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EXPLORING CLASSROOM BEHAVIOR AND VOCABULARY LEARNING OUTCOMES IN KINDERGARTEN

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EXPLORING CLASSROOM BEHAVIOR AND VOCABULARY LEARNING OUTCOMES IN KINDERGARTEN

BY

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ABSTRACT

The purpose of the present study was to investigate the impact of student behavior on vocabulary knowledge development across three groups of kindergarteners: Intervention, Control, and Reference. Kindergarten students (n = 1132) from forty schools across Rhode Island, Connecticut, and Oregon completed a vocabulary program approximately 20 weeks in duration, including an additional vocabulary intervention for students in the Intervention group. Each student was assessed on four different vocabulary knowledge measures before and after completion of the vocabulary program, using both standardized and experimenter-developed formats: Target Receptive, Target Expressive, PPVT-4, and EVT-2. Results showed significant impact on vocabulary outcomes by classroom behavior and across groups of students. Students who received the supplemental vocabulary intervention performed as well, or better than reference peers on experimenter-developed measures of target words. Additionally, intervention student behavior was considered between whole-class and small group settings; however, no significant effects were found on vocabulary knowledge outcomes. These results suggest that while behavior did not have an impact on vocabulary knowledge outcomes in this study, all students successfully made considerable gains in vocabulary knowledge upon completion of this vocabulary program and intervention.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

FIGURE PAGE

CHAPTER 1

INTRODUCTION

There is increasing evidence identifying a bi-directional and interconnected relationship between student behavior and academic performance (Putnam, Horner, & Algozzine, 2006; Spira, Bracken, & Fischel, 2005). Research findings have determined a variety of student behaviors that may interfere with and others that may promote positive academic outcomes. For example, academic engagement has been found to be associated with positive academic outcomes (DiPerna, Volpe, & Elliott, 2002; Finn & Pannozzo, 2004; Greenwood, Delquadri, & Hall, 1984), whereas problem behaviors, such as disruptive comments or inattention, have been linked with more negative academic outcomes (Greenwood et al., 1984; Rabiner & Coie, 2000; Spira et al., 2005).

Although this relationship between behavior and academic outcomes has been widely documented, few studies have investigated the role of behavioral variables as contributors to a response to specific academic intervention, such as vocabulary. As a result of the myriad factors contributing to human behavior, the purpose of this study is to establish whether there is a relationship between students' behavior and vocabulary knowledge increases. Further, this study aims to explore the relationship between student behavior and vocabulary knowledge growth across large- and small-group settings.

Vocabulary Knowledge

Children come to school with vast differences in vocabulary knowledge as a result of their experiences and exposure to literacy activities and these differences tend to grow more discrepant over time (Hart & Risley, 1995). These differences in knowledge are more widely recognized as "the vocabulary gap". Established in early childhood, the vocabulary gap then grows wider throughout the early grades; children who enter school with limited vocabulary knowledge increase their vocabulary more slowly over time than their peers who begin school with rich vocabulary knowledge (Biemiller & Slonim, 2001).

The importance of vocabulary knowledge on reading comprehension as well as general school success has been widely demonstrated (National Institute of Child Health and Human Development, 2000). While some children enter school with thousands of hours of exposure to books and a wealth of rich oral language experiences, other children begin school with very limited and impoverished knowledge of language and word meanings. Most vocabulary differences between children occur before grade three, at which point children with large vocabularies know thousands more word meanings than children who are experiencing delays in vocabulary development (Biemiller & Slonim, 2001). Further, there are consistent findings that children's early vocabulary knowledge strongly predicts their later reading success (Cunningham & Stanovich, 1997; Senechal et al., 2006). For instance, Cunningham and Stanovich reported that orally-assessed vocabulary levels in first grade accounted for 30 percent of reading comprehension variance as seen in test scores in eleventh grade. However, very little instructional time is devoted to

vocabulary development in primary grades (Biemiller, 2001). Thus, in order to improve reading comprehension, it is imperative that we find ways to increase vocabulary knowledge through whole-class instruction or smaller interventions as early in the schooling process as possible; this is especially true for students who enter school with less literacy exposure and limited vocabulary knowledge, are English Language Learners (ELL), or are at-risk for learning and reading difficulty.

