How Early Experiences in a Kindergarten Classroom Shape the Development of Self-Regulation Skills of Children

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Abstract

Providing the support that children need to build self-regulation skills has come to the forefront for educators today. This study investigated how kindergarten students (N=19) improved their self-regulation skills through direct instruction and effective scaffolding techniques. Self-regulated instruction was adapted to behavior activities for three months. Data were collected from 19 heterogeneously grouped students in an experimental (N=19) classroom. The effects of self-regulation interventions were administered through an individual pre- and post- student questionnaire on self-regulation. Descriptive statistics for post-test student questionnaires show no statistical significance in emotional regulation, goal setting, and behavioral regulation. Descriptive statistics for the Teacher Child Behavior Rating Scale (CBRS) show a statistical significance in areas assessed by the classroom teacher. The results of this study suggest that the participants increased self-regulation skills due to appropriate interventions. Self-regulated learning positively affected performance.

Keywords: *self-regulation, kindergarten, self-monitoring*

The academic demands for kindergarten classrooms today are rigorous (Rimrn-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009, p. 958). The demands of *No Child Left Behind* have altered kindergarten instruction from behavioral/social regulation skills to a more academic focus (Rimrn-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009, p. 958). Rimrn-Kaufman, Curby, Grimm, Nathanson, & Brock (2009) state that, "children's behavioral adaptations within the classroom environment, such as a child's ability to persist at work, stay on task, attend to learning goals, and participate actively in learning" has been shown to increase academic achievement in kindergarten (p. 958). Children who have difficulty learning after entering school may lack the self-regulating skills needed to succeed in our schools (Tangney, Baumeister, & Boone, 2004). Educators contribute by finding ways for students to increase academic success every day; and helping students to improve self-regulation skills is a promising avenue to achieve this (Baumeister, Vohs, & Tice, 2007). Deal and Bolman (2008) state, "Doing the right job requires a structure or structures well suited to what an organization is trying to

accomplish[and]…shapes purpose that translates into measurable performance goals" (p. 111). Students benefit from educators who think about what it takes for students to stay on task and focus on learning. It takes more than the mere expectation that students should pay attention and focus on tasks at hand. Understanding and modeling behaviors consistent with expanding their knowledge of what self-regulation looks and feels like has positive effects on student learning. As children grow older and their brains develop, they can increasingly take control of both their thinking and their feelings, particularly if a neural system is repeatedly exercised (Ebert, Rockstrom, Lutzenberger, & Birbaumer, 1984). Conversely, if children do not systematically engage in self-regulatory behaviors at a young age, the corresponding brain areas may not develop to their full potential (Bodrova & Leong, 2008, p. 2). Lastly, "The way in which self – regulation influences the adjustment to school during kindergarten is theoretically important because the start of formal schooling is a critical period in which children's performance at school has lasting effects that may matter more for their academic success than at any other time" (Entwisle &Alexander, 1998, p. 104). Students who have good self-regulation skills develop better academic skills quicker and had higher reading scores compared to students who lacked self-regulation skills.

There is growing evidence that self-regulation can and should be taught in the classroom (Blair & Razza, 2007; Diamond et al., 2007). The acquisition of self-regulation skills strengthen the student's ability to regulate their emotions, actions, and thoughts before reacting, especially in situations that there is a need for pause, to focus on a task, and to listen to the teacher (Ponitz, McClelland, Matthews, & Morrison, 2009, p. 606). During the preschool and kindergarten years, children begin to acquire skills and knowledge that corresponds to their ability to self-regulate (Ponitz, McClelland, Matthews, & Morrison, 2009, p. 606). It is the professional responsibility of educators to work towards helping and fostering their students in developing this skill set. These formative years are important because school success depends on a strong foundation as well as a student's ability to focus and self-regulate.

School presents a unique challenge for children. According to Riggs, Jahromi, Razza, Dillworth-Bart, and Mueller (2006), children who cannot properly self-regulate their emotions (e.g. screaming if they do not have their way, physically lashing out, or bullying other children) often elicit negative reactions from the social environment, which in turn, can exacerbate or maintain their regulation problems over time (p. 302). Teachers need strategies to help provide support and guidance. This study was designed to test an easy-to-learn set of strategies that can be implemented in every classroom to help address these concerns. Thus, the principle objective of the present research is to examine the direct teaching, practicing, and assessing self-regulation skills and its effect on student behavior.

