A COMPARISON OF THE RELATIONSHIPS OF STUDENTS' SELF-EFFICACY, GOAL ORIENTATION, AND ACHIEVEMENT ACROSS GRADE LEVELS: A META-ANALYSIS

by

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Abstract

Students' self-efficacy and achievement motivation may influence their academic achievement. Through meta-analysis, this study examines relationships of students' self-efficacy, mastery goal orientation, and performance goal orientation to their achievement. Also, this study analyzes these relationships with achievement across grade levels.

This study had three purposes: 1) to compare the strength of relationships among self-efficacy, goal orientation, and academic achievement; 2) to examine the relationship between self-efficacy and achievement when mastery orientation is statistically removed; 3) to determine if differences exist when comparing these relationships across grade levels.

Self-efficacy was most strongly related to student achievement, followed by mastery orientation and then performance orientation. The relationship between self-efficacy and achievement was less strong when mastery goal orientation was statistically removed. However, this relationship between self-efficacy and achievement was still higher than that between mastery orientation and achievement. Last, relationships between mastery orientation and performance orientation with achievement differ across grade levels.

Keywords: achievement, goal orientation, self-efficacy, meta-analysis

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Chapter One: Introduction

In general, students aspire to achieve in educational settings. Students' sense of competence to succeed, namely their academic self-efficacy, and purposes for learning, their goal orientations, may both relate positively to achievement (Linnenbrink, 2005). Regarding self-efficacy, students who believe they will perform well in school usually do. Theoretically, self-efficacy is influenced by past performance. For instance, a student who performed at a high level on a math test in the past will predict similarly high performance on future math assessments. Greater self-efficacy correlates with, and may even lead to, higher achievement; just as lower self-efficacy relates to lower achievement.

The construct of self-efficacy in educational settings may be categorized into two components: 1) self-efficacy for learning (SEL) and 2) self-efficacy for performance (SEP) (Pintrich, Smith, Garcia, & McKeachie, 1991, as cited in Lodewyk & Winne, 2005). Self-efficacy for learning includes both "judgments about one's ability to accomplish a task as well as one's confidence in one's skills to perform that task" (Pintrich, Smith, Garcia, & McKeachie, 1991, as cited in Lodewyk & Winne, 2005., p. 13). On the other hand, self-efficacy for performance is usually measured by asking students their expectancy for success or outcome in a particular course or on a specific task. As such, constructs of performance expectations (Senko & Harackiewicz, 2005), and competence expectancy (Elliot & Church, 1997) are used synonymously with self-efficacy for performance. The type of self-efficacy most commonly measured in educational research is self-efficacy for learning (SEL). For example, the Patterns of

Adaptive Learning Scales (PALS) by Midgley et al. (2000), measures academic efficacy with five statements, such as "I can do even the hardest work in this class if I try" and "I'm certain I can master the skills taught in class this year" (p. 20). Midgley et al. (2000) also state that self-efficacy "refers to students' perceptions of their competence to do their class work" (p.20). Hence, perceived competence has been considered synonymous with self-efficacy for learning. Harackiewicz, Barron, Carter, Lento and Elliot's (1997) study created their own perceived competence scale; similar to self-efficacy it is context-specific (e.g. "I think I am doing very well in this class", and "I am satisfied with my performance so far in this class", p. 1222).

Subsequently, academic success may be contingent on students' ability to appraise accurately their self-efficacy. Elementary grade children often have an inflated sense of competence due to an inability to compare their ability to others (Pintrich & Schunk, 1996). For instance, young children are not able to think as critically or reason as deeply as older children; hence, younger children usually believe praise without questioning it and are more apt to believe positive feedback from authorities. As students become more aware of their limitations, their corresponding self-efficacy may change.

Like the model of self-efficacy for learning and self-efficacy for performance, students' achievement motivation is described traditionally through a two component framework of mastery versus performance. Students' orientations towards particular goals associate with academic success or failure. Those who learn for mastery's sake possess the determination, persistence, and interest necessary to achieve. In contrast, those oriented toward performance are focused on demonstrating their ability in relation to others; they may be willing to resort to wrote-learning, or any other means to achieve.

Research in educational psychology suggests generally that self-efficacy and goal orientations relate to academic achievement. However, it is questionable which of these constructs, self-efficacy or achievement motivation, is most influential in determining student success. It is assumed that self-efficacy and goal orientations relate to academic achievement but researchers are unsure whether self-efficacy or goal orientations are consistently more highly related to school success.

Students' self-efficacy is often viewed as the more influential variable on achievement. Findings from empirical research indicate that self-efficacy is one of the constructs most highly related to achievement (e.g. Bembenutty, McKeachie, & Lin, 2000; Karabenick, 2004; Merritte, 1999; Mizelle & Hart, 1993; Roeser, Midgley, & Urdan, 1996; Salili, Chiu, & Lai, 2001; Wolters, Yu, & Pintrich, 1996). Yet other research suggests that students' goal orientation is the more important variable relating to achievement (Wahlstrom, 2001). In most studies, mastery orientation is found to be related positively to achievement while performance orientation is less related to achievement, although this may not always be the case (See Salili, Chiu, & Lai, 2001).

For studies that examine the relationships between self-efficacy, achievement motivation, and academic achievement, a difficulty exists in that self-efficacy may relate highly to mastery goal orientation (see Patrick, Ryan & Pintrich, 1999; Kozlowski, Gully, Brown, Salas, Smith, & Mason, 2001; Salili, Chiu, & Lai, 2001; Vrugt, Oort, & Zeeberg, 2002). Students with high self-efficacy often take a mastery-approach to learning. Mastery-approach oriented students believe they can master or fully learn, may set more challenging goals for themselves and maintain higher levels of commitment to those goals (Caraway, Tucker, & Reinke, 2003). Hence, it is often questioned in studies

examining self-efficacy, goal orientation, and achievement whether it is self-efficacy which associates strongly to achievement, or goal orientation to achievement, or both. Less research has been conducted which examines what happens to self-efficacy's relationship with achievement when the presence of mastery goal orientation is considered in the self-efficacy-achievement relationship. This undertaking may discern better whether the relationship between self-efficacy and achievement is substantially lowered when mastery orientation has been statistically removed from that relationship.

This study examines research on relations among self-efficacy, achievement motivation, and academic achievement. Specifically, it investigates the relationship between self-efficacy and achievement. Next, it compares the relationship between goal orientation – mastery and performance orientation – and achievement with self-efficacy's relationship with achievement. Lastly, since self-efficacy is age-related to change (Pintrich & Schunk, 1996), these relationships will be further examined to see if they differ by grade levels.

Purposes

This study has three purposes.

1. Through meta-analyses, to examine the strength of relationships between self-efficacy, mastery goal orientation and performance goal orientation to academic achievement.

2. To determine if the relationship between self-efficacy and achievement is substantially lowered after mastery goal orientation is partialed out of self-efficacy's relation to achievement.

3. To examine the relationships of self-efficacy, mastery goal orientation and performance goal orientation to achievement across grade levels (elementary, middle school, high school, and post-secondary).

Chapter Two: Review of Literature

Definition of variables

Self-efficacy

Self-efficacy is defined most commonly as, "People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391). Individuals' self-efficacy could be an indicator of their abilities [achievement capabilities], willingness to exert effort and likelihood to persist towards an achievement goal [mastery orientation], and their perceptions of task difficulty (Bandura, 1982). In addition, factors such as past performance, experiences with others' performances, persuasion from others and physiological changes can influence self-efficacy judgments in a given context (Schunk, 1984). In essence, self-efficacy is a person's belief about the capability to master or succeed at a specific task.

The construct of self-efficacy is unlike the more global self-confidence construct which reflects a belief that one can cope with almost any task. In educational settings, self-efficacy is usually task specific asking how well a student believes he or she will do on an approaching exam or in a particular course. For example, Pintrich, Smith and Garcia (1993) state that the Motivated Strategies for Learning Questionnaire (MSLQ) measures students' self-efficacy by how students believe they can master the course

material (e.g., I'm confident I can understand the basic concepts taught in this course). Self-efficacy is "one's sense of competence" (Salili & Lai, 2003, p. 55).

Self-efficacy in educational settings may be categorized into two areas: 1) self-efficacy for learning (SEL) and 2) self-efficacy for performance (SEP) (Pintrich, Smith, Garcia, & McKeachie, 1991, as cited in Lodewyk & Winne, 2005). Self-efficacy for learning includes both "judgments about one's ability to accomplish a task as well as one's confidence in one's skills to perform that task" (Pintrich, Smith, Garcia, & McKeachie, 1991, as cited in Lodewyk & Winne, 2005, p.13). SEL is the more commonly measured construct in educational research. SEP is usually measured by asking students their expectancy for success in a particular course or on a specific task. Hence, constructs of perceived competence (Harackiewicz, Barron, Carter, Lento & Elliot, 1997), performance expectations (Senko & Harackiewicz, 2005), and competence expectancy (Elliot & Church, 1997) are used synonymously with self-efficacy in this meta-analysis.

Achievement motivation

The most popular perspective in achievement motivation literature is the achievement goal approach framework; it was first conceptualized in the late 1970s and early 1980s (Elliot, 1999). Goals or purposes that are perceived for achievement behavior rather than levels of motivation are the focus. In short, a quality of motivation as opposed to a quantity of motivation is investigated through the achievement goal approach (Middleton & Midgley, 1997).

