation

In an older study that predicted the concerns of many of the current studies about gender differences in achievement orientation, Reid and Cohen (1974) attempted to answer the following question: Are there sex differences in achievement orientation and intellectual achievement responsibility related to student's choices to enter a degree vs. certificate only teacher preparation course?

168 British teacher education students participated in the study. All had similar qualifications that would have enabled them to choose a four-year degree program, yet about a third chose to attain a certificate only. Of the 85 female participants, 58 were

degree seeking and 27 certificate seeking. Of the 83 male participants, 57 were degree seeking and 26 certificate seeking. Professors administered Anglicized versions of the Mehrabian Achievement orientation measure and a modification of the Crandall Intellectual Achievement Responsibility Scale.

Achievement orientation differentiated between degree and certificate females (*t* value = 3.50, $p < 0.001$) but not males. Differences in Intellectual achievement responsibility between degree and certificate seekers were similar for males and females. The authors suspected the females who chose degree courses were atypical of the general population of females regarding their achievement orientation, whereas males making the same choice were not significantly different from those who did not choose a degree course.

This study's validity seemed difficult to determine. It set out to measure achievement motivation, but never defined it or gave an example of a question used to measure it. At first, I assumed that it was similar to one's achievement goal orientation, but I cannot be sure. Such being the case, I cannot use the findings to inform the question of focus in this paper. Generalizability of the study would have been hindered by the fact that the study is based in England, limits participants to teacher candidates at one university, and is rather old. It did hint at the historical roots of many of the more recent studies: citing a need for a separate psychology of motivation for the two sexes. Reid and Cohen (1974) represented an early concern that males and females may be motivated differently (not just achieve differently).

Shim and Ryan (2005), in a study outlined earlier in the paper (Goal Orientation and Learning section), measured correlations between gender and self-reported goal

orientations (defined as in chapter one). The only goal orientation that significantly correlated with gender was the mastery orientation ($r = .10$, $p<.05$). Positive correlations indicated advantages to females. Both the performance-approach and performance-avoidance orientations returned no significant correlations. The correlation between gender and a mastery goal orientation could be important, as a mastery goal is most conducive to positive learning outcomes. The finding that females were more likely to report a mastery orientation paralleled Martin's (2004) finding. Shim and Ryan also found a correlation between gender and intrinsic value twice ($r = .18$ and $.22$, $p<.01$). One disadvantage of this study was a focus on general measures, as opposed to domain specific measures.

Greene et al. (1999) also found some evidence of gender differences in reported goal orientations, as eluded to earlier (Academic Self-efficacy and Learning section). Interestingly, whether the students were in courses they chose or required courses mediated much of the difference. In required courses, males and females reported approximately the same level of learning goals ($M = 3.72$ and 3.78), but reported more divergent means for performance goals (3.18 and 2.75). In elective courses, males and females were more divergent in their reports of learning goals ($M = 3.57$ and 3.90), but were essentially equal in reported performance goals ($M = 2.82$ and 2.85). Findings indicated greater tendency for males than females in required coursed to focus on performance goals, while females in elective courses were more likely than males to focus on learning goals.

A pattern emerged when combined with other findings of some preference for females to report learning goals (Martin, 2004; Shim & Ryan, 2005), though differences reported were very small.

Meece and Holt (1993) performed a novel re-analysis of a previous study (by Meece, Blumenfeld, & Hoyle) in which they tested the hypothesis that it might be better to group students into clusters of response levels to mastery, ego, and work-avoidance statements on a survey and use those to groupings to determine relationships to performance measures rather than the more common method of analyzing correlations between single variables. The original sample included 100 5th graders and 175 6th graders (approximately equal in terms of gender) from two elementary and two middle schools in predominantly White, middle- to upper-class communities. 10 classes taught by five teachers (three women and two men) participated. To eliminate effects of subject matter, all classes were science classes.

Students completed a self-report that measured three goal orientations (task-mastery, ego-social, and work-avoidant) and two academic performance measures (active engagement and superficial engagement) on a 4-point Likert-scale. An example of a task-mastery statement is 'I wanted to learn as much as possible.' An example of an ego-social statement is 'I wanted others to think I was smart.' An example of a work-avoidant statement is 'I wanted to do as little as possible.' Active engagement statements included 'I went back over things I didn't understand.' While superficial engagement statements included 'I guessed a lot so I could finish quickly.' The definitions for the goal orientations paralleled those outlined in chapter one. The definition for active engagement paralleled that of deep cognitive strategies outlined in chapter one. In

addition to self-report measures, teachers rated the students on similar items, scores on the most recent achievement test score were collected, and year-end grades were collected for each participant.

They re-analyzed the results of the two data collections using hierarchical cluster analysis. Three main clusters were identified. Cluster 1 (high mastery) included students with very high task mastery scores, but low ego social and work avoidant scores. Cluster 2 (combined mastery-ego) included students with high task mastery and ego social scores, but low work avoidant scores. Cluster 3 (low mastery-ego) included students with relatively even scores through all goal orientations. They determined Cluster 1 to be most beneficial for academic achievement, resulting in the highest correlations with active engagement (M = 2.38), science grades (M = 8.44), and achievement scores (M = 109.09). While Cluster 2 was clearly the second best, with the third cluster being least conducive to academic achievement.

Meece and Holt (1993) did find two significant gender differences in the makeup of the clusters identified. Cluster 1 (high mastery) contained a greater number of girls (59%) than boys (41%), whereas Cluster 3 (low mastery-ego) contained more boys (61% than girls (39%). Given the academic advantages of Cluster 1 and disadvantages of Cluster 3, this seems an important finding. 18% more girls in the academically advantageous cluster is a large difference.

The study's construct validity must be scrutinized due to the fact that it is a re-analysis of an older study. Despite that, the congruence is high between goals and measures collected for the study. Given the homogenous nature of the sample, the generalizability is also limited without confirmation from additional research. The

confirmatory step taken in this study of having teachers also rate the students in the same areas the students were self-reporting was the first example of going beyond a simple self-report method. This adds to the validity of the findings. Despite the different tact taken to analyze data, Meece and Holt (1993) found gender differences regarding female advantages in mastery goal orientations that paralleled, though were more pronounced than, other researchers reported above (Greene et al., 1999; Martin, 2004; Shim & Ryan, 2005). The difference in effect size between findings may relate to the cluster-grouping.

Patrick et al. (1999) reported a longitudinal study in which they measured the different effects on females and males of holding to an extrinsic vs. mastery goal orientation in three domains (math, English, and social studies). To do so, they administered two rounds of two surveys (PALS and MSLQ) to collect student self-reports in various areas. They collected the first round of data in October and the second in June. The participants were 445 seventh and eighth-grade students in a working class suburb of a Midwest City. 95% of participants were Caucasian. All were enrolled in classes for English, mathematics, and social studies.