Student Behavior and Academic Achievement

In response to the evidence of early childhood knowledge gaps that lead some to significant underachievement, researchers have discussed differences in behavior regulation as one potential contributing factor to such disparities (Heckman, 2006; McClelland, et al., 2007). A large number of studies indicate that general intelligence and behavioral regulation are significant predictors of children's academic achievement (McLeod & Kaiser, 2004; Sektnan et al., 2010; Taub et al., 2008). Behavior regulation skills help children pay attention, remember instructions, and inhibit inappropriate actions. Strong behavior regulation also helps children modify their behavior according to social rules and the demands of a situation (Vohs & Baumeister, 2004). All of these regulatory skills are associated with children's academic outcomes (Clark, Pritchard, & Woodward, 2010).

Children with behavioral difficulties in early education often lack regulation skills, spend little time engaging in classroom tasks, and are often disliked by their peers and teachers (Hamre & Pianta, 2001). They also may exhibit more academic problems as well as be at increased risk of dropping out later in education (Gutman et al., 2003). One study even found that children who are disruptive, aggressive, or act

out in preschool are more likely to have high rates of delinquency and school drop out during adolescence (Nagin & Tremblay, 2001).

Teachers who observe a child engaging in problem behavior may infer that such behaviors reflect the child's underlying dispositions and may generally lower their perceptions of the child's academic ability. This is true even if the child shows adequate academic performance (McLeod & Kaiser, 2004; McLoyd, 1998). As early as kindergarten, externalizing problem behaviors like inattention, aggression, or delinquency and deficits in social competence are associated with academic achievement deficits (Nelson et al., 2004). Gut and colleagues (2013), found that the higher children's behavior problems were, as rated by teachers, the lower the teacher perceptions of children's competence.

Another study found that teacher ratings of student inattention and over-activity have been found to negatively correlate with achievement test scores in elementary grades (Finn et al.,1995). Thus, a child's problem externalizing behaviors, for example, may indirectly affect his or her own subsequent academic achievement long-term. The lack of attention to indirect effects might cause researchers, educators, and policymakers to overlook the full weight of learning-related skills such as behavior regulation for children's learning outcomes (von Suchodoletz & Gunzenhauzer, 2013).

There is limited, but growing evidence that explores a bidirectional or transactional explanation for co-occurring academic and behavior problems. Studies have found that poor academic performance is related to the onset, frequency, and persistence of delinquent behaviors, and that academic difficulty or failure exists in a

reciprocal relationship with behavior that is context specific (Maguin & Loeber, 1996; McEvoy & Welker, 2000). Specifically, there is increasing evidence that supports the theory that reading-related academic struggle during the first years of primary school predicts later behavior problems (Zibulsky, 2010; Halonen, Aunola, Ahonen, & Nurmi, 2006). Longitudinal research by Miles and Stipek (2006) demonstrated that poor achievement predicted aggressive behavior in a sample of low-income elementary school students. Specifically, they determined that poor reading achievement in Grade 1 predicted aggression in Grade 3, rather than early levels of aggression predicting later reading achievement. This finding, outlining the influence of early behavior, was also replicated from Grade 3 to Grade 5.