A commonly used framework for achievement motivation distinguishes orientations as mastery versus performance directed. Recent theories on achievement

motivation have introduced valence, either approach or avoidance, into the mastery and performance orientation framework (Elliot, 1999). This 2 x 2 framework, referred to as multiple goal perspective (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002), separates achievement motivation into four components (mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance). Mastery-approach involves striving to attain task mastery or improvement; mastery-avoidance is concerned with striving not to fall short of task mastery or not to lose one's skills, abilities, or knowledge; performance-approach focuses on striving to perform better than others; and performance-avoidance involves striving not to perform worse than others (Elliot & Thrash, 2001). Therefore, motivational goals guide the student toward or away from achievement.

This meta-analysis chose to use the dichotomous framework of mastery and performance-approach goal orientation due to the practical and theoretical limitations of including avoidance goals for several reasons. First, this dichotomy is the prevalent theoretical issue examined in the literature – over two-thirds of all studies, ranging from 1988 to 2005 considered for this meta-analysis used the dichotomous mastery versus performance, or intrinsic versus extrinsic goal orientation framework. Second, of the 48 studies selected for this meta-analysis, only two of the studies measured mastery-avoidance and they did not provide its correlation with achievement. Only 15 studies measured performance-avoidance and its relation to achievement, a smallish sample for meta-analytic statistical analysis. Therefore, mastery and performance goal orientation are used in this meta-analysis. These orientations may be described as follows.

Mastery goal orientation

Students with a mastery goal orientation try to develop new skills and attain a sense of mastery and learning (Ames & Archer, 1987). The construct of mastery goal orientation may be conceived of, and measured, through different names, such as: task-involved goal (Nicholls, 1984), mastery goal (Ames & Archer, 1988), intrinsic goal (Pintrich, Smith, & Garcia, 1993), learning goal (Elliott & Dweck, 1988) or task-focused goal (Maehr & Midgley, 1991). These labels reflect the qualities of a mastery approach to learning, namely task and learning-focused and intrinsic motivation. Reviewers of the achievement goal literature often conclude that mastery goals' broad set of positive processes are linked to positive outcomes (Elliot & Thrash, 2001).

A mastery goal orientation involves the belief that effort leads to improvement in tasks and that ability is malleable. For example, students with a mastery orientation may believe that a characteristic such as intelligence is not fixed. Students with a mastery orientation may also believe that success in school is related to interest, effort and collaborative learning (Thorkildsen & Nicholls, 1998). Hence, these students focus on learning and understanding the material (Wolters, Yu, & Pintrich, 1996). They may not highly value marks. Rather, they may value their experience and level of acquired learning as measured by their feelings of understanding and interest. The focus is on *developing* one's competence with a mastery goal orientation (Ames & Archer, 1987).

Performance goal orientation

Students with a performance goal orientation focus on demonstrating one's competence (Ames & Archer, 1987). These students believe success requires high ability and therefore, a characteristic such as intelligence is fixed rather than malleable. They usually view success as achieving higher results in comparison to others. According to Ames and Archer (1987), performance goal orientation is the goal to show your ability by out-performing others and achieving success with little effort. Consequently, the focus of a performance goal orientation is on extrinsic awards, such as high-grades, awards or approval by others and demonstrating superior ability in comparison to others.

Performance goal orientation may also be referred to as performance-approach (Elliot & Harackiewicz, 1996), extrinsic (Murdock, Hale, & Weber, 2001; Patrick, Ryan & Pintrich, 1999; Wolters, Yu & Pintrich, 1996), ability-approach (Midgley et al., 1998), ability-focused (Maehr & Midgley, 1991), relative ability (Roeser, Midgley, & Urdan, 1996; Wolters, Yu & Pintrich, 1996), ego (Skaalvik, 1997; Seegers & Boekaerts, 1996). All of these names reflect the learning goals of someone with a performance goal orientation; namely, the valuing of extrinsic rewards, focusing on elevating the self (ego) in comparison to others' ability, and being concerned with demonstrating one's own ability in comparison to others. To performance goal-oriented students, performing well on a test is usually more important than mastering new skills or retaining the material; learning is not necessarily done for learning's sake, but often for receiving external reward such as earning a high grade or degree.

Academic achievement

Achievement is usually defined in educational literature by cognitive measures such as standardized academic achievement and aptitude tests, and markers of academic performance (e.g., grade point average [GPA] and course performance). These school-based measures may be scores on quizzes, tests, individual or group projects, midterm and final exams, and final course grades or GPA.

Educators often define achievement in this quantitative and objective fashion. However, students may define achievement differently depending on their goal orientation. For example, students with a mastery orientation might equate their level of achievement subjectively by the amount of mastery they achieve in understanding a subject, how much they enjoy the course, and/or how much they learn from the course. This said, teachers normally record students' achievement through the more objective means of measurement, such as course mark.

Relationship of variables

Self-efficacy and achievement

Numerous studies have suggested that self-efficacy is strongly related to achievement (Bembenutty, McKeachie & Lin, 2000; Karabenick, 2004; Mizelle & Hart, 1993; Roeser, Midgley, & Urdan, 1996; Salili, Chiu & Lai, 2001; Wolters, 2004). Bembenutty, McKeachie, and Lin (2000) studied the self-efficacy of American university students in relationship to final course grades. These researchers found that students' self-efficacy was strongly related to achievement with a correlation of $r = .64$. Students who believe they will achieve academically appear to do so.

Additional research has shown a positive relationship between self-efficacy and achievement of students in elementary school (Wentzel, 1996), middle school (Patrick, Ryan & Pintrich, 1999; Wolters, Yu & Pintrich 1996), high school (Wey, 1998) and university (Senko & Harackiewicz, 2005; VandeWalle, Cron, & Slocum, Jr., 2001).

Using 36 studies conducted between 1977 and 1988, Multon, Brown and Lent (1991) examined self-efficacy and academic performance among different grade levels through a meta-analysis. Two of their four main findings identified moderators in the efficacy-performance relationship: (1) the age of students, and (2) achievement type used. Specifically, they found that high school students (r_u = .41) and college student samples (r_u = .35) showed stronger estimated effect sizes for self-efficacy in its relationship to academic outcome, than did elementary school students (r_u =.21). Also, regardless of variance, they found that self-efficacy was related to students' performance (academic outcome) in all of these grade levels.

Secondly, Multon, Brown and Lent (1991) reported that the type of achievement measure may moderate self-efficacy's relationship to academic performance. Specifically, estimated effect sizes for basic skills measures (r_u = .52) and classroom-based performance indices, such as grades (r_u = .36) were more highly related to self-efficacy than standardized achievement tests (r_u = .13). This finding supports the theoretically situation-specific and domain-specific nature of self-efficacy beliefs (Bandura, 1986). Current research is needed to examine whether these patterns, of self-efficacy with achievement, now differ across grade levels.

Self-efficacy across grade levels

Self-perceptions of competence for children change over time as they are "age-related" (Pintrich & Schunk, 1996). Two main areas of research have supported the concept of developmental self-efficacy: the level and accuracy of children's self-perceptions of competence, and children's definitions of ability and effort (Blumenfeld, Pintrich, Meece, & Wessels, 1982). Research on the developmental differences in "self-perceptions of [academic] competence" or academic self-efficacy has shown consistently a decrease in the mean level of self-perceptions of ability as children move into adolescence (Pintrich & Schunk, 1996). Specifically, Eccles (1993) suggests that this average level decrease in self-efficacy seems greatest when students move into the seventh grade of junior high schools or sixth grade of middle schools (as cited in Pintrich & Schunk, 1996).

Levels of self-efficacy may decrease over time due to a number of reasons. According to Pintrich and Schunk (1996), this age-related drop in mean level of self-perceptions may be accounted for through five main reasons. 1) Young children often respond at the end-points on Likert-scales, typically the higher end-point, making the means higher on scales measuring self-efficacy. 2) Young children may have an inflated perception of their ability. 3) Young children may lack information-processing skills necessary for accurate social comparison (See Blumenfeld, Pintrich, Meece, & Wessels, 1982). 4) Young children may use lower comparative standards than older students. 5) Structural changes of streaming in the classroom environment, from elementary to middle and high school, may make academic comparisons more obvious. Young children do not often compare themselves academically. Also, elementary grading is structured to have

students complete short and easy assignments. Therefore, younger children seem to have an inflated degree of self-efficacy.

Mastery goal orientation and achievement

In general, mastery goal orientation relates positively to achievement. Students with mastery orientation put in the required time, energy, and interest required for school success. Wentzel (1996) studied 290 sixth graders from a middle school in the mid-Atlantic United States. She found that self-efficacy was moderately related to achievement ($r = .39$, $p < .001$), mastery goal orientation related weakly to achievement ($r = .19$, $p < .001$), and performance goal orientation had a weak negative correlation with achievement ($r = -.15$, $p < .01$).

Mastery orientation has been associated with high levels of persistence through difficulties (Dweck & Leggett, 1988). Researchers found that when students are concerned with mastery rather than performance, they put a great deal of effort into their school work and report they adopt beneficial learning strategies (e.g., Dweck & Leggett, 1988; Pintrich & De Groot, 1990; Wolters, Yu, & Pintrich, 1996). Such effortful learning strategies may include students' attempts to plan, monitor, and regulate their cognitions and study activities, as well as be willing to continue trying in the face of challenge (e.g., Garcia & Pintrich, 1996). Students' use of these strategies is associated with enhanced performance in school (e.g., Zimmerman, 1989).