A Functional Theory of Self-Regulation
For the purposes of this study, self-regulation (i.e. self-control, self-determination) is defined as "the capacity to override one's thoughts, emotions, impulses, automatic or habitual behaviors" (Gailliot, Mead, & Baumeister, 2008, p. 472) and to work autonomously. According to Zimmerman and Schunk (2011), self-regulation is an integrated learning process (p.1). It consists of the development of a set of constructive behaviors that affect one's learning (p. 1). Rather than creating learned helplessness, students need to take an active role in their own learning (Winne, 2011, p.19). When taught strategies, children will be more successful in

school, have better peer interactions and friendships, and less psychopathology. (Lyon & Krasnegor, 1996, 235-236).

Sustained attention is crucial for successful learning. Teachers frequently need to "jog" students back to task after their attention has waned. According to Reid & Lieneman (2006), when left to their own devices, students, particularly learning disabled students, will only be on-task for 30 to 60 percent of the time (p. 7). Educational implications are evident from this statistic. If a student does not complete a task set forth by the classroom teacher, a student may lose out on developing the knowledge and skills incorporated in the lesson.

With this in mind, the researchers for this study utilized the behaviorist approach to improve attention to task. Behaviorism is based on a theory that a relationship exists between behavior and the environment (Reid & Lieneman, 2006, p. 5). This approach requires direct observation as "ongoing data collection of objective information" (Reid & Lieneman, 2006, p. 5). Behaviorists believe that learning is hierarchical, where a "child must master skills in a prescribed order" (Reid & Lieneman, 2006, p. 5).

The use of Zimmerman's three phase process of learning, which includes "the preaction phase/forethought, the action phase/performance and volitional control, as well as the post action phase/reflection (Perels, Dignath, & Schmitz, 2009, p. 18) provided the framework for this study. In conjunction, the researchers utilized Harris and Graham's Self-Regulated Strategy Development (SRSD) model (Reid & Lienemann, 2006, p. 32). For this study, students learned the strategy of self-monitoring. Self-monitoring refers to purposeful attention to some aspect of one's behavior followed by documentation of its frequency or intensity (Reid & Lienemann, 2006, p. 32). Self-monitoring has been the most thoroughly researched method of self-regulation (Duckworth, Akerman, MacGregor, Salter, & Vorhaus, 2009, p. 26). For the purposes of this study students were taught and practiced self-monitoring of attention (paying attention when cued).

Methodology

The study investigated a heterogeneously group of kindergarten students (N=19) to help regulate their attention to task behavior. The study was based on the premise that if daily support of self-monitoring skills across the school day were taught and monitored, then the classroom teacher will have helped the students regulate, internalize, and manage their own behavior.

Research Question
What effects does the behavioral strategy of self-monitoring have on student behavior?

Setting
The school district where this study took place is located in Southeastern New Hampshire with a population of almost 30,000 according to U. S. Census Bureau (2010). This study was conducted at one of the eight district K-5 elementary schools. The enrollment for the elementary school where this study took place was 386 students (N=386) with 29 full-time teachers. The average student-teacher ratio is 13 to 1. Of the 386 students, 3 percent are Asian, 4 percent Hispanic, 3 percent African American, 89 percent White, and 1 percent are unknown. The number of students eligible for free and reduced lunches is 42 percent. Four of the remaining

elementary schools with similar student body size range from 31 percent to 47.6 percent of students eligible for free and reduced lunches (U. S. Census Bureau, 2010).

Participants
The classroom teacher within this environment is a female with thirty three years of teaching experience. She holds a Bachelor of Science Degree in Elementary School (K-8) teaching and a Masters of Education Degree in Literacy. She also holds a Doctor of Education Degree in Educational Leadership K-12. The intent to conduct research in this kindergarten classroom was due to expressed interest by the teacher to learn ways of helping her students grow behaviorally through strategy instruction.

Of the participants who were included in the study (N=21), nineteen students (aged 5-6) participated with parent consent. Ten students (53 percent) were male and nine students (47 percent) were female. Four students were identified for special education services. Title I services are provided to students who are performing below average on Title I reading assessments. Within the experimental classroom, four male students attended Title I services and Response to Intervention instruction.