The pertinent findings of the study for the purposes of this section of the paper related to gender differences in any of the measures of motivation. They found significant gender differences in the second data collection (but not the first) regarding responses indicating an extrinsic motivation orientation. Males were more likely than females to report having extrinsic goals in English ($t = 2.72$, $p<.05$), mathematics ($t = 2.80$, $p<.05$), and social studies ($t = 2.80$, $p<.05$). Males were also more likely to report a higher self-efficacy than females in math ($t = 4.08$, $p<.05$) in the second data collection. There were no significant gender differences in the means reported for self-efficacy in English or

social studies. Nor were there significant differences in the means reported for mastery goal orientation.

Patrick et al. (1999) used research methods that aligned with goals, although they relied on self-reports for data. They reported that despite small or no differences in reported goal orientations, males and females were affected by their goal orientations differently. This finding presents a potential confound to the logic presented earlier in the paper. It was outlined that if motivation drives learning and different genders are differentially motivated, than learning outcomes would be threatened. Patrick et al. presented the idea that even if motivation is similar, learning outcomes could be different. Of course not all measures of motivation were studied, so no definitive conclusions can be drawn about the reported effects. This study is limited in its generalizability by its geographical scope (one Midwestern suburb) and its homogeneity regarding ethnic groups included. It found boys were slightly more likely to take on an extrinsic or performance oriented goal across domains, which other researchers also found (Greene et al., 1999; Meece & Holt, 1993). It did not support the finding of other research that girls are more likely to report being intrinsically motivated (Greene et al.; Martin, 2004; Meece & Holt). Additionally, it added support to parallel findings of males reporting higher self-efficacy in math (Eccles et al., 1993; Jacobs et al., 2002; Wolters et al., 1996).

Giota (2002) also measured gender differences in achievement goal orientations. The study was part of an ongoing longitudinal project in Sweden called 'Evaluation Through Follow-up.' In this project, nationally representative samples comprising approximately 10,000 10 and 13 year old children born in 1948, 1953, 1967, 1972, 1977, and 1982 completed a data collection. Within the project, 13-year-old children are

required to give their own reasons (i.e. goals) in an open-ended question about why they were going to school.

In the March 1995 data collection, 7,391 pupils answered the question. Giota used data from 7,367 of them (3,697 boys and 3,670 girls) and identified eight distinct types of goal orientations among the students (having put together patterns of responses). The eight groupings follow: Self-now (focused on self-development, mastery, and learning through effort to be able to read books, write to friends, or count money in the present), Self-future (focused on learning to better oneself for future or adult life), Others-now (focused on going to school because others require it), Preventive-future (focused on the idea of 'should' go because of possible future consequences, like not competing in labor market), Self-now + Self-future (focused on both categories), Others-now + Preventive-future (focused on both categories), Integrative (different combination of the other orientations above), and Negative/Critical (an avoidance orientation toward school and learning). These groupings approximately paralleled goal orientations defined in chapter one and used by researchers above as indicated by Table 10.

Table 10:

Parallels to Goal Orientations (Giota, 2002)

Self-now Self-future Self-now + Self-future	Mastery/Learning/Task/Intrinsic Orientation
Others-now Preventive-future Others-now + Preventive-future	Performance/Extrinsic/Ego Orientation
Integrative	Master + Performance (Intrinsic and Extrinsic)
Negative/Critical	Work avoidance/performance-avoidance

One of the goals of Giota's (2002) analysis was to determine if any gender differences in goal orientations were evident. After running t-tests on the groupings, five were found to have significant differences regarding gender. Girls reported holding an Integrative (t = 10.51), a Self-now + Self-future (t = 7.73), and an Others-now + Preventative-future (t = 4.23) goal orientation more than did boys. Boys reported holding a Self-now (t = -12.89) and an Others-now (t = -3.05) goal orientation. Authors reported no mean scores or p-values, but almost any finding of difference would be significant ($p<.05$) with such a large sample. The author made some speculations that social gender expectations contributed to these differences, but no general conclusions. The author speculated and found that the Integrative orientation would be most conducive to general school achievement.

This study used a very large and representative study in Sweden. The construct validity merited some critique based on goals and methods reported. The grouping method was somewhat subjective. Researchers identified certain common ideas expressed by students, which formed the basis for grouping. The groupings were different from, but fairly closely paralleled the definitions for goal orientations used in this paper. In fact, in the introductory remarks of the research article, Giota (2002) spoke of parallels between the orientation labels used by Dweck and Pintrich in some of their research with the orientation labels used in the groupings. Certainly, the location of the study limited the generalizability of the findings. The largely homogenous population of Sweden does not represent the diversity found in America's public schools. Additionally, cultural and political factors affecting socialization and schooling would differentiate that population from American students. The findings do, however, contribute to evidence that some

differences were found between genders regarding goal orientations. In this case, females were most likely to have the two most positive combinations of motivation orientations with regard to academic performance (Integrative and Self-now + Self-future).

The articles analyzed in this section found fairly consistent evidence of gender differences in goal orientations (Greene et al., 1999; Giota, 2002; Meece & Holt, 1993; Patrick et al., 1999; Shim & Ryan, 2005). Before analyzing parallels across data sets and drawing conclusions regarding gender differences measures in any of the three motivation variables explored above, we will explore three studies that provide a caveat of sorts to those conclusions.

Confounds in Measured Gender Differences?

One possible reason for some inconsistent findings regarding gender differences in motivation is the potential for confounding factors in measuring supposed gender differences. We have already seen a couple of studies that directly or indirectly hint at alternative explanations for measured gender differences. In the last article critiqued in the previous section (Giota, 2002), I hinted at a concern I had regarding differences in social influences on gender in Sweden and the United States. This context could be important because one's motivation may be influenced by the expectations within the culture regarding what should interest, be a value for, be one's goals, or be one's competencies based on (in this case) her/his gender. Martin (2004) also hinted at a possible confound, that researchers had been confusing gender differences in degree motivated with gender differences in the kind of thing that motivates students. They concluded that even in areas where small gender differences were found, they were differences in the degree to which the two genders were motivated by things, not the kind

of things that motivated them. The three studies in this section each address other possible confounding factors that could influence our interpretation of the data.

Vispoel and Forte Fast (2000) measured the extent to which measured differences in self-concept represented honest beliefs about personal characteristics and competencies. They expected sex differences in self-concept to be mediated by the impression management facet of Socially Desirable Responding (SDR) but not by the self-deception facet. In other words, the researchers suspected that when students reported their self-concept they were, in part, just saying what they think society expects them to say (not necessarily what was true of them). Participants in the study included 390 University of Iowa students taking introductory statistics courses required in many graduate and undergraduate programs. 69% were women. Their mean age was 24. They were 86% White, 7% Hispanic, 4% Asian, 2%African-American, 6% were freshmen, 31% sophomores, 21% juniors, 10% seniors, and 31% grad students.

Students completed three self-report instruments. The first was the SDQ-III, a self-concept measuring instrument for math ability, verbal ability, general school ability, problem-solving creativity, physical ability, physical appearance, same-sex relations, opposite-sex relations, parent relations, religion-spirituality, honest-trustworthiness, and emotional stability. The second was the ASPI-Adult, a self-concept measuring instrument for visual art, music, dance, and dramatic art. The final questionnaire was the BIDR, a response bias measurement of self-deception and impression management. Students were to complete and return the instruments within a week. Researchers performed statistical analyses on inter-correlations between self-concept and response bias measurements.