Research has shown that children who adopt mastery goals do well in school (Middleton & Midgley, 1997; Midgley, Kaplan, & Middleton, 2001; Pintrich, 2000; Wentzel, 1996). Studies examining students in middle school (Wolters, 2004), high school (Brookhart & Durkin, 2003; Salili, Chiu & Lai, 2001), and university (Philips &

Gully, 1997) have also found mastery goal orientation to be strongly related to achievement.

However, other studies have shown that among college students the expected positive relation between having a mastery goal orientation and instructor-assigned grades did not materialize (Barron & Harackiewicz, 2001; Elliot & Church, 1997; Harackiewicz, Barron, & Carter, 1997; Kozlowski, Gully, Brown, Salas, Smith, & Mason, 2001). For example, Kozlowski, Gully, Brown, Salas, Smith, and Mason (2001) examined learning (mastery) and performance goal orientations with outcomes of training for Midwestern American undergraduate students. These researchers did not statistically detect a correlation between mastery orientation and training performance ($r = .14$). Hence, the literature is inconsistent in terms of findings on mastery orientation's relationship with achievement.

Performance goal orientation and achievement

While a mastery orientation is usually measured by questions such as, "I want to do my school work because I am interested in it," performance orientation may be measured by students' desire to outperform others as measured by questions such as, "Doing better than other students is important to me" (Midgley et al., 1998, p. 128). Therefore, students focused on achieving higher grades might strive harder towards achieving their goals than those who do not.

Studies measuring performance orientation and achievement differ in findings both within and across grade levels. For instance, researchers have found a positive relation between course achievement and college students' performance-approach goal orientation (Elliot & Church, 1997; Harackiewicz, Barron, & Carter, 1997; Harackiewicz,

Barron, & Tauer, 2000), but also a negative relationship between performance orientation and achievement in university (Ford, Smith, Weissbein, Gully, & Salas, 1998; Holladay & Quinones, 2003). Negative relationships between performance goal orientation and achievement have also been found to exist for samples using elementary school students (Meece, Blumenfeld, & Hoyle, 1988), and middle school students (Patrick, Ryan & Pintrich, 1999). Variance in lower grades appears to abound. For example, Skaalvik (1997) found that ego-enhancing or performance goals were positively related to achievement in elementary school students, whereas others have failed to find a clear relationship between elementary students exhibiting performance-approach goals and their classroom grades (Pintrich, 2000; Wolters, Yu & Pintrich, 1996).

However, performance-approach goals have been linked positively to teacher-assigned grades in early adolescent students. This occurs despite performance goal orientation's lack of relation to students' reported use of learning strategies (Pintrich, 2000; Skaalvik, 1997). This could be because grades in middle school are usually assigned on the basis of normative standards or are the result of completing repetitive work, being compliant and well-behaved, or generally exhibiting a surface-level understanding of the material (Harackiewicz & Elliot, 1998).

Students who adopt performance goals typically report using superficial rote mechanist strategies and many other inefficient strategies for learning. Wang (2003) claims these motivated approaches to learning combine to decrease achievement. However, if extra practice and effort are in place, achievement can still be positive even if a student holds a performance goal (Elliot, McGregor, & Gable, 1999). Therefore, some researchers posit that there is no difference in achievement for students with

learning goals or performance goals (e.g., Elliot & Harackiewicz, 1996). Other researchers argue that performance orientations have direct negative effects on school achievement (e.g., Meece & Holt, 1993). Still others have suggested that performance goals can increase academic performance in the short term (e.g. Skaalvik, 1997). However, little verification exists as to whether performance goals are responsible for long-term academic achievement gains. The relationship between performance orientation and achievement seems more questionable compared to the association between mastery orientation and self-efficacy with achievement.

The relationships between self-efficacy, mastery goal orientation, and performance goal orientation

Students who are efficacious and confident normally take on a mastery approach to learning new material. Past research has found a positive relationship between mastery goal orientation and self-efficacy across all grade levels including elementary (Bell & Kozlowski, 2002), middle school (Mizelle & Hart, 1993;Roeser, Midgley, & Urdan, 1996;Wolters, 2004), high school (Salili, Chiu, & Lai, 2001; Wey, 1998), and university level students (Curda, 1997; Diefendorff, 2004; Ford, Smith, Weissbein, Gully, & Salas, 1998; Garcia & Pintrich, 1996; Holladay & Quinones, 2003; Horn, 1993; Howey, 1999; Karabenic, 2003, 2004; Kozlowski, Gully, Brown, Salas, Smith, & Mason, 2001; Lee, 1997; Phillips & Gully, 1997).

Self-efficacy's relationship with performance-approach goal orientation has shown contrasting results. For instance, among university students, the relationship of self-efficacy with performance-approach goal orientation has been positive (Lee, 1997;

Howey, 1999), negative (Ford, Smith, Weissbein, Gully, & Salas, 1998) and neutral (Bell & Kozlowski, 2002; Diefendorff, 2004).

While self-efficacy tells *how* students believe they will do on a task, goal orientations such as mastery and performance reveal *why* they are motivated to do it. A student with low self-efficacy regarding their competency in a subject area may feel this way due to low past performance since prior performance is often linked to a student's self-efficacy (See Bembenutty, 2001). However, the relationship between a student's achievement behavior and personal factors of affect, namely self-efficacy, and cognition, such as goal orientation, are not necessarily uni-directional, but dynamic and interactive.

Bandura's (1986) model of Reciprocal Determinism shows human functioning as the outcome of a dynamic interplay between personal factors (cognitive, affective and biological), environmental factors (social conditions) and behavior. For example, how students interpret the results of their past behavior or achievement on a test may in turn alter their personal factors of self-efficacy and goal orientation toward that subject. This may then alter their behavior and future test outcomes. For instance, if students perform poorly on a test, they may experience a decrease in self-efficacy and choose a more performance goal orientation. Or, if students perform well on a test, they may experience an increase in self-efficacy and have the confidence to take on more mastery goal orientation. Self-efficacy is often found to be positively related to mastery goal orientation, and performance orientation less so or even negatively (See Appendix A).

Mastery and performance orientations may be similar to intrinsic and extrinsic motivation, respectively. Mastery may relate to intrinsic motivation, which is defined as "behavior undertaken for its own sake, for the enjoyment it provides, the learning it

permits, or the feelings of accomplishment it evokes", while performance may relate to extrinsic motivation, defined as "actions undertaken in order to obtain some reward or avoid some punishment external to the activity itself" (Lepper, 1988, p. 292). In other words, mastery orientation involves the enactment of activities purely for the sake of learning, while performance orientation involves the undertaking of activities as a means to the end of demonstrating a relatively high level of ability (Ames & Archer, 1988; Elliott & Dweck, 1988; Nicholls, 1984). Concerning effort, students with mastery orientation usually feel self-efficacious about the task and persist through difficult tasks. This type of learning behavior is adaptive and has been found to result in achievement. In contrast, students with performance orientation have been found to display maladaptive behaviors toward learning and a general lack of persistence (Dweck, & Leggett, 1988; Elliot & Dweck, 1988). The relationship between performance orientation and self-efficacy is less clear.

Mastery and performance are often viewed as opposing components, e.g. learning for learning's sake versus learning for extrinsic gain. Perhaps not surprisingly, mastery has been shown to strongly relate to self-efficacy, while performance has shown a negative relation to self-efficacy (See Patrick, Ryan & Pintrich, 1999; Philips & Gully, 1997). Other researchers have found self-efficacy and performance orientation to be positively correlated (See Elliot & Church, 1997; Salili, Chiu & Lai, 2001; Skaalvik, 1997; Kozlowski, Gully, Brown, Salas, Smith, & Mason, 2001). Research shows varying results as to whether mastery or performance orientation is more strongly correlated with self-efficacy.

Rationale

A meta-analysis on self-efficacy and its relation to achievement outcomes has not been conducted for the last fifteen years, since Multon, Brown and Lent's review in 1991. Yet, much research has continued to investigate self-efficacy, as well as goal orientations' relationships with achievement. A meta-analysis on these constructs would add to the literature in three ways. First, a comparative analysis of self-efficacy and goal orientation's relation with achievement would give directions for further research regarding student achievement. Second, since mastery orientation and self-efficacy are highly correlated there may be an additive effect in the latter's relationship with achievement. Therefore, by partitioning-out mastery from self-efficacy's relationship with achievement their relationship may be understood better. Third, self-efficacy is known to be age-related to change (Pintrich & Schunk, 1996). For example, older students usually experience a decrease in self-efficacy since they are better able to compare themselves in relation to others. Therefore, investigating these studies' correlations of self-efficacy to achievement may show if they differ across grade levels.

Hypotheses

Consequently, the three hypotheses for this study are as follows.

1. Self-efficacy may be the strongest in its relation to achievement, with mastery goal orientation next, and performance goal orientation the weakest.
2. Self-efficacy's relationship to achievement may be lower than mastery goal orientation's relationship with achievement after mastery is partialed-out of it.
3. Self-efficacy may differ in its relationship with achievement across grade levels.

