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Effect of Goal Setting for Motivation, Self-Efficacy, and Performance in Elementary Mathematics

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Goal setting is utilized by adults regularly to foster success. It has also been shown to benefit academic achievement. This 8-week study sought to determine the effects of goal setting on motivation, self-efficacy, and math achievement in elementary students. The quasi-experimental study included 70 students in 3rd and 4th grade math classes. Students in the experimental group were involved in setting an achievement goal for fluency of multiplication facts. The students monitored their progress through a weekly graphing and reflection activity. The results indicated that elementary students involved in setting goals showed an increase in their mathematical performance of multiplication facts. However, based on the results from this study, goal setting did not have an impact on motivation or self-efficacy. These results support the concept of goal setting theory in the academic setting, suggesting that it may be beneficial for teachers to include goal setting in their day-to-day instructional practices, though further research on its effect on affective traits is warranted.

Keywords: goal setting, motivation, self-efficacy, elementary, mathematics, goal setting theory

INTRODUCTION

There is ongoing research to determine the best methods for how to assist students in achieving academic success. According to Locke and Latham (2002), decades of research have shown that setting academic achievement goals is among one of the most important and beneficial approaches in education. However, frequent urging from teachers for students to do their best is less effective than setting explicit and rigorous goals (Latham & Locke 2007; Locke & Latham, 2002; Locke & Latham, 2006). Furthermore, studies have revealed that goal setting may affect academic performance through increasing motivation, self-efficacy, and self-regulation in students (Rowe, et al., 2017; Schunk, 1985; Sullivan & Strode, 2010; Travers, et al., 2015).

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Goal-setting theory indicates that there is a positive relationship between setting explicitly high goals and academic performance. When one is committed and invested in setting a goal, no matter the difficulty of the goal, performance is increased and attainment is probable (Locke & Latham, 2006). Seijts et al. (2004) found that previous research suggested that goal setting was primarily associated with motivation but later found goal setting to be closely related to academic performance as well.

In addition to these findings, research suggests that one can reliably produce academic benefits when goal setting is used effectively in the classroom (Locke & Latham, 2006). Travers et al. (2015) summarize goal setting theory as one of the most prevalent and influential theories when addressing motivation and performance. However, there is a lack of relevant research available for use in the elementary academic setting.

Goal setting is described as the identification of a specific accomplishment to be made in a specific area with measurable outcomes, such as actions and timelines for achievement (Rowe et al. 2017). Sullivan and Strode (2010) mention the importance of learning to set goals for achievement. The attainment of goals provides students with the feeling of capability, enhancing self-efficacy in learning. Additionally, feedback on the progress of the goal can foster self-efficacy and motivation in students, conveying that they are capable and making improvements with their hard work (Putwain, et al., 2018; Schunk, 2003). According to Bandura (2001), when goals have value and a sense of ownership is present, they provide meaning, purpose, and motivation in learning.

Goal Orientations. According to Seijts et al. (2004), there are two types of goal orientations. Those with learning goal orientations look for opportunities to enhance their knowledge through more challenging tasks, whereas those with performance goal orientations focus more on the outcome of their achievement to impress others. Seijts et al. investigated whether one's goal orientation had an effect on future performance when setting a specific goal. Individuals who set goals for performance and were instructed to achieve their best showed significantly higher conscientiousness than others. The study also revealed a significant relationship between commitment and performance goal orientation.

Wolters' (2004) study focused on student perception of goals, goal orientation, and how these relate to one another, as well as motivation, cognition, and achievement. Survey results indicated a positive correlation between performance-approach strategies and goal mastery. Additionally, students who found the classroom to have more of a mastery-based environment (setting goals for mastery of a specific skill) with a focus on performance later developed similar goals independently. According to Putwain et al. (2018) and Wolters (2004), adopting mastery-based beliefs is effective in both the classroom and at the individual level, which supports goal-setting theory.

Enhancing Self-Efficacy. While working toward more difficult goals builds self-efficacy, it is essential to set realistic goals to allow for monitoring of progress and flexibility (Schunk, 1990). Goals that are too easily achieved can hinder growth in self-efficacy, leaving students with little knowledge of their real capabilities. Likewise, goals

set too high can have the same effect on self-efficacy. Furthermore, goals are affected by self-efficacy and the value placed on the outcome (Latham & Locke, 2007).