In all cases, controlling for impression management decreased the mean self-concepts for female students and increased the means for male students. Therefore, in domains where females scored higher than males (general school, verbal, parent relations, music, visual art, dance, honesty-trustworthiness, and same-sex relations), the differences diminished with control, and in domains where males scored higher than females (physical appearance, problem-solving, math, and emotional stability), the differences increased with control. Table 11 reports pertinent numbers for the purposes of this paper (those associated with academic self-efficacy).

Table 11:

Impression Management of Self-concept (Vispoel & Forte Fast, 2000)

Self-concept area (advantaged gender)	r^2 (squared zero-order correlation between sex and self-concept)	Partial r^2 (squared zero-order correlation between sex and self-concept after the effects of impression management have been removed)
General school (F)	.018**	.008
Verbal (F)	.011*	.004
Problem Solving (M)	.022**	.034***
Math (M)	.020**	.022**

Note. M = male, F = female

*p<.05 **p<.01 ***p<.001

Vispoel and Forte Fast (2000) indicated that sex differences in some self-concept areas were not as directly interpretable as previously thought, particularly in areas sex-stereotyped toward females. When males report their self-concepts, they tend to diminish the numbers. Whereas when females report their self-concept, they tend to inflate the numbers. The study argued a need for more research that accounts for impression

management. This study shed light on an issue I highlighted regarding much of the research in the area of gender differences in motivation (as well as connections between motivation and learning). Too much research is reliant on self-reports that could include personal bias. The study itself was internally consistent, as its goals and methods aligned. The irony should be noted, however, that they studied bias inherent in self-reporting with a self-report! This study highlighted a concern that should be addressed, however its findings are not highly generalizable. The sample was very limited in geographical focus (Iowa), age (college students), and demographics (under representative of various groups, especially African Americans).

Even after controlling for impression management, Vispoel and Forte Fast (2000) found advantages for boys in math and problem solving, the math finding supported by other studies above (Eccles et al., 1993; Jacobs et al., 2002; Patrick et al., 1999; Wolters et al., 1996). The study itself supported the data regarding gender differences in motivation, while simultaneously shedding doubt on self-report findings that don't control for impression management.

Klein (2004) performed another study that hypothesized a confound in measured gender difference. He focused on the outcome measure of achievement rather than on any measure of motivation, but his findings may reveal an area that should be studied related to student motivation. Klein wanted to know if the relationship between gender and achievement was explained more by gender of students or gender of teachers. The participants included 3446 pupils from 110 Israeli coeducational public school classes (grades five to 11). These students were of North African origin from the socio-economic middle class.

Researchers analyzed end of year grades for all 3446 pupils. Female teachers gave 1720 of the grades, males the other 1726. Half were from the humanities (history, literature), and half were from math and exact sciences (chemistry, physics). Additionally, researchers collected end of year behavior evaluations from the same teachers. Other data collected included teacher gender, seniority, number of pupils per class, number of classes per school, and highest/lowest grades given for each class. Analysis of the numbers occurred in two stages. First, they compared academic grades and behavior assessment assigned by male and female teachers to male and female students. Then, they inserted the contribution of background factors (teacher gender, student gender, teacher seniority, grade level, number of students per class, number of students per school, science vs. humanities, teacher's highest grade, and teacher's lowest grade) to determine which factors were most responsible for differences.

Gender related differences in academic achievement related primarily to the gender of the instructor. When initial grade/gender analysis took place, it indicated that both female and male teachers gave significantly higher grades to girls ($p < 0.05$). After controlling for the background factors listed above, however, gender of the student only reached a minimal level of significance for male teachers ($\beta = 0.03$, $p > 0.05$) and did not reach significance for female teachers in explaining differences of given grades. The measured differences in achievement for the students were explained by various factors related to how instructors assign grades. One very interesting factor in the analysis was the relationship between class size and grades assigned. Female instructors tended to assign higher grades to larger sized classes, whereas male instructors assigned lower

grades as class sizes increased. This study revealed no gender differences in student achievement of any effect.

The goals and methods used in the study aligned to give validity to the findings. The process of checking for mediating factors as explanations for student variations in achievement supported the findings of the study. The focus on one ethnic group in Israel limited generalizability to United States classrooms. Also, I cannot apply findings related to achievement to motivational factors. The findings revealed a study that should be done, though. In the areas where gender differences do appear (even if to a small degree), might it have more to do with the practices of the teacher than with the inherent ways in which genders are motivated? It is important for educators to be able to teach in positive and equitable ways for both genders. While many of the studies analyzed above reported the gender makeup of the teachers who's classrooms were studied, no analysis of the data accounted for a potential for male and female teachers to inspire motivation differentially.

A third study, by Pomerantz and Ruble (1998), investigated a possible confounding variable in findings of gender differences in self-evaluation. They wondered what the role of parents was in the development of gender differences in two areas: taking responsibility for failure and possessing strong standards. Attributions of failure is related, though not exactly parallel, to academic self-efficacy. Realistic attributions that recognize one's own role in failure are similar to a realistic sense of one's own self-efficacy in an academic area. If one is socialized to attribute failure to lack of ability, it will have a large effect on the sense of self-efficacy. If one believes it is because of a lack of effort, one could fail while retaining a strong self-efficacy in the academic domain.

91 mothers of elementary school children participated (50 mother-daughter pairs and 41 mother-son pairs). 71% of the mothers were European American, 19% African American, and 10% other minorities. 90% of the participants were from two parent households. To complete the study, mothers completed a daily checklist for seven to 21 days every night before going to bed. The checklist measured levels of control exercised with their children in five domains: helping (i.e., helping child when child does not request help), monitoring (i.e., checking to make sure child has done homework correctly when child does not request it), decision making (i.e., making decisions for the child), praising (i.e., giving children rewards for accomplishments), and discipline (i.e., withdrawal of privileges, reprimands, discussion). For each of these areas, they also measured the reverse: the level of autonomy granted to the children (i.e., encouraging the child to attempt to solve problems on own when child asks for help, encouraging child to check homework over on own when child asks parent to do so, encouraging child to make own decisions, etc.). Answers on the checklist were operationalized into three categories: High control, wherein the use of pressure guided children toward particular outcomes; Moderate control, wherein a more subtle use of pressure to guide children was exerted, often in response to children's requests; and Autonomy granting, wherein children were encouraged to pursue their own goals and were given a message of competency.

Children were asked to attribute both hypothetical school related failure and experimentally created failure. They were also tested to determine the strength of these attributions of failure. Both aspects of the study concerned with the children were in a lab-type setting and used a self-report of self-evaluative factors. In the hypothetical

school-related failure situation, children were asked to rate the first, second, and third best reasons explaining why they failed from a list of four options: 1- you're not smart (ability), 2- you did not try very hard (effort), 3- you were unlucky (luck), or 4- the work was hard (task difficulty). They were given essentially the same set of options to choose from to explain their failure to complete the puzzles in the experimentally created failure.