There is a supporting theory behind this low achievement-behavior problems link. The theory sustains that students will surely become unhappy or annoyed when repeatedly facing an inability to achieve valued academic goals, which may develop into externalizing (and/or internalizing) problem behavior. This theory has been recently demonstrated in studies such as Halonen and colleagues (2006) and Zibulsky (2010). Halonen et al. examined the relationship between learning to read and problem behaviors of 196 children, beginning in preschool and implementing six separate monitoring visits during the transition to primary school and through second grade. The results showed that problems in reading acquisition predicted an increase in internalizing problem behavior during the preschool year and first grade, whereas during the second grade they were associated with an increase in subsequent externalizing problem behavior. Halonen and colleagues suggested a more concerning conclusion that difficulties in learning to read, and internalizing and externalizing

problem behaviors are developmentally linked in a cumulative manner. Therefore, early intervention for children demonstrating early difficulty with reading might not just promote academic success, but behavioral success as well.

More recently Zibulsky (2010) examined the relationships between various measures of pre-reading abilities and behavior as students moved from preschool through kindergarten while accounting for environment. Zibulsky found contrasting early childhood evidence, ultimately determining that learning behaviors, such as attending to instruction and ignoring distractions, aid the development of reading acquisition more than externalizing behaviors hinder such development. As such, further consideration of causality is warranted along with increasing research examining the numerous pathways that lead to co-morbid academic and behavioral problems.

Further, a meta-analysis by Maguin and Loeber (1996) examined studies on the relationship between academic performance and delinquency behaviors and offered associations between early academics and later behavior. The authors' main points highlight that poor academic performance is related to the onset, frequency, intensity and persistence of delinquent behaviors across genders and independent of socioeconomic status. However, the strength of the relationship between academics and delinquent behavior related to age is not clearly established. Maguin and Loeber also discussed that interventions aiming to improve academic performance were found to foster a reduction in delinquent behaviors concurrently. However, they concede that the strength of the relationship between academic performance and delinquency is not clearly established, nor does it explore causality; cognitive deficits and attention

problems are commonly identified correlates, not necessarily causes, of both academic performance and delinquent behavior.

Behavior Regulation and Literacy Skills

It seems likely that behavior regulation (as the integration of attention, working memory, and inhibitory control) helps children to enhance their performance on achievement tasks as well as in academic settings. Because of their ability to pay attention to instructions, remember classroom rules, and engage in learning activities even in the presence of attractive distractions, children acquire new skills and knowledge, generating higher scores on literacy tasks (von Suchodoletz & Gunzenhauzer, 2013). A recent longitudinal study also reported attention at the beginning of kindergarten to be one primary long-term predictor of later reading achievement (Grissmer et al., 2010). A study by McClelland and colleagues (2007) examined the effect of behavior regulation abilities on emergent literacy, vocabulary, and math skills over a prekindergarten year. Behavioral regulation was assessed using a Head-to-Toes Task requiring a child to perform the opposite of what is instructed verbally, tapping inhibitory control mainly, as well as attention and working memory skills. Both behavior regulation and literacy skills were measured at the beginning and end of an academic prekindergarten school year (fall and spring time points). Overall, McClelland et al. found that among preschool-aged children, behavior regulation significantly and positively predicted the level and growth in emergent academic skills, including literacy and vocabulary, over the prekindergarten year. Despite acknowledging the lack of information about classroom instruction throughout the school year, this study presents an initial examination of contributing factors

related early vocabulary and literacy development. The authors suggest that with further research, larger samples, and longitudinal data across years in primary school, a better indication or explanation may be established between early behavior and academic skill growth.

A similar study a study by Wanless and colleagues (2011) examined a behavioral regulation task, Head-Toes-Knees-Shoulders, teacher-rated classroom behavior, and early academic skills with children aged three to six across four countries. The authors established that higher scores on the behavior regulation task were significantly related to higher early academic skills beyond the influence of demographic variables and teacher behavior ratings. As such, both the Wanless and McClelland studies suggest that promoting early behavioral regulation may have significant benefits for young children. There are a variety of early intervention programs available that have already demonstrated the effectiveness of such intervention curriculum, for example the Tools of the Mind curriculua. This incorporates play activities and strategies that help children pay attention, which leads to increases in their attention, working memory, and inhibitory control skills, also improving their academic achievement (Barnett et al., 2008; Diamond et al., 2007).