Consent
The Principal and Assistant Principal of the research site interviewed the classroom teacher and researcher(s) prior to giving permission to research. Once permission was granted by a University Institutional Review Board (IRB), administration, and the parents, the study was conducted.

Participation was voluntary. Parental consent was obtained February 2015 through a parent information meeting held in the experimental classroom. Fifteen out of twenty-four parents/guardians attended with five students accompanying their parents/guardians. The experimental classroom teacher and researcher were present. Following a brief presentation and question and answer period, one hundred percent of the parents/guardians in attendance agreed to the research and signed a consent form The remaining seven parents/guardians were contacted by telephone to discuss the research and to answer questions. Two parents did not give consent for their child to participate in the study. Therefore, it was explained to those parents that no data would be collected however their child would still learn the strategies taught as part of the regular classroom instruction.

Independent Variable
The researchers and classroom teacher began role-modeling self-regulated strategy instruction in March 2015. Within the experimental classroom once a week, interventions to include on-task behavior were modeled with the following three components:
The on-task goal was designed to:

1. Address self-regulatory and strategic needs of the student(s).
2. Help the students understand where, when, why, and how to use the self-monitoring strategy.
3. Set up individual conferences, the teacher and student met to appraise growth and set goals according to these growths. (Wehmeyer, 2007)

The researchers and classroom teacher utilized an eight-step process when introducing a new target behavior to the participants:

Step 1- Identify examples of the targeted behavior.
Step 2- Describe the benefits of using self-management.
Step 3- Assist students to practice the target behavior with cue (i.e. chime).
Step 4- Review the elf-monitoring sheet with students for the first time.
Step 5- Teacher model how to use the self-monitoring sheet.
Step 6- Provide guided practice within role-playing situations.
Step 7- Provide independent in the use of the self-monitoring sheet in the actual   setting.
Step 8- Review through conferencing student's level of proficiency of the on-task behavior with the use of the self-monitoring sheet.

The teacher continued strategies modeled and practice throughout the remainder of the school week to provide generalization of skills. The research concluded the first week of June 2015.

Dependent Variables
SM1a6_ Student Questionnaire on Self-Regulation
This thirteen item questionnaire, developed by Brandy and Moore (2010), was used to assess the participants' ability to regulate negative emotions, disruptive behavior, and to set and attain goals. The questionnaire allows participants to "rate how true each item is, ranging from 1 (never true) to 4 (always true)" (Brandy & Moore, 2010, p. 3). Due to the age of the participants, the scale was modified to include items ranging from 1 (never true), 2 (sometimes true), and 3 (almost always true). Examples of items in the questionnaire are; I get distracted by little things, I have a hard time sitting still during important tasks, As soon as I see things that are not working, I do something about it.

The questionnaire is designed to be completed by the participant. Due to the age of the participants and differentiated reading abilities, the researchers determined to read each item to the participants in a quiet area within the regular education classroom and record responses. The researchers asking the thirteen-item questionnaire included two undergraduate Elementary Education/Special Education teacher candidates from a university in southern New Hampshire. A past full-time faculty member of the same university, with a Doctorate of Education Degree, also participated in administering the questionnaire.

Child Behavior Rating Scale (CBRS)- Teacher Edition
The Child Behavior Rating Scale (CBRS) has been used in many studies regarding self-regulation (Lim, Rodger, & Brown, 2010, p. 369-371). The scale includes items that measure approaches to learning, self-regulation, and social-emotional development. It is demonstrated to be strongly predictive of reading and mathematics achievement in elementary grades and validated in a wide range of cultural contexts (Schmitt, S, Pratt, M, & McClelland, M, 2014, p. 642-646). The classroom teacher rated participants from a 1 (The child never exhibits the behavior described by the item), to a 5 (The child always exhibits the behavior described by the item). Sample questions include: Observes rules and follows directions without requiring repeated reminders, concentrates when working on a task; is not easily distracted by surrounding activities, complies with adult directives, giving little or no verbal or physical resistance, even with tasks that he/she dislikes.