Pomerantz and Ruble (1998) found that mothers were significantly more likely to grant measures of autonomy to boys while also instituting measures of control ($M = .54$ versus .30, $p<.01$), whereas the control was more likely to be present without granting of autonomy for girls ($M = .71$ versus .47, $p<.001$). This held true across four of the five domains, with the notable exception of discipline. In related findings among the children studied, girls attributed failure to internal rather than external factors more than boys ($M = .25$, vs. -.30 for boys). The authors believed this suggested, though was not conclusive of, causation. That is, that maternal differences in granting autonomy may affect self-evaluation differences among girls and boys. A significant effect of maternal gender socialization on child taking responsibility for failure (.22, $p<.05$) was found. This study suggested that girls are more likely to attribute failure to their ability, which could have a profound effect on their future sense of self-competency, the area of interest for this paper. The finding that this difference may be socially created, as opposed to biological, does not really change the existence of the difference.

The major shortcoming of this study was something that the authors point out themselves: it only reflected maternal influence on differences developed in children's self-evaluation. They had limited opportunity to study paternal influence, so researchers left it out. Overall, the degree of controls and reliance on mathematical constructs when

analyzing the data contribute to the validity of the findings related to maternal influence on child attributions. The demographics were highly representative of the population of the United States, but did over-represent two-parent families. The findings were valid, but only indirectly applicable to the topic of this paper. They suggest another possible reason for the inconsistent findings of gender differences in motivation. Students may be differentially affected within different cultures were maternal involvement is different.

Because gender is a combination of biological and social factors, it seems to be hard to control for all the potential mediating factors and get consistent results regarding its relationship to motivation. Reported gender differences likely vary by the context of the study: type of family one lives in, social influences to report in certain ways, gender of teacher, cultural milieu in which one lives, etc. These are important to consider as we analyze findings across studies.

Summary of Gender and Motivation Findings

The second half of this chapter reviewed research related to gender differences in three measures of motivation: interest, self-efficacy (competence), and goal orientation. Eight studies measured the relationship between interest and gender (Eccles et al., 1993; Jacobs et al., 2002; Lightbody et al., 1996; Martin, 2004; McTeer, 1986; Shim & Ryan, 2005; Wolters & Pintrich, 1998; Wolters et al., 1996). Not defining interest invalidated one study's findings from applicability to this paper (McTeer). Three studies measured general (not domain specific) interest (Martin; Shim & Ryan; Wolters et al.). Martin found no significant differences in valuing of schooling for secondary Australian students. Wolters et al. found middle school boys had higher task value than girls ($\beta = -.08$, $p<.05$) in one of two data collections. And Shim and Ryan found college aged

females reported more intrinsic value than males in both data collections ($r = .18$ and .22, $p<.01$). This data revealed no trends in gender differences of valuing school generally. The remaining four valid studies each measured domain specific gender differences in interest, revealing some domain specific trends (Eccles et al.; Jacobs et al.; Lightbody et al.; Wolters & Pintrich). Of those, two found small interest advantages for boys in mathematics, on representing middle school students and one high school students (Lightbody et al.; Wolters & Pintrich). Three found girls to be advantaged in language arts (reading/English) throughout public school, though none reported effect size data larger than ES = .03 (Eccles et al.; Jacobs et al.; Lightbody et al.). One study found girls liked history more than boys (Lightbody et al.), while another found boys valued social studies more than girls (Wolters & Pintrich). Of the studies that reported demographic data, only one had a sample that represented any more than a 5% minority population (Shim & Ryan). All studies relied on self-reports for data. Studies using other data collection methods and sampling from more diverse populations should be done. Interest correlated with gender consistently and significantly only in the math and language arts domains, which have both been traditionally gender stereotyped. The differences measured were all quite small in effect size.

Nine studies measured the relationship between academic self-efficacy (or competence) and gender (Cole et al., 2001; Eccles et al., 1993; Jacobs et al., 2002; Martin, 2004; Patrick et al., 1999; Pomerantz et al., 2002; Vispoel & Forte Fast, 2000; Wolters & Pintrich, 1998; Wolters et al. 1996). Two studies measured general academic self-efficacy, with only one revealing any gender differences, and that in only 7th grade students (Cole et al.; Martin). Seven studies measured domain specific self-efficacy, and

they revealed three principle patterns of gender difference (Eccles et al.; Jacobs et al.; Patrick et al.; Pomerantz et al.; Vispoel & Forte Fast; Wolters & Pintrich; Wolters et al.). First, the two studies that included it found small significant relationships between gender and self-efficacy in social studies ($d = -.18$, $p<.05$; $\beta = -.08$ and $-.10$, $p<.05$), both advantaging boys (Pomerantz et al.; Wolters et al.). Subjects ranged in age from 4th grade to 8th. Second, three studies found that girls reported slightly higher competency than boys in language arts beginning in about 4th grade through high school (Jacobs et al.; Pomerantz et al.; Wolters & Pintrich). Third, all seven reported some advantage for males over females in reported self-competency in math, though none reported large effect sizes. Most studies reported here had largely White samples. All studies used self-reports to collect data (though one showing male advantage in math controlled for impression-management). Studies that use other methods for collecting data that could verify or contradict the findings reported here are needed. Additionally, studies of more diverse populations are needed. Those shortcomings aside, researchers found small domain specific gender differences in reported self-efficacy in social studies, math, and language arts. Males reported higher in social studies and math, and females reported higher in language arts.

Seven studies measured the relationship between gender and goal orientation (Giota, 2002; Greene et al., 1999; Martin, 2004; Meece & Holt, 1993; Patrick et al., 1999; Reid & Cohen, 1974; Shim & Ryan, 2005). One reported no definition for variables measured, making the findings unusable for this paper (Reid & Cohen). Three studies found that females reported higher than males regarding the most positive goal orientation (Giota; Martin; Shim & Ryan). Martin found Australian secondary age

females reported more learning focus (ES = .14). Shim and Ryan found a relationship between a mastery goal orientation and gender in a Midwest University advantaging females ($r = .10$, $p<.05$). And Giota found school-aged girls in Sweden reported more advantageous goals for learning than those reported by boys. One study divided findings between required high school courses and electives (Greene et al.). In required courses, males reported higher performance goals than females. In elective courses, females reported higher learning goals than males. Two other studies looked at domain specific goals, one specifically at science and one at English, math, and social studies (Meece & Holt; Patrick et al.). Meece and Holt found that girls tended toward the high mastery goals cluster (59%), while boys tended toward the low mastery-ego cluster (61%) in science classes. Patrick et al. found middle school males reported extrinsic goal orientations significantly more than females in English, math, and social studies. Most researchers used self-reports, but Meece and Holt went beyond only self-report data and asked teachers to report on students as well. More of this secondary methodology is recommended for future research. The demographics of the samples represented a wide range of race/ethnic makeup. Although different researchers measured gender differences in goal orientations differently across the studies, females tended to have advantages in goal orientations related to learning, while males tended to have advantages in goal orientations related to performance. More domain specific studies should be undertaken.

