SELF-REGULATION THROUGH GOAL SETTING AND REFLECTIVE PRACTICE: IMPACT ON STUDENTS’ PERCEIVED SCHOLASTIC COMPETENCY AND MOTIVATION IN NINTH-GRADE MATHEMATICS CLASSROOMS

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IMPACT ON STUDENTS’ PERCEIVED SCHOLASTIC COMPETENCY AND
MOTIVATION IN NINTH-GRADE MATHEMATICS CLASSROOMS

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SELF-REGULATION THROUGH GOAL SETTING AND REFLECTIVE PRACTICE: IMPACT ON STUDENTS’ PERCEIVED SCHOLASTIC COMPETENCY AND MOTIVATION IN NINTH-GRADE MATH CLASSROOMS

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Abstract

The purpose of this study was to explore the impact of self-regulatory practices on scholastic competency and motivation in the classroom. Research on goal orientation theory indicates that students who have power over their learning will become more competent and motivated. Data were collected using an exploratory sequential mixed-methods design. The treatment group was comprised of ninth-grade mathematics students who received a goal setting and reflection treatment that was embedded in their mathematics unit of study and a comparison group where students received standard mathematics instruction. For the quantitative portion of the study, data were collected using a pretest/posttest method. Each student participant completed two instruments that measured scholastic competency and motivation within the classroom. For the qualitative portion of the study, students were interviewed in order to better understand the findings of the quantitative data. Findings were analyzed and while there were no statistically significant results that the self-regulatory practices of goal setting and reflection impact students’ perceptions of scholastic competency and motivation in the classroom, qualitative findings emerged that inform current educators on the implications of self-regulatory strategies and suggestions for future research.
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DEDICATION

This dissertation is dedicated to my daughter, Reagan. I’ve dreamt of you for as long as I can remember. Every decision I’ve made in my life has led me to you and becoming your mother. You were my motivation in the final hours of this academic marathon. I wish for you to have a life full of adventure, wonder, confidence, and motivation; for you are my greatest adventure.
# TABLE OF CONTENTS

## CHAPTER ONE: INTRODUCTION TO THE STUDY

- Rationale .................................................................................................................. 2
- Statement of the Problem .......................................................................................... 2
- Significance of the Study .......................................................................................... 4
- Potential Benefits ...................................................................................................... 4
- Definition of Key Terms ........................................................................................... 4

## CHAPTER TWO: REVIEW OF RELATED LITERATURE

- Grade Nine and On-Track Graduation ......................................................................... 8
- Social Cognitive Theory and Self-Efficacy .................................................................. 12
- Self-Regulation and Goal-Setting .............................................................................. 16
- Goal Orientation ........................................................................................................ 18
- Scholastic Competence and Motivation ..................................................................... 20
- Summary .................................................................................................................... 24

## CHAPTER THREE: METHODOLOGY

- Description of the Setting, Participants, and Sampling Procedures .......................... 26
- Research Design ........................................................................................................ 34
- Research Questions and Hypotheses .......................................................................... 35
  - Research Question 1 .............................................................................................. 36
  - Research Question 2 .............................................................................................. 38
- Description of Intervention ......................................................................................... 38
- Teacher Professional Development and Training ...................................................... 39
- Treatment Protocol for Student Participants ............................................................ 40
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of Instruments</td>
<td>41</td>
</tr>
<tr>
<td>Demographic Surveys</td>
<td>41</td>
</tr>
<tr>
<td>Scale of Intrinsic versus Extrinsic Orientation in the Classroom</td>
<td>42</td>
</tr>
<tr>
<td>Self-perception Profile for Adolescents (ages 14–19) Instrument</td>
<td>43</td>
</tr>
<tr>
<td>Data Collection</td>
<td>44</td>
</tr>
<tr>
<td>Data Collection and Procedures</td>
<td>45</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>46</td>
</tr>
<tr>
<td>Quantitative</td>
<td>46</td>
</tr>
<tr>
<td>Qualitative</td>
<td>47</td>
</tr>
<tr>
<td>Statement of Ethics</td>
<td>48</td>
</tr>
<tr>
<td>CHAPTER FOUR: ANALYSIS OF DATA AND FINDINGS</td>
<td>49</td>
</tr>
<tr>
<td>Research Question 1 Analysis</td>
<td>51</td>
</tr>
<tr>
<td>Research Question 2 Analysis</td>
<td>73</td>
</tr>
<tr>
<td>Results of Qualitative Data Analysis</td>
<td>77</td>
</tr>
<tr>
<td>Results of Semi-Structured Interviews</td>
<td>77</td>
</tr>
<tr>
<td>Discussion of Categories and Themes</td>
<td>78</td>
</tr>
<tr>
<td>Conclusion</td>
<td>92</td>
</tr>
<tr>
<td>CHAPTER FIVE: SUMMARY AND CONCLUSIONS</td>
<td>93</td>
</tr>
<tr>
<td>Discussion of Results</td>
<td>94</td>
</tr>
<tr>
<td>Findings and Implications</td>
<td>101</td>
</tr>
<tr>
<td>Research Question 1</td>
<td>102</td>
</tr>
<tr>
<td>Research Question 2</td>
<td>110</td>
</tr>
<tr>
<td>Limitations of the Study</td>
<td>116</td>
</tr>
</tbody>
</table>
Table 11: Box’s Test of Equality of Covariance Matrices for Pretest Scores ............... 58
Table 12: Levene’s Test of Equality of Error Variances for Pretest Scores ............... 58
Table 13: Results for a Multivariate Analysis of Variance Test for Pretest Scores ....... 59
Table 14: Test of Between-Subject Effects for Pretest Mean Scores ....................... 60
Table 15: Shapiro-Wilk Test of Normality for Posttest Scores ................................ 66
Table 16: Descriptive Statistics for Posttest Scores .............................................. 67
Table 17: Bivariate Correlations for Posttest Scores ............................................. 68
Table 18: Box’s Test of Equality of Covariance Matrices for Posttest Scores .......... 69
Table 19: Levene’s Test of Equality of Error Variances for Posttest Scores .............. 69
Table 20: Results for a Multivariate Analysis of Variance Test for Posttest Scores .... 70
Table 21: Test of Between-Subject Effects for Posttest Mean Scores ....................... 71
Table 22: Description of Grade Nine Algebra I Student Participants in Case Study ...... 76
Table 23: Implication for Educators and Future Research for Research Question 1 ..... 108
Table 24: Implication for Educators and Future Research for Research Question 2 ..... 115

List of Figures

Figure 1: Stem and Leaf Plot for Posttest Mastery Subscale by Group ....................... 62
Figure 2: Stem and Leaf Plot for Posttest Scholastic Competence Subscale by Group . 63
Figure 3: Stem and Leaf Plot for Posttest Mastery Subscale by Course ....................... 64
Figure 4: Stem and Leaf Plot for Posttest Scholastic Competence Subscale by Course . 65
Figure 5: Graph depicting treatment and course interaction .................................... 72
CHAPTER ONE: INTRODUCTION TO THE STUDY

Individualizing goal setting and reflection practices allow students the time to think more deeply about their learning process rather than focusing on the overall grade (Elliot & Harackiewicz, 1994; Lin-Siegler, Dweck, & Cohen, 2016). Research indicates that students’ perceptions of their academic experience are critical to the field of education (Cleary & Zimmerman, 2004). This study explored the impact of goal setting and reflection on perceived scholastic competency and self-reported orientation of intrinsic vs. extrinsic motivation in the classroom. The participants in this study were grade 9 mathematics students and self-perception of scholastic competence and motivation in the classroom were explored.

Goal setting is widely viewed as a way for students to grow academically (Zimmerman, 1990). The process of combining reflection with goal setting is a practice for metacognition and the development of self-efficacy (Bandura, 1988; Schunk, 1990; Zimmerman, 2002). A number of researchers have investigated the pertinence of goal setting to academic achievement (Greene & Miller, 1996; Kitsantas & Cleary, 2016). However, limited research has been conducted to explore its relationship to competency and motivation.

This study investigated the relationship between the self-regulatory practices of goal setting and reflection on students’ perceptions of their scholastic competency and motivation in the classroom. The researcher used the Self-Perception Profile for Adolescents (Ages 14–19) instrument to assess perceived scholastic competency (Harter, 1981a). Scholastic competence is one of nine subscales in this measurement that assesses students’ perceptions of how they view their whole self. Additionally, the researcher measured intrinsic and extrinsic motivation in the classroom using Susan Harter’s Scale of Intrinsic versus Extrinsic Orientation in the Classroom (Harter, 2012), which contains five subscales, three of which measure motivation in the
Harter’s (2012) intention in creating this scale was to investigate what determines a student’s motivation for learning in a classroom. This study was used to analyze three subscales to measure for intrinsic versus extrinsic motivation, (a) Preference for Challenge vs. Preference for Easy Work Assigned, (b) Curiosity/Interest vs. Pleasing the Teacher/Getting Grades, and (c) Independent Mastery vs. Dependence on the Teacher (Harter, 2012).

Rationale

It has become critical to explore the impact of goal setting and reflection on adolescent students’ self-perceived motivation and competency as they develop academically (Harter, 1992, 2008). Self-efficacy, social cognitive theory (SCT), and self-regulation through goal setting and reflection, have all been linked to increased academic ability and motivation (Zimmerman, Bandura, & Martinez-Pons, 1992). Students who are empowered through goal setting, tracking, action planning, and reflection often have greater control over their learning than those who do not (Zimmerman, Bonner, & Kovach, 1996; Zimmerman, 2008). Research indicates that ninth grade students’ academic experience is critical in maintaining their motivation in the classroom and retention towards graduation (Allensworth & Easton, 2005). Educators have the potential to implement effective classroom strategies for self-regulated learning protocols that allow students to monitor their growth and learning experience.

Statement of the Problem

Self-regulatory practices such as goal setting and reflection traditionally have been associated with student achievement and self-efficacy (Usher & Kober, 2012; Zimmerman et al., 1992). The researcher determined after a review of the literature, that there is a gap in the research on how goal setting and reflection affect students’ self-perception as learners, and what motivates them in the classroom. A five-year longitudinal study was conducted with the purpose
of investigating the effects of student goal-setting and reflection portfolios regarding their impact on achievement (Moeller, Theiler, & Wu, 2012). The portfolios consisted of students collecting and tracking their assignments and assessments, goal setting, tracking, and reflection worksheets. This research suggests that involvement in goal setting and reflection on assignments and assessments supports students’ achievement and growth. Moeller et al. (2012) concluded that, though there have been studies connecting goal setting to student achievement and motivation, little experimental research has been conducted on the relationship of goal setting to perceived scholastic competency and motivation specific to the classroom.

Zimmerman (2002) explained that self-regulation includes forethought, action planning, and reflection. Cleary and Zimmerman’s (2004) Self-Regulation Empowerment Program (SREP) is a self-directed self-regulation program that involves cyclical feedback through goal setting, action planning, tracking, and reflection based on this three-step cyclical feedback process grounded in social cognitive theory (Cleary & Zimmerman, 2004). Cleary and Zimmerman (2004) examined this self-regulation model, a key component of which is having students take action to encourage their own learning success. Their model has not been tested using an experimental design, but data collected from case studies show that it might have had positive effects on student achievement and motivation (Cleary & Zimmerman, 2004).

However, beyond achievement, adolescent student development includes recognizing what motivates them in the classroom and how they perceive their competency when asked to complete a task (Greene & Miller, 1996; Harter, 2008). Greene and Miller (1996) indicate that, “future research efforts should attempt to clarify the relationship between perceived ability and learning goals in more direct ways” (p. 191).
Significance of the Study

Meaningful research has been conducted on self-regulatory practices designed to support student achievement and its relation to motivation in the field of education (Harter, 2015; Kitsantas & Cleary, 2016; Lepper, Corpus, & Iyengar, 2005). As student-centered learning practices and teacher evaluation paradigms shift, the question arises as to the significance of student involvement in forming their academic goals. Studies suggest that there be a focus on student self-regulation through creating personal goals and reflecting on the process to become more independent as learners (Bandura, 1986, 1988, 1997).

Potential Benefits

This study offers a potential benefit to educators because it will demonstrate how students can create individualized mastery goals and gain ownership of their learning through goal-setting and reflective practices. The potential benefit of this research is that the adapted SREP program will provide teachers with a researched-based Tier I intervention to support student learning. Finally, the SREP goal-setting program created by the researcher was adapted for mathematics, but can be used across all disciplines.

Definition of Key Terms

1. *Algebra I College Prep (CP)* emphasizes the study of functions with tables, graphs, verbal rules, and symbolic rules. Students will explore topics in solving linear equations and inequalities, Systems of Linear Functions Exponential Functions, Quadratic Functions, and topics in statistics. Practical application through the incorporation of word problems is required in this course.

2. *Algebra I Honors (H)* emphasizes the same study of functions from College Prep with in-depth exploration of how these functions relate to subsequent math courses with an
increase in pace and rigor. Students will explore topics in solving linear equations and inequalities, Systems of Linear Functions and Exponential Functions, Quadratic Functions, and topics in statistics. Practical application through the incorporation of word problems is required in this course.

3. *Common Unit Summative Assessment* (CUSA) is a summative post assessment created by school personnel and administered to a student upon the completion of a particular unit.

4. *Cyclical feedback* is a three-phase model of self-regulation. It includes the forethought phase (self-evaluation and goal setting); the performance phase (monitoring progress and adjusting behavior to reach desired effect); and the reflection phase (Panadero & Alonso-Tapia, 2014; Zimmerman, 2002).

5. *Goal setting* is the process of establishing clear and usable targets or objectives for learning (Moeller et al., 2012).

6. *Extrinsic motivation* in relation to the classroom is the degree to which grades, feedback, and dependence on the teacher motivate a student (Harter, 1981b).

7. *Intrinsic motivation* as it pertains to the classroom is the degree that curiosity, interest, and mastery motivate a student (Harter, 1981b).

8. *Mastery goals* focus on students’ individual action planning and are typically oriented toward helping students develop new skills, understand their own work, and achieve a sense of competency based on a set of standards. These goals are also known as achievement or learning goals (Senko, Hulleman, & Harackiewicz, 2011) and in this study will be referred to as learning goals.

9. *Motivation* is the impetus to be moved to do something (Ryan & Deci, 2000).
10. *Orientation of motivation* is to the degree to which internal or external forces motivate an individual (Ryan & Deci, 2000).

11. *Performance goals* are designed to compare one’s ability to that of others; the goal is considered reached when the individual outperforms others (Ames, 1992).

12. *Pre-Common Formative Assessments (PCFA)* are formative pre-assessments created by the school personnel and are used to assess students at the beginning of a unit.

13. *Scholastic competency* is a child’s perceived cognitive competency as applied to schoolwork (Harter, 2012; Harter, Whitesell, & Kowalski, 1992).

14. "*Self-regulated learning strategies* refer to actions and processes directed at acquisition of information or skills that involve agency, purpose, and instrumentality perceptions by learners" (Zimmerman, 1990, p. 5).

15. *Student Portfolios* are individual student folders for the treatment group so that students will keep goal setting and reflection materials.

16. *Tier I intervention* is an intervention that supports student learning in the classroom and progress is monitored (Fuchs & Fuchs, 2006).

17. *Tier II intervention* is an intervention that small groups of students for those in need of extra support on a specific goal. Students can be pulled from the classroom for more intensive sessions (Fuchs & Fuchs, 2006).
CHAPTER TWO: REVIEW OF RELATED LITERATURE

The review of literature is presented in four main sections with subsections. The first section includes research supporting the focus on grade nine and the indicators of on-track graduation. The following section provides a discussion of the components of the theoretical background for this study; Self-Efficacy, Social Cognitive Theory, and Self-Regulation. The third section presents goal setting and reflection. The fourth section addresses scholastic competence and motivation in the classroom. The final section presents a summary of the literature review.

The researcher utilized the following academic databases to conduct research for the first section: Google Scholar, EBSCHO Host Complete and ERIC. The researcher used a variety of search terms such as: (a) grade nine retention graduation, (b) grade nine on time graduation, and (c) specific authors, Allensworth and Easton, as they are leaders on the subject. To narrow the search, the researcher used advanced search settings and used the field selector to search “Abstract” only for search terms and limited the search for full text and peer reviewed. For the first search term, three results came back and one study was selected as relevant. For the second search term, 27 results came back and the researcher determined that one article and two research reports were relevant. Lastly, the third search term returned five articles, but only one was the specific study from Allensworth and Easton that was related to this research design.

For section two, the researcher used Google Scholar as the main database. The researcher used search terms that would help to return research that defined these theoretical frameworks and how they relate to self-regulation. The researcher used the following search terms: (a) definition of self-efficacy and social cognitive theories, (b) self-efficacy and self-regulation, (c) the specific author, Bandura, as he is an expert on the subject. To narrow the
search, the researcher used these search terms and began finding relevant articles, then used the “cited by” tool. By using this research tool saturation of information on these theoretical constructs was obtained as they are related to this study.

As the third section presents goal setting and reflection, the researcher supported these constructs by using the following search terms: (a) self-regulation and goal setting, (b) goal setting and reflection, (c) Self-regulation Empowerment Program (SREP). The fourth section was supported by the following search terms: (a) scholastic competency, (b) academic competency, (c) motivation in the classroom. By using these searcher terms, the researcher was able to make an initial attempt to find studies related to the constructs presented in the previous sections. The researcher continued to narrow down the results by setting parameters and using the “cited by” tool.

**Grade Nine and On-Track Graduation**

In the most recent data reported by the National Center of Education Statistics (NCES, 2017), the United States high school graduation rate was at 83%, up from 79% in 2010–11. The U.S. Department of Education began collecting these data in 2010–11 using the Adjusted Cohort Graduation Rate (ACGR) by requiring state agencies to report on-time (four-year) graduation to be calculated starting with incoming first-time freshman and then adjusted for adding incoming students or subtracting outgoing students. The ACGR is used to calculate cohorts that graduate within four years with a regular high school diploma (NCES, 2017).

Grade nine is a pivotal time for students as they transition from middle-school to high school and obtaining passing course credits in grade nine are predictors for on-time graduation (Allensworth & Easton, 2007). Bornsheuer and colleagues (2011) examined the relationship between ninth-grade retention and on-time graduation. Their study used a sample of
convenience totaling 1,202 students in a southeast Texas high school and collected data from high school transcripts then used a chi-square for analysis. Data were isolated to the population of students that did not obtain enough credits to move forward from grade nine to grade 10. The researchers also collected data on whether or not these students were able to recover the credits and graduate on-time (Bornsheuer, Polonyi, Andrews, Fore, & Onwuegbuzie, 2011). The analysis indicated that retention in ninth grade impacts on-time graduation rates. For example, 85.7% \((n = 181)\) of ninth graders who were retained were not likely to complete high school within four years with only 14.2% \((n = 30)\) graduating on time despite retention. Bornsheuer and colleagues (2011) also discovered that 85.9\% \((n = 851)\) of ninth graders who were promoted completed high school within four years with only 14.1% \((n = 140)\) not doing so despite being promoted.

As a result, this researcher has selected a grade nine student population as its focus for this study since the site selected has an on-time graduation rate in 2017 at 80.3% and in 2015–16, 306 students were retained across all grade 9–12 totaling 10.56% of the whole student body \(n = 2,926\). More specifically, 164 of the 856 \((19.14\%)\) students that entered with freshman status were retained, making the grade nine students the grade level with the highest number of students being retained compared to other grade levels (Martins, 2016).

Three main reasons that students fail to promote to grade 10 have been identified as attendance, behavior, and course performance (Bruce, Bridgeland, Fox, & Balfanz, 2011). Recent research from Hazel, Pfaff, Albanes, and Gallagher (2014) suggest that to increase high school graduation rates, schools need to focus on creating a positive transitional experience from middle school to high school. There are factors outside of school control, such as poverty, that predict drop-out rates, yet it is also important to identify school-related characteristics of students
that make up the population of at-risk students to create preventative supports (Hazel et al., 2014).

The purpose of Hazel and colleagues’ (2014) research was to promote initiatives for school based programming that supports on-time graduation for first time freshman. Findings of Hazel and colleagues’ (2014) were that increasing adult to student contact time to build relationships is beneficial to students. Specific examples of what school districts can do are: (a) using a team-based model, (b) having school-based advisory programming embedded in the schedule, (c) having freshman housed together separate from other grades for courses and lunch, and (d) scheduling a common planning time for teachers as a team and as departments (Hazel et al., 2014). The site in which this study was conducted already implemented these components by using a team-based model that was embedded with common planning time for teachers, freshman were located in one section of the school for the majority of their classes, and the entire school had advisory as part of their schedule. Therefore, this study intended to focus on in-classroom curriculum based supports to be put in place for freshmen.

To corroborate the necessity to continue research specific to high school freshmen, the studies conducted by Norbury et al. (2012), Hartman and colleagues (2011), and Allensworth and Easton (2007) focused on identifying predictor characteristics of students in grade nine that may be at risk of retention and those who are on-track for promotion to grade 10. Allensworth and Easton (2007) did original work with the University of Chicago and the Consortium on Chicago School research that outlines the characteristics of on-track students. To be considered on-track for graduation by the end of grade nine, a student needs at least five or more credits to have sophomore status and cannot earn a failing grade for more than one semester in a core course work; English, Mathematics, Social Studies, or Science, and has not had more than two
infractions for discipline (Allensworth & Easton, 2007). Findings indicated that the attendance and student behavior while in grade nine (studying and following school rules) are better predictors for on-track graduations than student profiles and test scores in reading and mathematics prior to high school (Allensworth & Easton, 2007). Furthermore, it was not only at-risk students who needed intervention and monitoring, but additionally students who had a grade point average (GPA) in the C– to D+ range with a failure for a core academic course were just as likely to go onto graduation as they were to not graduate on time (Allensworth & Easton, 2007). The researchers explored interventions at the classroom level (Tier I) to support all students since the freshmen participants were not among the lowest performers and therefore were often overlooked in the system.

Allensworth and Easton (2007), Hartman, Wilkins, Gregory, Gould, and D’Souza (2011) and Norbury et al. (2012), have conducted further research in Southeast Texas region and the Midwest region of the United States, respectively. A total of 12,662 grade-nine students were examined in Hartman and colleagues’ (2012) study in five districts in Texas. The purpose of their study was to determine if the predictors for on-time graduation with this population could be applied across racial/ethnic and socio-economic subgroups. The results of this study showed that the majority of non-repeating grade nine students were on track to graduate on time by the end of grade nine in all five school districts. These rates ranged from 61.2 to 86.0 percent. Therefore, students who were passing grade nine with at least the minimum number of credits to be promoted on-time to grade 10 had higher rates for on-time graduation than students who were off-track by the end of grade nine (Hartman et al., 2011). Furthermore, Hartman and colleagues (2011) report that “in four districts, the difference between on-time graduation rates for on-track and off-track students was 36.1–51.7 percentage points; the fifth district had a difference of 18.4
percentage points (p. IV). In summary, being able to accurately predict four-year graduation rates has become increasingly more accurate based on these grade-nine characteristics.

Specifically, ninth-grade students who had been retained were more than six times less likely not to graduate on time than were the ninth-grade students who had not been retained (Bornsheuer et al., 2011). In 2012, a study with the same purpose and methodology was conducted by Norbury and colleagues and had similar findings. After reviewing student academic transcripts, attendance records, free and reduced lunch states, and grade 8 student test scores in reading and mathematics, they found that in both participating districts the on-track indicator was a significant predictor of on-time high school graduation. Additionally, their data determined that students who were on-track by the end of their freshman year were 6.6 times more likely to graduate on-time than off-tracks students with similar characteristics in District A and 5.5 times more likely in District B (Norbury et al., 2012).

To summarize, ninth grade is a pivotal grade in terms of high school completion rates. Therefore, this study explored in-class supports of goal setting and self-regulation to promote student success in grade nine. As previously stated, the most important aspects of for on-time graduation is attending school and good behavior. This study intended to study beyond academic achievement and attempted to gain insight into student self-perception of scholastic competence and motivation in the classroom.