Data Analysis
SM1a6_Student Questionnaire on Self-Regulation
With a modified questionnaire, items 1, 2, 3, 4, 5, 8, 10, 11, 12, and 13 used a reverse score. If a participant rated themselves as 3 (Almost Always), they received a score of 1. Questions 1, 2, 3, 4, and 5 measures the participant's ability to regulate his/her emotions. Participant's responses were added and compared to the total score of 15. Scores were converted to a percentage. Questions 6, 7, and 8 measures the participant's goal setting ability. Participant's responses were added together and totaled out of 9. Scores were converted to a percentage. Questions 9, 10, 11, 12, and 13 measured participant's ability to regulate his/her behavior. Participant scores were added out of a total of 15. Scores were converted to a percentage. Higher total scores show a participants stronger ability to regulate.

Child Behavior Rating Scale (CBRS)
No modifications were made to the scoring of this scale. Items 12 and 13 are worded differently, meaning the scoring is reversed for these two items. For example, if the teacher rated a participant as a 5 (Always) on the questions: Expresses hostility to other children verbally (teasing, threats, taunts, name calling, "I don't like you, etc.), this would inflate the participants score. Participant's scores were added out of a total of 77. Scores were converted to a percentage.

Results

SM1a6_Student Questionnaire on Self-Regulation
For this study, it was hypothesized that self-monitoring interventions would improve self-regulation skills in participants. The mean and standard deviation obtained from the individual participants are based on pre- and post-testing. Table 1 reports the means and standard deviations for the three subtests administered using SPSS.

Table 1
Differences in Means and Standard Deviations for Pre and Post-Test Subtests

Measurement	Pre-Test (N=19)		Post-Test (N=19)	
	M	SD	M	SD
Emotion Regulation	66.80	9.43	68.10	13.11
Goal Setting	65.10	3.45	68.00	3.41
Behavior Regulation	66.05	17.64	66.63	10.31

Note. Scores are displayed as percentages.

The data in Table 1 show that the means for the emotional regulation and goal setting post-tests are higher than the pre-test mean. The behavioral regulation post-test mean is .58. Paired sample *t*-tests were used to test the significance between the pre- and post-test means for the three regulation subtests.

The Emotion Regulation mean difference between the pre- and post-test is 1.3. The standard error is 3.10. The *t*-value for this test was .43 (19) with a *p*-value of 0.70. The difference between the pre- and post-test is not significant at the .05 level. The results of the test are in Table 2.

The Goal Setting mean difference between the pre- and post-test is 2.89. The standard error is 21.40. The *t*-value for this test was .60 (19) with a *p*-value of 0.60. The difference between the pre- and post-test is not significant at the .05 level. The results of the test are in Table 2.
The Behavioral Regulation mean difference between the pre- and post-test is .60. The standard error is 4.43. The *t*-value for this test was .13 (19) with a *p*-value of 0.90. The difference between the pre- and post-test is not significant at the .05 level. The results of the test are in Table 2.

Table 2
Paired Samples Test: Mean Differences between Pre- and Post-Test Scores for Self-Regulation Questionnaire

Subtest	Sig.	*t* value	df	*p* value*	Mean Difference	Std. Error Difference
Emotion Regulation	0.19	0.43	18	.70	1.32	3.10
Goal Setting	1.00	0.60	18	.60	2.90	5.00
Behavior Regulation	0.61	0.13	18	.90	0.60	19.30

No*te.* Scores are displayed as percentages. **p* <0.05, two-tailed.

Child Behavior Rating Scale
For this study, it was hypothesized that self-monitoring interventions would improve self-regulation skills in participants. The mean and standard deviation obtained from the classroom teacher are based on pre- and post-testing. Table 3 reports the means and standard deviations for the rating scale administered using SPSS.

Table 3
Differences in Means and Standard Deviations for CBRS Pre and Post-Test

	Pre-Test (N=19)			Post-Test (N=19)	
Measurement	M	SD		M	SD
Child Behavior Rating Scale	67.73	16.93		85.94	12.41

Note. Scores are displayed as percentages.

The data in Table 3 show that the means for the Child Behavior Rating Scale post-tests are higher than the pre-test mean. The mean difference between the pre- and post-test is 18.21. The standard error is 9.60. The *t*-value for this test was 8.30 (19) with a *p*-value of 0.01. The difference between the pre- and post-test is significant at the .05 level. The results of the test are in Table 4.