In an early study on goal setting, Schunk (1985) set out to investigate the effects of goal setting on self-efficacy and academic performance through a math training program for 6th grade students with learning disabilities. Results indicated students who set their own goals showed higher self-efficacy and stronger computational skills. Findings revealed a positive relationship between goal setting, self-efficacy, and skill development. Locke and Latham (2002) and Smithson (2012) agree that allowing students to establish goals and measure their progress towards reaching goals fosters self-confidence and motivation to achieve success, resulting in long lasting self-efficacy.

Fostering Motivation. Simply defined, motivation is the force that drives the willingness to learn (Smithson, 2012). Although there are three types of motivation, intrinsic, extrinsic, and amotivation, motivation is mostly associated with intrinsic beliefs and actions coming from within an individual (Sullivan & Strode, 2010). However, it is common for many students to struggle with motivation when it comes to academics.

Research has revealed that motivation greatly affects student learning and performance in the classroom (Shores & Shannon, 2007). However, attempts at motivating students to foster academic success continue to provide a challenge for educators (Dotson, 2016). Yet, Wolters (2004) asserts that when classroom environments emphasize learning and promote competition, students tend to show more motivation in academic areas.

In one study, Smithson (2012) sought to determine if motivation could be fostered through goal setting. Not only did goal setting increase or maintain student performance on all assessments in reading, math, and language arts, there was an increase in the amount of student-to-student encouragement. The overall findings revealed that goal setting was a strong motivator for students in increasing their performance and self-efficacy.

Rowe et al. (2017) found goal-setting opportunities can enhance motivation and foster growth of skills and engagement in learning. They sought to determine the effects of goal setting on active academic engagement. Results revealed a positive relationship between goal-setting and student engagement. The results support previous research concluding that goal setting instruction is effective in benefiting academic engagement and motivation. In addition, the findings also provide support for goal setting theory and the beneficial outcome of including goal setting to enhance student performance.

Improving Academic Achievement. Goals are beneficial as they provide for needed attention and effort required to achieve success, foster great effort, positively impact persistence and motivate students to learn new strategies and skills (Latham & Locke, 2007; Locke & Latham, 2002; Schunk, 1985; 2003). Goal setting provides students with a focus on desired academic outcomes and direction in achieving success (Dotson, 2016). Martin and Elliot (2016) conducted a yearlong study that indicated that those participating in setting goals showed higher achievement gains in math, with a positive correlation between achievement gains and pursuing alternative goals. Thus, goal setting is imperative to student growth in academics and plays a vital role in accountability.

Travers et al. (2015) determined that having goals written down provided more self-awareness and ownership in the process for academic and psychological growth. Additionally, indirect academic goals may have an effect on academic performance by fostering good study habits; however, Travers et al. suggested the need for additional research to measure the impact of goal setting on academic growth.

Two additional studies illustrate the positive impact goal setting has on math performance (Coddling, et al., 2009; Gross, et al., 2014). Coddling et al. (2009) conducted a study on interventions for mathematical computation fluency. The results revealed that the group using the goal setting intervention showed quicker progress and higher scores in math computation. The students who set goals to improve the number of problems answered correctly made the most progress.

Gross et al. (2014) found a beneficial outcome for students who set goals, charted goals to monitor progress over time via “goal lines”, and utilized explicit timing to increase math performance. The group that received researcher-assigned goals with goal lines showed the greatest effect. The results also indicated that goal setting and goal line strategies have a positive effect on student math performance. However, this study contradicts some research stating that when students set their own goals it provides an ownership role and is just as effective as assigning goals (Locke & Latham, 2002), possibly even more effective (Rowe et al., 2017).

Self-Efficacy. Self-efficacy, which is considered to be a motivational belief, is defined as one’s confidence in their own ability to reach their goals (Locke & Latham, 2002; Schunk, 1985; 2003). Academic performance and achievement can be greatly affected by self-efficacy (Burns, et al., 2018; Fast et al., 2010; Schunk, 1985). Since self-efficacy is tied closely to goal setting theory, those with higher self-efficacy tend to set higher goals and show more commitment in goal attainment (Locke & Latham, 2002). In addition, when students have a greater sense of efficacy, they will embrace more challenging goals (Katz, 2015; Schunk, 1990; 2003).