Social Cognitive Theory and Self-Efficacy

Schunk (1990) explains that Social Cognitive Theory (SCT) as it pertains to self-regulation is a theoretical construct with three general processes (a) self-observation, (b) self-judgment, and (c) self-reaction of which occur with feedback and support. Self-Efficacy is the belief that determines whether or not people believe they have the capability to attain the goal or
solve the task at hand (Schunk, 1990). Self-regulation and self-efficacy are embedded in the SCT framework because self-efficacy will help students determine whether or not they can perform or acquire knowledge through the self-regulation process (Schunk, 1990). “As students work on tasks, they observe their performances, evaluate goal progress, and continue their work or change their task approach. Self-evaluation of goal progress as satisfactory enhances feelings of efficacy, goal attainment leads students to set new challenging goals” (Schunk, 1990, p. 73).

Self-Efficacy is a main construct of Social Cognitive Theory (SCT) (Stajkovic & Luthans, 1979). In relation to self-regulatory practices such as goal setting and reflection, SCT supports the idea that setting goals increases peoples’ “cognitive and affective reactions to performance outcomes because goals specify the requirements for personal success” (Zimmerman et al., 1992, p. 664). While Stajkovic and Luthans’ (1979) research was focused on workplace motivation within an organization, their study helped to lay the groundwork for future exploration in other organizational structures where learning and motivation are paramount. Stajkovic and Luthans (1979) state that SCT explains behavior in organizations in terms of the reciprocal causation among the person (unique personal characteristics), the environment (consequences), and behavior (experiences with success or failure); given the triangulation of these three influences, all three constructs are equally impactful for the task at hand. Stajkovic and Luthans (1979) summarize the core of SCT as “(1) symbolizing, (2) forethought, (3) vicarious learning, (4) self-regulation, and (5) self-reflection” (p. 129).

A summary these five characteristics outlined in Stajkovic and Luthans (1979) is as follows. Symbolizing is the ability to transform visual experiences into guides for future actions from which people derive meaning, form, and duration to the past experiences. It is an action of making connections. Forethought is a self-regulatory strategy that helps people plan and
anticipate various course of actions for the near future. Vicarious learning through observation enables people to obtain and accumulate rules for different behavioral patterns without having to use trial and error. Self-regulatory capability, central to SCT, is a process of meeting a set of personal standards and self-evaluating reactions to a task; changing actions and processes as needed.

Self-reflective capabilities is the type of knowledge people gain from the ability to think and analyze their experience and thought processes. It is here that people make judgments of their capabilities and is also central to SCT because these types of perceptions are referred to as self-efficacy. This research focused on the characteristics related to self-efficacy and self-regulation. The characteristics most related to self-regulation determined by the researcher are forethought, self-regulation, and self-reflection. The treatment that is described in Chapter 3 is an adapted version of the Self-Regulation Empowerment Program that includes these three characteristics at its core (Cleary & Platten, 2012). Research findings on the SREP are highlighted in the Self-Regulation subsection in Chapter 2.

In the research presented on SCT, self-efficacy is described as central to SCT because perceptions of self-efficacy influence task choice, effort, persistence, resilience, and achievement (Bandura, 1997). Compared with students who doubt their learning capabilities, those who believe they are efficacious in regard to learning participate more, work harder, persevere, and achieve at a higher rate (Bandura, 1997). Bandura (1986, 1997) suggests that self-efficacy beliefs tend to decline as students advance from elementary grades to high school for several reasons. For example, competition, less teacher attention, stress emanating from transition, peer influence and comparison, and ability all impact one’s self-efficacy (Bandura, 1997). Specific to the transition from middle school to high school, students are forced to reassess their academic
abilities, as there is less attention by the teacher to individual progress and evaluation (Bandura, 1988). Coupled with the research on the need to support grade nine students, this researcher has worked within the theoretical frameworks of SCT and self-efficacy to support students further.

Self-regulatory practices like goal setting and reflection traditionally have been associated with student achievement and self-efficacy (Usher & Kober, 2012; Zimmerman et al., 1992). Stajkovic and Luthans (1979) define self-efficacy as “an individual’s belief (or confidence) about his or her abilities to mobilize motivation, cognitive resources, and courses of actions needed to successfully execute a specific task within a given context” (p. 126). Academic attainment depends on interactions between one’s behaviors (Zimmerman et al., 1992), personal thoughts and beliefs (Lepper et al., 2005), and environmental conditions (Self-Brown & Mathews, 2003). Learners appraise their self-efficacy based on their actual performances, vicarious experiences, feedback from others, and physiological reactions (Bandura, 1986; Bandura, 1997). The results of these aforementioned studies helped to inform the current research as self-regulation is associated with goal setting, reflection, and self-efficacy is related to motivation and perceived competence. Zimmerman and colleagues (1992) conducted a study using a pretest/posttest design with a sample ($n = 102$) of ninth grade social studies students in a lower-middle class community and data collected were analyzed using a path analysis. Their findings showed that personal goal setting played a key role in academic attainment and the previous school year’s grades in social studies were predictors of the grade related goals set by students and parents. The findings of Lepper and colleagues (2005) and Self-Brown and Mathews (2003) research led this researcher to a better understanding of Self-Regulation Theory (SRT) and Goal-Orientation Theory (GOT), which will be discussed in the following sections.
Self-Regulation and Goal-Setting

Albert Bandura (1988) and colleagues Cleary and Zimmerman (2004), have contributed to the development and understanding of self-regulation theory (SRT) and its application to teaching and learning through goal setting and reflective practices. According to SRT, individuals monitor their abilities and adjust to meet their goals. In so doing, people evaluate their ability to set a standard and create action steps to meet that goal. Self-reflection is a vital step in this process, as it forces one to readjust his or her action steps to successfully accomplish the task at hand (Stajkovic & Luthans, 1979). Students who are empowered through goal setting, tracking, action planning, and reflection often have greater control over their learning than those who do not (Zimmerman, 2008; Zimmerman, Bonner, & Kovach, 1996). More specifically, Stoeger and Ziegler (2005) conducted a six-week pretest/posttest study with a sample of 36 out of 1200 4th grade mathematics students who were identified as gifted underachievers in mathematics. Results reported that students in the treatment group (n = 15) showed increased effort and improved ability to self-regulate their learning as compared to the control group (Stoeger & Ziegler, 2005).

Zimmerman’s (1990, 2002) research on self-regulatory practices and achievement is widely focused on shifting teaching and learning cycles to student-centered learning. This connection between the self-regulatory practices in attainment and motivation grounds this study. Specifically, in a six-week goal setting treatment for learning disabled students, 61 junior high students participated in a pretest-posttest study. Results indicated that the experimental group learned to set realistic goals and to attribute achievement outcomes to the amount of personal effort expended (Tollefson, Tracy, Johnsen, Farmer, & Buenning, 1984). To continue, the research supports that supporting self-regulatory practices such as goal setting support academic
achievement. More specifically, Moeller et al.’s (2012) five-year longitudinal quasi-experimental study, that had a total sample of 1,273 across 23 high school Spanish classrooms, indicated that involvement in goal-setting and reflection on assignments and assessments supported students’ achievement and growth. However, it was the focus of this research to determine whether or not self-regulatory practices impact perceived scholastic competence and motivation in the classroom.

Since a breadth of research states that self-regulation supports academic achievement, it is important to note that Harter (2015) cited the need to explore self-regulation and its impact on the development of self and motivation. Specifically, Harter (2015) states that there is a need to inquire about the student’s role in goal setting and reflection, and its impact on perceived scholastic competency and motivation specific to the classroom environment and learning as part of the development of self. Adolescent student development includes recognizing what motivates them in the classroom and how they perceive their academic competency when asked to complete a task (Greene & Miller, 1996; Harter, 2008). Furthermore, Greene and Miller (1996) indicate that, “future research efforts should attempt to clarify the relationship between perceived [academic] ability and learning goals in more direct ways” (p. 191).

The research suggests that teacher and school psychologists report that students referred to academic interventions often have deficits with self-regulation and motivation (Cleary, Platten, & Nelson, 2008). More recent studies expanding on self-regulation have been conducted using the Self-Regulation Empowerment Program (SREP) developed by Cleary and Zimmerman (2004) for Tier II interventions. Cleary and colleagues (2008) conducted a pilot case study of the SREP as a Tier II intervention that requires pullouts from the classroom. In 2012, their mixed methods case study with a sample of four students enrolled in grade nine biology courses at an
urban high school, showed improved motivation and increased perceived ability of self-regulatory skills (Cleary & Platten, 2012). As a result of their study, future research was suggested to create a Tier I intervention protocol that can be used in the classroom as part of regular instruction to larger populations (Cleary & Platten, 2012; Cleary et al., 2008). The researcher created an adapted version of the SREP to be a Tier I or general classroom use intervention and was given permission by Timothy Cleary (Timothy Cleary, personal communication, December 22, 2016) and Barry Zimmerman (Barry Zimmerman, personal communication, December 17, 2016) to adapt their intervention for the current research study.

**Goal Orientation**

Goal orientation means that people either set mastery (learning) or performance goals. Senko et al. (2011) define mastery/learning goals as goals to improve competence through effort in order to gain understanding, while performance goals are to improve competence by outperforming others (Ames, 1992). Ames and Archer (1988) support that task goals versus performance goals will dictate the student’s self-perception in the classroom. Anderman and Midgely (1997) claim that in elementary school, students are more task-oriented; in middle school they become more performance-oriented.

Based on these findings, the researcher included sentence starters to support mastery goals as a part of the Self-Regulation Empowerment Program (SREP) goal setting and reflection treatment and incorporated a section for individualized teacher feedback. There has been debate over whether or not it matters if students are creating mastery or performance goals as they relate to achievement. While there are claims made that performance goals improve achievement, it has been recommended to move students forward from performance goals and continue working with mastery goals to support self-regulatory practices in education (Brophy, 2005). Research
indicates that, “mastery goals promote greater educational benefits than performance goals, especially for students harboring self-doubts” (Senko et al., 2011, p. 26). As a result of these findings, this study’s treatment included sentence starters to help develop learning goals rather than performance goals since the researcher intended to measure the impact on competence and motivation rather than achievement. However, it is important to note that the researcher did not determine or analyze the student goal types, as that was not the primary scope of this study because Senko and colleagues (2011) also expressed that in the end it does not necessarily matter what types of goals students are setting, as long as students are setting goals and reflecting on their own ability and individual growth rather than comparing themselves to others.

One specific example to support environments that encourage individualized goal setting and reflection was when Self-Brown and Mathews (2003) conducted a quantitative study that explored the effects of classroom structure on student goal orientation (mastery or performance). The study included three types of classrooms; contingency-contracts, token-economy, and control group with a sample of $n = 25$ fifth graders, $n = 18$ fourth graders, and $n = 28$ fifth graders, respectively. This study defined a “contingency-contract” structure as one based on reflection and revision of weekly goals. Students in classrooms based on this structure received stickers for individualized effort. The “token economy” structure employed a whole group competition and students were given “class bucks” to spend in on prizes based on performance. The third classroom was the control and did not employ any of these strategies.

Their study concluded that students in classrooms with a contingency structure set significantly more mastery than performance goals compared with those in other classrooms like the token economy group in which they found that students set more performance than mastery goals. Results indicated that students in the contingency group perceived the focus on their
individual growth and progress, and created a classroom culture in which failure was not a threat compared with students in the token economy group that encouraged competition and bestowed various prizes.

**Scholastic Competence and Motivation**

Scholastic competency, also referred to as academic competency, is defined as students’ perceptions of themselves as either competent or incompetent learners (Harter, 1992, 2008, 2015). Students have internal and external experiences that influence their motivation to learn. Intrinsic and extrinsic orientations exist on a continuum and relate to how students perceive their tendencies within the classroom (Harter, 1981a, 1981b, 2012). An intrinsic motivation orientation is the degree to which curiosity, interest, and mastery motivate a student (Harter, 1981a). In contrast, an extrinsic motivation orientation is the degree to which grades, feedback, and dependence on the teacher motivate a student (Harter, 1981a). The purpose of the current study was developed based on the presented research and as a result it intended to measure the impact of self-regulatory practices on perceived scholastic competence and orientation of motivation the classroom.

The self-regulatory strategies of goal setting and reflection have been presented because they support academic achievement. The researcher conducted this study based on the theoretical frameworks of self-efficacy, social cognitive theory, and self-regulation since all three constructs are related to student self-perception of academic ability and the development of motivation. Lin-Siegler et al. (2016) reviewed research on instructional interventions that motivate students in the classroom. The findings indicated that students need effective self-regulation strategies that support short- and long-term goals to learn effectively.
Kaplan and Midgley (1997) explored whether perceived academic ability moderated types of goals students set for themselves. The types of goals presented in the research were learning goals and performance goals. Kaplan and Midgley (1997) explain that when students set performance goals they are focused showing their ability and focus on being judged and when they set learning goals students are interested in improving their ability and focus on their understanding. There were 217 student participants in grade seven from a predominantly white working class metropolitan area in southeastern Michigan. Students were from two separate middle schools, but within the same district and data were collected from the Patterns of Adaptive Learning Survey (PALS), only 27 of the 128 items were used from the sub-scales that measured (a) learning goal orientation, (b) performance goal orientation, (c) perceived academic competence, (d) adaptive learning strategies, and (e) maladaptive learning strategies. Students were further analyzed in two groups for English and mathematics. There were a total of 120 student participants for mathematics and 97 student participants for English.

Researchers used a multiple regression procedure to analyze the data. The dependent variables for the multiple regression analysis were adaptive and maladaptive strategies and the analysis employed a Bonferroni adjustment ($p = .025$). The variables that were entered started with the student academic achievement scores from the Comprehensive Test of Basic Skills (CTBS), then the learning goals, performance goals, and perceived competence scores from the PALS were entered. Finally the researchers entered two interactions, learning goals and perceived competence, and performance goals and perceived competence (Kaplan & Midgely, 1997).

Findings indicated that, “The results of the regression analysis in the English sample indicated that neither the interaction between performance goals and perceived competence nor
the interaction between learning goals and perceived competence were significant predictors of adaptive learning strategies. Achievement and performance goals were not significant predictors. Learning goals and perceived competence were both positive predictors of report of adaptive learning strategies. These results point to the facilitating roles of learning goals and perceived competence for adaptive learning strategies. The facilitating role of perceived competence was found among all students regardless of their level or type of goal orientation. In the math sample, however, the interaction between learning goals and perceived competence was marginally significant ($p = .03$)” (Kaplan & Midgely, 1997, p. 426).

Furthermore, Harter, Whitesell, and Kowalski’s (1992) conducted two studies. Harter and colleagues (1992) first examined the effects of school or grade level transition on perceived scholastic competence, orientation of motivation (intrinsic and extrinsic), and general feelings towards school. The sample size included 463 student participants from two schools in four types of school transition groups; (a) fifth to sixth grade, same school; (b) fifth to sixth grade, new school; (c) sixth to seventh grade, same school; and (d) sixth to seventh grade, new school (Harter et al., 1992). Both sites were middle to upper class and were similar in size, had three grade levels, and required students to switch classes each period with different teachers for each subject. The research design was a longitudinal study where the researchers followed students between the transitions of grade levels.

Harter and colleagues (1992) collected data in May and again the following school year in December. The reason for waiting was to avoid the “honeymoon” period that occurred after transitioning because students were too focused on social experiences from September to May and academic importance seemed to set in by December (Harter et al, 1992). This current study was designed so that pretests, treatment, and posttests were administered in the spring, allowing
students in grade nine to have a chance to be out of the “honeymoon” period after transitioning from middle school to high school, when in the first few months new peer relationships, new building and environment, and new expectations are being experienced

In the first study, Harter et al. (1992) reported findings that anxiety was negatively correlated with students’ perception of competence and with motivation when students changed schools; yet it was not significant for the students in groups that stayed in the same school building and only transitioned to a new grade level. Furthermore, these findings indicated that students who perceived themselves to have low academic competence and low intrinsic motivation also had higher anxiety in the new school environment, as compared to students who remained in the same school environment. However, findings were also reported that students with high levels of scholastic competence and identified with intrinsic motivation, reported far less anxiety in the new school experience (Harter et al., 1992).

The second part of the study by Harter et al. (1992) included in this article was conducted three years prior at the same school sites, but with different students ($n = 338$) in grades 6–8. Harter, Whitesell, and Kowalski’s (1992) data in the second part of their study were analyzed using a two-factor solution and findings related to orientation of motivation in the classroom. Findings indicated that:

A general positive affect toward school was associated with an intrinsic motivational orientation, but was not related to extrinsic motivation; specific anxiety about school performance, on the other hand, was predictive of an extrinsic orientation, but was not related to intrinsic motivation. These findings offer further evidence that intrinsic and extrinsic motivations are separate dimensions rather than ends of a continuum (Harter et al, p. 796, 1992).
Therefore, the orientation of motivation data collected in this study has been analyzed with this in mind; that extrinsic and intrinsic motivation is fluid in which students may move towards one end of the pole to the other. This researcher’s criteria for qualitative data are focused on student participants’ scores that shift towards the intrinsic pole since self regulation strategies created for this study are intended to support independence and ownership over learning.

This study explored the constructs, self-efficacy, social cognitive theory, and self-regulation, presented earlier as frameworks to determine if there was a positive impact on student perception of scholastic competence and increased intrinsic motivation in the classroom.

**Summary**

In summary, the researcher has determined there is a need to support grade nine students so that they have a better opportunity to stay on track towards graduation. Furthermore, the literature provides findings that students become less motivated as they transition from lower grades to upper grades (Bandura, 1988). Students also focus more on competition and value their academic ability and motivation based on their peers and performance rather than focusing on learning goals and self-improvement. Additionally, the development of self-regulation processes is grounded in the theoretical frameworks of Self-Efficacy (Bandura, 1986) and Social Cognitive Theory (Stajkovic & Luthans, 1979). A review of the literature has informed this study that a cyclical feedback loop of forethought, monitoring and adjusting, and reflection has the potential benefit of student empowerment and ownership of their learning (Cleary & Zimmerman, 2004). By creating the opportunity for students to participate in this process, the researcher explored if this had a significant impact on their perception of scholastic competence and fostered intrinsic motivation. Therefore, the researcher adapted the SREP (Cleary & Zimmerman, 2004) treatment into a general use Self-Regulation Treatment that includes the
cyclical process of forethought and goal setting, daily monitoring and adjustment, and reflection as a way for students to examine their own learning experiences. This study was informed by the literature as there is a need to focus on grade nine students, to create opportunities for self-regulatory strategies to promote self-evaluation and independence, and to research the impact on their perception of scholastic competence and orientation for motivation.
CHAPTER THREE: METHODOLOGY

The purpose of this study was to investigate the use of goal setting and reflection with ninth-grade mathematics students and the impact of a self-regulatory practice on perception of scholastic competence and motivation in the classroom. This chapter describes the methodology used to conduct this research study. This chapter contains a description of the setting, participants, and the sample procedures. The research questions and design are outlined with a description of the teacher training process and student groups (comparison and treatment) in the study. Furthermore, a review of the instruments, data collection, and justification of analysis conducted are presented. Lastly, the researcher shares the limitations of the study and includes a statement of ethics.

**Description of the Setting, Participants, and Sampling Procedures**

This study was conducted at an urban high school located in western Connecticut. At the time the study was conducted, the city had a population of 83,476 with a median income of $66,676 (United States Census Bureau, 2015). The last school profile and performance reports (2016) from the State Department of Education indicated that total enrollment in the PK–12 public school district where the study was conducted was 11,157 students. One school participated in this study and enrollment at this site for grades 9–12 at the time of study was 3,020 (Martins, 2016). Please refer to Table 1 for further description of the setting.
Table 1

*Description of Setting*

<table>
<thead>
<tr>
<th>Enrollment Classification</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades 9–12 (2016–17)</td>
<td>3,020</td>
<td></td>
</tr>
<tr>
<td>Free and Reduced Lunch</td>
<td>1,134</td>
<td>37.5</td>
</tr>
<tr>
<td>Identified for Special Education</td>
<td>388</td>
<td>12.8</td>
</tr>
<tr>
<td>Average Class Size Range</td>
<td>23.6–27.0</td>
<td></td>
</tr>
<tr>
<td>Ninth-Grade Enrollment (2016-17)</td>
<td>866</td>
<td>28.7</td>
</tr>
<tr>
<td>Students retained in 2015–16 School Year</td>
<td>306(^a)</td>
<td>10.4(^b)</td>
</tr>
</tbody>
</table>

\(^{a}\) Data for 2016-17 School Year for number of students retained is not known until end of school year and was unavailable at time of study; \(^{b}\) Percentage calculated based on enrollment from 2015-16 School Year (\(n = 2,926\)).

The school reports that in 2016-2017 school year, the population of students were as follows: Asian, 6.9%; African –American, 8.7%; Hispanic or Latino, 43.0%; White, 38.7%.

Refer to Table 2 for the demographic data of the setting compared to the sample population. The demographic data collected for the sample indicated that the grade nine Algebra I student participants do not necessarily represent the larger population of the setting for white students, but is representative of Asian, Black and Hispanic students.
Table 2

*Diversity of School Setting and Sample Population*

<table>
<thead>
<tr>
<th>Race</th>
<th>Setting %</th>
<th>Sample %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>6.9</td>
<td>6.0</td>
</tr>
<tr>
<td>Black</td>
<td>8.7</td>
<td>10.1</td>
</tr>
<tr>
<td>Hispanic</td>
<td>43.0</td>
<td>41.0</td>
</tr>
<tr>
<td>White</td>
<td>38.7</td>
<td>28.0</td>
</tr>
</tbody>
</table>

The high school was comprised of grades nine to 12. Grade nine is known as the “Freshman Academy”. It follows a team model with a block schedule. The team model for grade nine core academic classrooms consists of mathematics, social studies, science, and English classrooms. The block schedule for grade nine has 90-minute core academic classes that alternate on an A/B schedule. For example, a student attended English and social studies on an A-day, then mathematics and science on a B-day.

The mathematics course sections were general education classrooms at the honors or college prep level and included students identified for education services. The site employs an “Open Enrollment” policy in which students are not recommended for course level. The students are able to register for the level course of their choice. There are two levels: College Prep and Honors. The College Prep (CP) course is the general academic level course and the Honors (H) level course moves at a faster pace and has a more in-depth curriculum. This study was conducted during the Algebra I curriculum Unit 6: Systems of Linear Equations. The unit is described as: A system of linear equations is an algebraic way to compare two equations that...
model a situation and find the breakeven point or choose the most efficient or economical plan.

The student learning objectives for both CP and H courses were:

1. Students will compare and analyze two linear equations, look for common solutions and use this information to make choices between competing situations in real world contexts.
2. Students will solve system of equations numerically, graphically and algebraically.
3. Students will be able to explain what the solution of a system of linear equations represents in the context of various applications.

As part of their contractual teaching responsibilities, teachers also met monthly in data team meetings to create and analyze common formative assessments (CFAs) and common unit summative assessments (CUSAs). During these data team meetings, teachers worked collaboratively to maintain a shared curriculum, providing students with an equitable learning experience. A typical mathematics unit starts with a Pre-Common Formative Assessment (PCFA), followed by learning activities that include small and whole group instruction with graded assignments, culminating with a CUSA. Furthermore, each teacher participant teaches multiple sections of Algebra I on a rotating block-schedule so two Algebra I classes were invited to be student participants for each teacher, totaling 10 Algebra I classes.