Currently, however, there is some evidence that suggests the relation between behavior regulation and vocabulary may decrease over time. Although previous studies reported significant findings in 4-year-olds, there is some evidence suggesting that the contribution of behavior regulation to children's vocabulary knowledge decreases as children age through primary school (McClelland et al., 2006). An earlier study by McClelland and colleagues outlined the importance of early self-

regulation skills, including behavior regulation, and early school success. The authors noted that in kindergarten, first, and second grade, the latent growth curves and academic (reading and math) performance indicated that learning related behavior skills predicted growth in reading and math. The growth curve differences grew from kindergarten to second grade, but were then maintained, not made wider, as the students were followed through sixth grade. Therefore, early intervention aimed at both improving behavior regulation as well as promoting academic skills is essential for students in kindergarten, for example, and may help narrow the performance gap between students as they progress to sixth grade.

Vocabulary Intervention and Outcomes

Multi-tier systems of support offer great promise for enabling high levels of achievement for all students and, in particular, for accelerating the learning of those students who are most at risk for experiencing learning difficulties (Gersten et al., 2005). The different tiers of support include general classroom instruction as the first tier, targeted small-group instruction for the second tier, and individualized instruction for students comprises the third tier, typically (Wanzek & Vaughn, 2007).

Direct vocabulary instruction is well suited to a multi-tier approach, especially when aimed to close the vocabulary gap, despite its infrequent occurrence currently. However, vocabulary learning from direct instruction is often paced by prior vocabulary knowledge (Coyne et al, 2010) and classroom-based vocabulary instruction does not appear to fully meet the needs of students with low levels of vocabulary knowledge (Loftus & Coyne, 2013). Students with low levels of initial vocabulary knowledge likely require supplemental intervention in addition to

classroom-based vocabulary instruction in order to make gains similar to those of students with higher levels of initial vocabulary knowledge. Therefore, screening for existing vocabulary knowledge it is critical for correct student placement among tiers of instruction and the promotion of academic success.

Because receptive vocabulary knowledge, specifically, is a strong academic predictor of response to vocabulary intervention (Coyne, McCoach, & Kapp, 2007), students can be effectively identified for vocabulary intervention based on vocabulary knowledge. There are a number of reliable measures available to identify a young student's receptive vocabulary ability, like the Peabody Picture Vocabulary Test, for example (PPVT; Dunn & Dunn, 2007). Studies have utilized the PPVT to identify and group students who may be at risk for lower vocabulary development (Beitchman et al., 1996; Pullen et al., 2010) and to monitor progress over time related to vocabulary knowledge (Mancilla-Martinez & Vagh, 2013).

However, unlike early reading skills, there are few evidence-based vocabulary interventions available for schools to implement, especially for those students most at-risk for language and literacy disabilities (Gersten, et al., 2009). The limited availability of such vocabulary interventions is then compounded when schools have access to very few of these evidence-based practices that support early vocabulary development within a multi-tier framework (Coyne et al., 2010). This further highlights the need to develop and validate appropriate early vocabulary interventions for at-risk children that can be widely implemented in schools specifically utilizing existing resources within a multi-tier format.

Behavior and Response to Academic Interventions

Although small group environments are designed to teach students specific academic skills, it also provides an opportunity to develop students' learning-related behaviors. Difficulty with attention to task, following directions, persisting during challenging tasks, and completing independent work in early elementary school is associated with low academic achievement (Weiss, 2013). Further, students who have difficulty with these behaviors may also make limited progress even when participating in intensive interventions through small group instruction (Torgesen et al., 2001).

Previous research has indicated that student behavior is significantly associated with academic outcomes even after controlling for expected predictors of response to academic instruction and intervention, such as receptive language (Torgesen et al., 2001). Therefore, children who exhibit few positive predictors of change (i.e.: academic focus and progress) and many risk factors (i.e.: maladaptive externalizing behaviors and low vocabulary abilities) are more likely to have a true impairment. These children require intervention more than children who exhibit many predictors of change and few risk factors (Olswang et al., 1998). Specifically, inappropriate classroom behavior, such as inattentive or disruptive behavior, may interfere with learning by reducing opportunities to respond to academic material (Greenwood et al., 2002) and prevent positive academic outcomes.