Chapter Three: Method

Procedure

Study selection criteria

Based on the preceding review of literature concerning the relationship of self-efficacy and goal orientation with achievement, criteria were formed to select studies to use in this meta-analysis. Specifically, two main criteria were utilized. The studies had to contain the variables of self-efficacy, mastery and/or performance goal orientation, and one or more objective achievement measure. Further, the studies needed to be empirical in design (See Table 1). Some studies manipulated the self-efficacy and goal orientation variables. These types of studies were included in this meta-analysis only if all the four variables were pre-tested before the manipulation took place.

Most studies examined students' levels of self-efficacy and goal orientation within the first two weeks of the school year or semester. For achievement tasks these studies generally utilized final course grades, especially for elementary students, or midterm or final exam marks for middle, high school or post-secondary students (See Appendix B).

Many articles reported students' attribution of achievement or achievement behavior rather than an actual achievement or performance variable. These articles were not used. Also, when a study was reported in more than one source (e.g., dissertation and journal article) a random selection was chosen and used for coding.

Search retrieval and selection of studies

Empirical studies and reviews containing self-efficacy, goal orientation, and achievement were accessed through computer searches on PsycINFO, PsycARTICLES, PsycBOOKS, and ERIC from September 16, 2005 to October 2, 2005. Table 1 provides information regarding key descriptor words, how the search was refined or expanded, and the number and type of studies found.

Table 1. Procedure for obtaining articles for meta-analysis

Search Engine Used	Descriptor Words	Refine or Expand Search by:	Number and Type of Studies Found
PsycINFO	goal orientation achievement self-efficacy	√ English Population - human Methodology – empirical study	40 journal articles 3 chapters in books 46 dissertations (89 total)
PsycINFO	goal orientation achievement	√ English Population – human Methodology – empirical study	252 journal articles 147 dissertations (404 total)
PsycARTICLES	goal orientation achievement self-efficacy	√ Exclude book reviews √ Search within full text of articles (for descriptor words)	96 articles total
PsycARTICLES	goal orientation achievement	√ Exclude book reviews	16 articles total
PsycBOOKS	goal orientation achievement self-efficacy	Population – human √ Search within full text of article (for descriptor words)	0 total
PsycBOOKS	goal orientation achievement	Population - human √ Search within full text of article (for descriptor words)	0 total
ERIC	goal orientation achievement self-efficacy	√ Search within full text of article (for descriptor words)	35 documents 13 journal articles (48 total)

In reference to Table 1, the key words of self-efficacy, goal orientation, and achievement were initially used as the search descriptors. Secondary searches through databases were conducted using the search words goal orientation and achievement, without self-efficacy. These subsequent searches were undertaken to scrutinize articles that may contain a measure of self-efficacy that has a different label (e.g. self-competency and competence-expectancy). In addition, some studies were excluded even though they had a self-efficacy labeled variable such as collective efficacy (measuring

group efficacy) or social-efficacy (measuring non-academic efficacy). Students' individual self-efficacy regarding their own personal ability to achieve in a school subject was examined in this research; therefore group efficacy and non-academic efficacy were not usable.

Sample

Overall, 89 potential publications were reviewed as they met the selection criteria of containing the necessary variables of self-efficacy, mastery or performance goal orientation, and achievement. However, further examination of those four variables within each potential study revealed that 51 of those publications were missing one or more of those required variables or their correlations. This left 38 usable publications containing 48 studies. Only those with relevant correlations were used in this meta-analysis.

First, 19 publications did not contain a measurable achievement variable; they either did not include achievement in their computations with other variables, or instead provided attribution of achievement, attitudes of achievement, beliefs of achievement or learned helplessness and feelings of failure, rather than a graded achievement measure.

Second, nine publications had to be eliminated after discovering goal orientation statistics were missing; publications instead measured goal structure, goal setting, goal attainment, importance of goals, or achievement orientation which combined mastery and performance goal orientation into one variable.

Next, nine publications were omitted because they did not have the required statistics; for instance, of those nine publications, six were theoretical and three did not compute correlations between all variables.

Nine publications were deemed unusable due to not including a self-efficacy variable; rather group, social, team, or collective efficacy was tested. Or, if self-efficacy was actually in the publication, no statistics were given concerning its relation to goal orientation or achievement.

The final five studies which were omitted had variables that seemed to be synonymous with self-efficacy, but were later deemed not to be. These variables were: perceived competence (Leondari & Gialamas, 2002; Meece, Blumenfeld & Hoyle, 1988; Merritte, 1999), self-concept of math ability (Seegers & Boekaerts, 1996), and confidence in reading math (Thorndike-Christ, 1998). Leondari and Gialamas (2002), Meece, Blumenfeld and Hoyle (1988), and Merritte (1999) each used Harter's (1982) Perceived Competence Scale for Children. This instrument measures students' perceptions of their cognitive ability for how they think they do in school, but it is not task-specific for that class. For instance, Harter's (1982) Scholastic Competence Scale, from his Self-Perception Profile for Children (SPPC) is based on a "general feeling of doing well or poorly in school" (Leondari & Gialamas, p.282). Hence, those studies were deemed to not contain a measure of self-efficacy. Seegers and Boekaerts' (1996) work was not used because they measure self-concept and warn that self-concept differs from self-efficacy in that the former is more of a global construct. Similarly, Thorndike-Christ's (1998) dissertation was not included in this meta-analysis because its self-efficacy measure was not task or class specific, but part of a mathematics attitude scale measuring students' general confidence in learning math.

Consequently, out of the initial 420 publications found when searching for the descriptor words of goal orientation and achievement in the data-base searches,

omitting self-efficacy as a descriptor, only three were deemed useable. Caution was taken to ensure construct and internal validity when choosing studies to include in this meta-analysis. Furthermore, after inputting data, it was noticed that one journal article and conference paper contained the same data reported four years a part. The conference paper, which occurred prior, was retained in the meta-analysis, while the latter was deleted. Another study was removed after further examination when it was discovered that the goal orientation correlation was really an average of students being surveyed three times, at the beginning, middle and end of the study. This study was deleted because its method was not consistent with the other studies in which the self-efficacy and goal orientation measures took place before the achievement measure, except possibly when the achievement measure was grade point average, or post-test with self-efficacy measured during this period but not prior.

When studies gave correlations for a time one (T1) and time two (T2), T1 correlations were chosen, unless T1 had missing data and T2 did not. However, if three self-efficacy data were collected in separate classes — for instance, in English, Math, and Social Studies — all these correlations were averaged to produce one correlation. Similarly, if more than one mastery or performance goal orientation variable was measured, for instance intrinsic and mastery, their correlations were averaged to form one composite score. A similar procedure was done with achievement measures. All correlations for standard achievement test score(s), grade-point-average(s), and course performance measure(s) (usually a final course grade, midterm or test), were averaged to form one overall achievement measure correlation for each study (See Appendix A).

For a list of each type of achievement measure used to compute the aggregate achievement measure for each study see Appendix B: Table 7.

In total, these 38 publications contained 48 studies with a combined sample size of 12,466 students. Table 7 in Appendix B outlines the publication type, sample size, racial and gender composition, grade level, and achievement task(s) for each study used in this meta-analysis. Full bibliographic information for each of these studies is in the References and marked with an asterisk.

Coding of variables

Each study was coded using a coding form initially consisting of 57 features: five study descriptors, 21 sample descriptors, four dependent measure descriptors, four means and four standard deviations, seven effect sizes (e.g. five correlations, two semi-partial correlations), their related seven z-scores, and five reliability measures for the studies. After analyses were conducted, four more features were added to record the type of survey used (see Appendix C for a copy of the study coding form). The additional features allowed for generation of comparative data to be presented in Table 2.

Regarding Table 2, two studies had a self-efficacy variable named by their authors as performance expectations (Senko & Harackiewicz, 2005). Another study used competence expectancy (Elliot & Church, 1997). The third study used perceived-competence (Harackiewicz, Barron, Carter, Lehto & Elliot, 1997). Yet these variables measured specifically how students believed they will succeed in that course.

Table 2. Comparative elements of the studies used in this meta-analysis

Measure	Variable	Number	Percent
Course Type	English	5	11.4%
	Math	11	22.7%
	Social Sciences	4	9.1%
	University Psychology	11	22.7%
	Science	5	6.8%
	University Business	1	2.3%
	Mix of 2 or more classes	7	15.9%
	University Computer task	2	4.5%
	High School Vocational/Tech	1	2.3%
	University German Language	1	2.3%
	Subtotal	48	100%
Grade Level	Elementary	6	13.6%
	Middle	9	20.5%
	High School	9	18.2%
	University (22) or Community College (2)	24	47.7%
	Subtotal	48	100%
Nation/Region	North America (Canada (2) and U.S.A (41))	43	88.6%
	Europe (Greece and Norway)	2	4.5%
	Asia (Hong Kong (1) and Taiwan (2))	3	6.8%
	Subtotal	48	100%
Publication Type	Journal Article	33	70.5%
	Chapter of book	3	6.8%
	Dissertation	8	13.6%
	Other (AERA Conference, etc.)	4	9.1%
	Subtotal	48	100%
Self-efficacy Name	Self-efficacy	44	93.2%
	Other (Perceived competence (1), competence expectancy (1), or performance expectations (2))	4	6.8%
	Subtotal	48	100%
Survey for Goal Orientation	MSLQ	9	15.9%
	PALS	15	29.5%
	Other (created by author, or other)	26	54.6%
	Subtotal (2 studies used MSLQ and PALS)	50	100%
Survey for Self-Efficacy	MSLQ	20	40.9%
	PALS	9	20.5%
	Other (created by author, or other)	19	38.6%
	Subtotal	48	100%

Interestingly, many researchers who chose to use the Motivated Strategies for Learning Questionnaire (MSLQ) to survey self-efficacy did not use this same instrument to also survey goal orientation. Similarly, many researchers who chose to use the Patterns of Adaptive Learning Scales (PALS) for goal orientation did not necessarily use this instrument to also survey self-efficacy. Authors often created their own measure for self-efficacy or opted to use the MSLQ (See Table 2). One publication, containing two studies, used both surveys to measure goal orientation. To record data from those studies, correlations from both goal orientation scales were averaged to create one set of scores for each study.