**Sampling procedure and participants.** The Deputy Superintendent for the participating district was asked to review the study. He subsequently gave permission for it to be conducted at the district’s high school. The researcher then contacted the principal and associate principal of curriculum and instruction, the mathematics department chair, and faculty members who taught Algebra I mathematics courses. The researcher employed a sample of convenience and a total of five out of seven ninth-grade mathematics teachers agreed to participate.
The grade nine mathematics teachers met on a weekly basis on Thursday mornings as a department and the researcher was able to support the teacher participants throughout the study during this period. At these meetings, their department head joined them as part of a school-wide commitment to align curriculum and assessments. Over the course of the seven-week study, the researcher attended four weekly meetings to provide professional development and support throughout the study. Table 3 provides a description of teacher demographics. Data indicated that teachers had minimal, if any, experience with formal goal setting in their classrooms.

Table 3

_Demographic Information Regarding Teacher Participants_

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Total Years Teaching</th>
<th>Sex</th>
<th>Race</th>
<th>Degrees Obtained</th>
<th>Experience with Goal Setting/Reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher A</td>
<td>13</td>
<td>M</td>
<td>Caucasian</td>
<td>BS\textsuperscript{a}, MS\textsuperscript{b}</td>
<td>Informal</td>
</tr>
<tr>
<td>Teacher B</td>
<td>18</td>
<td>F</td>
<td>Asian-Hispanic</td>
<td>BS\textsuperscript{a}, MS\textsuperscript{b}</td>
<td>Minimal</td>
</tr>
<tr>
<td>Teacher C</td>
<td>3</td>
<td>M</td>
<td>Caucasian</td>
<td>BS\textsuperscript{a}, MS\textsuperscript{b}</td>
<td>None</td>
</tr>
<tr>
<td>Teacher D</td>
<td>12</td>
<td>F</td>
<td>Caucasian</td>
<td>BS\textsuperscript{a}, MS\textsuperscript{b}</td>
<td>None</td>
</tr>
<tr>
<td>Teacher E</td>
<td>9</td>
<td>F</td>
<td>Caucasian</td>
<td>BS\textsuperscript{a}, MS\textsuperscript{b}</td>
<td>Minimal</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Bachelors of Science; \textsuperscript{b} Masters of Science

The researcher used a sample of convenience when inviting students to participate in the study. The accessible population for this study was grade nine Algebra I mathematics students in the classrooms of teachers who agreed to participate. The total accessible \((n = 7)\) population of teachers were invited to participate, one declined and another was going to be out of medical leave in the spring semester and a total of five teachers agreed to participate in the study. The
accessible student population enrolled in mathematics courses in grade nine was 866. However, not all of these students were enrolled in Algebra I. The researcher employed a sample of convenience and invited two class sections for each teacher to participate; the total possible population for the quantitative sample was 230 students. These students were invited to participate from this urban school district and a total of 102 student participant consents were obtained from their parent or guardian. A total of three students were dropped from the study because two moved outside the district and one student did not complete the treatment due to absenteeism. See Table 4 below for description of student participants.
Table 4

*Descriptions of Student Participants*

<table>
<thead>
<tr>
<th></th>
<th>Treatment n</th>
<th>Comparison n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>51</td>
<td>48</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>36</td>
<td>34</td>
</tr>
<tr>
<td>Male</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td><strong>Course Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algebra I Honors</td>
<td>13</td>
<td>29</td>
</tr>
<tr>
<td>Algebra I College Prep</td>
<td>38</td>
<td>19</td>
</tr>
<tr>
<td><strong>Do you like math?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19</td>
<td>28</td>
</tr>
<tr>
<td>No</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Sometimes</td>
<td>21</td>
<td>14</td>
</tr>
<tr>
<td><strong>First Language Spoken</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>28</td>
<td>38</td>
</tr>
<tr>
<td>Spanish</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>Portuguese</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Multi-Lingual</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>33</td>
<td>32</td>
</tr>
<tr>
<td>15</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

For the qualitative aspect of the study, a purposeful sample was employed. Ninth-grade mathematics treatment participants bound the case study. The researcher used a purposeful sample that meet this criteria: Student participants who had the highest change in scholastic competence
scores and motivation scores on the mastery from the treatment group were invited to participate in semi-structured interviews. Refer to Table 5 and 6 for description of student participants that met the criterion for the case study.

Table 5

*Student Participants Identified from Scholastic Competence Subscale*

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Pretest Mean Score</th>
<th>Posttest Mean Score</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chris</td>
<td>1.667</td>
<td>2.667</td>
<td>+1.00</td>
</tr>
<tr>
<td>Jimmy</td>
<td>2.000</td>
<td>2.800</td>
<td>+.800</td>
</tr>
<tr>
<td>Kristen</td>
<td>2.200</td>
<td>3.000</td>
<td>+.800</td>
</tr>
<tr>
<td>Mary</td>
<td>2.200</td>
<td>3.000</td>
<td>+.800</td>
</tr>
</tbody>
</table>

Table 6

*Student Participants Identified from Mastery (Motivation) Subscale*

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Pretest Mean Score</th>
<th>Posttest Mean Score</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>James</td>
<td>1.667</td>
<td>3.333</td>
<td>+1.67</td>
</tr>
<tr>
<td>Brennan</td>
<td>2.167</td>
<td>3.167</td>
<td>+1.00</td>
</tr>
<tr>
<td>Addison</td>
<td>2.333</td>
<td>3.000</td>
<td>+.667</td>
</tr>
<tr>
<td>Reagan</td>
<td>2.500</td>
<td>3.000</td>
<td>+.500</td>
</tr>
<tr>
<td>Tucker</td>
<td>1.667</td>
<td>2.167</td>
<td>+.500</td>
</tr>
</tbody>
</table>

*Note.* Five students were invited, rather than four, for the Mastery Subscale scores, as there were two students with the same change in means scores from pre to posttest.
Research Design

The methodology for this research followed a mixed-methods quasi-experimental pretest-posttest exploratory sequential design (Creswell & Plano-Clark, 2011; Gall, Gall, & Borg, 2003). The quantitative component used a treatment and a comparison group with a convenience sample of intact classrooms. The independent variable was program type with 9th grade mathematic students who participated in the SREP goal-setting and reflection treatment group and the comparison group members who did not participate. The dependent variables were student scores on Harter’s (1981a) Self-Perception Profile for Adolescents (Scholastic Competence) and Harter’s (2012) Scale of Intrinsic Versus Extrinsic Orientation in the Classroom (Preference for Challenge vs. Preference for Easy Work assigned, Curiosity/Interest vs. Pleasing the Teacher/Getting Grades, and Independent Mastery vs. Dependence on the Teacher). This quantitative aspect of the research design was used to address research question one.

The researcher endeavored to keep the treatment and comparison groups as separate as possible, so only the teacher was told which classes would receive the treatment. All students in the classes that were deemed the treatment group participated in the self-regulation treatment that was imbedded as part of their regular mathematics curriculum with permission from the school district. The only data collected were from students with parental consent and student assent. The treatment intervention was aligned with district and school goals for including reflection.

The treatment group \(n = 51\) and the comparison group \(n = 48\) both completed pre- and posttest surveys at the start and end of a mathematics unit. The treatment group participated in the researcher-adapted version of the Cleary and Zimmerman’s (2004) Self-Regulation Empowerment Program (SREP) goal setting and reflection program as described in the treatment
section with the permission of Timothy Cleary and Barry Zimmerman. See Tables 4 for description of student participants.

The independent variable, program type, had two levels (a) goal setting and reflection treatment integrated with standard instruction and, (b) standard instruction excluding goal setting and reflection. See Table 7 for the design used to depict this study.

Table 7

<table>
<thead>
<tr>
<th>Quasi-experimental Pretest–Posttest Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
<tr>
<td>Ninth Grade Treatment (Self-regulation Strategies)</td>
</tr>
<tr>
<td>Ninth Grade Comparison Group (Traditional Instruction)</td>
</tr>
</tbody>
</table>

The qualitative research design was a case study in which student participants who were members of the treatment group bound the case. A mixed-methods design using qualitative and quantitative data was conducted to gain different perspectives to examine and interpret the data (Jick, 1979). The case study data were applied to address research question two. Student participants in the case study were identified based on highest positive change from pretest to posttest mean scores from the Scholastic Competence and Mastery subscales. Student interviews were recorded, transcribed, and analyzed through in-vivo coding (Creswell, 2013).

Research Questions and Hypotheses

This study was designed to investigate the impact of goal setting and reflection activities on perceived scholastic competence and motivation in grade-nine Algebra I mathematics classrooms. The two research questions that guided this research study were as follows:
Research Question 1

Is there a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses who participate in the self-regulatory practices of goal setting and reflection (treatment group) and those who do not (comparison group)?

Main Effect 1: Is there a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students who participate-in the self-regulatory practices of goal setting and reflection (treatment group) and those who do not (comparison group)?

Main Effect 2: Is there a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses?

Interaction: Is there a significant interaction between program type (treatment and comparison) and course level (college preparatory and honors) with respect to mean scores for students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher)?
Non-Directional Hypothesis

There will be a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses who participate in the self-regulatory practices of goal setting and reflection (treatment group) and those who do not (comparison group).

Main Effect 1: There will be a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students who participate in the self-regulatory practices of goal setting and reflection (treatment group) and those who do not (comparison group).

Main Effect 2: There will be a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses.

Interaction: There will be a significant interaction between program type (treatment and comparison) and course level (college preparatory and honors) with respect to mean scores for students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher).
Research Question 2

How do goal setting and reflection self-regulatory practices in mathematics affect the perceived scholastic competency and motivation of ninth-grade students?

Description of Intervention

The treatment for this study was adapted from Cleary and Zimmerman’s (2004) Self-Regulation Empowerment Program (SREP). The researcher adapted the treatment for general classroom use or Tier I intervention that can be used for all students. These types of interventions were embedded within the curriculum and are research based (Fuchs & Fuchs, 2006). Tier II interventions, like the SREP, are conducted with small groups of students who have a specific area of need. These types of interventions are designed for small groups and can take place in or out of the classroom with a higher rate of intensity and frequency as necessary (Fuchs & Fuchs, 2006). Cleary and Platten (2012) suggested that adaptations to their Tier II intervention program should be made to support future research for use in larger populations of students, such as part of the regular curriculum as a Tier I intervention. Therefore, this study investigated the effects of the general classroom use self-regulatory practice of goal setting and reflection intervention on ninth-graders’ perceptions of their scholastic competency and motivation during their mathematics classes. It is important to note that the researcher for this study did not identify whether or not students were in academic need of a Tier I intervention, and the intervention was solely implemented for general classroom use.

Overall, teachers participated in professional development led by the researcher on how to deliver pretest and posttest surveys, instruct students on setting learning goals using the intervention materials (Component 1-3 worksheets provided in Appendix A), and how to time-manage the reflection and the adjustment process of action steps. All student participants
completed the Self-Perceptions Profile instrument and the Orientation of Motivation in the Classroom instrument as a pretest. Student participants in treatment classrooms participated in an SREP-adapted goal-setting and reflection treatment (see Appendix A) that ran for the length of one mathematics unit; approximately nine class sessions in double class periods totaling ninety minutes each meeting on alternating days for approximately 7 weeks. At the end of the mathematics unit, all students in treatment and comparison groups completed their posttest surveys. This section provides a detailed explanation and process for teacher professional development and treatment protocol for student participants.

**Teacher Professional Development and Training**

The researcher included all participating teachers in two 45-minute professional development sessions; the first one the overall study, pacing, fidelity, and consents. The second session focused on implementation of the treatment program. Furthermore, all the teachers and students were located at one school with weekly scheduled collaborative time, so it was convenient to train all the teachers together.

During the teacher training, the teachers were given necessary materials: portfolio bin; hanging folders; self-adhesive notes; and pens. They were then trained on how to administer each survey to their comparison and treatment groups. Participant teachers were provided with color-coded surveys labeled with student name and ID so they would distinguish between comparison and treatment classes. The teachers were then trained in how to administer the goal setting and reflection treatment for the treatment group. They also followed the prompts on Component 1, 2, and 3 of the treatment materials (see Appendix A). The teachers administered both pretest and posttest surveys to their assigned classes. The researcher provided them with
verbal directions to recite during the professional development to ensure that all surveys were administered with fidelity.

**Treatment Protocol for Student Participants**

After consent to participate in this research study was obtained, teachers in participating classrooms administered the demographic survey and two pretests to all students prior to the start of the intervention program. The comparison group continued with their regular mathematics unit while the treatment group completed the adapted SREP materials embedded within their mathematics unit. The treatment group began the goal setting and reflection treatment with Component 1 (Refer to Appendix A).

Component 1 consists of a forethought and goal setting phase in which the students completed a self-diagnostic about their own learning experiences and habits pertaining to academics. Student participants also completed their PCFA and received those scores at the start of the unit, so they set their goal for the unit using the guidelines provided. Component 2 (Refer to Appendix A) is the second phase in which student participants self-monitored and considered adjusting their own actions to continue working towards their goal. This phase is done at the end of every class session for approximately a total of 9 block class sessions. The final step, Component 3, occurred after the students completed their CUSA and received their test grade. Once the mathematics unit embedded with the intervention was completed, the teachers administered the two posttest surveys to all students. The researcher then collected the posttest and recorded posttest scores from student participants.

Since all students completed the demographic surveys, pre- and posttests, and treatment materials, the only data collected were from students whose parents gave their consent. All other materials were shredded. The district advised the researcher to have all students in participating
classrooms complete all research materials since the program was embedded within the general classroom mathematics unit.

**Description of Instruments**

To conduct this study, a teacher and student demographic survey was used to collect information about the participants (see Appendix D). To further understand the academic experience, the researcher measured ninth-grade students’ scholastic competency and motivation scores before and after setting goals and conducting daily monitoring for the length of an academic unit. Scholastic competency, intrinsic motivation, and extrinsic motivation were measured using the Self-Perception Profile for Adolescents Ages 14–19 (Harter, 2012) and the Scale of Intrinsic Versus Extrinsic Orientation in the Classroom (Harter, 1981a), respectively. Other instrumentation created by the researcher includes a student semi-structured interview protocol. See Appendix B for Student Interview Protocol.

**Demographic Surveys**

The researcher created a demographic survey for teachers and students to better understand the population in the sample (See Appendix B). The teacher demographic survey asked teacher participants to identify their gender, race, years of experience, certification, level of education, and experience with goal setting and reflection as part of their teaching experience. The teacher demographic survey was administered during teacher training and took five minutes to administer and collect. The student demographic survey asked student participants to identify their age, gender, race, and first language spoken, course, and whether or not they like math. The student demographic the teachers administered survey with the first set of pretests and took less than five minutes to complete and return.
Scale of Intrinsic versus Extrinsic Orientation in the Classroom

Intrinsic and extrinsic motivation in the classroom was assessed using the Scale of Intrinsic Versus Extrinsic Orientation in the Classroom (Harter, 1981a). This instrument was designed to investigate children’s orientation to motivation as it pertains to three intrinsic areas: mastery, curiosity, and preference for challenge, as compared with extrinsic realms such as grades, teacher approval, and dependence on guidance.

The scale is comprised of five subscales (Harter, 1981a) that measure: (a) Challenge vs. Preference for Easy Work, (b) Curiosity/Interest vs. Doing what the Teacher Assigns, (c) Independent Mastery vs. Dependence on the Teacher, (d) Independent Judgment vs. Reliance on the Teacher’s Judgment, and (e) Internal Criteria for Success/Failure vs. External Criteria for Success/Failure. The researcher collected data for the challenge, curiosity, and mastery subscales. The manual that accompanies the scale states that researchers can measure specific subscales independently, but that the 30-item questionnaire must stay intact for reliability and validity purposes so all items were administered to participants.

Each subscale was composed of several items which participants ranked themselves from: 1 (not all true of me) to 4 (very true of me). Survey items within each survey were varied in order of occurrence. For example, the items for Mastery Subscale were 2, 8, 15, 20, 24, and 29. Furthermore, students were presented with two polarized statements and were asked to check a box for which was most true for them. Reverse scoring depending on positive or negative statements was identified in the scoring guidelines provided in the manual. The researcher used these scoring guidelines. This description applies to the Self-Perception Profile as well. This survey took approximately 30 minutes to administer.
The Scale of Intrinsic versus Extrinsic Orientation in the Classroom (Harter, 1981a) was reliable for internal consistency and test-retest reliability (Harter, 1981b). Internal consistency was calculated using Kuder–Richardson Formula 20 using samples from New York, California, and Colorado (Harter, 1981a). Harter (1981b) reports that the “reliabilities range from .78 to .84, .68 to .82, .54 to .78, .72 to .81, and .75 to .83 for the challenge, mastery, curiosity, judgment, and criteria subscales, respectively” (p. 304). The low value of .54 representing the curiosity subscale was originally based on three items and has since been revised to include six items. The value of .78 represents that reliability for the six items including the revised three items (Harter 1981b). Furthermore, test-retest reliability data were collected for several samples over various lengths of time. Harter (1981b, 1981a) established factorial validity for the instrument. The five subscales can be analyzed individually. In addition, the questions they use are itemized, allowing the researcher to measure orientation of motivation in the classroom. Finally, there was evidence for have discriminant validity as well (Harter, 1981a).

**Self-perception Profile for Adolescents (ages 14–19) Instrument**

Harter’s (2012) survey seeks to uncover the differences between students’ views of their ability and how it was perceived in the classroom. This instrument contains 45 questions, each of which was measured as 1 through 4 on a Likert scale, with 1 being the least adequate self-judgment score and 4 the most adequate self-judgment score. Harter’s (2012) Self-Perception Profile for Adolescents (Ages 14–19) contains the following nine subscales: scholastic competency, social competency, athletic competency, physical appearance, job competency, romantic appeal, behavioral competency, close friendship, and global self-worth. The survey was reported to be both reliable and valid (Harter, 2012). All subscales were administered to participants; however, only scores from the scholastic competence subscale were used to address
research question one. This took approximately 45 minutes to administer. They were scored using the answer key provided in the manual and scoring guidelines.

During review of the instrument for reliability, the scholastic competency subscale’s internal consistency measured .91, .81, .77, and .81, respectively, across four samples (Harter, 2012).

The five types of validity measurements reported for this instrument has reported are: face validity, factorial validity, convergent validity, discriminant validity, and construct validity. Face validity refers to the content of the instrument and its transparency that the 45 items on the instrument make a direct association to the construct in question (Harter, 2012).

Convergent validity was found when comparing the results from the use of this instrument to another similar instrument, the Self-Description Questionnaire that was validated (Harter, 2012). Convergent validity was found for four subscales. According to Marsh (1988, 1990, 1991) convergence between the four subscales ranged from .56 to .69. Conclusively, this instrument has convergent validity based on the criteria. Lastly, construct validity requires that the tool measure the specific construct it intends to measure. Harter (2012) reported that over the course of development and research, empirical evidence has emerged that this instrument was measuring the intended constructs.

Data Collection

The quantitative data collected from Susan Harter’s (1981a, 2012) Self-Perception Profile for Adolescents (Ages 14–19) and Scale of Intrinsic Versus Extrinsic Orientation in the Classroom were interval-level in the form of subscale group means. Additionally, qualitative data were collected from semi-structured interviews.
Data Collection and Procedures

1. Winter 2017, this research study was presented to Western Connecticut State University’s Internal Review Board (IRB) for full review and approval was obtained.

2. The researcher presented the study to the Associate Superintendent, building principal, associate principal for curriculum and instruction, and the mathematics department head. The researcher received approval to conduct this mixed-methods research study with the ninth-grade class.

3. Spring 2017; The researcher received consent from grade-nine general education mathematics teachers willing to facilitate the research study in Algebra I classes.

4. Spring 2017; The researcher presented the study to the accessible student population, distributed consent/assent forms, and collected signed forms.

5. Spring 2017; The researcher conducted teacher professional development on how to administer pre- and posttest assessments and determined which class sections would be in the treatment and comparisons groups based on organization and total number of students. The researcher conducted two professional development sessions there were approximately 40-minutes.

6. Spring 2017; The teachers administered the pretests at the start of a new unit in their mathematics courses. The treatment group then began their goal setting and reflection intervention embedded in their mathematics unit of study. The unit of study lasted approximately 5 weeks or 11 block periods that met every other day as per the block schedule.

7. The researcher collected all pretest surveys and recorded the data.
8. Throughout the study, the researcher visited classrooms and checked treatment materials for fidelity purposes every other week. The researcher also visited teachers during their weekly meetings to offer assistance and support.

9. After student participants completed their CUSA and their mathematics unit and treatment ended, the teacher re-administered surveys and the researcher collected and recorded the posttest data.

10. During the spring, summer, and fall of 2017, the researcher analyzed the pre- and posttest data from the study.

**Data Analysis**

**Quantitative**

Quantitative methods were utilized for this study to answer research question one a two-way Multivariate Analysis of Variance (MANOVA) was used to determine whether or not there was a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses who participated in the self-regulatory practices of goal setting and reflection (treatment group) and those who did not (comparison group). A two-way Multivariate Analysis of Covariance (MANCOVA) was used to analyze posttest data controlling for pretest challenge and scholastic competence mean scores.

The independent variable was program type (comparison and treatment); the dependent variables were student scores on the aforementioned instruments. The Scale of Intrinsic Versus Extrinsic Orientation in the Classroom (Harter, 1981a) contains five subscales and three of which
measure motivation in the classroom (preference for challenge, curiosity/interest, and independent mastery). The subscale for scholastic competency was one of nine subscales in Harter’s (2012) Self-Perception Profile for Adolescents (Ages 14–19). The alpha level was set at \( p \leq .05 \).

**Qualitative**

Cleary and colleagues’ (2012, 2008) most recent Tier II SREP interventions were in case studies comprised of \( n = 5 \) and \( n = 4 \) participants, respectively. Based on their case studies, the researcher decided to include a larger sample for qualitative measures, and invited a total of nine students for interviews from the treatment group. Four student participants were selected for interviews based on highest change of scores on self-perception (scholastic competency subscale scores) and five student participants with the highest changes of scores on motivation (mastery subscale scores).

Individual student goal and reflection worksheets were completed and organized into student portfolio folders (see Appendix A). After the quantitative data was collected and analyzed by comparing mean scores for Scholastic Competence and Mastery subscales, student participants in the treatment group with the highest change in scholastic competence and motivation scores for the mastery subscale were identified. Semi-structured interviews were conducted and coded as part of the qualitative analysis. Please See Appendix B for a list of the semi-structured interview questions.

Once student mean scores from pre- to posttests were compared and participants identified with the highest change in scores, the researcher reviewed student portfolio folders that included the goal setting and reflection treatment materials. The researcher reviewed the materials to ensure they were completed and then invited these students to participate in recorded
semi-structured interviews. The portfolios were cataloged and interviews conducted utilizing a semi-structured interview protocol (Boekaerts & Corno, 2005; Pintrich & De Groot, 1990). The objective of these interviews was to gain an understanding of how student participants’ experiences with goal setting and reflection impacted their posttest scores for scholastic competency and motivation in the classroom.

**Statement of Ethics**

Upon IRB approval, the researcher secured permission from each participating district’s superintendent and the corresponding building principals. All teachers who volunteered for the study provided consent after reading a full disclosure that explained the nature of the study and provided the option of withdrawal. Using pseudonyms for the schools, students, and teachers when discussing results will protect the confidentiality of all participants and setting. Identification was only used to match data collected from qualitative and quantitative methods. All data were kept secure through the use of password-protected computers and accounts. A gift card for 20 dollars was given to each teacher participant in appreciation of his or her efforts.
CHAPTER FOUR: ANALYSIS OF DATA AND FINDINGS

The purpose of this study was to investigate the impact of self-regulatory strategies on grade nine mathematics students’ motivation in the classroom and perception of scholastic competence. To achieve this, two research questions provided a focus for this study. This chapter explains the findings of the two research questions:

1. Is there a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses who participate in the self-regulatory practices of goal setting and reflection (treatment group) and those who do not (comparison group)?

Non-Directional Hypothesis: There will be a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses who participate in the self-regulatory practices of goal setting and reflection (treatment group) and those who do not (comparison group).

Main Effect 1: Is there a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the
teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students who participate in the self-regulatory practices of goal setting and reflection (treatment group) and those who do not (comparison group)?