Self-efficacy is adaptable and changeable. A strong sense of self-efficacy leads to confidence in the desired outcome and perseverance to accomplish goals, which also plays a primary role in self-regulation (Bandura, 2001). Self-efficacy beliefs allow choice in what challenges are accepted, the amount of effort to apply, the amount of time to devote to the task, and acceptance of failures as a motivating factor (Bandura, 2001; Schunk, 1985). However, self-efficacy is not the only influential factor in academic performance. Requisite skills, knowledge, perceived value, and expected results are all influential to achievement. Additionally, teachers should apply self-efficacy building strategies combined with goal setting and self-evaluation skills to foster academic success in struggling students (Burns, et al., 2018; Schunk, 2003).

Cleary and Zimmerman (2004) explain that one quality of self-regulation is self-efficacy. Those with a higher level of self-regulation will frequently feel enabled. Additionally, they tend to have greater aspirations, are more committed to goals, and have better resilience from setbacks (Fast et al., 2010). Cleary and Zimmerman (2004) found weak self-efficacy beliefs interfere with a student’s motivation. Likewise, Katz

(2015) and Schunk (2003) agree that when self-efficacy is low, students' confidence levels are low, which negatively affects their capabilities, aspirations, and commitment.

Students who exhibit high self-efficacy perform better in academic areas than those with low self-efficacy (Shores & Shannon, 2007). In addition, perceptions of their self-efficacy are closely related to progress monitoring. Fast et al. (2010) found that there is a relationship between mastery goals and self-efficacy, and classes should focus on mastery goals that exemplify intrinsic motivation and determination in learning.

Students' actions in regard to setting goals could be influenced by their self-efficacy (Zimmerman et al, 1992). When students reflect on their progress and attain their goals, they develop greater self-efficacy, resulting in setting more challenging goals (Schunk, 1990). Seijts et al. (2004) explain that those with high self-efficacy show a higher level of commitment, take initiative, and accept negative feedback positively.

Self-Regulation. Self-regulation involves those who are proactive at focusing behaviors or strategies on self-set goal achievement (Cleary & Zimmerman, 2004). Those who are self-regulated learners are proactive. They use a variety of self-regulation strategies, such as goal setting, self-observation, and self-evaluation combined with task strategies and motivational beliefs, such as self-efficacy (Cleary & Zimmerman, 2004). It has been determined that self-regulation can be directed by the ability to self-monitor, self-guide performance, and self-correct reactions (Bandura, 2001; Burns, et al., 2018).

Cleary and Zimmerman (2004) found that students trained in self-regulation practices show higher levels of success and motivation. When students are able to identify their strategies for studying and are aware of their ability to self-regulate, they learn to set goals resulting in a positive effect on their motivation and performance in the classroom. Additionally, it is essential to encourage the idea that the student has control of his or her academic success to foster self-regulation (Cleary & Zimmerman, 2004; Katz, 2015). When students experience success, it leads to further success. Success in academics requires one to be thoughtful, independent, and self-regulated through metacognition skills, such as self-reflection or self-evaluation.

Summary. There has been intermittent research on goal setting over the past four decades. Results reveal the need to continue investigating the effects of goal setting in academics, as this process has been found to benefit students of all ages. However, there is little research available connecting goal setting to fact fluency skills, which is essential to academic success in mathematics. Not only would this be an effective skill for elementary aged children, it would also provide insight into the age appropriateness of goal setting and their ability to understand the purpose of goal setting.

Research Questions

Setting goals is a universal life skill, producing benefits in many different areas. A goal most teachers have for their students is to become advocates for their learning. Research suggests that student goal setting promotes academic success through awareness and accountability. Likewise, with the development of these self-advocating skills comes intrinsic motivation prompting students to take necessary actions to learn. The

anticipation is that students will take these strategies and apply them across learning environments. Developing the skills of goal setting at a young age is essential. Students need instruction on how to set effective goals to become responsible for their learning.