Summary

This chapter critically reviewed research literature with the goal of answering the question "What are gender differences in motivation and what is the effect of those differences on learning?" It began by analyzing the literature related to the impact of

motivation on learning, using the definitions outlined in chapter one for motivation and for learning (As shown in Figure 2).

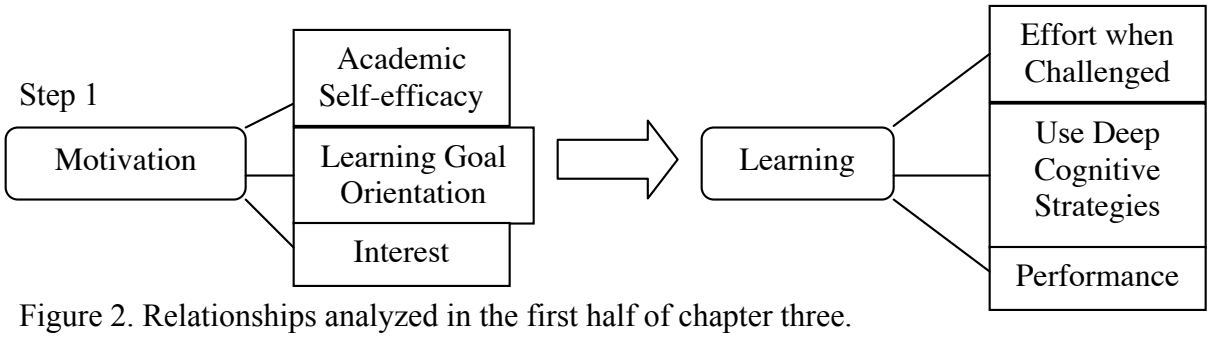

Figure 2. Relationships analyzed in the first half of chapter three.

The research indicated consistent, significant, and positive relationships between each of the motivation constructs and each of the learning constructs. The chapter then proceeded to analyze gender differences in motivation with the goal of determining if gender differences in motivation differentiate the opportunities for learning that males and females in American schools receive (as shown in Figure 3).

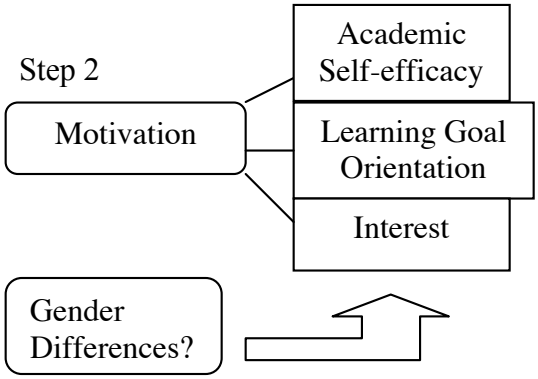

Figure 3. Relationships analyzed in the second half of chapter three.

The research was less consistent with regard to gender differences in these motivation constructs than regarding their relationship to learning constructs. Some indicated significant, but small, differences. Generally, these were in gender-typed domains (i.e. girls valued or felt more competent in English class, while boys valued or

felt more competent in math or social studies class). All findings of differences were small in effect size. Some studies found no significant differences. Combined with the various potential confounds explored, the results cast doubt about the actual effect of findings of gender differences in motivation.

In conclusion, while a consistent and at times strong connection between a students' motivation and his/her opportunity for learning can be made, only small, domain specific differences in motivation were evident. All three measures of motivation consistently related positively, significantly, and at time strongly with the use of deep cognitive strategies and effort exerted in the face of challenge. All three measures also tended to relate positively with performance, though to different extents. Boys tended to have greater self-efficacy and interest in both math and social studies, indicating the likelihood that boys will use more deep strategies, exert more effort in the face of challenge, and perform more positively in those subjects. While girls tended to have greater self-efficacy and interest in language arts, indicating the likelihood that girls will use more deep strategies, exert more effort in the face of challenge, and perform more positively in language arts. Girls also tended to report learning related goals more often, while boys tended to report performance related goals.

In answer to the question of focus, small gender differences in the motivation to learn existed within certain academic domains. The positive (and at times large) relationship between motivation and learning variables indicated that the areas of small gender differences in motivation may coexist with small differences in learning for boys and girls.

CHAPTER FOUR: CONCLUSION

Introduction

Chapter two outlined the historical context in which the current research on academic gender difference and motivation's role in it is done. Chapter three critically examined research that linked motivational factors to learning, finding a positive relationship between the two. It then continued with a critical examination of research into gender differences in motivation. The results were somewhat inconsistent: some research indicated small differences, other research did not. But within specific domains, studies revealed patterns of gender differences. Wigfield et al. (2002) warned, "drawing conclusions about sex differences must be done carefully… Although such differences often are observed, in general they tend to be relatively small, in terms of variance explained… there often is substantial overlap between boys and girls and men and women…" The findings in this critical review paralleled Wigfield et al's statement.

In a more expansive review of the literature related to gender differences, Hyde and Durik (2005) found patterns similar to those found in chapter three: general academic motivation tended to reveal no significant differences between genders, but domain specific research revealed more consistent, very small gender differences in self-efficacy beliefs and achievement goals. These differences tended to center around gender stereotyped domains: math, science, and sports as male advantages; language arts as female advantages. Specific parallels between Hyde and Durik and the findings of chapter three included differences in math advantaging males (Eccles et al., 1993; Jacobs et al., 2002; Lightbody et al., 1996; Patrick et al., 1999; Pomerantz et al., 2002; Vispoel & Forte Fast, 2000; Wolters & Pintrich, 1998; Wolters et al., 1996) and differences in

language arts advantaging females (Eccles et al.; Lightbody et al.; Jacobs et al.; Pomerantz et al.; Wolters & Pintrich). Of the studies reviewed in chapter three, relatively few included social studies as a domain specifically studied for gender differences in motivation. Four studies included it as a variable and found significant differences in measures of motivation (Lightbody et al.; Patrick et al.; Pomerantz et al.; Wolters et al.). Two found males reported more self-efficacy than females in social studies (Pomerantz et al.; Wolters et al.). Regarding interest, one study found females reported more interest in history than males (Lightbody et al.), while another found males reported more task value in social studies than females (Wolters et al.). Finally, Patrick et al. found males reported higher levels of performance goals than females in social studies.

In this chapter, I will briefly outline how the findings reported in the previous chapter related to the historical context presented in chapter two. I will then discuss some strategies used in classrooms that may be helpful in light of the findings discussed above. Because of my content focus as a teacher, I dwell specifically on secondary level social studies classrooms. Most strategies suggested are applicable in other classroom settings. In fact, some of the suggested pedagogy is inferred from studies focusing on other content areas. This chapter ends with suggestions for the direction of further research.

Historical Context of Findings

The excitement surrounding Summers' 2005 statement about possible gender differences in ability to perform at the highest levels of science indicated the emotional critique with which any statement regarding people's views of gender differences is likely to be met. The historical trend worldwide and in America headed toward a belief in the equality of men and women in their potential mental abilities. The leveling of various

domains traditionally dominated by men, especially since the enactment of Title IX in the 70s, supported the belief in equal potential. Some professional domains, however, remain starkly segregated by gender. In 1998, for example, Costello and Stone reported only 0.8% of auto mechanics were women (as cited in Hyde & Durik, 2005).