Group Size, Behavior and Academic Outcomes

Traditionally, education in America occurs in larger settings, with whole-class instruction for students. However, there is a growing body of evidence suggesting

small-group instruction is more beneficial for students than whole-class or even one-on-one instruction (Polloway et al., 1986). Vaughn and colleagues (2001) posit that small-group instruction offers an environment full of opportunities for students to discuss what they know and receive feedback from both peers and the teacher. Small-groups allow students to conduct instructional conversations and foster higher learning growth margins in addition to increased generalization of skills, enhanced pragmatic learning and increased peer interaction (Polloway et al., 1986).

When a small group format was compared to whole-class instruction, examiners found more positive behavioral outcomes. Researchers found that students who learned in a small-group setting demonstrated more altruistic behavior and were more likely to choose to collaborate in a small group than their peers from traditional (whole-class) settings (Hertz-Lazarowitz et al., 1980). This further outlines how small group intervention would be useful to build academic knowledge as well as remediate behavior in the classroom.

Behavior Rating Scales

Research has traditionally measured behavioral regulation with teacher or parent ratings, aggregate scores through testing memory and attention, or direct measures (Howse et al., 2003). These methods have proven useful for understanding perceptions of children's behavior, identifying individual components of behavioral regulation, and assessing specific populations of children. They are also readily available and valid for use outside of clinical or academic assessment of children whereas exclusive reliance on clinical interviews is costly, requiring considerable time for training and interviewing. By contrast, psychometric approaches involving paper-

and-pencil checklists, like behavior rating forms, can be valid, economical, and efficient methods of identifying and assessing childhood academic difficulties or disorders (Achenbach, 1995). Understanding the discriminative ability of behavior rating scales may allow more efficient screening identification of specific types (or subtypes) of childhood disorders (Ostrander et al., 1998).

A study by Koonce (2001) found that the teacher-completed BASC-TRS contributed useful and valid information for a differential diagnosis of disruptive behavior disorders like conduct disorder and oppositional defiant disorder. Further, the BASC-TRS featured items that were found to predict the diagnosis of a behavior disorder. Thus, using behavioral rating scales like the BASC can be a useful tool in determining behavior disorders. Specifically, the Teacher Rating Scale (TRS) in classrooms would therefore be a valid measure of classroom behaviors experienced by teachers.

Research Questions

Due to the increasing evidence outlining the bi-directional and interconnected relationship between student behavior and academic performance, this study aims to establish whether there is a relationship between students' behavior and vocabulary knowledge growth. Studies have found that poor academic performance is related to the onset, frequency, and persistence of delinquent behaviors, and that academic difficulty or failure exists in a reciprocal relationship with behavior that is context specific. Further, it has been established that higher scores on behavior regulation tasks were significantly related to higher early academic skills beyond the influence of demographic variables and teacher behavior ratings. Therefore, early intervention

aimed at both improving behavior regulation skills as well as promoting academic skills is essential for young students and may help narrow the gap as they progress through their education.

Effective interventions using small group environments have been identified across academic subjects; they are designed to teach students specific academic skills and provide an opportunity to develop students' learning-related behaviors. These small group interventions have been found to not just improve academic skills, but positive classroom behaviors as well. Specifically, vocabulary interventions can improve vocabulary knowledge through small group learning and practice, which could improve reading comprehension and overall academic skills and classroom behavior. Continued research efforts to validate vocabulary interventions for young students is crucial for the promotion of both short- and long-term success academically and socially or behaviorally. These efforts should also provide schools access to valid and reliable student supports that maximize existing resources and outcomes across academic subjects.