Ratings of measurement quality

A separate variable was created called 'Measurement Quality'. It reported whether each study's reliability values were overall "high" (.75 or greater), "medium" (greater than .5 but less than .75), or "low" (less than .5). Some studies only provided a range of reliabilities for the set of correlations or for each correlation. For these cases, midpoints were used. Table 3, in the Results section, presents the reliability findings.

Data analysis

Meta-analysis was the primary analysis for this study. This procedure gives a quantitative technique to determine the cumulative, generalizable knowledge essential in research (Robbins, Lauver, Le, Davis, Langley & Carlstrom, 2004). Correlations for self-efficacy/achievement, mastery orientation/achievement, performance orientation/ achievement, self-efficacy/mastery orientation, and self-efficacy/performance orientation were extracted from each study. These correlations were used to determine effect sizes.

$$ES_r = r$$

Effect sizes were then converted to *z*-scores using Fischer's transformation.

$$ES_{Zr} = .5 \log_e \left[\frac{1 + ES_r}{1 - ES_r} \right]$$

Next, a semi-partial correlation was computed to statistically remove variance shared between mastery goal orientation and self-efficacy before examining the relationship of self-efficacy to achievement. The formula to determine this semi-partial correlation is as follows.

$$r_{ACH(SE\text{-}M)} = \frac{SE/ACH - M/ACH(SE/M)}{\sqrt{1 - SE/M^2}}$$

where SE = self efficacy, ACH = achievement, and M = mastery goal orientation. Its z-score was then computed as previously described.

Then the inverse variance weight, important for aggregating effect sizes, was coded for each finding. The statistic is a simple function of the total number of participants in each study.

$$\omega_{Zr} = \frac{1}{SE^2_{Zr}} = n - 3$$

Following computation of the inverse variance weight, the standard error (SE) was computed using the following formula.

$$SE_{\overline{ES}} = \sqrt{\frac{1}{\Sigma \omega_i}}$$

Then the mean effect size for each relationship was found by having each effect size value multiplied by its individual weight, then summed, then divided by the sum of the weights (Lipsey & Wilson, 2001).

$$\overline{ES} = \frac{\sum(\omega_i ES_i)}{\sum \omega_i}$$

A confidence interval of 95% was constructed around each weighted mean effect size in order to determine statistical significance. The lower limit (ES_L) and upper limit (ES_u) of the confidence interval were calculated.

$$\overline{ES_L} = \overline{ES} - 1.96(SE_{\overline{ES}})$$

$$\overline{ES_U} = \overline{ES} + 1.96(SE_{\overline{ES}})$$

For the confidence interval computation, ES was the mean effect size, 1.96 the critical value for the z-distribution (alpha = .05) and SE_{ES} the standard error of the mean effect size. When the lower limit of a confidence interval was greater than zero, the mean effect size was interpreted as indicating a statistically detectable result showing a positive relationship with achievement.

A main assumption of the significance test is that all results aggregated into a weighted mean effect size have the same population effect size. As well, another assumption is that sampling error is the noticeable effect sizes around the mean resulting from the random sampling of participants from the population (Nesbit & Adesope, 2006). This assumption was tested by the homogeneity of variance statistic, as follows.

$$Q = \Sigma w_i (ES_i - \overline{ES})^2$$

When the mean effect size, made up of all k effect sizes, comes from the same population effect size, Q has a chi-square distribution with k-1 degrees of freedom. However, when Q is larger than the critical value of the chi-square distribution ($p<.05$), the mean effect size is considered to be significantly heterogeneous (Lipsey & Wilson, 2001). Due to this meta-analysis' large number of studies, Q's critical value of the chi-square distribution was set at $p<.01$.

Chapter Four: Results

Procedure

Data were coded and prepared for analyses through Microsoft Excel version X for Macintosh. Few cases contained missing data. Of studies that did have missing values, 11 authors were emailed to request missing data. Six of these researchers responded providing the required information. When an author did not provide missing data that publication was not used because it was missing one or more of the required variables needed for the calculations.

Study reliabilities and types of measures

Reliability statistics were recorded for each study. If a range of reliabilities was given then the midpoint was recorded. If more than one type of goal orientation survey was used in a single report, for instance Midgley et al's (1998) Patterns of Adaptive Learning (PALS) and Pintrich, Smith, Garcia and McKeachie's (1991) Motivational Strategies for Learning Questionnaire (MSLQ), then both scales' reliability factors were added together and then the average taken. Each study was then assigned a Measurement Quality rating of high (reliability values .75 or above), medium (values between .5 and below .75) and low (values below .5). Only eight of 48 studies' achievement measures gave reliability coefficients. Final grade or class test, were often not given a value by the study's author, whereas standardized tests did have reliability measures.

Table 3. Instrument reliability of variables in studies

Variable	Highest	Lowest	High	Medium	Low	Total studies with reliabilities	Missing reliability
Self-efficacy	.94	.73	95.35%	4.65%		43	5
Mastery goal orientation	.91	.57	81.82%	18.18%		44	4
Performance goal orientation	.94	.32	58.54.%	39.02%	2.44%	41	7
Achievement	.94	.72	75.00%	25.00%		8	40

In general, Table 3 shows that the data upon which correlations were based had high reliabilities. This could be explained by the fact that at least half of the studies in this meta-analysis, (e.g. for self-efficacy 29/48 studies and for goal orientation 22/48 studies), used well-known survey questionnaires, either Midgley et al.'s (1998) Patterns of Adaptive Learning Scale (PALS) or Pintrich, Smith, Garcia and McKeachie's (1991) Motivated Strategies for Learning Questionnaire (MSLQ) (See Table 2). Also, the remaining studies' authors created their own surveys very similarly to these surveys' questions regarding self-efficacy and goal orientation. However, using different instruments may effect relationships observed between goal orientation and other variables.

As Table 3 shows, reliabilities for self-efficacy and mastery goal orientation were high in most studies. Relatively fewer studies reported high reliabilities for performance goal orientation. Reliabilities for achievement were generally high but only a few studies reported reliabilities for this measure. These findings contextualize effect sized because, when reliability coefficients are low the correlations involving instruments with low reliability are attenuated. As will be seen later, this may explain why effect sizes involving performance goal orientation's relation to achievement were lower than those for mastery goal orientation and achievement.

Relationships between self-efficacy and achievement motivation with achievement

Relationships between the constructs of self-efficacy and achievement motivation (mastery orientation and performance) were examined. Specifically, weighted mean effect sizes, confidence intervals, and the homogeneity of effect sizes were computed for various relationships. Table 4 presents the results.

Table 4. Weighted mean effect sizes, confidence intervals, and homogeneity of effect sizes for the various relationships examined

			Effect size		95% Confidence interval		Homogeneity of effect size	
Relationship[a]	N	k	M	SE	Lower	Upper	Q	df
SE-MGO	12466	48	.450	.009	.432	.468	443.120*	47
SE-PGO	11894	45	.149	.009	.131	.167	391.115*	44
SE-ACH	12466	48	.345	.009	.327	.363	319.701*	47
MGO-ACH	12466	48	.124	.009	.102	.137	146.588*	47
PGO-ACH	11716	44	.047	.010	.029	.066	151.170*	43
SE-ACH MGO partialed out	12466	48	.313	.009	.297	.330	299.980*	47

*p<.01.
N is the total number of students; k is the total number of studies; M is the mean; SE is standard error.
[a]SE-MGO refers to self-efficacy-mastery goal orientation; SE-PGO refers to self-efficacy-performance goal orientation; SE-ACH refers to self-efficacy-achievement; MGO-ACH refers to mastery goal orientation-achievement; PGO-ACH refers to performance goal orientation-achievement; and SE-ACH, MGO partialed out refers to self-efficacy-achievement with mastery goal orientation removed.

Table 4 shows that self-efficacy appears to have the strongest relationship to achievement with a weighted mean effect size of .345. Interestingly, self-efficacy with mastery partialed-out of its relationship to achievement was second in strength at .313. Mastery goal orientation had the third strongest relationship to achievement at .124. Lastly, performance goal orientation had the weakest relationship to achievement with a weighted mean effect size of .047.

All means of the effect sizes were statistically detectable at the $p<.05$ level. However, the elevated homogeneity of the effect sizes of the studies, or the Q values,

suggests that these results are heterogeneous. The variability among effect sizes was greater than that expected from sampling error. This could be due to varying student populations. Specifically, different age-groups of students, from those in elementary to post-secondary, were measured. The following section looks at mean effect sizes of relationships by grade-groupings (elementary, middle school, high school, and post-secondary).

Relationship of self-efficacy and achievement motivation with achievement across grade levels

Mean effect sizes of relationships by grade-groupings (elementary, middle school, high school, and post-secondary) were individually computed to discern whether differences exist between school levels. Table 5 presents the findings.