Whether there is a biological or a sociological explanation for this difference (or a combination), this paper tested a hypothesis that underlying such outcome differences might be the motivation that guides student learning through school. Research indicated strong relationships between constructs of motivation and constructs of deep learning, but only weak indicators of gender differences in motivation. Might it be that the trend toward equal opportunities for boys and girls to learn in school has worked its way all the way into their inner motivations to learn? It is unclear, but even when domain specific gender differences to learn were found in the literature, they were very small in their effect size.

Two important elements of the findings inform the coming section discussing strategies: First, the positive and, at times, strong correlations between interest, self-efficacy, and a learning goal orientation with measures of learning indicated a need for teachers to use strategies that support increased interest, self-efficacy, and learning goals. The small relationship between these constructs of motivation and gender leads me to conclude that teachers did a relatively equal job of motivating male and female students. It does not indicate if that gender-equal job was of high quality or low. All teachers should strive to increase motivation measures in their students, which should see related increases in measures of learning.

Second, though they were small, findings of gender differences favoring boys in math and social studies and girls in language arts should inform teachers about a potential. Gender stereotyping of domains may threaten student motivation to learn in some instances. Two psychological theories relate. First, expectancy theory argued that people are motivated toward success if (in part) they expect that their effort will lead to a particular outcome (Droar, 2006). If a student has less expectation of success because he/she happens to be a boy or girl, then that student will be less motivated to try. Second, the theory of self-fulfilling prophecy argued that person A's beliefs about person B affect A's behavior towards B, which in turn affects the behavior of person B in a way that supports A's initial beliefs (Meyers & Spencer, 2006, p.101-103). More concretely, if I have the belief that female students will not do as well in social studies, then I may go easier on grading assignments for my female students, which means they have not been challenged to grow as much as the male students. When I give the final exam, my female students may perform lower because I did not challenge them, but it would confirm my initial belief that they would not do as well as the male students.

Teachers should be aware of their own and individual students' potential to have certain expectations about gendered ability within certain domains that can become limiting if negative. This is, of course, also true at the individual level. Every student brings with her/him an expectation for success that is founded on past messages they've received and personal experiences they've had. That one gender or the other is more likely to bring positive expectation for their success in a particular class is not a large leap in logic. In social studies, for example, girls seem to have intrinsic interest in the subject, but boys value it higher and have a higher self-efficacy for the subject. Awareness of

common (though small) domain specific gender differences in motivation and the goal to increase motivation for all students form the basis for suggested strategies in the following section.

Classroom Implications

Teaching strategies in use in some classrooms support the development of motivation that supports learning. Female and male interest increased when teachers used "female-friendly" teaching methods in the social studies classroom (Dam & Teekens, 1997). These teaching methods included analyzing events from various perspectives, studying in cooperative groups, and more interactive class structuring (i.e. discussion). Those paralleled suggestions made by Altermatt and Pomerantz (2003) regarding ways to motivate girls: school practices should focus on effort over ability, focus on learning and improvement over performance, involve all students in group-work and discussion, and discourage sex stereotyping in class-work (p. 67-68). The preceding suggestions for teacher practice directly connect (in theory and research) with motivation constructs shown to support learning, and they form the basis for the following discussion.

A classroom focus on learning over performance would be expected to encourage students toward a learning goal orientation and possibly promote strong self-efficacy over time. Bergin (1995) found that creating a learning goal situation correlated with better performance for lower achieving students than creating a performance goal situation. I plan to encourage students to perceive my classroom as one with learning (not performance) goals. Giving grades (performance) may be inevitable, but encouraging and celebrating student growth, ideas, and accomplishments (apart from graded work) should be a daily occurrence. Students who experience small successes in learning will become

more self-efficacious over time. In fact, just the effort trying should correlate with increased levels of self-efficacy (Meyer et al., 1997; Pintrich & De Groot, 1990; Sungur & Tekkaya, 2006; Wolters & Pintrich, 1998).

Working in cooperative groups, analyzing content from different perspectives to solve a problem, and having interactive discussions about class content are important aspects of problem-based learning (PBL). Sungur and Tekkaya (2006) found that students in a PBL classroom reported higher levels of task value and more learning goals than did students in a traditional classroom. Student activities in PBL paralleled Dam and Teekens' (1997) 'female-friendly' methods, which found increased interest for all students in the more interactive and student-centered classroom when compared to more traditional teaching methods. As a professional teacher, evidence points to the benefits for my students' motivation if I get away from traditional lecture and textbook-based teaching practices and create an interactive environments for students to debate, problem-solve, and work cooperatively with course content. In fact, the positive relationship between deep learning strategies and both interest and learning goals indicated increases in motivation within the context of active classrooms that require the use of elaboration, organization, and critical thinking (Grant & Dweck, 2003; Pintrich and De Groot, 1990; Sungur & Tekkaya, 2006; Vanzile-Tamsen, 2001).

The first two groups of teaching strategies promoted learning over performance and used interactive and problem-based learning teaching methods in the classroom. The third important strategy suggestion, recommended by Altermatt and Pomerantz (2003) and hinted by Dam and Teekens' (1997) title 'female friendly', promoted involvement of all students and the avoidance of gender stereotyping. This is an important addition to the

first two sets of strategies, as a classroom could conceivably be active and effort encouraging but biased in which gender gets each more. This potential bias brings us back to the concerns regarding expectancy and self-fulfilling prophecy alluded to earlier, which was also supported in the research from chapter three. Klein (2004) found that different gendered teachers rated the behavior and performance of their students differently, indicating a gendered bias of expectations. Pomerantz and Ruble (1998) found that mothers' level of autonomy granting to children was mediated by the gender of the child and correlated with children using different attributions for failure. In analyzing these results, a danger for teachers is evident: depending on personal biases, teachers could create an environment that fosters growth differentially across gender. One example was research by Altermatt, Jovanovic, and Perry (1998) that found teachers called on male students to answer questions significantly more often than they did female students. Questioning practices that promote discussion are great examples of getting learners actively engaged, but if they provide inequitable opportunities for that active engagement, disadvantaged students' interest may be lost. It is important that teachers analyze their own classroom practices for bias and make the adjustments that promote learning for all students.

As a secondary social studies teacher, it is important I make the desire to promote an equitable, interactive, and learning oriented classroom concrete in terms of my practice. Researchers found higher levels of motivation to learn for males than females in social studies. I presume this had to do with a combination of teacher practice and materials used. One danger in social studies is to focus on political and military history that historically had primarily male participants and heroes at the expense of social and

cultural history that engaged all members of society (Levstik, 2001). Levstik suggested social studies curriculum should not simply insert occasional stories about women into history texts, but must delve into the social and cultural realities of women and men through history. She even argued that engaging students in gender issues (i.e. why women in history are celebrated for doing things like men) in the classroom is an effective tool for promoting interest in both genders (p.194). I plan to include gender as a lens through which history is analyzed. I also plan to highlight social and cultural aspects of history in course content, which often provide context for military and political history, helping students understand history from multiple perspectives.