Therefore, the purpose of this study is to examine the role of student behavior as it contributes to response to vocabulary intervention in kindergarten. Primary research questions include: 1. Does student behavior relate to vocabulary learning outcomes for students? 2. Do students who are determined to be at risk for delayed vocabulary development have significant differences on behavior ratings and vocabulary growth from their typically achieving peers? A secondary research question is: 3. Will the student behavior by setting, whole-class or small group, impact vocabulary outcomes differently?

CHAPTER 2

METHODOLOGY

Proposed study

This study examined selected data from the Year 2 kindergarten-cohort collected within a larger US Department of Education funded vocabulary intervention study, Project Early Vocabulary Intervention. These data were collected over the course of the 2012-2013 school year in schools across Rhode Island, Connecticut, and Oregon.

Participants

Forty schools across Rhode Island, Connecticut, and Oregon were recruited for participation based on the availability of full-day kindergarten programming. Bilingual kindergarten classrooms were excluded due to the alternating nature of their instructional methods in both English and Spanish. This instruction involves Spanish at least part of the time, and deviates from the standard instruction method outlined by the curriculum that teachers were trained with for the purpose of our study.

All kindergarten classrooms within each of the participating schools screened kindergarten students (n=2959) using the Peabody Picture Vocabulary Test-Fourth Edition (PPVT-4). Students whose standard scores fell between 75 and 93 were randomly assigned to one of two at-risk groups: intervention (n= 410) and control (n= 371). Students with standard scores between 100 and 105 were randomly selected for

a third group: reference peers (n= 351). These group totals represent the final numbers per group after accounting for the 24 students who moved away during the school year and an individual who was exited from participation due to educational limitations.

Table 1.
Demographic Information of Participants for the Study by Group

	Gender		Race/Ethnicity					ELL	
Group	M	F	White	Black	Hispanic	Asian	Multi	Yes	No
Intervention (n= 410)	206	179	118	96	104	23	17	99	270
Control (n= 371)	197	152	125	73	101	8	20	82	250
Reference (n= 351)	163	171	138	73	74	10	23	21	290
Total (n= 1132)	566	502	381	242	279	41	60	202	810

Informed consent

All parents were required to give their consent for their child's participation in the larger research study. Because this study proposes maximum benefits and minimal risk to all children, active consent was not required by the IRB of the University of Rhode Island. Instead, the kindergarten teachers of each participating classroom sent home a passive consent form to the parents of each student (Appendix A). This required parents to return the signed form if they did not want their child to participate. Kindergarten students who had returned consent forms did not have any assessments administered at any time and no demographic or other information was collected about them.

Description of the Classroom Program and Intervention

All participating kindergarten classroom teachers implemented the Elements of Reading – Vocabulary curriculum (Beck & McKeown, 2002), a widely available evidence-based vocabulary program, to all students (including the intervention, control, and reference students) during whole class instruction. This instruction lasted for approximately 20 minutes per day, five days per week, over the course of a school year (approximately 20-24 weeks). This curriculum introduced five different vocabulary words on the first day of each week, provided activities for students to employ and manipulate the words the next three days per week, and the final day featured a five-question quiz to assess comprehension. This resulted in a total of 120 new words over the course of the school year.

Additionally, students in the intervention group received a supplemental small-group vocabulary intervention for approximately twenty-five minutes four days per week, following the whole class lesson. This intervention was also implemented over the course of the school year, in addition to and corresponding with the Elements of Reading – Vocabulary weekly lessons. Students in the classroom were often completing differentiated language arts activities at different centers during the time the intervention students were pulled out for their small group instruction. However, it should be noted that the vocabulary words were not added anywhere else in school programming for the students in this study.