Students must learn the benefits and importance of setting goals for success. In order to accomplish this, elementary students should be introduced to personal goal setting on a simplistic level. This study is driven by these ideas and the following questions. What are the results of student goal setting on student motivation? Does student goal setting impact self-efficacy in mathematics? When students monitor their own learning, one possible benefit is that they will increase their motivation and confidence levels when progress is noted. In addition, does student goal setting impact student performance toward multiplication fact fluency and accuracy? Setting goals in these areas may increase student achievement and confidence in tasks that may seem intimidating or monotonous to many students who feel unsuccessful in mathematics.

METHOD

Participants

This study was conducted in a rural public school located in north Georgia. There were approximately 3,500 students enrolled in the school system, grades kindergarten through 12th grade, with a graduation rate of 89.2% (Gibbs, 2016). The median household income was \$59,265 with a poverty rate of 13.4% (DataUSA, 2016). The study took place in a Title 1 elementary school with a total population of 396 students. The racial demographics of the student body were 91% White, 3% Hispanic/Latino, 1% Black, and 5% other. Of these, 23% had disabilities, 34% were economically disadvantaged, and 4% were gifted learners. This school was zoned for the higher poverty areas in the county and housed the self-contained special education classes for all of the elementary schools in the district. It was recognized as a Greatest Gains school, as well as a Beating the Odds school by the state of Georgia (The Governor's Office of Student Achievement, 2017).

The participants in the study included 70 third and fourth grade students. The students' ages ranged from eight to ten years of age. The racial demographics were 93% White, 3% Hispanic/Latino, 0% Black, and 4% other. Of those, 50% were male, while 9% were students with disabilities, 14% were gifted learners, and 1% were English Language Learners (ELL). Each grade level contained a class as the comparison group, totaling 33 students ($n = 33$), and a class as the experimental group, totaling 37 students ($n = 37$). The comparison group consisted of two classes, one at each grade level, which included all general education students with two identified gifted and six receiving Early Intervention Program (EIP; tier 2 and tier 3) services for math in 3rd grade and four receiving EIP services for math in 4th grade. The experimental group, also consisting of two classes, one at each grade level, contained three gifted, one special education student, one receiving EIP services for math in 3rd grade, and five gifted, three special education students, and two receiving EIP services for math in 4th grade.

Materials and Measures

Questionnaires. Two questionnaires were used to measure the students' motivation and self-efficacy towards mathematics. The questionnaires were coded with both positive and negative items to reduce the likelihood of response bias. Both questionnaires were scored using a Likert scale with pictures to ensure understanding. The students circled the corresponding picture representing their feelings towards the questions. Both questionnaires were administered before starting the study and after completion.

The Motivation for Reading Questionnaire (MRQ; Guthrie, 2004) was used to measure the motivation of students towards mathematics. The MRQ had a reliability rating of 0.43 to 0.81. Since the questionnaire was used to measure motivation towards mathematics, the MRQ was adapted to address mathematics by replacing references to reading with references to mathematics. The MRQ contained 11 constructs; however, only six constructs were used in the modified math questionnaire: importance, work avoidance, competition, recognition, grades, and compliance. This modified questionnaire contained 26 randomly arranged questions, which were scored using a four-point Likert scale. The visual representations used facial expressions to represent this scale. The happiest face represented a four, and the saddest face represented a one.

The Self-Efficacy Questionnaire (Gaumer, et al., 2016) was used to measure the self-efficacy of the students towards mathematics. The Self-Efficacy Questionnaire contained 13 questions and had a reliability rating of 0.90. The questionnaire was scored using a five-point Likert scale. The scale for the Self-Efficacy Questionnaire was represented using facial expressions as well. The happiest face represented a five, the neutral face represented a three, and the saddest face represented a one.

Pre-test and Post-test. Before beginning the study, the students completed a pre-test, which included 100 randomly created math multiplication fact problems with factors zero through twelve. The students were given five minutes to complete as many problems as possible. They were encouraged to answer as many problems as possible in the time allotted. The scores on the pre-test determined the students' fluency rate, which was shared with the students. The scores for the experimental group were recorded in the personal folders and used to help the students set goals. After completing the study, the students completed a post-test equivalent to the pre-test.

Probes. Multiplication fact probes were used to help the experimental group track their progress throughout the study. The probes consisted of 100 randomly created multiplication problems with factors zero through twelve, similar to the pre-test and post-test. Each Monday and Wednesday the experimental group completed a different version. The following day, the students recorded and tracked their scores in the personalized folders. The probes were used to help the students track their progress towards their goal. The comparison group also completed the probes; however, they did not track their progress.