Table 4
Paired Samples Test: Mean Differences between Pre- and Post-Test Scores for Self-Regulation Questionnaire

Subtest	Sig.	*t* value	df	*p* value*	Mean Difference	Std. Error Difference
Chile Behavior Rating Scale	0.01	8.30	18	.01	18.21	9.60

No*te*. Scores are displayed as percentages. *$p < 0.05$, two-tailed.

Discussion

Children develop differently. Self-regulation skills can be gained from a young age. For example, infants show self-regulation when they are able to suck their thumb to soothe themselves (Conway, 2009, p. 18). Self-regulation is the ability to control emotions based on a particular situation. Children with self-regulation are able to be flexible with unknown outcomes as they arise and behave appropriately (Conway, 2009, p. 17). As age increases, so can self-regulation skills. This study examined the effect of self-regulated strategy interventions to aid in on-task behavior during instruction within a kindergarten classroom. Self-monitoring

interventions used scaffolding techniques to help students internalize skills. For this study, it was hypothesized that self-regulation interventions would positively affect assessed rating scales.

Post-test Performance
SM1a6_Student Questionnaire on Self-Regulation. The number of research articles accessed through regular search engines such as ERIC and Psych Info was surprisingly low when comparing results. What is available for self-regulation questionnaires is predominantly related to adolescents and college students. Panadero, Tapia, & Huertas (2012) results showed that scripts enhance self-regulation more than rubrics when secondary students measure their self-regulation (p. 810-813). Bakracevic Vukman & Licardo (2010) found that adolescents decreased in self-regulation skills between the ages of 14 to 18. Results from this study are not consistent with earlier research. When each task was analyzed separately, regulation skill scores indicated that the participants' ability to regulate their emotions and goal setting slightly increased. Behavioral regulation, the main purpose for this study, remained consistent.

Child Behavior Rating Scale
In line with previous research, the results from this study are consistent with von Suchodoletz, Gestsdottir, Wanless, McClelland, Birgisdottir, Gunzenhauser, & Ragnarsdottir (2010) when understanding the importance of behavioral self-regulation in young children's development. The current study found that self-monitoring interventions resulted in increased on-task behavior among kindergartners in a heterogeneously grouped classroom. When sharing the pre-post test results with the classroom teacher/researcher, she identified that scaffolding instruction in self-monitoring strategies ensured students' understanding of each strategy, why it aids behavior, and when to employ such skills was significant.

Discussion of Methodological Limitations
This study has multiple limitations. First, the sample size was large enough to produce results and run the proposed analysis, but it was too small to make strong statements on the effectiveness of the interventions. The sample was also from a single grade in a school district in southeastern New Hampshire. Although this grade was chosen specifically because of the developmental level of children's ages of five to six, it does not provide a wide scope of ages or developmental stages.

Second, this study did not take into account urban and rural schools in terms of sameness or differences. Conducting research in both settings so that those sameness/differences are identified could help provide educators with further results.

Third, in designing this study, the researchers selected only one classroom due to ease of gaining permission and implementation. Due to the specific demographics of the school and the classroom, the findings can most likely be generalized to children only in the same environment.

Fourth, several factors could have contributed to the inconsistency in self-regulation scores as assessed by the participants. Sequenced instruction in self-regulation strategies was at the beginning stages of students' understanding of how/when to employ such skills. Some of the questions did not pertain to strategies being taught (i.e. emotion regulation). The age of the participants in answering the questions may have prohibited their responses. The pre-test was

administered by two undergraduate students with a brief training along with an adult (Ed. D) researcher. The post-test was administered by only two adult (Ed. D) researchers. This may have contributed to inconsistencies when administering the questionnaires to participants.

Administering the rating scales to the participants within the classroom setting may have caused a distractive and less confidential environment when assessing. A quiet environment outside of the classroom might have helped participants focus and provide answers in a safe manner.

Fifth, there is also no research conducted to prove strong reliability and validity when using the student self-regulation questionnaire. Therefore, the results from this study may not provide strong statistical analysis.

Sixth, it is possible to not rule out biasness as teacher ratings could have been influenced by possible teaching effectiveness being challenged.