Table 5. Weighted mean effect sizes, confidence intervals, and homogeneity of effect sizes for self-efficacy, achievement motivation, and achievement across grade levels

				Effect size		95% Confidence interval		Homogeneity of effect size	
Relationship[a]	Level	N	k	M	SE	Lower	Upper	Q	df
SE-MGO	Elementary	2065	6	.432	.022	.388	.475	40.495*	5
	Middle school	3166	9	.521	.017	.487	.555	62.910*	8
	High school	1269	9	.396	.029	.339	.453	37.555*	8
	Post-secondary	5966	24	.430	.013	.405	.456	279.571*	23
SE-PGO	Elementary	1960	5	.053	.023	.008	.097	27.859*	4
	Middle school	3166	9	.115	.017	.081	.149	78.000*	8
	High school	1269	9	.310	.029	.253	.367	26.936*	8
	Post-secondary	5499	22	.167	.014	.140	.193	202.474*	21
SE-ACH	Elementary	2065	6	.327	.022	.284	.370	16.532*	5
	Middle school	3166	9	.358	.017	.324	.392	10.938	8
	High school	1269	9	.297	.029	.240	.354	28.341*	8
	Post-secondary	5966	24	.354	.013	.328	.379	259.374*	23
MGO-ACH	Elementary	2065	6	.102	.022	.059	.146	13.25	5
	Middle school	3166	9	.178	.018	.143	.213	23.486*	8
	High school	1269	9	.152	.028	.097	.208	31.252*	8
	Post-secondary	5966	24	.096	.013	.070	.121	62.671*	23
PGO-ACH	Elementary	1960	5	-.023	.023	-.067	.022	16.200*	4
	Middle school	3166	9	.047	.017	.013	.081	51.862*	8
	High school	1269	9	.121	.029	.064	.178	18.995	8
	Post-secondary	5321	21	.051	.014	.024	.078	48.982*	20
SE-ACH, MGO partialed out	Elementary	2065	6	.309	.022	.266	.353	11.221	5
	Middle school	3166	9	.301	.017	.267	.335	16.691	8
	High school	1269	9	.244	.029	.187	.301	19.885	8
	Post-secondary	5966	24	.336	.013	.311	.362	242.634*	23

*p<.01.

N is the total number of students; k is the total number of studies; M is the mean; SE is standard error; SE-MGO refers to self-efficacy-mastery goal orientation; SE-PGO refers to self-efficacy-performance goal orientation; SE-ACH refers to self-efficacy-achievement; MGO-ACH refers to mastery goal orientation-achievement; PGO-ACH refers to performance goal orientation-achievement; and SE-ACH, MGO partialed out refers to self-efficacy-achievement with mastery goal orientation removed.

Findings from Table 5 provide grounds for inferring that differences in effect sizes may exist between different educational groupings. The relationship between self-efficacy and achievement remained strong across grade levels. However, this relationship of self-efficacy and achievement was strongest for middle school students (.358) and lowest for high school students (.297). As well, the correlation between self-efficacy to achievement with mastery partialed stayed similar in its strength across grade levels from

elementary (.309), to middle school (.301), to high school (.244), and post-secondary (.336).

Across grade levels, the relationship between mastery goal orientation and achievement was strongest for middle school (.178) and high school students (.152), and weakest for post-secondary students (.096). This relationship appeared low, but detectable as well for elementary students (.102).

The relationship between performance goal orientation and achievement appears to differ across grade levels. All aggregated effect sizes showed a statistically detectable relationship except performance orientation and achievement's at the elementary school level (-.023). However, a positive relationship was detected for high school (.121). Relationships for performance goal orientation and achievement were also detected at the post-secondary and middle school levels, but at very low levels (.051 and .047 respectively).

The following mean effect size relationships were found to be homogeneous at $p<.01$. At the elementary school level the relationship of mastery goal orientation and achievement (.102); at the middle school level the relationship between self-efficacy and achievement (.358); at the high school level the relationship between performance goal orientation and achievement (.121); and, at the elementary (.309), middle school (.301) and high school (.244) levels self-efficacy's relationship with achievement, with mastery statistically removed. The post-secondary level's high Q values show that results may not be as reliable. Self-efficacy and goal orientations' relationships with achievement might be more complex at the post-secondary level.

Chapter Five: Discussion

This study uncovered a number of interesting findings.

Relationship of self-efficacy and achievement motivation with achievement

Students' sense of competence to succeed, namely their academic self-efficacy, and orientations towards goals for mastery both relate positively to achievement. However, self-efficacy was found to be related more strongly to achievement. This finding supports previous research, which indicates that students' self-efficacy is one of the psycho-social constructs most highly related to achievement (e.g. Bembenutty, 2000; Karabenick, 2004; Merritte, 1999; Mizelle & Hart, 1993; Roeser, Midgley, & Urdan, 1996; Salili, 2001; Wolters, Yu & Pintrich, 1996; Wolters, 2004). A previous meta-analysis analyzing self-efficacy's relation to achievement in 36 studies, dating from 1977 to 1988, also reported self-efficacy's strong relation to achievement (See Multon, Brown & Lent, 1991).

Bandura (1986) warns that self-efficacy is best measured in task-specific environments. Consequently, it may be that questions measuring goal orientations should be constructed with better consistency of context as well. For instance in Midgley et al's (1998) Patterns of Adaptive Learning Scales (PALS), measurement for self-efficacy mention "in this class" or "in class" or "class" for four of the five statements. Whereas, for PALS' mastery goal orientation scale none of the five questions mention "in this class" and only two mention "class" (e.g. "One of my goals in class is to learn as much as

I can.", p. 11). For PALS' measurement of performance-approach goal orientation the specific context is even more ambiguous. Four of the five statements refer to "my class" and one to "class work" instead of "in this class". Goal orientation scales may need to be made more specific in terms of context. Similarly, this study aggregated and then averaged different achievement measures to obtain one achievement measure for each study. While some studies used only one measure of achievement, such as grade-point-average, others used more than one (See Appendix B). While Multon, Brown and Lent's (1991) meta-analysis on self-efficacy and its relationship with performance outcomes compared type of performance measures used by investigators, this meta-analysis did not. Future research could examine this further.

Research on achievement motivation suggests that mastery orientation is moderately correlated to achievement (See Bell & Kozlowski, 2002; Brookhart, & Durkin, 2003; Curda, 1997; Dermitzaki & Efklides, 2003; Patrick, Ryan & Pintrich, 199; Salili, Chiu & Lai, 2001). However, this meta-analysis of 48 studies found the relationship between mastery orientation and achievement substantially lower with an effect size at 0.124 compared to that relating self-efficacy and performance goal orientation's effect size at 0.149 (See Table 4). Mastery goal orientation did not have as strong a relationship with achievement as originally hypothesized.

Mastery orientation as a moderator of the relationship between self-efficacy and achievement

Self-efficacy and mastery goal orientation are usually found to be powerfully related (see Kozlowski et al., 2001; Linnenbrink, 2005; Wey 1998; Ryan, Patrick & Shim, 2005). This study statistically removed mastery orientation from the relationship between self-efficacy and achievement. The expectation was that this procedure would lower the relationship between self-efficacy to achievement below that of the relationship between mastery orientation and achievement. This result failed to materialize.

Therefore, self-efficacy most likely has its own substantive predictive power regarding achievement behavior. For instance, students who think they will do well in a subject usually achieve, and those who have achieved in a subject in the past, usually feel that they are destined to achieve again. Schunk (1984) claims that one's past performance can influence their judgments of self-efficacy in a given context.

Differences of relationships across grade levels

This study also found differences in the nature of relationships between self-efficacy and achievement motivation with achievement across grade levels. In particular, the relationship between self-efficacy and achievement appeared strong for each school level. However, the relationship between achievement motivation and achievement differed markedly. For instance, mastery goal orientation and achievement was strongest for those students at the middle school level. The relationship between performance goal orientation and achievement was highest for high school students.

Self-efficacy may be an overarching and stable construct within educational settings. For instance, high-achieving students may be more likely to succeed in more

than one academic arena and throughout their educational careers. Students may maintain a relatively constant level of self-efficacy. Consequently, the relationship between self-efficacy and achievement may remain stable over time.

In contrast, students' levels of achievement motivation (mastery and performance goal orientations) may be highly influenced by differing environmental influences, such as classroom goal structures (Wolters, 2004). For instance, how each teacher sets up their classroom environment and goals, to be focused on mastery learning or performance results, may drive students' goal orientation choice for that class. This meta-analysis found that students with mastery goal orientation seemed to achieve higher in middle school and high school rather than elementary and post-secondary. In addition, the relationship between performance orientation and achievement was strongest at the high school level. Students who elicit performance orientation desire to outperform others through competition. A culture of competition may be evident at the high school level. As such, students who seek to outperform peers may be those who achieve highest.

Interestingly, seemingly weak relationships for both mastery goal orientation and especially performance goal orientations with achievement were found at the post-secondary level. This finding may be a consequence of the complexity of the goal orientation-achievement relationship at the post-secondary level; achievement in university may require a combination of goal orientations. While this study treated mastery and performance goal orientation separately, research has suggested that students may hold both mastery and performance goal orientations at the same time. Specifically, correlational research has shown a positive or orthogonal relation between the two (See Harackiewicz, Barron & Elliot, 1998 for a review). These combinations may produce

different effects on achievement across grade levels. Additional research could explore this further, and specifically at the post-secondary level.