Personalized Folders. Personalized folders were created for each of the students in the experimental group. The folders contained a goal and reflection sheet, and a self-monitoring sheet, such as a graphing sheet, to track fluency during the study. The

participants recorded their scores from the pre-test on the goal and reflection sheet as well as set a goal for the end of the eight-week study. The scores from the probes were then recorded using the graphing sheet in each student's folder twice per week. Each Friday the students used the reflection sheet to reflect on their progress towards meeting their goal. This reflection contained where they were in reaching their goal and what they would do differently to help achieve their goal.

Procedures

Group Assignment. The groups were assigned by classes, which were pre-formed by the school. Two classes were picked at random for the comparison group and two were picked at random for the experimental group.

Experimental Group. The experimental group consisted of both a 3rd and 4th grade general education class. The experimental group contained 37 participants in a co-taught setting. All participants were given two questionnaires before introducing the intervention to measure their motivation and self-efficacy. The questionnaires were read aloud to each participant, and clarification was provided when necessary.

The participants then completed the five-minute timed pre-test on multiplication facts. After the completed pre-tests were scored, the students' personalized folders contained the scores on the first goal sheet. Once prepared for each participant, the students received their personalized folders. The students then filled out the goal sheet inside the personalized folder. To help in keeping the goals attainable, teachers assisted students in setting goals. The goals contained a specific number of facts to be completed accurately within five minutes.

Each Monday and Wednesday during the study, the students completed multiplication fact probes to track their fluency and progress towards their goal. The students were given five minutes to complete the probe and instructed to complete the facts they recognized first. The probes were collected and scored then placed in the corresponding student's folder. The following day, the students recorded the score from the previous day's probe on the graphing sheet. To record their scores, the students wrote the date with the numeric grade from the probe (fluency) in the specified place on the sheet. The students colored the graph to represent their achievement for that probe and were then asked to self-reflect on the progress toward their goal. Once they recorded the results from the probe, they placed the probe in the personalized folder. Each Friday during the study, the students completed a reflection on the progress made towards meeting their goal. They wrote one or two sentences that reflected where they were in reaching their goal and what their next steps would be to help them achieve their goal.

Upon completion of the study, the participants completed a five-minute timed post-test. The participants also completed the questionnaires again following the study.

Comparison Group. The participants in the comparison group consisted of both 3rd and 4th grade students in the general education classroom. The comparison group contained 33 students in a co-taught setting. The participants in the comparison group completed

both questionnaires, which were read aloud, to determine their motivation and self-efficacy levels before beginning the study.

The comparison group also completed the five-minute timed pre-test. The students received their scores, and the teachers provided verbal strategies (i.e., practice each night, flashcards, etc.) on how to increase their fluency and accuracy. The comparison group continued with routine math instruction with no additional interventions and did not receive personalized folders to write goals or track their progress.

The comparison group also completed multiplication fact probes each Monday and Wednesday in unison with the experimental group. The probes were scored and individually shared with each student the following day. Following the completion of the study, the participants of the comparison group also completed a five-minute timed post-test. Again, the participants completed the questionnaires upon completion of the study.

FINDINGS

In order to determine whether the groups were equivalent, an Independent Samples T-Test was used to analyze the pre-test scores of the comparison and experimental groups. The Independent Samples T-Test revealed that there was no significant difference between the pre-test scores of the comparison group ($M = 71.72, SD = 21.96$) and the experimental group ($M = 65.57, SD = 28.61$), $t(68) = -1.001, p = .313$. Because there was no significant difference between groups on the pre-test, this allowed for subsequent analyses on the post-test to be conducted. Tables 1 and 2 below provide additional information on these results.