Non-Directional Hypothesis: There will be a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students who participate in the self-regulatory practices of goal setting and reflection (treatment group) and those who do not (comparison group).

Main Effect 2: Is there a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses?

Non-Directional Hypothesis: There will be a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses.
Interaction: Is there a significant interaction between program type (treatment and comparison) and course level (college preparatory and honors) with respect to mean scores for students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher)?

Non-Directional Hypothesis: There will be a significant interaction between program type (treatment and comparison) and course level (college preparatory and honors) with respect to mean scores for students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher).

2. How do goal setting and reflection self-regulatory practices in mathematics affect the perceived scholastic competency and motivation of ninth-grade students?

The chapter presents the results from this study. The first section is a description of data collected which precedes a section for each of the research questions. Research Question 1 was investigated by quantitative data and pretest and posttest data preparation is highlighted; Research Question 2 is qualitative in nature and data were collected through semi-structured interviews. In this section of Chapter Four, data for Research Question 2 are displayed by providing detailed information on the coding process and analysis. Findings for Research Question 2 are then presented.

**Research Question 1 Analysis**
Description of the quantitative data. This research study employed a mixed-methods quasi-experimental pretest posttest explanatory design. A sample of convenience was used from five intact grade nine mathematics classrooms for comparison and treatment groups. The researcher used the Statistical Package for the Social Sciences (SPSS) (IBM, 2013) program to analyze data for research question 1. The researcher conducted an evaluation of the data from the total sample \((n = 102)\). Three students were removed from the data set because two students moved and one student was chronically absent and did not complete the pre- or posttest assessments. The researcher then screened the data and no data were missing for a total sample of 99.

Data collected for this study were from student responses on the *Self-Perception Profile for Adolescents (Ages 14–19)* (SPPA) (Harter, 1981a) and the *Orientation of Motivation in the Classroom* (OMC) (Harter, 2012). The *Self-Perception Profile for Adolescents* contains 45 questions, each of which was measured as 1 through 4 on a Likert scale to identify a perception of self-score with 9 subscales. Data were scored using an answer key provided in the manual that identified when reverse scoring was necessary. The researcher scored data accordingly. The SPPA contains the following nine subscales: (a) scholastic competency, (b) social competency, (c) athletic competency, (d) physical appearance, (e) job competency, (f) romantic appeal, (g) behavioral competency, (h) close friendship, and (i) global self-worth. For the scope of this study, only the scholastic competence subscale data were analyzed.

The *Orientation of Motivation in the Classroom* contains 30 questions and utilized a 4-point Likert scale to identify an extrinsic or intrinsic pole score. Data were scored using an answer key provided in the manual that identified when reverse scoring was necessary. The researcher scored data accordingly. While there are five subscales measured by this instrument,
the data for three subscales were analyzed. The three subscales initially analyzed were (a) Preference for Challenge, (b) Mastery, and (c) Curiosity.

The researcher followed the procedures outlined by Meyers, Gamst, and Guarino (2006) to analyze descriptive statistics. Skewness (symmetry) and kurtosis (pointedness) values were considered acceptable if they fell within the ranges of –1.0 to 1.0 (Meyers, et al., 2006). For the purpose of this study, the researcher utilized Meyers et al. guidelines when evaluating and determining acceptable skewness (symmetry) and kurtosis values (pointedness). As there were values for peakedness that exceeded this assumption for pre- and posttest scores for the subscale of curiosity, the researcher removed analysis of this subscale. In the initial cleansing of the data, the pretest scores for curiosity did not meet these assumptions and therefore the data from the curiosity subscale for motivation were removed from pre and posttest analysis.

The pretest scores on the Orientation of Motivation subscale for Curiosity reflected a standard deviation of .49 in the treatment group and .45 in the comparison group with means scores of 2.39 and 2.28, respectively. Pretest scores calculated a skewness of .836 in the experimental group and .232 in the Comparison group while kurtosis levels reflected 2.102 and .884, respectively. Furthermore, the pretest scores on the Orientation of Motivation subscale for Curiosity reflected a standard deviation of .48 in the College Prep (CP) group and .47 in the Honors (H) group with means scores of 2.32 and 2.37, respectively. Pretest scores calculated a skewness of .405 in the CP group and .924 in the H group while kurtosis levels reflected .803 and 3.24, respectively.

Kurtosis values did not fall within acceptable ranges from –1.0 to 1.0 (Meyer’s, et al., 2006) and the researcher considered further acceptable assumptions of D’Agostino, Belanger, and D’Agostino (1990) of -2.0 to 2.0, however the assumptions were still not met. All other
subscales fell within the acceptable range of +/-1 (Meyers, et al., 2006), therefore the researched decided to remove the data analysis for the Curiosity subscale.

**Pretest data preparation.** Research Question 1 guided the examination of the difference in orientation of motivation and self-perception of scholastic competence for grade nine mathematics students who had participated in the self-regulation intervention focusing on goal setting and reflection and those who did not. Pretest data were collected from all participants before the intervention occurred to determine any statistical difference between treatment and comparison groups. The sample size included $n = 102$ students, of which three students dropped from the study leaving a total of 99. The treatment group had 51 students and the comparison group had 48. The CP group had a total of 57 students and the honors group had a total of 42. Refer to Table 4 for further description of participants.

**Data normality.** The researcher evaluated the data normality by conducting an evaluation of the multivariate outliers. The normality of pretest scores distribution on the subscales for Orientation of Motivation in the Classroom (OMC) and Self-Perception Profile for Adolescents (SPPA) were tested. Stem-and-leaf plots were analyzed for all dependent variables and showed no evidence of outliers by group or course type.

The Shapiro–Wilk test was employed to analyze the significance of normality. The researcher used an alpha level of .001 as it is recommended to indicate a possible violation of normality (Meyers et al., 2006). The test results verified that normality was not violated at the .001 alpha level between groups. Results from the Shapiro–Wilk test for pretest data are displayed in Table 8.
Table 8

Shapiro–Wilk Test of Normality for Pretest Scores

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Treatment</th>
<th>Comparison</th>
<th>CP</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPPA: Scholastic Competence Subscale</td>
<td>.138</td>
<td>.274</td>
<td>.075</td>
<td>.187</td>
</tr>
<tr>
<td>OMC: Challenge Subscale</td>
<td>.218</td>
<td>.790</td>
<td>.141</td>
<td>.599</td>
</tr>
<tr>
<td>OMC: Mastery Subscale</td>
<td>.456</td>
<td>.512</td>
<td>.135</td>
<td>.716</td>
</tr>
</tbody>
</table>

Note. OMC = Orientation of Motivation; SPPA = Self-Perception Profile for Adolescents

Descriptive statistics for research question 1. Descriptive statistics were used to analyze the pretest scores for the subscales aforementioned on the Orientation of Motivation in the Classroom (OMC) and Self-Perception Profile for Adolescents (SPPA) instruments. Descriptive statistics are presented in Table 9 for the total sample. The researcher examined pretest mean scores for scholastic competence subscale and motivation (challenge and mastery) subscales. Subscales reflect standard deviations ranging from .57 to .78, with means ranging from 2.34 to 2.88 on a 4-point scale. Assumptions for skewness and kurtosis values fell within acceptable ranges from -1.0 to 1.0 (Meyers, et al., 2006).
Table 9

*Descriptive Statistics for Pretest Scores*

<table>
<thead>
<tr>
<th>Experimental Condition</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment (n = 51)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholastic Competence</td>
<td>2.51</td>
<td>.68</td>
<td>.369</td>
<td>-.411</td>
</tr>
<tr>
<td>Challenge</td>
<td>2.46</td>
<td>.78</td>
<td>.282</td>
<td>-.623</td>
</tr>
<tr>
<td>Mastery</td>
<td>2.47</td>
<td>.64</td>
<td>.283</td>
<td>.110</td>
</tr>
<tr>
<td>Comparison (n = 48)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholastic Competence</td>
<td>2.79</td>
<td>.68</td>
<td>-.253</td>
<td>-.447</td>
</tr>
<tr>
<td>Challenge</td>
<td>2.52</td>
<td>.62</td>
<td>-.036</td>
<td>-.588</td>
</tr>
<tr>
<td>Mastery</td>
<td>2.59</td>
<td>.60</td>
<td>-.001</td>
<td>-.181</td>
</tr>
<tr>
<td>College Prep (n = 57)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholastic Competence</td>
<td>2.47</td>
<td>.68</td>
<td>.154</td>
<td>-.639</td>
</tr>
<tr>
<td>Challenge</td>
<td>2.34</td>
<td>.73</td>
<td>.328</td>
<td>-.624</td>
</tr>
<tr>
<td>Mastery</td>
<td>2.44</td>
<td>.64</td>
<td>.394</td>
<td>.135</td>
</tr>
<tr>
<td>Honors (n = 42)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholastic Competence</td>
<td>2.88</td>
<td>.64</td>
<td>.098</td>
<td>-.867</td>
</tr>
<tr>
<td>Challenge</td>
<td>2.69</td>
<td>.62</td>
<td>.168</td>
<td>-.177</td>
</tr>
<tr>
<td>Mastery</td>
<td>2.64</td>
<td>.57</td>
<td>-.180</td>
<td>.024</td>
</tr>
</tbody>
</table>

*Correlations.* The researcher analyzed Pearson correlation coefficients to determine the relationship between variables. Table 10 shows the Pearson correlations variables for the pretest data. In order to meet the assumption for MANOVA, dependent variables must be moderately
correlated from .21 to .6 (Meyers et al., 2006). Analysis indicates that the dependent variables are moderately correlated and range from .369 to .544.

Table 10

*Bivariate Correlations for Pretest Scores*

<table>
<thead>
<tr>
<th></th>
<th>OMC: Challenge</th>
<th>OMC: Mastery</th>
<th>SPPA: Scholastic Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMC: Challenge</td>
<td>1</td>
<td>.544**</td>
<td>.499**</td>
</tr>
<tr>
<td>OMC: Mastery</td>
<td></td>
<td>1</td>
<td>.369**</td>
</tr>
<tr>
<td>SPPA: Scholastic Competence</td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

*Note. n = 99*

OMC = Orientation of Motivation; SPPA = Self-Perception Profile for Adolescents

** Correlation is significant at the 0.01 level (2-tailed).
• Correlation is significant at the 0.05 level (2-tailed).

**Testing assumptions.** The researcher utilized a multivariate analysis (MANOVA) for this study. The researcher ran a Box’s Test of Equality of Covariance to evaluate the assumptions (a) normality, (b) linearity, (c) homogeneity of variance, (d) independence of samples, and (e) homogeneity of slopes. These assumptions must be met so researcher could interpret the data with accuracy. These results were not significant ($p < .05$) for pretest scores, which indicated that the assumptions of homogeneity were met for pretest scores. Box’s Test for Equality of Covariance Matrices for Research Question 1 pretest scores are shown in Table 11.
Table 11

*Box’s Test of Equality of Covariance Matrices for Pretest Scores*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Box’s M</td>
<td>28.848</td>
</tr>
<tr>
<td>$F$</td>
<td>1.489</td>
</tr>
<tr>
<td>$df1$</td>
<td>18</td>
</tr>
<tr>
<td>$df2$</td>
<td>10734.1</td>
</tr>
<tr>
<td>Sig.</td>
<td>.083</td>
</tr>
</tbody>
</table>

*Homogeneity of variance.* The researcher utilized the Levene’s test for homogeneity of variance to examine variance across experimental and comparison groups. The researcher ran a Levene’s test for homogeneity of variance, shown in Table 12. Levene’s test did not find significance at $p < .01$ (Keyes & Levy, 1997), indicating there was equal variance across groups.

Table 12

*Levene’s Test of Equality of Error Variances for Pretest Scores*

<table>
<thead>
<tr>
<th></th>
<th>$F$</th>
<th>$df1$</th>
<th>$df2$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMC Challenge</td>
<td>1.954</td>
<td>3</td>
<td>95</td>
<td>.126</td>
</tr>
<tr>
<td>OMC Mastery</td>
<td>2.925</td>
<td>3</td>
<td>95</td>
<td>.038</td>
</tr>
<tr>
<td>SPPA Scholastic Competence</td>
<td>.196</td>
<td>3</td>
<td>95</td>
<td>.899</td>
</tr>
</tbody>
</table>

*Note.* OMC = Orientation of Motivation; SPPA = Self-Perception Profile for Adolescents

*Pretest data analysis for motivation and self-perception scales:* The researcher employed a two-way multivariate analysis of variance (MANOVA) and the Wilks’ Lambda was used to compare means for the experimental and comparison groups, course type, and interaction. The Wilks’ Lambda results indicated that there was no significant difference
between groups. Results from the pretest Orientation of Motivation in the Classroom (OMC) and Self-Perception Profile for Adolescents (SPPA) subscale scores did not yield statistically significant results for the effect of the self-regulation intervention or traditional curriculum on motivation (mastery and challenge) or self-perception of scholastic competence, $F(3, 93) = .862$, $p = .464$. The results of a multivariate analysis of variance test comparing experimental and comparison groups of pretest are shown in Table 13.

Table 13

*Results for a Multivariate Analysis of Variance Test for Pretest Scores*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Wilk’s Λ</th>
<th>$F$</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>.973</td>
<td>.8620</td>
<td>3.000</td>
<td>93.000</td>
<td>.464</td>
</tr>
<tr>
<td>Course</td>
<td>.922</td>
<td>2.167</td>
<td>3.000</td>
<td>93.000</td>
<td>.056</td>
</tr>
<tr>
<td>Interaction</td>
<td>.998</td>
<td>.0470</td>
<td>3.000</td>
<td>93.000</td>
<td>.986</td>
</tr>
</tbody>
</table>

There was no statistically significant main effect for course type (CP and H) for pretest that led the researcher to analyze follow up tests $F(3, 93) = 2.167$, $p < .056$. However, further analysis indicates that students in honors classes scored higher on the pretests for challenge and scholastic competency subscales ($M = 2.69$, $SD = .62$) ($M = 2.88$, $SD = .64$) than students in college prep courses ($M = 2.34$, $SD = .73$), $p = .017$; ($M = 2.47$, $SD = .68$), $p = .018$, respectively. There were no other significant differences. In response to these results from the pretest data, the researcher continued by employing a two-way MANCOVA for posttest data analysis. The researcher set the pretest mean scores for the challenge and scholastic competence subscales as covariates for the posttest data analysis.
Review of the Test of Between-Subject Effects indicates that there was no statistically significant interaction between the pretest scores of students in treatment or comparison groups and course type (CP or H) with respect to mean scores for motivation (challenge and mastery) and self-perception (scholastic competence) \( F(3, 93) = .047, p = .986 \). Refer to Table 14 for Test of Between-Subject Effects.

Table 14

*Test of Between-Subject Effects for Pretest Mean Scores*

<table>
<thead>
<tr>
<th>Test of Between-Subject Effects</th>
<th>Pretest Challenge Mean Scores Significance</th>
<th>Pretest Mastery Mean Scores Significance</th>
<th>Pretest Scholastic Competence Mean Scores Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>.656</td>
<td>.695</td>
<td>.278</td>
</tr>
<tr>
<td>Course</td>
<td>.017</td>
<td>.181</td>
<td>.018</td>
</tr>
<tr>
<td>Group*Course</td>
<td>.989</td>
<td>.970</td>
<td>.742</td>
</tr>
</tbody>
</table>

*Note. p ≥ .05*

**Posttest data preparation.** Research Question 1 guided the examination of the difference in orientation of motivation and self-perception of scholastic competence for grade nine mathematics students who had participated in a self-regulation intervention focusing on goal setting and reflection and those who did not. Posttest data were collected from all participants after the intervention occurred and at the end of their mathematics unit. The end of their mathematics unit was determined after students received their CUSA grade for the treatment and comparison groups. The treatment culminated with a reflection assignment in which students received their mathematics CUSA grade. The sample size included 102 students, of which three students dropped from the study leaving a total 99. The treatment group had 51 students and the comparison group had 48. The CP group had a total of 57 students and the honors group had a total of 42.
**Outliers and data normality.** The researcher evaluated the data normality by conducting an evaluation of the multivariate outliers. The normality of pretest and posttest scores distribution on the subscales for the Orientation of Motivation in the Classroom (OMC) and Self-Perception Profile for Adolescents (SPPA) instruments were tested. Stem-and-leaf plots were analyzed for all dependent variables and showed evidence of outliers. There were two cases for the following subscales in pre- and posttest data. Posttest data analysis for treatment and comparison groups revealed that treatment participant 72 the Mastery subscale was an outlier. Posttest data analysis revealed that treatment participant 37 was an outlier on the Scholastic Competence subscale. There were no outliers for posttest data on Challenge subscale. Additionally there were two outliers for course type (CP and H). Participant 32 in the Algebra I CP course was an outlier for the Mastery subscale. Participant 57 in the Algebra I H course was an outlier for the Scholastic Competence subscale. See Figures 1-4 for stem and leaf plots identifying outliers. The researcher did not remove these outliers as assumptions were met for skewness and kurtosis at +/-1 (Meyers, et al., 2006). Refer to Table 15 for descriptive statistics on posttest data that include skewness and kurtosis values.
Figure 1. Stem and Leaf Plot for Posttest Mastery Subscale by Group
Figure 2. Stem and Leaf Plot for Posttest Scholastic Competence Subscale by Group
Figure 3. Stem and Leaf Plot for Posttest Mastery Subscale by Course
The Shapiro–Wilk test was employed to analyze the significance of normality. The researcher used an alpha level of .001 as it is recommended to indicate a possible violation of normality (Meyers et al., 2006). The test results verified that normality was not violated at the .001 alpha level between groups. The results from the Shapiro–Wilk test for posttest data are displayed in Table 15.

Figure 4. Stem and Leaf Plot for Posttest Scholastic Competence Subscale by Course
Table 15

*Shapiro-Wilk Test of Normality for Posttest Scores*

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Treatment</th>
<th>Comparison</th>
<th>CP</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMC: Challenge Subscale</td>
<td>.093</td>
<td>.258</td>
<td>.024</td>
<td>.327</td>
</tr>
<tr>
<td>OMC: Mastery Subscale</td>
<td>.437</td>
<td>.432</td>
<td>.116</td>
<td>.538</td>
</tr>
<tr>
<td>SPPA: Scholastic Competence Subscale</td>
<td>.197</td>
<td>.115</td>
<td>.182</td>
<td>.195</td>
</tr>
</tbody>
</table>

*Note. OMC = Orientation of Motivation; SPPA = Self-Perception Profile for Adolescents*

*Descriptive statistics for research question 1.* Descriptive statistics were used to analyze the posttest scores for the subscales aforementioned on the Orientation of Motivation and the Self-Perception Profile instruments. Descriptive statistics are presented in Table 16 for the total sample. The researcher examined pretest mean scores for scholastic competence subscale and motivation (challenge and mastery) subscales. Subscales reflect standard deviations ranging from .52 to .67 with means ranging from 2.31 to 2.89 on a 4-point scale. Assumptions for skewness and kurtosis values fell within acceptable ranges from -1.0 to 1.0 (Meyers, et al., 2006).
Table 16

*Descriptive Statistics for Posttest Scores*

<table>
<thead>
<tr>
<th>Experimental Condition</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Effect 1: Treatment Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment (n = 51)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholastic Competence</td>
<td>2.58</td>
<td>.63</td>
<td>-.253</td>
<td>.022</td>
</tr>
<tr>
<td>Challenge</td>
<td>2.41</td>
<td>.65</td>
<td>.493</td>
<td>-.201</td>
</tr>
<tr>
<td>Mastery</td>
<td>2.41</td>
<td>.57</td>
<td>.396</td>
<td>.397</td>
</tr>
<tr>
<td><strong>Main Effect 2: Course Level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College Prep (n = 57)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholastic Competence</td>
<td>2.80</td>
<td>.65</td>
<td>-.222</td>
<td>-.705</td>
</tr>
<tr>
<td>Challenge</td>
<td>2.44</td>
<td>.59</td>
<td>-.255</td>
<td>.214</td>
</tr>
<tr>
<td>Mastery</td>
<td>2.61</td>
<td>.55</td>
<td>.136</td>
<td>.129</td>
</tr>
<tr>
<td>Honors (n = 42)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholastic Competence</td>
<td>2.89</td>
<td>.60</td>
<td>-.287</td>
<td>.179</td>
</tr>
<tr>
<td>Challenge</td>
<td>2.58</td>
<td>.67</td>
<td>-.118</td>
<td>.372</td>
</tr>
<tr>
<td>Mastery</td>
<td>2.66</td>
<td>.60</td>
<td>.010</td>
<td>-.341</td>
</tr>
</tbody>
</table>

*Correlations.* The researcher analyzed Pearson correlation coefficients to determine the relationship between variables. Table 17 shows the Pearson correlation variables for the posttest data. In order to meet the assumption for MANOVA, dependent variables must be moderately
correlated from .21 to .6 (Meyers et al., 2006). Analysis indicates that the dependent variables are moderately correlated and range from .495 to .576.

Table 17

*Bivariate Correlations for Posttest Scores*

<table>
<thead>
<tr>
<th></th>
<th>OMC: Challenge</th>
<th>OMC: Mastery</th>
<th>SPPA: Scholastic Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMC: Challenge</td>
<td>.576**</td>
<td>.519**</td>
<td></td>
</tr>
<tr>
<td>OMC: Mastery</td>
<td></td>
<td>.495**</td>
<td></td>
</tr>
<tr>
<td>SPPA: Scholastic Competence</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. OMC = Orientation of Motivation; SPPA = Self-Perception Profile for Adolescents*

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

**Testing assumptions.** The researcher utilized a multivariate analysis of variance (MANOVA) for this study. The researcher evaluated the following assumptions (a) normality, (b) linearity, (c) homogeneity of variance, (d) independence of samples, and (e) homogeneity of slopes. These results were not significant ($p < .05$) for posttest scores, which indicated that the assumptions of homogeneity were met. The researcher utilized the Box’s M test of Equality of Covariance and the Levene’s test for homogeneity of variance to examine variance across groups (treatment and comparison) and course type (CP and H). Box’s Test for Equality of Covariance Matrices for Research Question 1 pretest posttest scores are shown in Table 18. The researcher analyzed the Levene’s test for homogeneity of variance for posttest data, shown in Table 19. The Levene’s test did not find significance at $p < .01$ (Keyes & Levy, 1997), indicating there was equal variance across groups.
Table 18

*Box’s Test of Equality of Covariance Matrices for Posttest Scores*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Box’s M</td>
<td>15.234</td>
</tr>
<tr>
<td><em>F</em></td>
<td>.786</td>
</tr>
<tr>
<td>df1</td>
<td>18</td>
</tr>
<tr>
<td>df2</td>
<td>10734.1</td>
</tr>
<tr>
<td>Sig.</td>
<td>.719</td>
</tr>
</tbody>
</table>

Table 19

*Levene’s Test of Equality of Error Variances for Posttest Scores*

<table>
<thead>
<tr>
<th></th>
<th><em>F</em></th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMC Challenge</td>
<td>1.270</td>
<td>3</td>
<td>95</td>
<td>.289</td>
</tr>
<tr>
<td>OMC Mastery</td>
<td>.414</td>
<td>3</td>
<td>95</td>
<td>.743</td>
</tr>
<tr>
<td>SPPA Scholastic Competence</td>
<td>2.148</td>
<td>3</td>
<td>95</td>
<td>.099</td>
</tr>
</tbody>
</table>

*Note.* OMC = Orientation of Motivation; SPPA = Self-Perception Profile for Adolescents

*Posttest data analysis for motivation and self-perception scales:* The researcher employed a two-way MANCOVA statistic and the Wilk’s Lambda was used to compare means for the groups (treatment and comparison) and course (CP and H) when controlling for pretest mean scores for the Challenge and Scholastic Competence subscales. The Wilks’ Lambda results indicated that there was no significant difference between groups or course. Results from the posttest Orientation of Motivation in the Classroom (OMC) and Self-Perception Profile for Adolescents (SPPA) subscale scores did not yield statistically significant results for the effect of the self-regulation intervention or traditional curriculum on motivation (mastery and challenge)
or self-perception of scholastic competence, $F(3, 91) = 1.150, p = .333$ when controlling for pretest challenge and scholastic competence mean scores. There was not a statistically significant main effect on course type (CP and H) when controlling for pretest challenge and scholastic competence mean scores $F(3, 91) = .209, p < .890$. The results of a multivariate analysis of variance test of posttest mean scores by group, course, and interaction are shown in Table 20.