Findings regarding gender differences revealed another area to consider for practice. When motivation differences were measured in domains, boys tended to have an advantage in math (Eccles et al.; Jacobs et al.; Lightbody et al.; Patrick et al.; Pomerantz et al.; Vispoel & Forte Fast; Wolters & Pintrich; Wolters et al.). Girls, meanwhile, had advantages in verbal areas (Eccles et al.; Lightbody et al.; Jacobs et al.; Pomerantz et al.; Wolters & Pintrich). My methods for teaching social studies have the potential to support and use both of these areas. Economics, military maneuvers, technology, and written tests, all relate strongly with abstract mathematical thinking. Social, cultural, and personal histories, as well as the use of essay writing and discussion can support and enhance verbal learners.

Alternating methods for study and evaluation may be good for motivation. Greene et al. (1999) found that students' reported performance and learning goal orientations fluctuated depending on whether they were in a required or elective class. The sense of having a choice may be the reason behind such fluctuation. Within a single class, whether

required or elective, giving students choices on some assignments and more concrete goals for others may produce similar variations in which students feel motivated by which type of assignment. Similarly, Brookhart and Durkin (2003) found reported levels of self-efficacy and learning goals fluctuated across types of evaluative assessment (including presentations, games, quizzes, and essays). A classroom with balanced focuses of study, methods for exploration, and methods for evaluation should motivate all students, gaining interest at times, challenging their skills at times, and helping them to feel self-efficacious at times.

In summary, theory and research inform practices in the social studies classroom that enhance motivation and do so equitably. A focus on effort over performance should encourage learning goal orientations. Using interactive learning methods that require deep processing of content should also strengthen student motivation to learn. The context of concern over gender differences in motivation (despite being small and domain specific) highlights the importance of equitable implementation of the above strategies. Teacher awareness of potential bias in expectations should lead to implementation of teaching methods that connect with each students' strengths, interests, and challenges. Teachers should take steps to make sure all students actively participate. Teachers should also take steps to ensure class content connects with a variety of topics and types of thinking. If teachers create equitable, interactive, and learning oriented classrooms, all students should benefit.

Implications for Further Research

Certainly, much more research should be done regarding the above suggestions for teacher strategies to enhance motivation and do so equitably. Most of the suggestions

stem from one or two studies, then expand the thought into theory. Some findings related to the use of problem-based learning (Sungur & Tekkaya, 2006) and "female-friendly" methods (Dam & Teekens, 1997) revealed increased motivation as a result of methods employed, but more research is needed using motivation and teaching strategies as variables.

Many studies in this critical review lacked representative demographics of the country. Little research included large representation of minority groups. Research that did lacked any breakdown across groups to analyze the notion that findings of a relationship between motivation and learning are generalizable to all groups. No research represented rural areas. Research similar to those reported on in chapter three should be done that focus on under represented groups.

Much of the research critiqued in this paper relied on the use of self-reports. The shortfalls of this method, as noted by Pintrich and De Groot (1990) and others, demonstrate the need for researchers to use other confirmatory methods. Some research reviewed here used methods such as follow-up interviews with students, observing student behavior, and asking teachers to also report on their perspectives about the students. These and other non-survey methods should be used as often as possible.

Research regarding gender differences in motivation should be domain specific more often. When researchers measured gender's impact on motivational constructs generally, significant differences rarely occurred. When measured within specific academic domains, however, researchers found significant differences. More research, specifically regarding goal orientations, should focus on specific academic domains.

Summary

This paper asked "What are gender differences in motivation and what is the effect of those differences on learning?" The history of society's belief's about women's thinking, of educational opportunities for women, and of research regarding gender differences in academics revealed a consistent trend toward equality of potential for thinking, schooling, and achievement of men and women. Chapter three analyzed and critiqued thirty research articles regarding the question, revealing a strong relationship between motivation and learning, but only small, domain specific gender differences in motivation to learn. These findings revealed a need to use teaching strategies that promote the motivation to learn in both males and females. Research is needed regarding the relationships between motivation and learning as well as gender and motivation that addresses the gaps in generalizability and is not solely reliant on self-report methods. Further research regarding the above-suggested strategies for teaching is also recommended.

REFERENCES

Altermatt, E. R., Jovanovic, J., & Perry, M. (1998). Bias or responsivity: Sex and achievement-level effects on teachers' classroom questioning practices. *Journal of Educational Psychology, 90*, 516-527.

Altermatt, E. R., & Pomerantz, E. M. (2003). Why girls worry about school performance. *Principle, 82(4),* 67-68.

American Association of University Women. (1991). *Shortchanging girls, shortchanging America: Executive summary*. Washington, DC: American Association of University Women.

Becker, L. (2000, February 10). *Effect Size Lecture Notes*. Retrieved December 18, 2006, from University of Colorado at Colorado Springs, Psychology 590 Course Web site: http://web.uccs.edu/lbecker/psy590/es.htm

Bergin, D. A. (1995). Effects of a mastery versus competitive motivation situation on learning. *Journal of Experimental Education, 63(4),* 303-314.

Bombardieri, M. (2005, January 17). Summers' remarks on women draw fire. *The Boston Globe, boston.com,* Retrieved May 15, 2006, from http://www.boston.com/news/local/articles/2005/01/17/summers_remarks_on_women_draw_fire?mode=PF

Brookhart, S. M., & Durkin, D. T. (2003). Classroom assessment, student motivation, and achievement in high school social studies classes. *Applied Measurement in Education, 16(1),* 27-54.

Cole, D. A., Maxwell, S. E., Martin, J. M., Peeke, L. G., Serocynski, A. D., Hoffman, K. B., et al. (2001). The development of multiple domains of child and adolescent

self-concept: A cohort sequential longitudinal design. *Child Development, 72(6),* 1723-1746.

Dam, G. T., & Teekens, H. F. (1997). The gender inclusiveness of a women's history curriculum in secondary education. *Women's Studies International Forum, 20(1),* 61-75.

Dewey, J. (1938). *Experience and education*. New York: Touchstone.

Droar, D. (2006). *Expectancy theory of motivation.* Retrieved December 21, 2006, from http://www.arrod.co.uk/archive/concept_vroom.php

Eccles, J., Wigfield, A., Harold, R. D., & Blumenfeld, P. (1993). Age and gender differences in children's self- and task perceptions during elementary school. *Child Development, 64,* 830-847.

Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A. Elliot & C. Dweck (Eds.), *Handbook of competence and motivation* (pp. 52-72). New York: The Guilford Press.

Farman, G., Natriello, G., & Dornbusch, S. M. (1978). Social studies and motivation: High school students' perception of the articulation of social studies to work, family, and community. *Theory and Research in Social Education, 6(3),* 27-39.

Freeman, C. E. (2004). *Trends in educational equity of girls & women: 2004* (NCES 2005-016). U.S. Department of Education, National Center for Education Statistics. Washington, D.C.: U.S. Government Printing Office.