The vocabulary intervention includes four lessons per week that provide extra activities focusing on three of the five weekly vocabulary words from the Elements of Reading – Vocabulary curriculum. The intervention provides structured instruction

with standard wording to introduce activities, provide feedback to students, and solicit deeper thinking. The instruction also provides clear and consistent wording of definitions from the teacher, as well as teacher modeling, opportunities for student practice, reinforcing feedback, and scaffolding to expand and promote student learning. Over the course of four days each week, students are able to review the three vocabulary word definitions, identify examples and non-examples, and expand contextual knowledge through guided activities.

A sample week of the intervention includes the following:

Day 1: Interventionists reintroduce three of the target words from the earlier whole-class Elements of Reading – Vocabulary instruction and reviews each word definition. There are also picture activities where students identify picture cards as examples or non-examples of each of the words by putting their thumbs up or down as a group. Students then individually choose a picture at random and must decide whether it is an example or not and briefly explain why.

Day 2: Interventionists reintroduce the three target words and reviews the definition of each word. The students are then encouraged to each tell about an example picture based on the target word after the interventionist models the activity. Feedback and scaffolding are provided for student answers to promote using the target word and definition in explanations. Finally, there is also a picture sort activity where students choose an example picture and decide which of the target vocabulary words it matches.

Day 3: Interventionists reintroduce the three target words and reviews the definition of each word before introducing an activity that makes connections and builds word context through word webs and charts. The interventionist encourages students to think about the target word and name other things that can also be the same thing. For example, the target word "fleet" means fast, so students are asked to come up with other things that can be fast, like cars, trains, boats, animals, people, and so forth. Also, target words can be verbs, so context is also built through thinking about other ways things can move and students are encouraged to demonstrate the movements. The interventionist validates correct student answers by writing it into the webs and charts or encouraging the group to mimic actions. Interventionists also guide students to correct responses through scaffolding scripted answers provided in the curriculum. At the end, the interventionist reviews the target word, definition, and examples the students provided.

Day 4: The final lesson of the week begins with a review activity that reminds students of word definitions, and then asks students to choose a picture from a pile and ask a fellow student to tell them about it. Also, there is a cumulative review activity that varies from telling about picture cards from the current lesson and past lessons to listening for target words in a story and then retelling parts from memory.

Assessment of Students

The Project EVI team collected demographic information and assessed all students identified for the three groups individually at the beginning of the school

year, prior to beginning any vocabulary curriculum or intervention. Assessments included brief measures of language and vocabulary knowledge, utilizing both standardized and experimenter-developed measures that took approximately 30-40 minutes to complete in each of two assessment sessions. At the end of the school year, after approximately 24 weeks of the vocabulary program, students were re-assessed on the measures in the same manner across two sessions. Additionally, whole-class behavior rating scales were collected from all teachers for all participants at the completion of the study. Interventionists working with the intervention students specifically also submitted behavior ratings for their small group setting at the end of the program as well.

Standardized Measures

Peabody Picture Vocabulary Test-4 (PPVT-4, Dunn & Dunn, 2007).

The PPVT-4 is a norm-referenced, individually administered measure of receptive vocabulary. Students are presented with four pictures and are asked to point to the picture that best represents the word given by the examiner. Standardized scores (mean = 100; SD = 15) are computed based on number of items correct and the student's chronological age. Reported reliability of the PPVT-4 is satisfactory with alternate forms reliability coefficients ranging from .87 to .93 and test-retest reliability coefficients ranging from .92 to .96. Correlational studies between the PPVT-4 and other tests of verbal ability suggest high criterion validity of the PPVT-4 (Dunn & Dunn, 2007).

Expressive Vocabulary Test-2 (EVT-2, Williams, 2007).