Table 1
Group Statistics of Pre-Test for Comparison and Experimental Groups

Group	N	Mean	Std. Deviation	Std. Error	Mean
Experimental	37	65.5676	28.61288	4.70393	
Comparison	33	71.7273	21.96485	3.82359	

Table 2
Independent Samples T-Test of Pre-Test for Comparison and Experimental Groups

	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal Variances Assumed	.979	.326	-1.001	68	.320	-6.15971	6.15341
Equal Variances Not Assumed			-1.016	66.586	.313	-6.15971	6.06191

Research Question 1

When addressing the first research question regarding the effects of student goal setting on student motivation, an ANCOVA was conducted with the post-survey motivation score as the dependent variable and the pre-survey motivation score as the covariate. The motivation survey scores for the comparison group ($M = 3.05, SD = 0.51$) were similar to those for the experimental group ($M = 3.07, SD = 0.43$), with no statistically

significant difference, $F(1, 67) = 0.001, p = .982$. See Table 3 below. The results indicated that there was no effect of student goal setting on motivation in mathematics.

Table 3
Descriptive Statistics of Motivation for Comparison and Experimental Groups

Group	N	Mean	Std. Deviation
Experimental	37	3.0748	.43163
Comparison	33	3.0490	.51290
Total	70	3.0626	.46837

Research Question 2

To address the second research question and determine if student goal setting effects self-efficacy in mathematics, an ANCOVA was conducted with self-efficacy post-survey scores as the dependent variable and the self-efficacy pre-survey scores as the covariate. The self-efficacy scores for the comparison group ($M = 4.55, SD = 0.40$) were similar to the self-efficacy scores for the experimental group ($M = 4.55, SD = 0.46$) with no statistically significant difference, $F(1, 67) = 0.31, p = .579$. See Table 4 below. Results indicated there was no effect of student goal setting on self-efficacy in mathematics.

Table 4
Descriptive Statistics of Self-Efficacy for Comparison and Experimental Groups

Group	N	Mean	Std. Deviation
Experimental	37	4.5518	.46246
Comparison	33	4.5530	.40010
Total	70	4.5524	.43107

Research Question 3

To answer the third research question and determine whether student goal setting affects academic performance in regard to multiplication fact fluency and accuracy, an ANCOVA analysis was conducted. The post-test scores were entered as the dependent variable, and the pre-test scores were entered as the covariate. The test scores for the comparison group ($M = 86.30, SD = 30.89$) were substantially lower than the test scores for the experimental group ($M = 114.65, SD = 43.17$). The results indicated that there was a statistically significant difference in the area of multiplication fact fluency and accuracy in mathematics as a result of using goal setting in the academic setting, $F(1, 67) = 45.17, p < .001$. The difference in scores had a medium effect size ($\eta_p^2 = .40$). Tables 5 and 6 below provide additional information from this analysis.

Table 5
Descriptive Statistics of Performance for Comparison and Experimental Groups

Group	N	Mean	Std. Deviation
Experimental	37	114.6486	43.16841
Comparison	33	86.3030	30.88738
Total	70	101.2857	40.22226

Table 6
Tests of Effectiveness of Performance Between Comparison and Experimental Groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	79029.245 ^a	2	39514.622	81.208	.000	.708
Intercept	2681.144	1	2681.144	5.510	.022	.076
Pretest	65014.361	1	65014.361	133.614	.000	.666
Group	21977.633	1	21977.633	45.167	.000	.403
Error	32601.041	67	486.583			
Total	829746.000	70				
Corrected Total	111630.286	69				

a. R Squared = .708 (Adjusted R Squared = .699)

DISCUSSION

The purpose of this study was to ascertain the effects of goal setting on motivation, self-efficacy, and academic performance on multiplication fact fluency and accuracy in mathematics for elementary school students. Previous research on goal setting for elementary students has been limited. This study sought to provide insight into the effectiveness student goal setting in the elementary classroom.

According to the analyses conducted for this study, the first research question addressing the effects of student goal setting on student motivation indicated that there was no impact for these students. This was inconsistent with a number of previous research findings showing that goal setting did have an effect on motivation (Rowe et al., 2017; Schunk, 1985; Sullivan & Strode, 2010; Travers et al., 2015). As suggested by Goal-setting theory, it was expected that motivation and academic performance would be closely related, as many other studies have noted (Rowe et al., 2017; Seijts et al., 2004; Shores & Shannon, 2007; Smithson, 2012; Travers et al., 2015). However, the results of this study indicated otherwise. The discrepancy of this study's results compared to previous studies' results would suggest that goal setting may not have an effect on motivation for students in this age group for this timeframe. Additionally, surveys may not be appropriate for students in this age group, as they may have a difficult time connecting the survey questions with their affective and cognitive states.