Table 20

*Results for a Multivariate Analysis of Variance Test for Posttest Scores*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Wilk's Λ</th>
<th>$F$</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>.963</td>
<td>1.150</td>
<td>3.000</td>
<td>91.000</td>
<td>.333</td>
</tr>
<tr>
<td>Course</td>
<td>.993</td>
<td>.209</td>
<td>3.000</td>
<td>91.000</td>
<td>.890</td>
</tr>
<tr>
<td>Group*Course</td>
<td>.937</td>
<td>2.039</td>
<td>3.000</td>
<td>91.000</td>
<td>.114</td>
</tr>
</tbody>
</table>

*Note. MANCOVA – Controlled for Pretest Challenge and Scholastic Competence Mean Scores*

There was no statistically significant interaction between the posttest scores of students in treatment or comparison groups and course type (CP or H) with respect to mean scores for motivation (challenge and mastery) and self-perception (scholastic competence) $F(3, 91) = .937, p = .114$. However, analysis of the Test of Between Subject Effects indicated that there was a statistically significant interaction between the posttest scores of students in the treatment groups and honors courses with respect to mean scores for the challenge subscale, $p = .018$. Student participants from the treatment group that were also members of the honors level Algebra I course, scored statistically significantly higher on challenge subscale mean scores from pre ($M = 2.29, SD = 55$) to post ($M = 2.79, SD = .788$). See Table 21 for Test of Between-Subjects and Figure 5 for graph on interaction.
Table 21

*Test of Between-Subject Effects for Posttest Mean Scores*

<table>
<thead>
<tr>
<th>Test of Between-Subject Effects</th>
<th>Pretest Challenge Mean Scores Significance</th>
<th>Pretest Mastery Mean Scores Significance</th>
<th>Pretest Scholastic Competence Mean Scores Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>.272</td>
<td>.351</td>
<td>.950</td>
</tr>
<tr>
<td>Course</td>
<td>.666</td>
<td>.465</td>
<td>.623</td>
</tr>
<tr>
<td>Group*Course</td>
<td>.018</td>
<td>.683</td>
<td>.644</td>
</tr>
</tbody>
</table>

Note. $p \geq .05$
Interaction for Grade 9 Algebra 1 Honors and College Preparatory Students Who Participated in a Program Employing Self-Regulatory Strategies (Treatment) and those Who Did Not (Comparison) Regarding Their Preference for Challenge

Figure 5. Graph depicting treatment and course interaction
Research Question 2 Analysis

Description of the qualitative data. The second part of this study was qualitative in nature as the purpose of this study was to investigate student self-perceptions of scholastic competence and orientation of motivation for the treatment group. For research Question 2, the researcher analyzed qualitative data from a total sample 9 by employing in-vivo coding. Direct interpretation of participant responses of themes and patterns that emerged are reported. The researcher invited student participants from the treatment group who showed the highest positive change in scores for Scholastic Competence and Mastery subscales. The researcher chose a case study research design to study self-perception of scholastic competence and orientation of motivation for students who participated in goal setting and reflection treatment. Student participants from the treatment group bind the case study. All interview transcriptions were transcribed and analyzed by the researcher. The research question guiding this part of the study was: How do goal setting and reflection self-regulatory practices in mathematics affect the perceived scholastic competency and motivation of ninth-grade students?

This chapter presents the related codes, categories, and the research question from one data source of student semi-structured interviews. After a 7-week treatment and quantitative analysis, the researcher interviewed nine student participants individually on one occasion for a total of 10-12 minutes each. The semi-structure interview protocol included an introduction and overview of the study. The researcher reviewed confidentiality and the declaration that it was possible to exit the interview at any time with no repercussions. She also asked permission to record the session. Once the student participants were aware of their rights, the researcher began the semi-structured, open-ended questions. The researcher created these questions specifically to
collect data related to the implementation of the treatment, self-perception scholastic competence, and orientation of motivation in the classroom.

The researcher began the session with questions to better understand the students’ day at school. For example, questions related to the following; what they were studying in their mathematics class, self-perceptions of strengths in mathematics, experience with the goal setting and reflection treatment, definition of scholastic competence and motivation, and ultimately, why they believed to have improved in scholastic competence or mastery of content. Data analysis and findings are presented in this chapter and pseudonyms were used for all participants.

**Description of the participants.** Nine students were identified from the quantitative data to show the highest change in scholastic competence and mastery subscale scores. Four students were invited to participate from the treatment group for highest changes for scholastic competence scores and five students were invited to participate from the treatment group for highest change in the mastery subscale scores since two students showed the same change in mean scores. See Tables 5 and 6 for student mean scores for highest change for scholastic competence subscale and mastery subscale. The researcher identified the students with the highest positive change in mean scores by comparing mean scores for these two subscales.

The mastery subscale mean score change ranged from -1.833 to +1.667 and the scholastic competence mean score change ranged from -1.15 to +.95. Student participant 184, placed in the top scores for both subscales, but was invited to interview based on the higher score for the mastery subscale of 1.667. James’ mean score from pre to posttest on the scholastic competence subscale showed a .80 positive change, and since James was already participating in the interviews, the researcher went to the next student participant with the highest change. Student
participant 37, Mary, was invited to participate. The researcher ultimately did this in order to include one more student experience since the interview protocol was similar for all students.

Table 22 outlines the description for each student participant who met the criteria for the case study. The case is bound by treatment students and the criteria was set at the four scores that showed the highest increase from pretest to posttest on the perceived scholastic competence subscales and the highest four changed scores on the mastery subscales.
Table 22

Description of Grade Nine Algebra I Student Participants in Case Study

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Age</th>
<th>Race</th>
<th>Gender</th>
<th>First Language</th>
<th>Course Level</th>
<th>Like Math?</th>
<th>Case Study Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chris</td>
<td>15</td>
<td>Hispanic</td>
<td>Male</td>
<td>English</td>
<td>College Prep</td>
<td>No</td>
<td>Scholastic Competence</td>
</tr>
<tr>
<td>Jimmy</td>
<td>14</td>
<td>Other</td>
<td>Male</td>
<td>English</td>
<td>College Prep</td>
<td>Yes</td>
<td>Scholastic Competence</td>
</tr>
<tr>
<td>Kristen</td>
<td>14</td>
<td>Hispanic</td>
<td>Female</td>
<td>Spanish</td>
<td>College Prep</td>
<td>Yes</td>
<td>Scholastic Competence</td>
</tr>
<tr>
<td>Mary</td>
<td>14</td>
<td>Hispanic</td>
<td>Female</td>
<td>Spanish</td>
<td>College Prep</td>
<td>No</td>
<td>Scholastic Competence</td>
</tr>
<tr>
<td>James</td>
<td>14</td>
<td>Asian</td>
<td>Male</td>
<td>English</td>
<td>Honors</td>
<td>Yes</td>
<td>Motivation - Mastery</td>
</tr>
<tr>
<td>Brennan</td>
<td>15</td>
<td>White</td>
<td>Male</td>
<td>Portuguese</td>
<td>College Prep</td>
<td>Yes</td>
<td>Motivation - Mastery</td>
</tr>
<tr>
<td>Addison</td>
<td>15</td>
<td>Hispanic</td>
<td>Female</td>
<td>Spanish</td>
<td>College Prep</td>
<td>Sometimes</td>
<td>Motivation - Mastery</td>
</tr>
<tr>
<td>Reagan</td>
<td>15</td>
<td>Hispanic</td>
<td>Female</td>
<td>English</td>
<td>Honors</td>
<td>Yes</td>
<td>Motivation - Mastery</td>
</tr>
<tr>
<td>Tucker</td>
<td>15</td>
<td>White</td>
<td>Male</td>
<td>English</td>
<td>Honors</td>
<td>No</td>
<td>Motivation - Mastery</td>
</tr>
</tbody>
</table>
Results of Qualitative Data Analysis

The findings from the voices of student participants in this case study address the second research question. This section includes a summary of findings followed by the introduction of the theme that emerged from participants. Student participant interviews were held in one session over the course of two days. Students were given a pass to meet with the researcher during their math class. The interviews took approximately 10 minutes to complete. This was to ensure that students did not miss extensive time from class and were available to participate in the study. The researcher employed an in vivo coding process (Creswell, 2013). The researcher first analyzed data by individual interview question and coded student instances with first layer of codes. From there, the researcher organized student instances by paraphrased code. The researcher was then able to collapse codes into categories to reveal emergent themes that answer the second research question.

Results of Semi-Structured Interviews

Results from the nine semi-structured interviews revealed several codes that emerged from the in-vivo coding analysis of student participant transcripts. The researcher first organized the data collected by question and instances. Next, the researcher employed the process of in-vivo coding. This process revealed the first layers of 23 emergent codes that were then collapsed into five categories. From there, the second layer of analysis was conducted and categories were identified. Please refer to Appendix F for the audit trail of findings for more details on in-vivo codes. The researcher then categorized the emergent codes. The collapsed emergent codes that became categories are; (a) Functionality of Treatment, (b) Goal Setting, (c)
Metacognition, (d) Student-Teacher Relationship, (e) Motivation, and (f) Scholastic Competence. To better understand the results, the researcher collapsed these categories into themes. The themes that were identified are: (a) Metacognition is critical to the cyclical process of developing Self-Regulatory Practices (b) Positive perceptions of academic ability depend on opportunities to develop efficacious beliefs of one’s self. The following sections of this chapter will include a discussion of the categories, themes, and findings.

Discussion of Categories and Themes

Theme 1. Theme 1 was Metacognition is critical to the cyclical process of developing self-regulatory practices. The first category, Functionality of Treatment, was revealed from the following codes: (a) Transferable, (b) Ease of Use, and (c) Helpful. The Functionality of Treatment encompasses the ability for the treatment to be used in the classrooms, its ease of use by the student participants, and whether or not it was perceived as helpful to them as part of their classroom experience.

Instances for the emergent code of transferability appeared in 6 out of 9 student interviews. For example, Reagan shared in her interview, “I use it in Italian and bio because if I don’t reflect on how well I’m doing then it won’t help me because I remember in bio where I used to fail a lot on tests and grades like now I’m doing a little bit.” Addison responded saying, “for all my class at the end of the day I asked myself did you understand the material and from that I take on either I need to practice the material more or you need to focus more on this section of the material, so it kind of did help.”

Instances for the emergent code of Ease of Use appeared 6 out of 9 times. The results showed that there were varying degrees of difficulty that students faced as part of
the treatment. When asked if the goal setting and reflection treatment was difficult, four students responded saying that it was not difficult and described the process as easy. However, one respondent shared that there were some difficulties due to time constraints and another student respondent said that setting the goal was the easy part, but “doing the goal was just really hard.”

Regardless of varying degrees of difficulty, all students responded saying that the treatment was helpful to some degree. For example one participant reported, “It sort of did help because when we gave the teacher our paper back she would look over it and tell us if it was right or not and then she would tell me that that’s a good goal you should on that more” and “At a certain point it did [help me slow down] because I felt like I was going really fast and I wasn’t really focusing on what we had to learn, like overall. So, at a certain point I felt like I did and it did help me get like a better grade in the end on my tests.”

To summarize, the emergent codes and instances identify elements of functionality of the treatment. Students concurred that the treatment was helpful, many agreed that the treatment was “easy” to complete, but had varying degrees of difficulties due to scheduling and classroom management or frustration with trying to meet the goal. Lastly, the majority of student participants shared that the treatment was transferable and helped them in other classes as well. These relate to Theme 1, that states that, metacognition is critical to the cyclical process of developing Self-Regulatory Practices as students agreed that the treatment was helpful to reflect on their learning and that many of the participants used the goal setting and reflection process beyond their mathematics classes.
The next category, *Goal Setting*, was derived from the following emergent codes: (a) Specific Examples of Processing content, (b) Re-adjust/action step (cyclical), and (c) Individualized. *Goal setting* is the process of establishing clear and usable targets or objectives for learning (Moeller et al., 2012).

Instances for the emergent code, *Specific Examples of Processing Content*, appeared in 4 out of 9 student participant responses. When asked about the mathematics unit they were studying or questions relating to the treatment, these students used content specific examples. James, Brennan, and Addison are all student participants who showed increased mean scores from the Master Subscale and had specific responses during the interview protocol. For example, Addison stated that she was studying, “Systems and equations so we were learning how to graph them algebraically and substitution and elimination, different ways to solve equations.” Both James and Brennan explained they were learning about simplifying equations and using the substitution and elimination method.

The next code, *Readjust/Action step*, emerged from the interviews in which the students readjusted their behavior to reach their goal. There is evidence in student instances that this occurred across all participants. For example, Jimmy, a student participant that had increased mean scores for Scholastic Competence subscale, made several statements throughout his interview that indicated a readjustment towards a goal. “Well one of my goals was to stay with the after school things and I still go and one of the goals was to not depend on my friends to help me. So Ms. Teacher put me in a seat not far away, but not near some of my best friends in my class, so I had to do it either with the friends or by myself.” The student participant was referring to setting a goal to
not rely on friends in class for help and to become more independent. The student explained that he needed to spend time away from his friends in class as they were also distracting. The student also shared that he attended extra help session at the start of the unit so the researcher asked if the student continued to attend. The student responded by saying, “Well going after school got kind of annoying, but yeah I still do that.” In reference to when the participant was asked if it helped to attend after school sessions, the student responded, “Yeah cause I mean I got a 20 on a quiz once and then I got 100 on the test and I haven’t gotten under a 69 on any of my other tests so far.”

The last emergent code that supported this category was that the process was individualized. While only 1 out of 9 had more explicit remarks to support this emergent code, the researcher was able to infer other instances as well. Kristen stated that, “It felt kind of interesting because I got to do my own set up and keep on tracking the schedule and to see if I improve or not.” Overall, the emergent codes related to the goal setting process and related to Theme 1 because goal setting is part of the cyclical process of self-regulation.

The final category for Theme 1, Metacognition, emerged from the data from the codes (a) Self-Awareness and (b) Determining what is known and what is not known. Metacognition is the awareness and monitoring of one’s thoughts and task performance, or described as thinking about your thinking (Flavell, 1979).

From the data, the code of Self-Awareness became apparent. Based on the data collected, 4 out of 9 instances showed evidence that student participants become self-aware about their learning. For example, Chris, a student participant in the treatment and interviews for improvement in perceived scholastic competence, reported that he does not
like math and throughout his interview there was a story of overcoming difficulties and becoming self-aware throughout. He shared that, “It’s usually when I know what I’m doing, like 100% sure I know what I’m doing, that’s really it because that’s like my worst subject” when referring to how he determined that he’s been successful. Prior to this, he told me how difficult math is for him and that he “didn’t like it because I didn’t understand it, it was really hard. I did understand some stuff because of the teacher occasionally when I did ask her for help, but it was just really hard for me.” But his self-awareness of his own learning also depended on his emotions. Chris said, “It depends on like how I feel in the day. Like sometimes in my head I kind of just don’t want to learn anything if I don’t understand it I just sit there unless the teacher pulls me into the conversation or to the unit.” Regardless of Chris’ hardships that he faced throughout this unit, he ultimately set a goal to focus more in class and while he said it was easy to set the goal, yet not follow through with it every day. He believed that setting this goal helped him become more self-aware of his capabilities. This is evidenced by Chris’ own words when describing his experience with the goal setting and reflection treatment. He shared that, “Even though it wasn’t my best unit I kind of knew what I had to do and I talked to the teacher when I didn’t understand it.”

Furthermore, the following code *determining what is known and was it not known*, emerged from the data for 6 out of 9 student participants’ experiences. This code supports the category *Self-awareness* because the student participants’ experiences explain how it is important for them to think about their own learning and become aware of what they understood. Chris’ experience of self-awareness relates to this code when asked about whether or not the treatment was helpful. When asked, “Was it helpful to do
the goal setting and reflection?” he responds with, “Yea it was because it’s just when I do the class I already know that I need to work on at the time and so I still need to figure out what I’m, bad at and what I’m good at.” It became apparent that students determined their level of success in various ways and that it was important to know where their mistakes were. For example, Addison stated that, “I don’t really use grades because numbers don’t really tell you anything because you need to like determine again if you understand it and if you’re capable of like doing it yourself that’s good enough, but like if you were able to teach to, like I use my sister, I teach it to her and if she understands what I’m saying then I know I can do it and I can help out someone else, then if I can do it myself I know I’m good for tests, quizzes, or homework grades or classwork grades.”

Similarly when asked about the experience with the treatment, Reagan responded with, “Sometimes it was really frustrating but other times it was really helpful and it helped me figure out what I need to work on and what like I had done good so far.”

Since metacognition is the process by which people think about their thinking, the connection between self-reflection specific to one’s learning and determining what is known versus what is unknown is supported by the data. There was indication from the data that students who participated in the treatment were given the opportunity to experience the cycle of self-regulation; forethought and goal setting, monitoring and adjustment, and self-reflection.

**Theme 2** This theme was *Positive perceptions of academic ability depend on opportunities to develop efficacious beliefs of one’s self*. While the criteria for participation in student interviews was defined by the highest positive increase in either perceived scholastic competence subscale scores or motivation scores on the mastery
subscales, student responses showed examples of intrinsic and extrinsic motivators during the interviews. Ryan and Deci (2000) define “Orientation of Motivation” as the degree to which internal or external forces motivate an individual. Three categories that resulted in Theme 2 were; (a) student-teacher relationship and (b) motivation and (c) confidence.

The category, Student–Teacher Relationship was identified when student participant’s commented on their learning experience and the role the teacher plays in that experience. The researcher defined this category from the qualitative data as the following codes: (a) Fun, (b) Extra Help, and (c) Asking Questions. The category student-teacher relationship showed elements of safeness in that the student has the opportunity to approach the teacher for help and that the student enjoys attending class.

The first emergent code, Fun, was revealed by a few student experiences. James showed an increase in his mastery subscale scores from 1.67 to 3.33. During the interview he described his learning experience in mathematics with his current teacher. James stated that, “Yeah, I became more motivated because at first like on the first day of learning everything, like the units, I wasn’t motivated because my teachers usually did the boring stuff like what the teachers did, and then as soon as all of us got comfortable he actually made learning fun and I got motivated.” James’ learning experience and efficacious beliefs relied on having a “fun” learning environment in which the teacher created opportunities for the students to learn in different ways.

Additionally, Reagan, who also showed an increase in her mastery subscale mean scores from 2.50 to 3.00. Reagan stated that, “it was just fun to see like different ways of learning things and techniques which did help me figure out a way to change my schedule up, so I think it was pretty helpful” when she was referring to the treatment
protocol of daily reflection as part of the learning experience. This statement was asked for clarification by the researcher. The student explained that adding the daily reflection log to her classroom routine was fun and helpful. The researcher confirmed when Reagan stated “change my schedule up” meant daily classroom routine in her mathematics class.

This emergent code supports the category of student-teacher relationships because the teacher and student cultivated a level of comfort to have fun with learning. Furthermore, when Reagan refers to the treatment being “fun” and helpful as part of her learning experience, the student-teacher relationship is cultivating opportunities for the student to think about his/her role in learning, therefore, creating a relationship.

The following code, extra help, emerged from the data as 7 out of 9 student participant responses used this term during their interviews. Extra help for students is not mandatory, however many teachers stay after school or make themselves available during their lunch periods. Mary, a student who had increased scores for perceived scholastic competency, explained that extra help was available after school with her teacher. During the interview, Mary stated that, “Like in the beginning it was hard be then I had to stay after school with Mrs. Teacher and get help to improve my grade because it was like a 64 and then I improved to like an 89.” Addison also shared how after studying and determining what she did not understand that her teacher was available during the school day to offer assistance. She said, “Well for the test and stuff I like how he does review packets and everything, so when I don’t understand something I just go and talk to him during my free period and stuff and he’s just really helpful.”
While the act of seeking out extra help after school or outside of class time emerged from the data, so did asking questions in general. The third code, *asking questions* emerged from the data when Chris shared that, “I didn’t like it because I didn’t understand it, and it was really hard. I did understand some stuff because of the teacher. Occasionally when I did ask her for help, but it was just really hard for me. I didn’t really do good at it.” Chris was referring to the fact that he did not “like” the mathematics unit and that he faced difficulties learning it. However, he pointed out that he asked questions and participated in class by asking the teacher for help. From the data analysis, it emerged that it was important for students to have extra time with their teacher for additional help and that they felt comfortable seeking assistance, and asking questions in class.

Students who participated in these interviews showed an increase in the self-perception of scholastic competence or were intrinsically motivated. The majority of the students felt comfortable asking for help during or outside of class time. Together, these codes formed the category of *student-teacher relationships* because each of the instances showed how the student felt comfortable with his or her teacher to seek out extra help or to enjoy the learning experience. This shows evidence of both intrinsic and extrinsic motivation. It is important to note that students can exhibit evidence of both types of motivation depending on their intentions. For example, the students are extrinsically motivated as the student depends on the teacher and is motivated to increase his/her mathematics grade. Conversely, the students were considered intrinsically motivated as he or she sought extra support so to gain understanding and mastery. Either way, these student participant instances support Theme 2.
The second category, which supports Theme 2, is motivation. This category was created from seven emergent codes: (a) Believing you can do something, (b) Set your mind to achieve a goal, (c) Helps you move forward, (d) Grades/Feedback, (e) Independence/Perseverance, (f) Mastery/Teaching others, (g) and Modelling.

As part of the interviews, students that showed an increase in Mastery subscale mean scores from pre- to posttest were asked to define motivation. Many of the responses in the data specifically address how the student participant defines motivation. Other instances refer directly to the student Reponses about their own motivation in the classroom. This section will refer to student definitions of motivation first as related to the literature and then the researcher will present the analysis of data that reflects the student sharing their own experiences of motivation in their mathematics class.

Ryan and Deci (2000) define “Motivation” as the impetus to be moved to do something. When asked during interviews how they would define motivation, students responded in various ways. Three out of nine student responses informed the code, believing you can do something. Chris described it as, “Oh it’s just you having like the thought that I can do this, I can do this work, I can keep trying and get it done with.” Many of the emergent codes in this section support others in relation to the definition of motivation. For example, this code relates to other emergent codes such as, set your mind to achieve a goal, and helps you move forward.

The following student responses are samples from the data for the emergent codes: set your mind to achieve a goal and helps you move forward. The set your mind to achieve a goal code came from the data related to the question asking students to define
motivation. Tucker defined it as, “When you’re set to do one thing and you’re ready to achieve it and you do your best to achieve it.”

Reagan and Kristen’s responses are examples of how motivation is what helps you move forward. Reagan said, “Motivated… I think I would define it as something that helps you like just take a little step forward, I think that it is someone or something that helps you get through life or get through something important that you want to get through” while Kristen shared that motivation is “something that keeps you up and running and you can achieve.”

The evidence from the first three codes showed that the students’ definitions for motivation are described similarly to Ryan and Deci’s definition. The students defined motivation as that ability to decide on a goal, that motivation helps you to move forward and improve, and lastly that motivation is a feeling that keeps you going. While Ryan and Deci share an overall definition of motivation, Harter’s specific definitions related to this study and the classroom experience were related to further analysis of student experiences when describing their own motivation in their mathematics class.

Harter’s (1981b) definitions for “extrinsic motivation” and “intrinsic motivation” were employed because the definitions of these terms also pertain to motivation in the classroom. Her definition of extrinsic motivation is the degree to which grades, feedback, and dependence on the teacher motivate a student while intrinsic motivation is the degree that curiosity, interest, and mastery motivate a student.