Practical implications

Students' level of academic self-efficacy and goal orientation are related to their achievement. Achievement is crucial to student academic success and retention. Students who do not academically achieve may choose to dropout of the education system. This negatively impacts society, the institution, as well as the students. For instance, educational attainment has been tied to higher social-economic status, higher earnings, and greater productivity. Findings from Census 2001 indicate that 60% of those in the top income category in Canada possess a university degree compared to more than 60% of lower earners having a high school education or less (Statistics Canada, 2004).

Completing high school and post-secondary studies may not only be extrinsically rewarding but intrinsically as well. Getting an education may provide a person with immeasurable personal and social opportunities. Failing to achieve may prevent these, as well as other possible prospects. By comparing the relationships between self-efficacy and achievement motivation with achievement, educators may better discern what most strongly relates to student success. This meta-analysis found that self-efficacy is related strongest with achievement even after mastery goal orientation is removed. Therefore, educators should continue to examine productive ways to foster self-efficacy in students.

While mastery goal orientation was consistently found to be moderately related to self-efficacy across grade levels, mastery goal orientation's relationship with achievement was weak in elementary school (.102) and at the post-secondary level

(.096). Therefore, researchers may want to target these grade levels for future exploratory research.

Bandura (1986) claims individuals may regard themselves as highly efficacious in one activity and not very efficacious in another; that is , self-efficacy is context specific. Researchers may want to similarly develop more situation-specific achievement motivation scales. This may be especially important at the elementary school level where students may not easily understand questionnaire statements' implications of context. In creating more task-specific goal orientation measures, researchers may find that mastery goal orientation is more strongly related to achievement than presently known.

Cognitive factors, such as learning strategies of rehearsal, elaboration, organization, and meta-cognitive self-regulation, and their relationship with achievement may be even more covert at the post-secondary level. A future meta-analysis could focus on cognitive factors and their relationship with achievement. Self-regulated learning strategies, along with goal orientation, might be chosen as cognitive factors. In so doing, the compositional nature of the cognitive and achievement relationship might be more fully understood and conceptualized.

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Appendices

Appendix A: Effect sizes

Table 6. Coded effect sizes for the relationships examined in the meta-analysis

			Effect sizes (ES_{Zr})[b]					
First Author	Level[a]	N	SE/ MGO	SE/ PGO	SE/ ACH	MGO/ ACH	PGO/ ACH	SE(M)/ ACH
Bell	PS	125	0.277	-0.030	0.458	0.169	-0.091	0.421
Bembenutty	PS	102	0.497	0.388	0.758	0.203	0.172	0.720
Bembenutty	PS	364	0.709	0.010	0.172	0.020	0.172	0.202
Brookhart	High	13	0.058	-0.043	0.122	0.386	0.220	0.171
Brookhart	High	23	0.002	-0.040	0.398	0.107	0.012	0.394
Brookhart	High	34	0.331	0.398	0.313	-0.033	-0.033	0.338
Chen	PS	174	0.354	0.121	0.193	0.105	0.055	0.166
Chen	PS	323	0.245	-0.020	0.321	0.111	0.005	0.302
Curda	PS	197	0.460	0.121	0.121	-0.090	-0.090	0.178
Dermitzaki	Middle	512	0.326	0.234	0.362	0.206	0.058	0.308
Diefendorff	PS	105	0.321	-0.070	0.213	0.025	0.045	0.216
Elliot	PS	178	0.377	0.203	0.239	0.096		0.218
Ford	PS	93	0.321	-0.277	0.412	0.151	-0.224	0.378
Garcia	PS	339	0.377		0.245	0.110		0.218
Harackiewicz	PS	311	-.010	0.110	0.811	-0.070	0.130	0.810
Holladay	PS	82	0.400	0.060	0.172	0.030	-0.111	0.174
Horn	Elem.	105	0.576		0.315	0.230		0.215
Howey	PS	141	0.709	0.563	0.010	-0.080	-0.010	0.074
Howey	PS	287	0.332	0.497	0.080	0.010	0.110	0.081
Karabenick	PS	852	0.564	0.155	0.281	0.170	0.056	0.222
Karabenick	PS	883	0.486	0.145	0.539	0.098	-0.023	0.552
Lee	PS	262	0.887	0.604	0.121	-0.010	0.161	0.182
Linnenbrink	Elem.	237	0.436	0.182	0.277	0.121	-0.040	0.247
McCollum	PS	128	0.725		0.590	0.424		0.376
Middleton	Middle	512	0.497	0.060	0.234	0.141	0.010	0.189
Middleton	Elem.	525	0.460	-0.010	0.192	-0.020	-0.110	0.224
Mizelle	Middle	226	0.811	0.400	0.349	0.307	0.281	0.179
Nichols	High	62	0.685	-0.161	0.332	0.272	0.131	0.270
Patrick	Middle	219	0.503	-0.199	0.366	0.087	-0.200	0.361
Patrick	Middle	226	0.511	-0.165	0.362	0.087	-0.064	0.362
Phillips	PS	330	0.192	-0.151	0.349	0.106	-0.040	0.333
Roeser	Middle	296	0.741	0.192	0.418	0.315	0.161	0.267
Ryan	Elem.	474	0.618	-0.040	0.392	0.165	-0.050	0.356
Salili	High	66	0.213	0.424	0.192	-0.141	0.131	0.228
Salili	High	217	0.310	0.288	0.365	0.172	0.182	0.324

			Effect sizes (ES_{Zr})[b]					
First Author	Level[a]	N	SE/ MGO	SE/ PGO	SE/ ACH	MGO/ ACH	PGO/ ACH	SE(M)/ ACH
Salili	High	288	0.536	0.141	0.497	0.182	0.060	0.456
Senko	PS	166	0.213	0.030	0.110	0.090	0.224	0.093
Senko	PS	207	0.065	0.187	0.306	-0.050	0.161	0.310
Skaalvik	Elem.	434	0.224	0.234	0.424	0.090	0.141	0.412
Stansbury	PS	154	0.770	0.249	0.423	0.328	0.061	0.260
Stansbury	PS	68	1.018	0.118	0.204	0.004	0.328	0.276
VandeWalle	PS	95	0.299	0.161	0.301	0.177	0.015	0.256
Wahlstrom	High	210	0.288	0.255	0.020	0.121	-0.121	-0.014
Wentzel	Middle	216	0.332	-0.060	0.412	0.192	-0.151	0.363
Wentzel	Elem.	290	0.332	-0.060	0.365	0.182	-0.050	0.319
Wey	High	356	0.604	0.424	0.424	0.321	0.234	0.284
Wolters	Middle	434	0.507	0.121	0.369	0.045	-0.009	0.395
Wolters	Middle	525	0.590	0.203	0.409	0.237	0.182	0.317

[a]Please note: Elem. refers to Elementary school level; Middle to Middle school level; High to High school level; and PS to Post-Secondary school level.

[b]SE/MGO refers to self-efficacy-mastery goal orientation; SE/PGO refers to self-efficacy-performance goal orientation; SE/ACH refers to self-efficacy-achievement; MGO/ACH refers to mastery goal orientation-achievement; PGO/ACH refers to performance goal orientation-achievement; and SE(M)/ACH refers to self-efficacy-achievement with mastery goal orientation removed.

Appendix B: Publications in this study

Table 7. Publication type, sample size, racial and gender composition, grade level, and achievement task(s) for studies in the meta-analysis

First Author (Year)	Type	n	% White	% Female	Grade Level	Achievement Task(s)
Bell (2002)	Journal	125	n/a	58	University	Performance task Knowledge Test Ability Test
Bembenutty (2000)	Conf.	364	74	60	University	Final Course Grade
Bembenutty (2001)	Conf.	102	65.69	60.78	University	Self-Reported GPA
Brookhart (2003)	Journal	23	N/A	N/A	HS	America Test Civil War Gp. Project Games Group Project JFK Group Project
Brookhart (2003)	Journal	13	N/A	N/A	HS	Early Philosophy Test Phil. Presentation Hindu Gp. Presentation Current Issues Project
Brookhart (2003)	Journal	34	N/A	N/A	HS	Renaissance Quiz Hobbes & Locke Write Industrial Age Game WWII Performance
Chen (2000)	Journal	174	N/A	78	University	Mid-semester Exam SAT – Cog. Ability
Chen (2000)	Journal	323	N/A	78	University	Mid-semester Exam
Curda (1997)	Dissert.	197	75.6	69.5	University	Midterm Exam
Dermitzaki (2003)	Journal	512	100	50.98	Mid School	Math Quiz SAT – H.S. Math
Diefendorff (2004)	Journal	105	N/A	78	University	WonderlicPIT 3 Exams
Elliot (1997)	Journal	178	N/A	59.8	University	Grade in Course
Ford (1998)	Journal	93	N/A	N/A		Transfer Performance
Garcia (1996)	Journal	339	N/A	58.6	University	Final Course Grade
Harackiewicz (1997)	Journal	311	N/A	63.99	University	Final Course Grade
Holladay (2003)	Journal	82	N/A	56.1	University	Training Performance General Cog. Ability
Horn (1993)	Dissert.	105	N/A	55.24	Elementary	General Ability ACT Lab Grade Lecture-Exam Knowledge Structure
Howey (1999)	Dissert.	287	N/A	N/A	Com. Coll.	Class Grade
Howey (1999)	Dissert.	141	N/A	N/A	Com. Coll.	Class Grade
Karabenick (2003)	Journal	883	N/A	51	University	Class Exam week 6
Karabenick (2004)	Journal	852	74	60	University	Class Test
Lee (1997)	Dissert.	262	0	69.08	University	Course Grade
Linnenbrink (2005)	Journal	237	44.3	48.52	Elementary	Pretest Math
McCollum (2003)	Journal	128	N/A	67.19	University	Final Course Grade
Middleton (2002)	Journal	512	41	52	Mid School	Math Prior Ach.
Middleton (1997)	Journal	525	47	51	Elementary	Prior Achievement
Mizelle (1993)	Conf.	226	92.92	47.79	Mid School	Social Studies Test Iowa Test Basic Skills