When considering the second research question of the impact of goal setting on student self-efficacy, the results also indicated that there was no effect for these students. This was an interesting outcome given that previous studies have shown that setting goals can have a positive impact on one's self-efficacy (Burns et al., 2018; Fast et al., 2010; Locke & Latham, 2002; Schunk, 1985; Shores & Shannon, 2007). As mentioned previously, the discrepancy in the results of this study compared to previous studies would suggest that students' self-efficacy within this age group may not be affected by setting goals over such short durations. This may be related to the lack of cognitive maturity and emotional awareness due to their age. A longer study may produce different findings for the effects of goal setting on motivation and self-efficacy for elementary students.

In regard to the first and second research questions, which were not confirmed by the data in the present study, there are several theoretical possibilities for why no effects emerged. First, 8 weeks may simply be too short a duration for these affective traits to show significant increases. Next, young students are known to have higher levels of motivation and self-efficacy compared to their older counterparts. As such, there may be a ceiling effect and slight changes in these traits may not be detectible using the instruments employed in this study, or those instruments may not have been sensitive enough to identify changes. Finally, it may simply be the case that goal-setting does not have an impact on affective traits in students of this age and developmental level, as they may lack the metacognition necessary to associate short term academic outcomes with internal dispositional tendencies.

Previous research has found that student goal setting positively affects academic performance (Dotson, 2016; Latham & Locke, 2007; Locke & Latham, 2002; Schunk, 1985; 2003; Travers et al., 2015) specifically in mathematics (Coddling et al., 2009; Gross et al., 2014; Martin & Elliot, 2016). For the third research question regarding whether student goal setting affected student performance in mathematics, the results indicated that student goal setting did have an effect on student performance. These results add to the research on goal setting theory, specifically in elementary-age students.

LIMITATIONS

The limitations of this study included certain logistical issues. The plan for this study was that the experimental group would participate in probes twice a week. However, due to issues such as schedule interruptions and inclement weather days, the experimental group was only able to participate in twice a week probes for half of the study, yet they still appeared to have an effect on performance.

Another limitation of this study included the short duration. This study was conducted over eight weeks, which is a relatively short time for an intervention. While the experimental group experienced a higher level of performance based on the intervention, it is unclear whether the results would have remained the same if the study had occurred over a longer duration.

CONCLUSION

It is necessary to continue researching the effectiveness of student goal setting in the academic setting. Additional research is likewise needed involving elementary school students in mathematic performance. Further research should also consider the effectiveness of student goal setting on elementary reading performance and levels.

When considering motivation and self-efficacy, more research is warranted that addresses the appropriate age that individuals become aware of these affective traits. It is possible that due to their age, the participants in this study may not have an awareness of their own motivation and self-efficacy. Additionally, it may be that elementary-aged individuals already maintain high levels of both of these affective traits and thus they

cannot easily be increased. Future research should investigate the levels of affective traits in younger individuals.

Future implementation in the classroom should involve students setting their own goals for academic achievement and success. Allowing students to work toward their own goals has shown to be effective in improving their performance. However, the appropriate age for setting goals is still a question needing to be addressed. Although this study revealed that student goal setting is appropriate for elementary school students in 3rd and 4th grade, it is unclear whether there is a definitive age for the appropriateness of this strategy. Additionally, would student goal setting produce the same effective results in reading performance for 3rd and 4th grade students? Future research could address student goal setting in different academic content areas and compare which areas goal setting appears to have a greater impact on student performance.

According to this study, student goal setting is appropriate for elementary school students. Based on the results of this study, elementary students involved in goal setting showed an increase in their performance in multiplication fact fluency and accuracy. However, goal setting did not have an impact on motivation or self-efficacy in math for these elementary school students. Upon analysis of the data from this study, goal setting is likely to increase the performance of elementary students. Thus, we can recommend that goal-setting be included in regular instructional practices in mathematics classrooms at the elementary level. While such interventions might have limited impact on students' dispositions at this age level, evidence from this study suggests that they may ultimately benefit achievement outcomes. This study ultimately adds to the body of knowledge of goal setting theory in the academic setting.

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Effect of Goal Setting for Motivation, Self-Efficacy, and ...

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