These instances are representative of the data analyzed as examples of orientation towards extrinsic motivation. Examples from the emergent codes that relate to the aforementioned definition for extrinsic motivation were focused on grades and teacher
feedback. The codes, *Grades and teacher feedback*, were mentioned in 6 out of 9 student interviews either when asked how they know they are successful with their learning or organically came up throughout the interview protocol. Regan explained how the treatment helped her slow down when she rushed with her learning reported, “because I felt like I was going really fast and I wasn’t really focusing on what we had to learn, like overall. So, at a certain point I felt like I did and it did help me get like a better grade in the end on my tests.” Regan concluded that the treatment helped to improve her grades.

Grades were Regan’s criteria when determining whether or not the goal setting and reflection process was helpful. Another student, Brennan, stated that he determines whether or not he is successful based on the teacher telling her how he is doing in class or that grades will show him.

Harter (1981b) defined intrinsic motivation pole as the degree that curiosity, interest, and mastery motivate a student. Examples of codes that demonstrate intrinsic motivation are *independence/perseverance* and *mastery by teaching others*. Jimmy shared his experience and one of his goals. He stated that, “one of the goals was to not depend on my friends to help me. So Ms. Teacher put me in a seat not far away, but not near some of my best friends in my class, so I had to do it either with my friends or I was going to have to learn by myself.” This student showed increased scores for perception of scholastic competence. This is evidence that supports the finding that goal setting facilitates orientation to intrinsic motivation.

Furthermore, data for the code *mastery by teaching others* appeared 2 out of 9 times. Addison said, “I think you can tell like if you understand the material and you feel like you can sort of teach it to someone and have them understand it, you’re successful in
that material and in that subject” and Mary corroborates this data when asked about the treatment and her experience. She stated that, “It was good I guess because it improved my learning I think because the questions like can you teach someone else or how do you get to this, with this like what we learned today.” Data indicates that these students are aware of mastery learning or are becoming exposed to it as part of the treatment. "Mastery goals" focus on students’ individual action planning and are typically oriented toward helping students develop new skills, understand their own work, and achieve a sense of competency based on a set of standards (Senko et al., 2011).

The final category that emerged from the data is Self-Efficacy. The emergent codes that led to this category were: (a) Confidence, (b) Good at School, (c) Academically Competitive, and (d) Ready to Learn. The student responses to the interview questions, “When I say the phrase ‘scholastically competent’ how would you define it?” and “Based on your experience, do you feel more competent in mathematics?” were specific to the researcher attempting to understand the student experience and understanding of self-perception of scholastic competence. Scholastic competence is a child’s perceived cognitive competency as applied to schoolwork (Harter, 2012; Harter, Whitesell, & Kowalski, 1992). Examples from instances and emergent codes are presented first by student participant responses of how they defined scholastic competency and then evidence of students’ experiences that related to their own perceptions of scholastic competence.

Student participants Reagan and Chris described scholastic competence to mean academically competitive and being ready for school and ready to learn. Mary described it as being “a good scholar.” Lastly, Tucker explained that it is “confidence in school.”
Another student participant described scholastic competence as someone that was “really focused.” When analyzing the data by interview question, the researcher identified codes according to individual definitions of Scholastic Competence.

Analysis revealed that student participant responses were specific to his/her own experiences with the study. The category, **Self-Efficacy**, emerged after the first level of analysis when the researcher identified *Confidence* as it occurred in 4 out of 9 student instances. For example, Tucker shared, “We're now basically at the end of the year but I just want to finish it and feel good about myself and not always putting myself down because I can’t do math. I have to go and get extra help and put in the extra work to feel better about it.” Additionally, Reagan explained:

> I like being confident, I like when I go into a class and I know that we’re going to have a test and I know what the unit was about and I know and understand that topics we had done, so I like just going in and saying I’m going to get a good grade on this test because I actually understand what’s going on.

To further support this point, Jimmy said, “I know that I can, I know that I can do things in school” and Tucker stated, “That I’m good at school.” Beyond that, Kristen shared her experience with the treatment and how it motivated her. She stated that, “Because I’m not like that organized, but if I have to write every day like I said like it tells me what I should do and that keeps me motivated because like if I write good things about what I’m doing it keeps my confidence going up.” The data showed that confidence supports *self-efficacy*, and that is a belief in one’s ability when it relates to schoolwork.

The following statement from Tucker encompasses the essence of Theme 2. Tucker’s response to his experience with the treatment was: “Well it’s hard to feel
motivated in math since it’s a lot of work and when you don’t get things right it puts you down, but doing this made me think different and trying to push myself more.” This final statement encapsulates the purpose of this study and evidence for the second research question.

**Conclusion**

The thread that weaves these two themes together is described in the overall concluding statement: Metacognition is fundamental to the development of self-regulatory practices. As student experiences revealed, metacognition allowed them to develop the abilities to set goals, take action, and reflect on the outcomes. The researcher’s finding statement is that metacognition facilitates the cyclical process of developing self-regulatory practices as it allows students to recognize what they know and what they do not know. It fosters opportunities for positive perceived scholastic competence and self-efficacious beliefs.
CHAPTER FIVE: SUMMARY AND CONCLUSIONS

This chapter presents an overview of the research study with a summary of chapters one through four and addresses the synthesis of the research questions. It is comprised of six sections that expand on this research study. The chapter includes a section on the findings, provides a discussion of the results, suggestions for educators, and recommendations for future research. The next section elaborates on the limitations pertaining to the study. Lastly, this chapter concludes with a summary of the study.

Overview of the Study

The purpose of this study was to investigate the use of goal setting and reflection with ninth-grade mathematics students regarding the impact of a self-regulatory practice on their perception of scholastic competence and motivation in the classroom. Zimmerman’s (1990, 2002) research on self-regulatory practices and student empowerment is focused on shifting teaching and learning cycles to student-centered learning. This connection between self-regulatory practices, empowerment, and motivation grounds this study.

The researcher determined there was a need to focus on grade nine students and developed this study with the theoretical frameworks of Social Cognitive Theory and self-efficacy to support students (Bandura, 1986; Zimmerman et al., 1992). Beyond the aforementioned research and theoretical frameworks, the researcher notes that Self-Regulation Theory occurs when individuals monitor their abilities and adjust to meet their goals (Bandura, 1988; Cleary & Zimmerman, 2004). In so doing, people evaluate their ability to set a standard and create action steps to meet that goal. Self-reflection is a
vital step in this process, as it forces one to readjust his or her action steps to successfully accomplish the task at hand (Stajkovic & Luthans, 1979).

Harter (1992) shared that there was a need for future research on whether or not self-regulation impacted self-perception and orientation of motivation. Based on the literature review, the researcher pursued this task with 99 grade nine mathematics students. More specifically, the review of the literature in Chapter Two informed the researcher on the subjects of self-efficacy, Social Cognitive Theory, Self-Regulation Theory, and how each relates to student learning experiences.

**Discussion of Results**

In the most recent data reported by the National Center of Education Statistics (NCES, 2017), United States high school graduation rates were at 83%, up from 79% in 2010–11. The researcher selected grade nine students as the focus for this study since the site selected has an on-time graduation rate in 2016–17 at 80.3% and in 2015–16, 306 students were retained across grades 9–12, and 164 of them were freshmen students (Martins, 2016). Since grade nine is a pivotal time for students as they transition from middle-school to high school and the academic successes in grade nine are predictors for on-time graduation (Allensworth & Easton, 2005), there was a need to focus on grade nine students to help support their success as 20% of the students in this district do not graduate on time.

Specific to the transition from middle school to high school, students are forced to reassess their academic abilities, as there is less attention to individual progress and evaluation (Bandura, 1988). Compared with students who doubt their learning capabilities, those who believe they are efficacious in regard to learning participate more,
work harder, persevere, and achieve at a higher rate (Bandura, 1997). Bandura (1986, 1997) suggested that self-efficacy beliefs tend to decline as students advance through school. For example, competition, less teacher attention, stress emanating from transition, peer influence and comparison, and ability, all impact one’s self-efficacy (Bandura, 1997).

Research presented in Chapter Two indicates that ninth grade students’ academic experience is critical in maintaining their motivation in the classroom and retention towards graduation (Allensworth & Easton, 2005). Students who are empowered through goal setting, tracking, action planning, and reflection often have greater control over their learning than those who do not (Zimmerman, 2008; Zimmerman, Bonner, & Kovach, 1996). Zimmerman, Bandura, and Martinez-Pons (1992) explain that self-efficacy, social cognitive theory (SCT), and self-regulation through goal setting and reflection have all been linked to increased academic ability and motivation. Therefore, the researcher created a general classroom use goal setting and reflection treatment that was implemented by mathematics teachers to provide students the opportunity to participate and develop self-regulatory processes to increase their self-perception of scholastic competence and shift students to be more intrinsically motivated in the classroom.

The methodology for this research follows a mixed-methods quasi-experimental pretest-posttest exploratory sequential design (Creswell & Plano-Clark, 2011; Gall et al., 2003). The quantitative study had a treatment and a comparison group using a convenience sample of intact classrooms. Therefore, each teacher who volunteered to participate had one whole classroom assigned to be a comparison group and one to be a treatment group. Assignment to group was not random due to scheduling challenges. All
of the teacher participants participated in two 45-minute professional development sessions in which they were taught how to administer pretests and posttest, the treatment protocol to their treatment group, and responsibilities and requirements for fidelity to the study.

Students in the treatment group participated in the self-regulation intervention imbedded as part of their regular mathematics curriculum. This was administered to all students in the treatment classrooms. Since the goal setting and reflection intervention was aligned with district and school goals, it was approved by the district administration as appropriate to have all students participate in the goal setting and reflection assignments from the treatment group, yet the only data collected were from students with parental consent and student assent.

Students in the treatment group \( (n = 51) \) and the comparison group \( (n = 48) \) completed pre- and posttest surveys at the start and end of a mathematics unit. The treatment group participated in the researcher-adapted version of the Cleary and Zimmerman’s (2004) Self-Regulation Empowerment Program (SREP) goal setting and reflection program as described in the treatment section with the permission of Timothy Cleary and Barry Zimmerman after their review of the treatment (see Appendix G).

For the qualitative study, a purposeful sample was employed. Ninth-grade mathematics treatment participants bind the case study. The researcher used a purposeful sample that met the following two criteria. Student participants were invited to participate in semi-structured interviews who had (a) the highest change in scholastic competence scores and motivation scores on the mastery subscale and (b) completed the goal setting and reflection treatment program.
After consent to participate in this research study was obtained, teachers in participating classrooms administered the demographic survey and two pretests to all students prior to the start of the intervention program. The comparison group continued with their regular mathematics unit while the treatment group completed the adapted SREP materials embedded within their mathematics unit. Once the mathematics unit embedded with the intervention was complete, the researcher administered the two post-assessments to all students.

The specific research questions addressed were:

1. Is there a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses who participate in the self-regulatory practices of goal setting and reflection (treatment group) and those who do not (comparison group)?

   Non-Directional Hypothesis: There will be a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses who participate in the self-regulatory practices of
goal setting and reflection (treatment group) and those who do not (comparison group)

Main Effect 1: Is there a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students who participate in the self-regulatory practices of goal setting and reflection (treatment group) and those who do not (comparison group)?

Non-Directional Hypothesis: There will be a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students who participate in the self-regulatory practices of goal setting and reflection (treatment group) and those who do not (comparison group).

Main Effect 2: Is there a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses?
Non-Directional Hypothesis: There will be a significant difference between students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher) for ninth-grade mathematics students in college preparatory and honors courses.

Interaction: Is there a significant interaction between program type (treatment and comparison) and course level (college preparatory and honors) with respect to mean scores for students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher)?

Non-Directional Hypothesis: There will be a significant interaction between program type (treatment and comparison) and course level (college preparatory and honors) with respect to mean scores for students’ self-perceptions of scholastic competence and motivation scores (preference for challenge vs. preference for easy work assigned, curiosity/interest vs. pleasing the teacher/getting grades, and independent mastery vs. dependence on the teacher).
2. How do goal setting and reflection self-regulatory practices in mathematics affect the perceived scholastic competency and motivation of ninth-grade students?

The quantitative data collected from Harter’s (1981a) Self-Perception Profile for Adolescents (Ages 14–19) and Harter’s (2012) Scale of Intrinsic Versus Extrinsic Orientation in the Classroom were interval-level in the form of subscale (Scholastic Competence, Challenge, and Mastery) group means. Additionally, qualitative data were collected from semi-structured interviews. Quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS) program to analyze (IBM, 2013). SPSS statistical software (2001) Qualitative data were transcribed, coded, and analyzed for findings.

The qualitative research design was a case study. Qualitative and quantitative data were collected to gain different perspectives to examine and interpret the data (Jick, 1979). Triangulation of data consisted of analyzing the quantitative data for research question one, then interpreting the data that were collected to identify student participants that met the criteria for further investigation by comparing mean scores for Scholastic Competence and Mastery subscales. The student participants in the treatment group with the highest change in scholastic competence and motivation scores for the mastery subscale were invited to participate in semi-structured interviews were conducted and coded as part of the qualitative analysis. The interviews were professionally transcribed. The researcher coded the data according to the in vivo coding process (Creswell, 2013), and an analysis matrix was developed (see Appendix F). The matrix supported the development of the two themes that emerged across each instance. The researcher
investigated the quantitative results further for the treatment group in order to gain a more thorough understanding of the student participant experience for those that had increases in their mean scores for the scholastic competence and mastery subscales.

The overarching conclusion that emerged from the student participant responses was that metacognition is fundamental to the development of self-regulatory practices. Two themes emerged from the qualitative data analysis: (a) Metacognition is critical to the cyclical process of developing Self-Regulatory practices and (b) Positive perceptions of academic ability depend on opportunities to develop efficacious beliefs of one’s self. Student experiences revealed that the treatment allowed them to develop the abilities to set goals, take action, and reflect on the outcomes.

Findings and Implications

In this section, the findings and implications from the statistical analyses of quantitative data collected and then the analysis of the qualitative data completed in Chapter Four are presented. It also includes a discussion and proposes implications for each research question related to the results.

The purpose of this study was to investigate the use of goal setting and reflection with ninth-grade mathematics students by studying the impact of a self-regulatory practice on perceptions of scholastic competence and motivation in the classroom. The researcher employed a mixed-methods design to better understand the sample and student experience. In doing so, the researcher utilized three instruments and semi-structured interviews to develop a rich understanding of the self-regulatory treatment used in this study. This study was created to better understand the impact of a self-regulation
strategies treatment on grade nine mathematics students’ perceptions of scholastic competence and motivation in the classroom.

**Research Question 1**

The research sought to investigate the impact of the self-regulatory strategies of goal setting and reflection on grade nine mathematics students perceived scholastic competence and orientation of motivation in the classroom. The independent variable was program type, which included 9th grade mathematic students who participated in the SREP goal-setting and reflection treatment group and those who did not. The dependent variables were student scores on Harter’s (1981a) Self-Perception Profile for Adolescents (Scholastic Competence) and Harter’s (2012) Scale of Intrinsic Versus Extrinsic Orientation in the Classroom (Preference for Challenge vs. Preference for Easy Work assigned and Independent Mastery vs. Dependence on the Teacher).

The researcher employed a two-way Multivariate Analysis of Variance (MANCOVA) and results from the posttest mean scores did not yield statistically significant results for the effect of the self-regulation intervention or traditional curriculum on motivation (mastery and challenge) or self-perception of scholastic competence, $F(3, 91) = 1.150, p = .333$ when controlling for pretest challenge and scholastic competence mean scores. Further more, there was not a statistically significant main effect on course type (CP and H) when controlling for pretest challenge and scholastic competence mean scores $F(3, 91) = .209, p < .890$ when controlling for pretest challenge and scholastic competence mean scores.

Lastly, there was no statistically significant overall interaction between the posttest scores of students in treatment or comparison groups and course type (CP or H)
with respect to mean scores for motivation (challenge and mastery) and self-perception (scholastic competence) $F(3, 91) = .937, p = .114$. However, analysis of the Test of Between Subject Effects indicated that there was a statistically significant interaction between the posttest scores of students in the treatment groups and honors courses with respect to mean scores for the challenge subscale, $p = .018$. Student participants from the treatment group that were also members of the honors level Algebra I course, scored statistically significantly higher on challenge subscale mean scores from pre ($M = 2.29, SD = 55$) to post ($M = 2.79, SD = .788, p = .001$).

As this study did not yield a statistically significant difference in perceived scholastic competence and motivation for grade nine mathematics students who participated in goal setting and reflection treatment and those who did not, then this treatment did not detract from the regular mathematics program.

The implication for educators is to take note that the metacognitive processes of goal setting and reflection embedded within the curriculum and daily routines of teaching and learning had a positive impact. The student participants from the treatment group that were also in the honors level Algebra I courses resulted in statistically significant positive change in mean scores on the challenge subscale indicating that participating in cyclical self-regulatory practices had a positive impact on these students’ motivation for preference of challenge.

Additionally, it is possible that the instrument used to measure students’ orientation of motivation or self-perception of scholastic competence did not measure the areas in which the students made the most gains. Student participants who did show increased scores and participated in semi-structured interviews were able to speak
specifically about how they determined their success with learning, their experience with
the goal setting and reflection treatment. Therefore, it may be critical for future
researchers to utilize an instrument that targets motivation and scholastic competence
specific to their ability to self-regulate in mathematics.

Previous research conducted reveals a downward trend of perceived academic
competency and motivation occurs from third grade to eighth grade (Harter et al., 1992;
Lepper et al., 2005). Lin-Siegler and colleagues’ (2016) findings indicated that students
need effective self-regulation strategies that support short and long-term goals to learn
effectively and increase motivation. While working with four students individually on
self-regulation in self-regulation in grade nine biology classes, Cleary and Platten’s
(2012) results indicated there was increased motivation and increased perceived ability of
self-regulatory skills.

Since this study did not pull students from class and created a general use
intervention to determine whether or not students’ perception of scholastic competence or
orientation of motivation was impacted, it is possible that the treatment was not as
intensive as other self-regulatory programs such as the original SREP (Cleary &
Zimmerman, 2004) and therefore needed more class time to yield statistically significant
results. The qualitative data did identify that it was helpful to meet with the teacher for
extra help.

In Cleary and Zimmerman’s (2004) research, the case study had a sample size of
one, and the participant completed eight 35-minute intensive sessions with a Self-
Regulation Coach who administered the SREP program. Students in the current study
were exposed to approximately 15 sessions that were embedded within the curriculum.
The goal setting and reflection intervention in this study took approximately 95 minutes of class time over the course of 7 weeks as opposed to Cleary and Zimmerman’s (2004) case study in which the student participant experienced a total of 280 minutes of individualized and intensive sessions with a self-regulation coach outside of class time.

Furthermore, during the time in which this study was conducted, Cleary, Velardi, and Schnaidman (2017) published their research on the effects of the SREP program on a population of at-risk middle school aged mathematics students embedded within their mathematics programming and investigated their strategic skills, self-efficacy, and achievement in mathematics. This study was experimental in nature and had a larger sample size compared to previous qualitative studies using SREP (Cleary & Platten, 2013; Cleary & Zimmerman, 2004).

The sample size for this study was 42. Students were purposefully selected as they fit the criteria as being part of the “What I Need” (WIN) mathematics intervention curriculum. One group received the WIN mathematics programming while the other group received the SREP treatment embedded within the WIN curriculum. There were four SREP trained instructors who delivered SRL support to small groups of 5–6 student participants approximately three times a week, of which each sessions lasted 25-minutes. The students first completed a component of forethought and goal setting, then the second component of monitoring and adjustment was implemented. Student participants continued with the second component until their end of unit test grades were distributed, it was after this point that they completed the final component of the SREP model of reflection.
In relation to this current study, Cleary and colleagues’ (2017) research did not yield statistically significant results at posttest or at the 2-month follow up for self-efficacy; posttest, \( t(40) = 0.61, p = 0.55 \); 2-month follow-up, \( t(40) = 0.67, p = 0.51 \). However, other findings indicated that the SREP “can lead to important changes in students’ strategic thinking and that it may relate to shifts in students' learning and achievement” (Cleary et al., 2017, p. 40). Regardless of these results, the researchers analyzed the SREP model and results indicated that the intervention was a valid intervention. The researcher’s analysis for these results suggested that the SREP “offers some promise as a useful and feasible school-based academic intervention for academically at-risk middle school populations” (Cleary et al., 2017, p. 40).

While findings for the current study were not significant regarding the impact of self-regulation strategies on perception of scholastic competence or motivation, research indicates that individualizing goal setting and reflection practices allow students the time to think more deeply about their learning process rather than focusing on the overall grade (Elliot & Harackiewicz, 1994; Lin-Siegler, Dweck, & Cohen, 2016). Goal setting is widely viewed as a way for students to grow academically (Zimmerman, 1990). The process of combining reflection with goal setting is an important practice for metacognition and the development of self-efficacy (Bandura, 1988; Schunk, 1990; Zimmerman, 2002).

**Suggestions for educators for Research Question 1.** In this study, the researcher explored how goal-setting and reflection self-regulatory practices impacted perceived scholastic competence and motivation for ninth grade mathematics students. Overall, while the results of the quantitative data analyses were not statistically
significant. Researchers have described how students that use explicit self-regulation learning strategies, have high self-efficacy, and high commitment to attain academic goals (Zimmerman, 1989). Please see Table 23 for findings, implications for educations, and future research related to the first research question.

While there was and still is a need to explore the impact of goal setting and reflection and its impact on perceived scholastic competency and motivation specific to the classroom environment as part of the development of self (Harter, 2015), this study offered insight as to how self-regulated learning can be implemented in the classroom that is embedded within the curriculum. Therefore in reference to Research Question 1, the following recommendations emerged for educators and future researchers wishing to study this area further. The treatment did not detract from the regular mathematics program and in the cases of treatment participants that were also enrolled in honors level Algebra I courses the results indicated that participating in cyclical self-regulatory practices had a positive impact on these students’ motivation for preference of challenge.

**Recommendations for future research.** Using the perceived scholastic competence and motivation subscale scores may not provide enough information about a student’s ability to self-regulate through the goal setting and reflection process; therefore a different instrument could be employed to measure students’ ability to self-regulate, specific to mathematics. Furthermore, since the student participants that were enrolled in honors level courses had a positive interaction indicating an increase of challenge subscale mean scores then future research would be to measure the ability for students to self-regulate that are enrolled in different level courses.
### Table 23

**Implication for Educators and Future Research for Research Question 1**

<table>
<thead>
<tr>
<th>Findings</th>
<th>Literature</th>
<th>Implication for Educators</th>
<th>Implication for Future Research</th>
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<tbody>
<tr>
<td>Results from the posttest mean scores did not yield statistically significant results for the effect of the self-regulation intervention or traditional curriculum on motivation (mastery and challenge) or self-perception of scholastic competence, $F(3, 91) = 1.150, p = .333$ when controlling for pretest challenge and scholastic competence mean scores. There was not a statistically significant main effect on course type (CP and H) when controlling for pretest challenge and scholastic competence mean scores $F(3, 91) = .209, p &lt; .890$ when controlling for pretest challenge and scholastic competence mean scores. There was no statistically significant overall interaction between the posttest scores of</td>
<td>Zimmerman’s research (1989) found that learners must use explicit self-regulation learning strategies, have high self-efficacy, and high commitment to attain academic goals. There is a need to explore the student’s role in goal setting and reflection, and its impact on perceived scholastic competency and motivation specific to the classroom environment and learning as part of the development of self (Harter, 2015).</td>
<td>If there was no significant difference in perceived scholastic competence and motivation for grade nine mathematics students who participated in goal setting and reflection treatment and those who did not, then this treatment did not detract from the regular mathematics program. The student participants from the treatment group that were also in the honors level Algebra I courses resulted in statistically significant positive change in mean scores on the challenge subscale indicating that participating in cyclical self-regulatory practices had a positive impact on these students’ motivation for preference of</td>
<td>Using the perceived scholastic competence and motivation subscale scores may not provide enough information about a student’s ability to self-regulate through the goal setting and reflection process; therefore a different instrument could be employed to measure students’ ability to self-regulate, specific to mathematics. Explore further studies using the self-regulatory treatment protocol in this study and embed lessons on metacognition and self-regulation prior to the goal-setting and reflection treatment used in this study. Continued</td>
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</table>
students in treatment or comparison groups and course type (CP or H) with respect to mean scores for motivation (challenge and mastery) and self-perception (scholastic competence) $F(3, 91) = .937, p = .114$. Analysis indicated that there was a statistically significant interaction between the posttest scores of students in the treatment groups and honors courses with respect to mean scores for the challenge subscale, $p = .018$.