This study does have a strength worth noting. Behavioral observations were conducted weekly in the participant's attention and responses to tasks through an interval recording and self-monitoring sheets. This process helped the researchers identify early deficits in self-monitoring, in order to aid in targeted interventions, particularly for participants who could be more at risk for continuing problems. Scaffolding then could be tailored to meet developmental needs.

Implications

Kindergarten classrooms, such as the one used in this research, shows how modeling of self-regulation skills improve student behavior. Future research that examines children's positive self-control and work habits are potential mediators between classroom management and children's achievement. Further research with this age group and data collecting on academic achievement while collecting self-regulation data would help inform educators of academic and behavioral gains, particularly if conducted over an academic year and possibly monitored over the course of subsequent years. Including participants parents in the research would also provide a home-school connection. Further research could also include parents in training and follow through of skills in the home environment.

The findings speak to the importance of teacher preparation in organizing their instruction in ways that promote self-regulation skills. Most teacher preparation programs and professional development for certified educators offer a myriad of classroom management techniques that are not tailored to children's needs or development. The present findings suggests that while teachers deliver academic instruction, they can infuse self-regulation skills at an early age and see positive results.

When implementing strategy instruction, there are practical considerations for educators to understand. Strategy instruction requires sustained effort and substantial time investment. It is always important to "loop back" once a strategy has been taught. Repetition and practice help students to make sense, meaning, and generalization of skills across the school environment(s). Re-teaching, review, and modeling is needed. This will require a commitment from teachers, students, and administrators who determine the amount of instructional time for subject areas.

Conclusion

Kindergarten students need time to learn, how to use materials in school appropriately, and how to consider social and emotional issues for themselves and others. They need to understand how and when to self-regulate within the context of the school environment so that they experience positive development during a crucial time in their childhood. Increasing self-regulation in children's development has shown to enhance social skills with peers (Onchwari & Keengwe, 2011, p. 284). Therefore, educators must strive to provide developmental consistency and foster a feeling in children socially and emotionally within and across learning environments. The results of this study translate to positive development in self-regulation skills among kindergarten students, improving the development of learning as early as possible.

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implications that self-regulation had on student behavior and learning in young children with much success. She continues to use the strategies she has learned to teach young children the importance of learning and the impact it will have on their future.

Dr. Sarah Sarette is a certified School Psychologist employed with a public school district in central New Hampshire. She not only has been a School Psychologist, but has taught K-8 regular and special education classes. She has also been a principal and a teaching consultant/Assistant Special Education Director. She earned her Ed.D in Educational Leadership K-12 at New England College in 2014. Her Bachelor of Science in Elementary Education K-8, M.Ed in Special Education K-12, and Certificate of Advanced Graduate Studies in Administration and School Psychology was obtained from Plymouth State University in Plymouth, New Hampshire. She also is an adjunct professor for various colleges/universities. Dr. Sarette's training expertise lies in working memory, self-regulation, and mathematics. Professional Development for teachers, paraprofessionals, and parents in various special education topics is a true joy for her.

Marley Martin was an undergraduate researcher during this research project. She holds her A.S. in Education and Certificate in Special Education from NHTI: Concord's Community College in 2014. Immediately upon graduating she transferred to Southern New Hampshire University (SNHU) to pursue her B.A. in Elementary Education and General Special Education, during her junior year she participated in this research project. Ultimately that experience led her to choose to student teach in a kindergarten classroom as well as a special education placement in Concord, NH. Marley graduated in May 2016 from SNHU Summa Cum Laude and was inducted into Pi Lambda Theta National Education Honor Society, she also obtained her teaching certification in both K-6 and Special Education K-12. Currently, she is pursuing her NH Alternative Four certification for Early Childhood Special Education while she teaches as a Special Education Preschool Teacher for the Concord NH School District. When she is not teaching, she can be found enjoying New Hampshire's and neighboring Maine's beautiful mountains and beaches.

Anna Boghigian has been working towards becoming a teacher her entire life. She is currently studying for her bachelors in Elementary Education with a certification in Special Education at Southern New Hampshire University. This is her first academic research article and one that has spurred her interests in educational research where she hopes to continue with articles and studies in the future.