First Author (Year)	Type	n	% White	% Female	Grade Level	Achievement Task(s)
						Cognitive Ability Test
Nichols (1994)	Journal	62	85.48	50	HS	Post-test
Patrick (1999)	Journal	226	95	100	Mid.School	Final Grade Math
						Final Grade English
						Final Grade Socials
Patrick (1999)	Journal	219	95	0	Mid. School	Final Grade Math
						Final Grade English
						Final Grade Socials
Phillips (1997)	Journal	330	N/A	72	University	Midterm – Average
						ACT/SAT
Roeser (1996)	Journal	296	87	49.6	Mid. School	GPA Grade 8
						GPA Grade 6
Ryan (2005)	Journal	474	N/A	50	Elementary	Final Math Grade
						Ill.SAT
						Gr. 7 Math Grade
						Math Test Grade 7
Salili (2001)	Chapter	217	0	N/A	HS	Eng., Math, S.S. Exam
Salili (2001)	Chapter	66	0	N/A	HS	Eng., Math, S.S. Exam
Salili (2001)	Chapter	288	100	N/A	HS	Eng., Math, S.S. Exam
Senko (2005)	Journal	166	N/A	62.05	University	Early Math Exam
Senko (2005)	Journal	207	N/A	51.21	University	Early Math Exam
						Early Math Exam
Skaalvik (1996)	Journal	434	100	N/A	Elementary	General Math Test
Stansbury (1997)	Dissert.	154	100	N/A	University	Prior Ach, Final Grade
Stansbury (1997)	Dissert.	68	0	N/A	University	Prior Ach, Final Grade
VandeWalle (2001)	Journal	95	N/A	N/A	University	SAT
						2nd Exam in Business
Wahlstrom (2001)	Conf.	210	84	5	HS	Self-Reported GPA
Wentzel (1996)	Journal	290	92	47.9	Elementary	Final English Grade
Wentzel (1996)	Journal	216	N/A	N/A	Mid. School	Final English Grade
Wey (1998)	Dissert.	356	0	67.42	HS	Writing Test
						First Semester Math
Wolters (1996)	Journal	434	95	51.84	Mid. School	Grade
						First Sem. English
	Journal	434	95	51.84		Grade
						F.S. Social Studies
	Journal	434	95	51.84		Grade
Wolters (2004)	Journal	525	69	52	Mid. School	Final Course Grade
						SAT – Math

Appendix C: Study coding form

STUDY CODING FORM [VARIABLE NAMES IN BRACKETS]

Bibliographic reference: _____

_____

_____ 1. Study ID number [STUDYID]
_____ 2. Number of Experiments in Study [NUMEX]
_____ 3. Experiment Sequence Number [EXSNUM] (e.g. 1st or 2nd or possibly 3rd experiment in study)
_____ 4. Publication Year [PUBYEAR]
_____ 5. Type of Publication [PUBTYPE] (e.g., 1. journal article, 2. book chapter, 3. dissertation, 4. other)

Sample Descriptors

_____ 6. Number of Participants [n]
_____ 7. Percent White [WHITE]; put in x if not given
_____ 8. Percent Female [FEMALE]; put in x if not given
_____ 9. Lowest Grade [LOWGRADE]
_____ 10. Highest Grade [HIGHGRADE]; 14 if University or College
_____ 11. Grade Level [GRLEV] (e.g., 1. Elementary 4-6, 2. Middle school 7-9, 3. High school 10-12, 4. University or college)
_____ 12. Nation [NATION] (use free text, e.g. USA, 2. CANADA, 3. NORWAY, 4. TAIWAN, 5. GREECE, 6. HONG KONG, 7. KOREA, 8. HOLLAND, keep listing what you find)
_____ 13. Self-Efficacy Variable Name [SENAME] (e.g., 1. self-efficacy, 2. perceived-competence, 3. competence-expectancy)
_____ 14. Type of Self-efficacy [TYPESE] (e.g., 1. domain specific self-efficacy, such as math self-efficacy 2. general academic self-efficacy (not specific to the course subject or task).
_____ 15. Minimum Self-Efficacy Value [MINSE]
_____ 16. Maximum Self-Efficacy Value [MAXSE]
_____ 17. Mastery Variable Name [MNAME] (e.g., 1. mastery or personal mastery, 2. learning, 3. task or task-focused, 4. intrinsic)
_____ 18. Minimum Mastery Goal Orientation Value [MINMGO]
_____ 19. Maximum Mastery Goal Orientation Value [MAXMGO]
_____ 20. Performance Variable Name [PNAME] (e.g., 1.performance or performance-approach, 2. extrinsic or personal 3. extrinsic, 4. ego or self-enhancing ego, 5. ability-focused)
_____ 21. Minimum Performance Goal Orientation Value [MINPGO]
_____ 22. Maximum Performance Goal Orientation Value [MAXPGO]
_____ 23. Achievement Variable [ACHNAME] (e.g., 1. final course grade, 2. graded performance, 3. training performance, 4. English grade, 5. math performance, 6. study results, 7. test performance, 8. Ability/SAT, 9. prior standing test, 10. average grade in last term exam marks.)
_____ 24. Minimum Achievement Value [MINACH]
_____ 25. Maximum Achievement Value [MAXACH]
_____ 26. Type of Subjects (use free text, e.g., normal achieving, high achieving, ADHD, and so on)

Dependent Measure Descriptors

_____ 27. Dependent Variable [DEPEND.VA] (e.g., 1. grade in class (e.g., final course grade, graded performance, training performance, English grade, math performance, study results, test performance), 2. GPA or average grade in last term marks, or prior standing test, 3. Ability/SAT [SCORE])
_____ 28. Study Quality Ratings [STQUAL] (use free text)
_____ 29. Type of Achievement Measures [ACHMEAS] (use free text, e.g., small quiz, full-course grade)
_____ 30. Course Type [COURSE] (e.g., 1. English, 2. Math, 3. Social Studies (History/Philosophy/World Cultures), 4. Elementary Grade, 5. High School Grade, 6. University level

Means and Standard Deviations

_____ 31. Self-Efficacy Mean [SEMEAN]
_____ 32. Self-Efficacy Standard Deviation [SESD]
_____ 33. Mastery Goal Orientation Mean [MASTMEAN]
_____ 34. Mastery Goal Orientation Standard Deviation [MASTSD]
_____ 35. Performance Goal Orientation Mean [PERFMEAN]
_____ 36. Performance Goal Orientation Standard Deviation [PERFSD]
_____ 37. Achievement Mean [ACHMEAN]
_____ 38. Achievement Standard Deviation [ACHSD]

Effect Size Data

Correlations

_____
_____ 39. Self-Efficacy/Mastery Goal Orientation [SE/MGO]
_____ 40. Self-Efficacy/Performance Goal Orientation [SE/PGO]
_____ 41. Self-Efficacy/Achievement [SE/ACH]
_____ 42. Mastery Goal Orientation/Achievement [MGO/ACH]
_____ 43. Performance Goal Orientation/Achievement [PGO/ACH]

Semi-Partial Correlations

_____ 44. Self-Efficacy (Mastery)/Achievement [SE(M)/ACH]
_____ 45. Self-Efficacy (Performance Goal Orientation)/Achievement [SE(P)/ACH]

Z scores (from r to z)

_____
_____ 46. Self-Efficacy/Mastery Goal Orientation [ZscSE/MGO]
_____ 47. Self-Efficacy/Performance Goal Orientation [ZscSE/PGO]
_____ 48. Self-Efficacy/Achievement [ZscSE/ACH]
_____ 49. Mastery Goal Orientation/Achievement [ZscMGO/ACH]
_____ 50. Performance Goal Orientation/Achievement [ZscPGO/ACH]
_____ 51. Self-Efficacy (Mastery)/Achievement [ZscSE(M)/ACH]
_____ 52. Self-Efficacy (Performance Goal Orientation)/Achievement [ZscSE(P)/ACH]

Reliability of Study

_____ 53. Reliability Type (use full text, e.g., alpha, test-retest)
_____ 54. Self-Efficacy Reliability Value [SERELI]
_____ 55. Mastery Goal Orientation Reliability Value [MGORELI]
_____ 56. Performance Goal Orientation Reliability Value [PGORELI]
_____ 57. Achievement Reliability Value [ACHRELI]

Type of Survey Used

_____ 58. Self-efficacy Survey's first Author
_____ 59. Self-efficacy Survey's name: 1. PALS, 2. MSLQ, 3. OTHER
_____ 60. Goal orientation Survey's first author
_____ 61. Goal orientation Survey's name: 1. PALS, 2. MSLQ, 3. OTHER