Student participants from the treatment group that were also members of the honors level Algebra I course, scored statistically significantly higher on challenge subscale mean scores from pre ($M = 2.29, SD = 55$) to post ($M = 2.79, SD = .788, p = .001$).

The implication for educators is to take note that the metacognitive processes of goal setting and reflection embedded within the curriculum and daily routines of teaching and learning had a positive impact.
Research Question 2

The second research question was as follows: “How do goal setting and reflection self-regulatory practices in mathematics affect the perceived scholastic competency and motivation of ninth-grade students?” The purpose of this question was to understand the student participants’ experience with the treatment based on their increased posttest scores for perceived scholastic competence or orientation of motivation in the classroom. Students’ experiences in their grade nine mathematics classes as a member for the treatment group were revealed through their responses from the semi-structured interviews conducted by the researcher.

Findings indicate that metacognition is an integral part of the self-regulation process. The process of combining reflection with goal setting is an important practice for metacognition and the development of self-efficacy (Bandura, 1988; Schunk, 1990; Zimmerman, 2002). Data analysis suggests that goal setting and reflection self-regulatory practices in mathematics may have helped students develop the processes necessary to think about their learning, set goals, take action, and reflect on their capabilities.

Furthermore, this study was grounded in the theoretical framework of Social Cognitive Theory. Zimmerman and colleagues (1992) explained that the process of setting goals improves people’s reactions to goal attainment in relation to goal setting; SCT supports the idea that for students setting goals creates a positive affect towards their own performance because their goals set criteria for personal success. Findings from the qualitative data support this because student instances included that they were able to identify what they knew and what they did not know specific to the curriculum and then take action, such as seeking extra help from their teacher.
Student instances provided support that the treatment allowed them to think about their own learning in an individualized way since it was their goal and what they were able to do each day in class. Individualizing goal setting and reflection practices allowed students the time to think more deeply about their learning process rather than focusing on the overall grade (Elliot & Harackiewicz, 1994; Lin-Siegler, Dweck, & Cohen, 2016). Data provided evidence that extrinsic motivators such as grades and teacher feedback were consistent factors as to how these students determined their successes. However, there were some instances in which students considered if they were able to be successful based on whether or not they could teach it to someone else, become independent, or take control of their own learning through further practice.

In regard to research question two, the themes that emerged from the data were: (a) metacognition is critical to the cyclical process of developing Self-Regulatory practices and (b) positive perceptions of academic ability depend on opportunities to develop efficacious beliefs of one’s self.

Theme 1 emerged from data that highlights that the 67% of student participants shared evidence that the treatment was transferrable to other academic courses and that it was “easy to complete”. Additionally, all students mentioned that they agreed that the treatment was helpful to some degree. The data also revealed 100% of student participants provided evidence that each student readjusted their actions to meet their goal, and 67% of students stated that they were able to determine what was known and what was not as a result of participating in the treatment. These results suggest that the treatment protocol in this study is able to be used in the classroom for general use and
that reflection and having time to thinking about their individual learning allowed for metacognitive reflection.

Theme 2 emerged from the data that highlighted that 78% of the students mentioned having extra-help from their teacher that was outside of class time and either individualized or in a smaller group setting. This is consistent with the Cleary and Zimmerman’s work with the SREP. Regarding motivation, 67% of the students mentioned “grades” in their responses indicating that grades were important to how they view themselves as a learner or what motivates them. Lastly, 44% of student participants used the term “confidence” in their responses. As a result of this analysis, it was determined by the researcher that positive perceptions of academic ability depend on opportunities to develop efficacious beliefs of one’s self.

In conclusion, these findings indicate that metacognition facilitates the cyclical process of developing self-regulatory practices as it allowed students to recognize what they knew and what they do not know. It also fostered opportunities for students to show increased perceived scholastic competence and motivation.

**Suggestions for educators and for future research.** The results of the qualitative study lead to conclusions that are consistent with current research findings. Zimmerman et al. (1992) stated that setting goals increases people’s “cognitive and affective reactions to performance outcomes because goals specify the requirements for personal success” (p. 664). Members of the case study revealed instances that confirmed that metacognitive skills are necessary to creating a cyclical process of self-regulation. Furthermore, this mixed-methods study provides a picture of a general classroom use self-regulated learning treatment that was adapted from a validated intervention (Cleary
et al., 2017). Therefore, recommendations emerged for educators and future researchers wishing to study this area further.

**Recommendations for practice.** Qualitative findings did support that metacognition is fundamental to the development of self-regulatory practices. Students’ responses revealed that metacognition allowed them to develop the abilities to set goals, monitor their learning, take action, and reflect on the outcomes. These metacognitive processing skills were evident across all instances. Teachers should implement researched based self-regulated learning strategies as part of their curriculum. If the educator can support self-regulated learning practices in the classroom then students could be empowered to become more independent, reflective of their current learning, and motivated. For example, students interviewed in this research study reported that the treatment was helpful, transferable, and helped them to isolate what they know and do not know specific to the curriculum.

**Recommendations for future research.** Future research is needed to understand Tier I self-regulatory treatments modeled from the SREP in various subjects in order determine its transferability and implementation since several students in the qualitative study mention that it was easy to use and transferable to the other classes. Additionally, the qualitative study did not include the comparison groups’ experience, so future research on self-perceived scholastic competence and motivation should include the experience of students who did not complete the treatment. Lastly, since the researcher and specific to the implementation of the adapted SREP treatment and relationship created the semi-structure interview protocol to scholastic competence and motivation, future research could use a structured interview protocol specific to self-
regulated learning and it was not the scope of this study to measure a students ability to
self-regulate. Zimmerman and Martinez-Pons’ (1986) structured interview protocol
called the Self-Regulated Learning Interview Scale (SRLIS) could be employed in future
research because the interview protocol in the current study was created by the researcher
and did not measure the students’ ability to self-regulate their learning. Please refer to
Table 24 for findings, implications for educators and future research related to the second
research question.
Table 24

*Implication for Educators and Future Research for Research Question 2*

<table>
<thead>
<tr>
<th>Findings</th>
<th>Literature</th>
<th>Implication for Educators</th>
<th>Implication for Future Research</th>
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<tbody>
<tr>
<td>Metacognition is critical to the cyclical process of developing Self-Regulatory Practices.</td>
<td>In relation to goal setting, SCT supports the idea that setting goals increases people’s “cognitive and affective reactions to performance outcomes because goals specify the requirements for personal success” (Zimmerman et al., 1992, p. 664).</td>
<td>Student experiences revealed that metacognition allowed them to develop the abilities to set goals, take action, and reflect on the outcomes. Educators should engage students in metacognitive processes as part of their teaching and learning practices since metacognition is fundamental to the development of self-regulatory practices.</td>
<td>Using the generalized goal setting and reflection treatment in the classroom helped students to become more aware of their learning. Future research on the implementation of these self-regulatory practices and its cyclical nature should be explored for the general classroom.</td>
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<tr>
<td>Positive perceptions of academic ability depend on opportunities to develop efficacious beliefs of one’s self.</td>
<td>The process of combining reflection with goal setting is an important practice for metacognition and the development of self-efficacy (Bandura, 1988; Schunk, 1990; Zimmerman, 2002).</td>
<td>Student participants’ responses revealed student-teacher relationships impacted their decision to seek extra help, ask questions, or to speak with the teacher. Therefore it is suggested that teachers establish positive student-teacher relationships with their students since it will create opportunities for students to develop efficacious beliefs of one’s self.</td>
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Limitations of the Study

The researcher acknowledges that there were threats and limitations to this study. The following section outlines the ways in which the researcher strove to control these variables and their impacts.

**Internal Validity**

Gall et al. (2003) defined internal validity as the actions by which the researchers attempt to control the extraneous variables and report the observed effect they can have on the treatment. The researcher outlines several actions taken to mitigate the following threats that are related to the parts of this study that are quantitative in nature.

**Subject Selection.** The researcher was unable to be the sole administrator for the pretests and posttests. The researcher assigned student ID numbers and verbal directions for teachers to recite when they administered the instruments. The teachers were provided with a professional development session prior to the start of the study in which they were given all required materials and supplies, pacing calendar, direct instruction for administration of pretests, treatment, and posttests. The teachers were offered time to ask questions at these sessions and an additional four times throughout the study.

The researcher also used color-coded paper for treatment and comparison groups and folders for the teachers to return pretests and posttests to the researcher. Teacher demographic surveys were used to collect information about participants to identify potential differences in their education and experience. The teacher demographic survey data indicated that four out of five teachers were Caucasian and one Asian-Hispanic. There were three female teachers and two males. All teachers held master’s degrees and had 3-18 years of experience. Three teachers had no experience with goal setting and reflection, while two reported minimal or informal
experience. While the researcher was able to identify differences, the researcher controlled for experience by providing the same professional development for all teachers.

**Experimental treatment diffusion.** The researcher attempted to control for this external variable as the study was conducted during the second semester of the school year. Since it was conducted at the end of the school year, the student population had the majority of the school year with their traditional curriculum. The researcher conducted fidelity checks throughout the treatment to log and ensure that teachers followed the goal setting and reflection protocol for treatment groups only (Please see Appendix E for Fidelity Checklist). The researcher also assigned a treatment group and comparison group to each teacher. The researcher was able to train teachers in the delivery of the treatment and to be explicit about the differences between treatment and comparison groups. Since all teachers were trained in the treatment protocol, they would have the opportunity to use the treatment materials should the study result in statistically significant findings. Through observation and fidelity checks, the researcher did not receive any indication of diffusion between the comparison group and the treatment group.

**Compensatory equalization of treatments.** This threat arises when one group wants to be part of the other group because members become aware of the treatment and find it desirable. Participants might face parental pressure to be included in the other group. This could have affected the study if parents believed that their child’s education was being tampered with, and might put pressure on school administration to equalize the treatment. Efforts made by the researcher to mitigate this threat included choosing the spring semester to conduct the study. The researcher invited all grade nine Algebra I students from participating teachers and introduced the study to those classes in person. Students were aware that the researcher was conducting a study to measure perceived scholastic competence and orientation of motivation in
the classroom. The researcher was given permission by the school district to administer the treatment to all students in the class regardless of consent so student participants were not isolated. The researcher was available to answer any questions the parents had and received no inquiries from parents, guardians, or students.

**History.** The researcher provided the teachers with logs to enter any observations or events they became aware of that occurred during the study so the researcher could determine if it could be related to student performance. Furthermore, the treatment lasted for the length of one math unit, approximately 7 weeks, with pretests and posttests administered at the start and end of treatment. There were no extraordinary events logged that impacted the study’s findings.
External validity

Gall et al. (2003) defined external validity as the extent to which findings of the study can be generalized outside the scope of the intended study. The researcher attempted to limit these threats to external validity that may have impacted the results of this study.

Population validity. The researcher determined that population validity was a threat because the results of this study from the sample cannot be generalized to the larger population scale from the public school district in which the study was conducted (Gall et al., 2003). The researcher used intact groups from a sample of convenience and comprised of heterogeneously grouped students that the researcher initially intended to reflect the larger population of the school district. However, the sample of students that the researcher obtained permission from may not be representative of the larger population.

Treatment fidelity. The researcher trained five teachers to implement the treatment and this was a possible threat to external validity. The researcher monitored the implementation of the treatment closely through observations, fidelity checklists for each teacher and student participant groups, teacher logs, and being available to teachers for support during this time. The researcher also provided a professional development that all teachers attended and received the same directions as well as materials.

Pretest and posttest sensitization. This can occur when the pretests interact with the experimental treatment and contribute to the final results. This can also result in Posttest Sensitization. Since the same survey was used for pretests and posttests, participants may have chosen options based on what their pretest responses were rather than on the impact of the treatment. To avoid this problem, a reasonable amount of time passed between administration of
the pretest and posttest, that of seven weeks. Furthermore, the comparison group completed the same pretest and posttest to allow the researcher to analyze the data with this threat in mind.

**Trustworthiness**

The research design used triangulation and purposeful sampling with the goal of collecting, analyzing, and providing a rich, thick description of the data (Anfara, Jr., Brown, & Mangione, 2002). These techniques supported a qualitative study that is rigorous and exhibits trustworthiness (Lincoln & Guba, 1985). The study utilized qualitative understandings of trustworthiness defined as credibility, dependability, conformability, and transferability to establish the rigor and enhance the “analytic defensibility of qualitative research” (Anfara, Brown, & Mangione, 2002, p. 28).

**Credibility.** Credibility establishes that the results of the research are based on the participants’ reality and perceptions. This was important to the researcher’s investigation of how student goal setting and reflection affected perceptions of scholastic competence and motivation in the classroom. The researcher employed the process of member checking during semi-structured interviews to ascertain the credibility of the students’ responses.

**Dependability.** Dependability requires that the researcher account for and communicate any changes that occur in the course of the qualitative study. Ultimately, disclosure of this information is important in that it may or may not have influenced the study and can affect how others may use the results. The researcher used quantitative and qualitative information to triangulate data for comprehensiveness and completeness of interpretation as described in the research design and data analysis (Creswell, 2013). A reflexive journal was also kept throughout the study to record any events and observations during the study.
**Confirmability.** Confirmability was addressed in this study so that others can corroborate the results. To mitigate any issues with trustworthiness in reference to confirmability, the researcher invited another researcher to audit and review the data, analysis process, and results to confirm the findings.

**Transferability.** Finally, transferability is the degree to which the results of the study can be used in another setting. The researcher kept a record of the audit trail and kept a reflexive journal for the duration of the study to keep track of teacher meetings, fidelity, and questions throughout the study. However, it is important to note that teachers were not formally interviewed to gain insight as members of the study.

**Conclusion**

This study investigated the impact of self-regulation strategies on self-perceived scholastic competence and orientation of motivation in the classroom, with grade nine mathematics students. The initial question of this research study was related to the impact of how an adapted SREP treatment embedded in a grade nine mathematics unit of study on students’ self-perceptions of scholastic competence and orientation of motivation. Findings indicated that there were no significant differences between students who were members of the treatment group that completed three-component goal setting and reflection intervention and those who did not. Suggestions from various research studies suggest the need to support student motivation as they move to upper grades, have students build self-regulation processes and skills, and to become more scholastically competent (Lepper et al., 2005; Lin-Siegler et al., 2016; Stoeger & Ziegler, 2005). To progress upon the current body of research and improve student perceptions of self and increase motivation, researchers should continue to investigate the impact of self-regulation strategies on these factors and how this can be applied to the classroom.
In regard to the second research question, analysis of the data showed one theme; metacognition is fundamental to the development of self-regulatory practices. Findings indicated that metacognition facilitates the cyclical process of developing self-regulatory practices as it allows students to recognize what they know and what they do not know and it fosters perceived scholastic competence and orientation of motivation. The significance and implication of this theme was previously presented and the implications for educators and future research were discussed. Although student participants were purposefully invited to partake in the qualitative part of this study and showed either an increase in self-perceived scholastic competence scores or scores leaned more towards intrinsically motivated on the mastery subscale, they all showed evidence that they internalized self-regulatory processes. However it is not known as to whether they can identify these processes. Therefore, if students can directly identify and build self-regulatory processes, they can become more independent and empowered in their learning.

In conclusion, this work may contribute to the existing body of knowledge of providing self-regulatory practices for all students in the general classroom and its impact on the development of self and orientation of motivation. Students in grade nine are unaware that grade nine is a pivotal time for them; however, if educators are aware of ways in which SRL can support student, then they may be able to foster motivation in the classroom and create positive self-perception of scholastic competence for students.
References


http://edsight.ct.gov/SASPortal/main.do


Harter, S., Whitesell, N. R., & Kowalski, P. (1992). Individual differences in the effects of educational transitions on young adolescent's perceptions of competence and


Appendix A: Treatment Materials - Goal Setting and Reflection Program

Component 1: Diagnostic Assessment for Goal Setting and Reflection

Student Name: ______________________________ Grade: ____ Quarter: ____
Course: _____________________ Teacher Name: ____________________________

Phase 1: Forethought

These are some things that I do to prepare for class: (check all that apply)

- [ ] I come to class on time
- [ ] I come to class everyday
- [ ] I bring all my materials to class; binder, pen, calculator
- [ ] I keep up with my assignment sheet/planner
- [ ] I am attentive in class
- [ ] I follow along with activities
- [ ] I participate in class
- [ ] I ask questions during class when I do not understand
- [ ] I have my homework done everyday
- [ ] I review what I have learned at home
- [ ] I come in during study hall to seek extra help
- [ ] I go to the student tutoring center
- [ ] Other _______________________

These are some challenges I have: (check all that apply)

- [ ] I am late to class
- [ ] I am frequently absent
- [ ] I forget my materials
- [ ] I am disorganized and/or don’t plan ahead
- [ ] I do other class work/draw/write notes to friends
- [ ] I get distracted during independently
- [ ] I forget to turn in my assignments
- [ ] I’m disorganized
- [ ] I don’t study
- [ ] I sleep in class
- [ ] I don’t understand the material
- [ ] I don’t like math
- [ ] Other _______________________

Reflection questions:

1. I prepare for my tests/quizzes by:

<table>
<thead>
<tr>
<th>My strengths are:</th>
<th>My weaknesses are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. I got a _____ on the PRE- CFA and we are going to start studying ______________.
Component 1: Developing the Self-Regulated Learner

Goal Setting Questions:

1. Based on your COMPONENT 1 worksheet, what do you notice that you will have to focus on for the upcoming unit?

2. CREATING MY LEARNING GOAL:

   By the time I take the end of unit test, I would like to improve on the following:
   
   •
   •

   ACTION PLANNING: In order to reach this learning goal I will do:
   
   •
   •
   •

Feedback:
Component 2: Self-Regulation: Monitoring my Goal and Adjusting

| Date | Today in class I… Consider what you did today to help you reach your goal. Consider these examples:  
|      | • I spent X amount of time on my homework.  
|      | • During class I asked questions about ____ and now I understand it because ____.  
|      | • I was on task for ____% of class today. | Adjustments of my learning to reach my goal. Sample questions to consider:  
|      | • After today’s class, I need to…  
|      | • What do you need to change?  
|      | • What didn’t you understand in class? | Feedback:  
|      | +++Thoughtful and complete responses and directly connects to your goal  
|      | ++ You are on your way! Partially complete and may or may not be connected to your goal.  
|      | + Vague or misrepresented (includes teacher comment)  
|      | - Missing, please complete |
Component 3: Self-Reflection on my goal:

**Directions:** After you take your End of Unit assessment, reflect on the learning goal you set, the steps you took to reach your goal, and the outcome.

Review your PRE-CFA, class assignments, goal setting/monitoring worksheet, and your End of Unit Assessment in order to answer the following reflection question for Unit #______.

a. Did you have to try to motivate yourself when studying for math tests?

b. What do you do when you don’t feel like studying for your math tests?

c. How do you determine if you performed well on your math test?

d. How satisfied are you with your learning this unit?

e. What is the main reason why you got a grade of ________ on your end of unit assessment?

f. What do you need to do to improve your performance on your next math test?
Appendix B: Semi-Structured Interviews

Student Interview Questions:

1. Tell me a little about yourself and what your typical day at school is like.

2. Tell me about your most recent unit in mathematics? What were you learning about?

3. What strengths do you have that help you to learn in mathematics?

4. How do you determine that you have been successful in your learning?

5. Did you participate in goal setting or reflection in mathematics to monitor how you were doing this unit?
   a. If so, how did you perceive your experience in using goal setting and reflection portfolios during the mathematics unit?
   b. Did you find it difficult to keep up with your goal setting and reflection work?
   c. Did you learn anything that can be applied to your other classes?

6. How would you describe yourself as a student?
7. When I say the phrase “scholastically competent” how would you define it?

8. How would you define motivated?

9. Based on your experience, do you feel more competent in mathematics?
   a. If so, tell me what contributed to you feeling more competent in mathematics?
   b. If not, what makes you feel that way?

10. Based on your experience, do you feel more motivated in mathematics?
    a. If so,
       i. Can you describe what motivates you?
       ii. What do you think contributed to feeling more motivated?
    b. If not
       i. What do you think would motivate you in mathematics?

11. Thank you for sharing about your learning experience, is there anything more you’d like to add?
Appendix C: Treatment Outline and Pacing Calendar

**Week 1:** Over the course of the first week, a detailed training and curriculum for delivering goal setting and reflection practices will be administered to the teachers of the treatment groups. Teachers assigned to control groups will participate in the training on how to administer the measurements. Student will complete their self-reported demographic survey. Over the course of this week, as part of their regular mathematics curriculum, students will complete their PCFA. By the end of this week, student will take the Intrinsic vs. Extrinsic Motivation in the Classroom survey.

**Week 2:** The students will complete the pretest survey Self-Perception Profile for Adolescents. After the students complete these surveys, the teacher will grade the PCFA and return it to students. The researcher will conduct a fidelity check and record the dates of when students completed the instruments. By the end of this week, the teachers will lead students in completing Component 1. Teachers will provide directions for students to create learning goals based on their completed PCFA. Students will create action steps to reach their goal. The researcher will conduct a fidelity check at this point to ensure that all students followed the protocol when drafting their goals.

**Week 3-5:** Students will reflect daily on their action steps and adjust accordingly based on homework assignments, classwork assignments, or other learning opportunities. See daily tracker.

**Week 6:** As part of their regular mathematics curriculum, students will complete a CUSA.

Upon completion of their assessment, the teacher will return the graded assessment and the students will review their feedback and reflect on their goals. The
teacher will lead Component 2 on reflection and comparison of their first and second assessment. They will reflect on areas of strength, growth, and what specific learning activities they participated in that worked for them. From there they will create a new goal or keep their original goal if they did not show mastery. While mastery is not being measured, it is important for students to continue making future goals in order to understand that self-regulation is an on-going process. Fidelity checks will be conducted to ensure that students completed all steps. By the end of week 6, the students will complete posttests surveys to measure scholastic competency and orientation of motivation in the classroom.

**Week 7:** Student interviews will be conducted. Two students will be invited from each teacher (two control, two treatment) for a total of 8 students.
Appendix D: Teacher and Student Demographics Questionnaires

Teacher Name: ____________________________ D.O.B. _____/ _____ /_______

Please select the choice that best describes you:

Sex:
☐ Female
☐ Male

Race:
☐ Asian
☐ Black
☐ Hispanic/Latino
☐ White
☐ Other
☐ Choose not to respond

How many years have you been teaching mathematics? __________

Are you tenured?
☐ Yes
☐ No

What is your level of education?
☐ Bachelors
☐ Masters
☐ Doctorate

What certifications do you hold?

What Experience do you have with goal setting and reflection in the classroom?
Student Name: ____________________________ D.O.B. _____ / ____ / ______

Current Age: ________

Please select the choice that best describes you:

Gender:
☑ Female
☑ Male

Race:
☑ Asian
☑ Black
☑ Hispanic/Latino
☑ White
☑ Other
☑ Choose not to respond

First Language Spoken:
☑ English
☑ Spanish
☑ Portuguese
☑ Other

If English is not for your first language, are you proficient in speaking and writing?
☑ Yes
☑ No
☑ Sometimes

Course:
☑ Algebra I (College Prep)
☑ Algebra I (Honors)

Do you like math?
☑ Yes
☑ No
☑ Sometimes
### Appendix E: Fidelity Checklist

**Self-Regulation: Student Goal Setting and Reflection**

**Implementation Fidelity Checklist**

**Instructions:** This checklist is created for frequent fidelity checks. The on-site researcher will use this to monitor participating classrooms.