Giota, J. (2002). Adolescents' goal orientations and academic achievement: Long-term relations and gender differences. *Scandinavian Journal of Educational Research, 46(4),* 349-371.

Grant, H., & Dweck, C. S. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology, 85(3),* 541-553.

Greene, B. A., DeBacker, T. K., Ravindran, B., & Krows, J. A. (1999). Goals, values, and beliefs as predictors of achievement and effort in high school mathematics classes. *Sex Roles, 40(5/6),* 421-458.

Gurian, M. (2001). *Boys and girls learn differently! A guide for teachers and parents.* San Francisco: Josey-Bass.

Hyde, J. S., & Durik, A. M. (2005). Gender, competence, and motivation. In A. Elliot & C. Dweck (Eds.), *Handbook of competence and motivation* (pp. 375-391). New York: The Guilford Press.

Inglehart, M. R., Nyquist, L., Brown, D. R., & Moore, W. (1987, May). *Gender differences in academic achievement – the result of cognitive or affective factors?* Paper presented at the Midwestern Psychological Association Meeting, Chicago, IL.

Jacobs, J. E., Lanza, S. D., Osgood, W., Eccles, J. S., and Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. *Child Development, 73(2),* 509-527.

Klein, J. (2004). Who is most responsible for gender differences in scholastic achievements: Pupils or teachers?. *Educational Research, 46(2),* 183-193.

Levstik, L. S. (2001). Daily acts of ordinary courage: Gender-equitable practice in the social studies classroom. In P. O'Reilly, E. M. Penn, & K. deMarrais (Eds.), *Educating young adolescent girls* (pp. 189-211). Mahwah, NJ: Lawrence Erlbaum Associates.

Lightbody, P., Siann, G., Stocks, R., & Walsh, D. (1996). Motivation and attribution at secondary school: The role of gender. *Educational Studies, 22(1),* 13-25.

Lips, H. M. (2005). *Sex and gender: An introduction* (5th ed.). New York City: McGraw Hill.

Lynch, D. J. (2006). Motivational factors, learning strategies and resource management as predictors of course grades. *College Student Journal, 40(2),* 423-428.

Martin, A. I. (2004). School motivation of boys and girls: Differences of degree, differences of kind, or both?. *Australian Journal of Psychology, 56(3),* 133-146.

McTeer, J. H. (1986). Gender differences in relationship to likes and dislikes of four subject areas. *The University of North Carolina Press, 69(4),* 260-263.

Meece, J. L., & Holt, K. (1993). A pattern analysis of students' achievement goals. *Journal of Educational Psychology, 85(4),* 582-590.

Meltzoff, J. (1998). *Critical thinking about research: Psychology and related fields*. Washington, DC: American Psychological Association.

Meyers, D. G., & Spencer, S. J. (2006). *Social psychology* (3rd Canadian ed.). Toronto: McGraw-Hill Ryerson.

Meyer, D. K., Turner, J. C., & Spencer, C. A. (1997). Challenge in a mathematics classroom: Students' motivation and strategies in project-based learning. *The Elementary School Journal, 97(5),* 501-521.

Miller, P. H. (1993). *Theories of developmental psychology* (3rd ed.). New York: W.H. Freeman & Co.

Nolen, S. B. (1988). Reasons for studying: Motivational orientations and study strategies. *Cognition and Instruction, 5(4),* 269-287.

Patrick, H., Ryan, A. M., & Pintrich, P. R. (1999). The differential impact of extrinsic and mastery goal orientations on males' and females' self-regulated learning. *Learning & Individual Differences, 11(2),* 153-171.

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82(1),* 33-40.

Plato. (1976). *Meno*. (G.M.A. Grube, Trans.). Indianapolis, IN: Hackett Publishing Company, Inc.

Pomerantz, E. M., Altermatt, E. R., & Saxon, J. L. (2002). Making the grade but feeling distressed: Gender differences in academic performance and internal distress. *Journal of Educational Psychology, 94(2),* 396-404.

Pomerantz, E. M., & Ruble, D. N. (1998). The roles of maternal control in the development of sex differences in child self-evaluative factors. *Child Development, 69(2),* 458-478.

Reid, I., & Cohen, L. (1974). Male and female achievement orientation and intellectual responsibility: A British validation study. *Educational and Psychological Measurement, 34(2),* 379-382.

Russett, C. All about Eve: What men have thought about women thinking. *The American Scholar, 74(2),* 41-48.

Schunk, D. H., & Pajares, F. (2005). Competence perceptions and academic functioning. In A. Elliot & C. Dweck (Eds.), *Handbook of competence and motivation* (pp. 85-104). New York: The Guilford Press.

Shim, S., & Ryan, A. (2005). Changes in self-efficacy, challenge avoidance, and intrinsic value in response to grades: The role of achievement goals. *The Journal of Experimental Education, 73(4),* 333-349.

Spring, J. (2006). *American education* (12th ed.). New York: McGraw-Hill Higher Education.

Spring, J. (2005). *The American school: 1642-2004* (6th ed.). New York: McGraw-Hill Higher Education.

Sungur, S., & Tekkaya, C. (2006). Effects of problem-based learning and traditional instruction on self-regulated learning. *The Journal of Educational Research, 99(5),* 307-317.

United States Department of Commerce (2000). *Profiles of general demographic characteristics: 2000 census of population and housing, United States.* Retrieved December 18, 2006, from United States Census Web site: http://www.census.gov/prod/cen2000/dp1/2kh00.pdf

VanZile-Tamsen, C. (2001). The predictive power of expectancy of success and task value for college students' self-regulated strategy use. *Journal of College Student Development, 42(3),* 233-241.

Vispoel, W. A., & Forte Fast, E. E. (2000). Response biases and their relation to sex differences in multiple domains of self-concept. *Applied Measurement in Education, 13(1),* 79-97.

Whitmire, R. (2006, January 23). Boy trouble. *The New Republic,* 15-18.

Wigfield, A., Battle, A., Keller, L. B., & Eccles, J. S. (2002). Sex differences in motivation, self-concept, career aspiration and career choice: Implications for

cognitive development. In A. V. McGillicuddy-De Lisi & R. De Lisi (Eds.), *Biology, sociology, and behavior: The development of sex differences in cognition* (pp. 93-124). Westport, CT: Ablex.

Witt, E. A., Dunbar, S. B., & Hoover, H. D. (1994). A multivariate perspective on sex differences in achievement and later performance among adolescents. *Applied Measurement in Education, 7(3),* 241-254.

Wolters, C. A., & Pintrich, P. R. (1998). Contextual differences in student motivation and self-regulated learning in mathematics, English, and social studies classrooms. *Instructional Science, 26,* 27-47.

Wolters, C. A., Shirley, Y. L., & Pintrich, P. R. (1996). The relation between goal orientation and students' motivational beliefs and self-regulated learning. *Learning & Individual Differences, 8(3),* 211-238.

Zull, J.E. (2002). *The art of changing the brain*. Sterling, VA: Stylus Publishing, LLC.