<table>
<thead>
<tr>
<th>Date:</th>
<th>Treatment Group</th>
<th>Yes</th>
<th>Partially</th>
<th>No</th>
<th>Field Notes/Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Administers pretest (Self-Perception Profile) after unit CFA</td>
<td>Yes</td>
<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
</tr>
<tr>
<td></td>
<td>Administers pretest (Orientation of Motivation) after unit CFA</td>
<td>Yes</td>
<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
</tr>
<tr>
<td></td>
<td>Administers and delivers instruction to complete Component 1</td>
<td>Yes</td>
<td>Partially</td>
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<td>Field Notes/Observations</td>
</tr>
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<td></td>
<td>Administers and delivers instruction to complete Component 2</td>
<td>Yes</td>
<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
</tr>
<tr>
<td></td>
<td>Week 3: Prompts students to monitor progress</td>
<td>Yes</td>
<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
</tr>
<tr>
<td></td>
<td>Week 4: Prompts students to monitor progress</td>
<td>Yes</td>
<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
</tr>
<tr>
<td></td>
<td>Week 5: Prompts students to monitor progress</td>
<td>Yes</td>
<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
</tr>
<tr>
<td></td>
<td>Administers Reflection after students receive their graded CUSA</td>
<td>Yes</td>
<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
</tr>
<tr>
<td></td>
<td>Administers posttest (Self-Perception Profile)</td>
<td>Yes</td>
<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
</tr>
<tr>
<td></td>
<td>Administers posttest (Orientation of Motivation)</td>
<td>Yes</td>
<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
</tr>
</tbody>
</table>

**Total**

<table>
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<tr>
<th>Date:</th>
<th>Treatment Group</th>
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<th>Partially</th>
<th>No</th>
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<tbody>
<tr>
<td></td>
<td>Administers pretest (Self-Perception Profile)</td>
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<td>No</td>
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<tr>
<td></td>
<td>Administers pretest (Orientation of Motivation)</td>
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<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
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<tr>
<td></td>
<td>Administers posttest (Self-Perception Profile)</td>
<td>Yes</td>
<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
</tr>
<tr>
<td></td>
<td>Administers posttest (Orientation of Motivation)</td>
<td>Yes</td>
<td>Partially</td>
<td>No</td>
<td>Field Notes/Observations</td>
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</table>

**Total**
## Appendix F: Qualitative Coding and Analysis

<table>
<thead>
<tr>
<th>Findings Statement</th>
<th>Metacognition is fundamental to the development of self-regulatory practices.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Themes</td>
<td>Metacognition is critical to the cyclical process of developing Self-Regulatory Practices.</td>
</tr>
<tr>
<td>Category</td>
<td>Functionality of Treatment</td>
</tr>
</tbody>
</table>

<p>| Instances Code 1   | Transferable: (6/9) “I use it in Italian and bio because if I don’t reflect on how well I’, doing then it won’t help me because I remember in | Processing Specific content (4/9) “We were learning about A and B equals whatever and then how much A and B there are, I mean what’s in an equation.” 1 | Self-Awareness: (4/9) “It’s usually when I know what I’m doing, like 100% sure I know what I’m doing that’s really it | Fun (2/9) “it was just fun to see like different ways of learning things and techniques which did help me figure out a way to change my schedule up, so I think it was pretty | Independence/Perseverance (5/9) “So mine was determination and not giving up. If I actually gave up then I wouldn’t be able to learn the things because I remember when I was doing a | Confidence (4/9) “I like being confident, I like when I go into a class and I know that we’re going to have a test and I know what the unit |</p>
<table>
<thead>
<tr>
<th>Comment</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>bio where I used to fail a lot on tests and grades like now I’m doing a little bit” 8</td>
<td>8</td>
</tr>
<tr>
<td>“for all my class at the end of the day I asked myself did you understand the material and from that I take on either I need to practice the material more or you need to focus more on this section of the material, so it kind of did help” 6</td>
<td>6</td>
</tr>
<tr>
<td>“Like history I’ve had a project, I would say try to work on “Simplifying equations.”2</td>
<td>2</td>
</tr>
<tr>
<td>“Systems and equations so we were learning how to graph them algebraically and substitution and elimination, different ways to solve equations.” 6</td>
<td>6</td>
</tr>
<tr>
<td>“Substitution and elimination” 8</td>
<td>8</td>
</tr>
<tr>
<td>because that’s like my worst subject” 5</td>
<td>5</td>
</tr>
<tr>
<td>“I don’t really use grades because numbers don’t really tell you anything because you need to like determine again if you understand it and if you’re capable of like doing it yourself that’s good enough, but like if you were able to teach to, like I use my sister, I teach it to her and if she understands what I’m saying then I know I can do it and I can helpful.” 3</td>
<td>3</td>
</tr>
<tr>
<td>“Yea I became more motivated because at first like on the first day of learning everything, like the units, I wasn’t motivated because my teachers usually did the boring stuff like what the teachers did, and then as soon as all of us got comfortable he actually made learning fun and I got motivated to like introduce my learning in many ways.” 8</td>
<td>8</td>
</tr>
<tr>
<td>“I determine if I’m learning if I’m actually having fun. So if my teacher is like being fun and helpful and trying to teach us what we actually need to homework assignment that time I did poorly on it. I reflected myself by saying I should just do things better independent and learn how I can fix my mistakes?” 8</td>
<td>8</td>
</tr>
<tr>
<td>“Well it’s hard to feel motivated in math since it’s a lot of work and when you don’t get things right it put you down, but doing this made me think different and trying to push myself more, it’s kind of hard to be motivated in math.” 7</td>
<td>7</td>
</tr>
<tr>
<td>“Well just to get my grade up because that’s what I was supposed to do, but sometimes like I don’t know it does help a little bit, but a lot of it just is a lot of was about and I know and understand that topics we had done, so I like just going in and saying I’m going to get a good grade on this test because I actually understand what’s going on.”3</td>
<td>3</td>
</tr>
<tr>
<td>“Confidence in school” 9</td>
<td>9</td>
</tr>
<tr>
<td>“We're now basically at the end of the year but I just want to finish it and feel good about myself and not always putting myself down because I can’t do math. I have to go and get extra help and”</td>
<td></td>
</tr>
</tbody>
</table>
this, try to ask
the teacher
after school
for help.” 5

“I guess like
at the end of
class to have a
summary of
what I learned
that day made
me think
about other
classes.” 4

“Yea like
things like
focusing, or
listening, or
putting effort
into it actually
helped me in
other classes.
Yea like you
wouldn’t
notice what
you’ve done
but after I
filled out the
questions I
notice what
help out
someone else,
then if I can do
it myself I
know I’m good
for tests,
quizzes, or
homework
grades or
classwork
grades. 6

“I think you
can tell like if
you understand
the material
and you feel
like you can
sort of teach it
to someone
and have them
understand it,
you’re
successful in
that material
and in that
subject” 6

“Mostly like
I’ll get a
feeling to
learn” 8

stress, so I just try to
get it [homework] it
done for my grade” 7

“It’s more like if I
could set myself a
goal in other classes
and try to follow it.
Like history I’ve had
a project, I would say
try to work on this,
try to ask the teacher
after school for
help.” 5

“I started to become
more independent
and more that it was
easier by myself
somewhat and I was
able to like figure
things out an help
others.” 8

“helps me a little bit
that will help me
become independent
a lot more so I’ll be
able to use my own
resources to learn
what I need.” 8

put in the extra
work to feel
better about it.” 7
“I’ve done.”  
“‘It’s even helped in my other classes too. Like I’ve only passed all the tests in history and I’ve passed all the tests in bio and English.”  
I could reflect on myself without the paper saying that I need to work on my homework. I need to focus on what I need to learn”  
“Yeah”  
“Well one of my goals was to stay with the after school things and I still go and one of the goals was to not depend on my friends to help me. So Ms. Teacher put me in a seat not far away, but not near some of my best friends in my class, so I had to do it either with the friends I’, going to have to learn to get or by myself.”  

| I’ve done.” 2 | “It’s even helped in my other classes too. Like I’ve only passed all the tests in history and I’ve passed all the tests in bio and English.” 1 | I could reflect on myself without the paper saying that I need to work on my homework. I need to focus on what I need to learn” 8 | “Yeah” [referring to whether or not it helped with the unit “[when asked how it helped…] I don’t know “Well one of my goals was to stay with the after school things and I still go and one of the goals was to not depend on my friends to help me. So Ms. Teacher put me in a seat not far away, but not near some of my best friends in my class, so I had to do it either with the friends I’, going to have to learn to get or by myself.” 1 |
because everything that I’m doing it showed like really better achievements and stuff. 2
“I know that I can, I know that I can do things in school.” I improve or not.” 1

<table>
<thead>
<tr>
<th>Code 2</th>
<th>Ease of Use: 6/9</th>
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<tbody>
<tr>
<td>“No. They were easy questions”</td>
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<tr>
<td>“They were sometimes frustrating because it was taking class time out of it which meant more homework”</td>
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<tr>
<th>Readjust/Action Step</th>
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<tr>
<td>“Well we basically had to tell ourselves what we had to do to reach our goal. For mine it was focus, basically telling myself to focus, or getting my homework done. I could write down on my board at home which homework I would have to do so I</td>
</tr>
</tbody>
</table>

| Determining What is Known and What isn’t: (6/9) |
| “Yea a bit more in that unit even though it wasn’t my best unit I kind of knew what I had to do and I talked to the teacher when I didn’t |

| Extra Help (7/9) |
| “Like in the beginning it was hard be then I had to stay after school with Mrs. Teacher and get help to improve my grade because it was like a 64 and then I improved to like an 89.” |

| Mastery/Teaching Others (2/9) |
| “I think you can tell like if you understand the material and you feel like you can sort of teach it to someone and have them understand it, you’re successful in that material and in that subject” |

| Good at School (2/9) |
| “a good scholar” |
| “That I’m good at school” |

| Staying after |
| “I don’t really use grades because” |
and then sometimes we don’t get to complete it every single class time because our classroom is really small, there’s certain people that go really fast but the rest of the class goes really slow. Sometimes it was really frustrating but other times it was really helpful and it helped me figure out what I need to work on and what like I had done good so far.”

“No it was easy”

could get that done.”

I don’t really use grades because numbers don’t really tell you anything

understand it.”

“Sometimes it was really frustrating but other times it was really helpful and it helped me figure out what I need to work on and what like I had done good so far.”

“Like you wouldn’t notice what you’ve done but after I filled out the questions I notice what I’ve done.”

“I don’t really use grades because numbers don’t really tell you anything

school with Ms. Teacher because like that helped me to improve my grade.”

“Like I do my homework and I try to keep my grades up and everything. If I need help I will ask for help, I think I’m successful”

“I didn’t like it because I didn’t understand it, it was really hard. I did understand some stuff because of the teacher occasionally when I did ask her for help, but it was just really hard for me. I didn’t really do good at it.”

“It’s more like if I could set myself a goal in other classes

numbers don’t really tell you anything because you need to like determine again if you understand it and if you’re capable of like doing it yourself that’s good enough, but like if you were able to teach to, like I use my sister, I teach it to her and if she understands what I’m saying then I know I can do it and I can help out someone else, then if I can do it myself I know I’m good for tests, quizzes, or homework grades or classwork grades.

“It was good I guess because it improved my learning I think because the questions like can you teach someone else or how do you get to this, with this like what
“It was setting the goal was easy because I already knew what I had to work on during the year, but doing the goal was just really hard.”
No I didn’t have any trouble with it”

“Yea, it was somewhat difficult because out timing wasn’t exactly correct because sometimes we had like school days off and we had like early dismissals, some people were missing
because you need to like determine again if you understand it and if you’re capable of like doing it yourself that’s good enough, but like if you were able to teach to, like I use my sister, I teach it to her and if she understands what I’m saying then I know I can do it and I can help out someone else, then if I can do it myself I know I’m good for tests, quizzes, or homework grades or coursework
and try to follow it. Like history I’ve had a project, I would say try to work on this, try to ask the teacher after school for help.”

“I well for the test and stuff I like how he does review packets and everything, so when I don’t understand something I just go and talk to him during my free period and stuff and he’s just really helpful.”

“Well just to get my grade up because that’s what I was supposed to do, but sometimes like I don’t know it does help a little bit, but a lot of it just is a lot of stress, so I just try
we learned today.”
in class, so she had to delay it a little bit, however I could reflect on myself without the paper saying that I need to work on my homework. I need to focus on what I need to learn”

“no” [referring when asked it was difficult]

grades. 6
“I reflected myself by saying I should just do things better independent and learn how I can fix my mistakes” 8
“Yea like things like focusing, or listening, or putting effort into it actually helped me in other classes. Yea like you wouldn’t notice what you’ve done but after I filled out the questions I notice what I’ve done.” 2

[Referring to daily logs at to get it [homework] it done for my grade” 7
“Substitution and elimination and at the time I was really clueless and I didn’t really know like what to do. So I put a bunch of like words and exponents because I thought that was like the right thing to do. However when I kept on asking my teacher like what I should do and like she told me all the simple steps that I learned and then after I graduate and increase to learn more about it I started to become more independent and more that it was easier by myself somewhat and I was able to
the end of class for treatment] Yes it did, it helped me understand better what I had learned and what I felt like I skimmed over and said, so it did help me like figure out the difference between what I already know and what I really need to focus on.”

“Yeah kind of doing reflections in math it kind of like, I normally for all my class at the end of the day I asked myself did you understand the material and from that I take like figure things out an help others.

“Well I have all my friends that help me and then my mom makes me go to after school so I see Ms. Teacher every Wednesday or Thursday. I’m good I I have a calculator around me I can do most of the work but the graphs I’m not okay at, but the rest I’m decent with.”

“Well one of my goals was to stay with the after school things and I still go and one of the goals was to not depend on my friends to help me. So Ms. Teacher put me in a seat not far away, but not near some of my best friends in my class,
on either I need to practice the material more or you need to focus more on this section of the material, so it kind of did help. Yeah.”

so I had to do it either with the friends I’m going to have to learn to get or by myself.”

“I well for the test and stuff I like how he does review packets and everything, so when I don’t understand something I just go and talk to him during my free periods and stuff and he’s just really helpful”

Helpful (9/9)

“[referring to treatment and grades] Yeah cause usually I mean cause I got a 20 on a quiz once and then I got 100 on the test and Individualized (1/9)

“It felt kind of interesting because I got to do my own set up and keep on tracking the schedule and to see if I improve or not.”

N/A

Ask Questions (6/9)

“So like I can talk to them without being embarrassed to talk to them, like some kids are like some kids are I don’t want to raise my hand because I look stupid, but in

Academically Competitive (1/9)

“I think that I would describe it as someone who is more like book smart and like they’re really
I haven’t gotten under a 69 on any of my tests so far.

“yeah” [referring to whether or not it helped with the unit]

“[when asked how it helped…] because everything that I’m doing it showed like really better achievements and stuff.”

“At a certain point it did [help me slow down] because I felt like I was going really fast and I wasn’t really

those classes if raise my hand I don’t feel stupid.”

“so when I don’t understand something I just go and talk to him during my free periods and stuff and he’s just really helpful” 3

“Like I do my homework and I try to keep my grades up and everything. If I need help I will ask for help, I think I’m successful” 4

“I didn’t like it because I didn’t understand it, it was really hard. I did understand some stuff because of the teacher occasionally when I did ask her for help, but it was just

competitive but it’s kind of like they’re knowledge wise, they know more than others like book wise, like we’re not world wise or street wise, but book wise.” 3
focusing on what we had to learn, like overall. So at a certain point I felt like I did and it did help me get like a better grade in the end on my tests.”

“It was good I guess because it improved my learning I think because the questions like can you teach someone else or how do you get to this, with this like what we learned today.

“It sort of did help because when we gave the teacher our
really hard for me. I didn’t really do good at it.”

“It’s more like if I could set myself a goal in other classes and try to follow it. Like history I’ve had a project, I would say try to work on this, try to ask the teacher after school for help.”

“I did understand some stuff because of the teacher occasionally when I did ask her for help” 5

“However when I kept on asking my teacher like what I should do and like she told me all the simple steps that I learned” 8

“I understand it and
paper back she would look over it and tell us if it was right or not and then she would tell me that that’s a good goal you should on that more.”

It was sort of helpful. I mean I didn’t really like doing reflections. I didn’t really have a goal set for the unit because like I understood what was going on and then other than paying attention more in class, but like having what could I know what to do instead of like having a hard time and asking the teacher every time. … 9
help me do it I didn’t really having anything except for like not get up during class or raise my hand more, so it didn’t really help me that much. “Yea that did help [referring to daily entries], I remember one of my goals like for the whole unit was get a higher test score and so I would do, one of my goals would be, like the first one we learned was graphing so it would be like after today I want to be, I
really want to memorize how to do the substitution method and like that”. I would help a little bit, but I wouldn’t get a lot of progress because I wouldn’t know what to say because I feel like I wouldn’t say what I was doing. After a while I wouldn’t know what to say because I feel like I wouldn’t get a lot of progress because I wouldn’t do my work, but I would really not understand what I was doing, what I was doing. “The experience was like it helped me somewhat.”
because I remember my first period class when she said reflections is annoying yet it will still help you learn your mistakes because like if you do not learn what your mistakes were from your reflections then you’re not trying hard to succeed in life."

“It felt kind of interesting because I got to do my own set up and keep on tracking the schedule and..."
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<td>“Just my grades” 9</td>
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<td>“At a certain point it did [help me slow down] because I felt like I was going really fast and I wasn’t really focusing on what we had to learn, like overall. So at a certain point I felt like I did and it did help me get like a better grade in the end on my tests”</td>
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<td>“Well maybe like the teachers will come up to me and tell me or</td>
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<td>“I would probably say something about you trying in school maybe and like you being ready for school, you being ready to learn”</td>
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maybe my grades will show me how I am doing” 2

“I like just going in and saying I’m going to get a good grade on this test because I actually understand what’s going on.” 3

“Like in the beginning it was hard be then I had to stay after school with Mrs. Teacher and get help to improve my grade because it was like a 64 and then I improved to like an 89.” 4

“Staying after school with Ms. Teacher because like that helped me to improve my grade.” 4

“Yeah, we had to pretty much just write down what we
were doing in the class that period and how we felt about it and we had to grade ourselves in that if we were doing well”

“Yea for me, like not even if I’m, learning, if I see my grades and they’re bad I kind of just like oh Jesus”

“I just think when I get the grade back I kind of look at it and like wow I could have done way better than this, I could have if I had actually paid attention in class I could have known, I could have gotten a higher grade, I could have passed it.”

“My grades mostly like how this whole year has been, it’s kind of like a wake
up call because it was a bad year with my grades and just me not caring about it. So that kind of tells me to work harder and do my homework and make sure everything is in on time.” 7

“Well just to get my grade up because that’s what I was supposed to do, but sometimes like I don’t know it does help a little bit, but a lot of it just is a lot of stress, so I just try to get it [homework] it done for my grade” 7

“I’m doing a little bit better because she told us we should reflect on ourselves and it actually helped me be better at quizzes so like now I get 80’s and above” 8
“What motivates me is like my teachers and my peers because they’re the ones that made me go into like all the things that I did in life because if I didn’t get motivated I would be just there at the bottom of learning. Like what happened in 5th grade. I wasn’t motivated and I was failing, I was mostly getting C’s and D’s and at middle school I was at C’s but like when I went to high school I just got motivated to learn because all my teacher like taught me throughout the whole entire year that it was better to reflect on yourself.”
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<td></td>
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<td>“Like some people are motivated, like the younger people are motivated they see something like other people and they want to grow up and be like them.”</td>
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<td>“Oh it’s just you having like the thought that I can do this, I can do this work, I can keep trying and get it done with.”</td>
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<td>“Motivated… I think I would define it as something that helps you like just take a little step forward, I think that it is someone or something that helps”</td>
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</table>
you get through life or get through something important that you want to get through.” 3

“Because I’m not like that organized but if I have to write every day like I said like it tells me what I should do and that keeps me motivated because like if I write good things about what I’m doing it keeps my confidence going up.” 9

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<td>“When you’re set to do one thing and you’re ready to achieve it and you do your best to achieve it.” 7</td>
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<td>“Motivated… I think I would define it as something that helps you like just take a little step forward, I think that it is someone or something that helps you get through life or get through something important that you want to get through.”</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>“something that keeps you up and running and you can achieve.”</td>
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165
Appendix G: Permissions for Adapted SREP

Hi Ann:

You have my permission to adapt the SREP For your research. You should contact Prof. Cleary to gain his permission as well. I wish you success with your research.

Warm regards,

Barry J. Zimmerman

Ann,

Thank you for your email and interest in SRL and my work. It looks like you were referencing the 2004 article and Professor Zimmerman and I co-authored.

I reviewed your documents and think you did a fine job of targeting some key ideas re: SRL. You have my permission to use these ideas as an adaptation to SREP.

If you have any questions about SREP or SRL in relation to your dissertation please let me know if I can help.

Happy Holidays!

Tim
Appendix H: Student Assent and Parent/Guardian Consent Letter

WESTERN CONNECTICUT STATE UNIVERSITY
Department of Education and Educational Psychology
181 White Street
Danbury, CT 06810

Dear Parent or Guardian,

My name is Ann Tucci and I am a doctoral student at Western Connecticut State University. I am seeking parental consent to carry out a study at Danbury High School. This study is designed to examine student's perception of scholastic competence and motivation, as it is associated to self-perception as a learner. This study will focus on grade nine students. They will be asked to complete two questionnaires and some will be invited to participate in interviews. These questionnaires will give students an opportunity to express their perceptions of scholastic competence and orientation of motivation in the classroom as it pertains to the mathematics classes your child is enrolled in. This research study has been reviewed and approved by Western Connecticut State University's Institutional Review Board. It is the hope of this study to find programs to help students develop positive perceptions of themselves as learners.

Participation in this study is completely voluntary. The collected data will be coded to ensure that all responses will be held strictly confidential.

If you have any questions, please feel free to contact me. If you agree to allow your child to participate in the data analysis, please sign and return this form. If you have any questions, please contact me via my university email at Tucci014@connect.wcsu.edu

If you agree to have your child participate in this study, please sign the attached statement and return it by February 28th, 2017. A signed copy for your records will be emailed upon completion.

Sincerely,
Mrs. Ann E. Tucci

-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Student Participation Consent

I, ____________________________________________, the parent/legal guardian of the student minor

(Printed name of parent or guardian)

below, acknowledge that the evaluator has explained to me the purpose this research study, identified any risks involved, and offered to answer any questions I may have about the nature of my child’s participation. I voluntarily consent to my child’s participation. I understand all information gathered during this project will be completely confidential.

Student/Minor Name: ____________________________________________

Signature of Parent or Guardian: ________________________________ Date ____________
EdD in Instructional Leadership
Department of Education and Educational Psychology
Dissertation Registration Form

Student Ann Tucci Date 5/14/2018

Dissertation Title: Self-Regulation through Goal Setting and Reflection: Impact on Student’s Perceived Scholastic Competency and Motivation in Ninth-Grade Mathematics Classrooms

Dissertation Committee Members: See attached Dissertation Approval Page

For Office Use Only.

Catherine O’Callaghan, PhD May 14/2018
Primary Advisor Signature Date

Marcia A. B. Delcourt, PhD May 14/2018
Program Coordinator Signature Date

Maryann Rossi, PhD June 19, 2018
Dean, School of Professional Studies Signature Date

Christopher Shankle, EdD 19 June 2018
Associate Director, Division of Graduate Studies Signature Date