The EVT is a standardized, norm-referenced, individually administered test of expressive language and vocabulary that assesses expressive vocabulary. In the EVT, students are presented with a colored picture and asked to respond with a one-word answer to a stimulus question, such as to provide a label or a synonym that connects to the picture. Reported test-retest reliability by age is .95 and alternate form reliability by age is .87. Split-half reliability by age is .94. The EVT-2 was 100% co-normed with the PPVT-4; their correlation is r = .82

Behavioral Assessment Rating System – Second Edition (BASC-2) **Behavior and Emotional Screening System** (BESS, Reynolds & Kamphaus, 2004)

The BESS is part of the BASC-2 family, specifically designed for use determining behavioral and emotional strengths and weaknesses in children and adolescents through high school. It consists of brief screening measures that can be completed by parents or teachers. This assessment includes a wide array of behaviors that represent both behavioral problems and strengths, including internalizing problems, externalizing problems, school problems, and adaptive skills. This nationally normed and standardized rating scale serves as an efficient, reliable, and valid measure of behavior (Merrell, 2003). Teachers are asked to respond to 27 items, rating how frequently the child engages in a particular positive or negative behavior on a scale that ranges from "Never" to "Almost Always." Item topics include paying attention, disobeying rules, completing assignments, annoying others, problem solving, and encouraging others. The teacher form for the Child and Adolescent level reported an internal consistency reliability estimate of .96 and the test-retest reliability coefficients .91. Due to the variability in cutoff scores based on student ages, scores

are then coded into the three risk groups based on T-scores, per the cutoff points established on the measure; T-scores at or below 60 are considered "Normal Risk", 61 to 70 are considered "Elevated Risk", and above 71 is considered "Extremely Elevated Risk".

Experimenter-Developed Measures

The National Reading Panel (NICHD, 2000) concluded that specific vocabulary growth is best assessed through researcher-developed measures because these measures are more sensitive to gains achieved through instruction than are standardized tools.

Measure of Target Word Knowledge (Appendix B)

This measure is a 26-item experimenter developed individual assessment that measures students' expressive knowledge of target word definitions. The student is asked, "What does the word ___ mean?" To detect full or partial word knowledge, responses are given two points for a complete response, one point for a partial, related response, and zero points for an unrelated response or no response. The maximum achievable score is 52.

Receptive Picture Vocabulary Measures of Target Words (Appendix C)

This measure is a 16-item experimenter developed individual assessment that measures students' receptive knowledge of target words. In the receptive vocabulary measure an examiner presents students with four pictures and asks them to point to the picture that corresponds with a spoken target word. Students are awarded one point for each correct answer. The maximum achievable score is 16.

Research Questions and Hypotheses

1. Does student classroom behavior relate to vocabulary learning outcomes for students?
    a. It is expected that there is a relationship between classroom behavior ratings and vocabulary knowledge outcomes. Further, high BESS ratings indicating behavioral risk negatively correlate with vocabulary knowledge outcomes and vice versa.
2. How does classroom behavior affect the vocabulary knowledge outcomes across intervention, control, and reference groups?
    a. It is expected that there are differences between groups. While all students are expected to demonstrate vocabulary knowledge increases across measures, intervention students are expected to demonstrate the best vocabulary knowledge performance on the experimenter-developed measures. Further, control and intervention students are expected to have higher behavior ratings than reference peers.
3. What is the impact of behavior ratings by setting, whole-class or small group, on vocabulary knowledge outcomes?
    a. It is expected that there is a main effect for both whole-class (IV) and small group behavior ratings (IV) that create differences in a linear combination of vocabulary knowledge outcomes (DV). Specifically, it is expected that students in the "Normal" risk group perform better (higher scores than the Elevated and Extremely elevated group) on the vocabulary knowledge measures across whole-class and small group

settings, while students in the “Extremely Elevated” risk group perform worse (lower scores than Normal and Elevated groups) across whole-class and small group settings.

CHAPTER 3

FINDINGS

To best answer the questions of this study, a data screening process was first employed in the data analysis. First, when examining individual participants, there were 1157 kindergarten students assigned to groups in this study. The data were checked for accuracy, normality and outliers, and missing values using SPSS 22. Students with missing data (individual measures) missing at either pre- or post-test were excluded from the analyses specific to the missing measure; participants with partial data were utilized in all applicable analyses. Students were fully excluded from analyses if they moved (n = 24) or were exited from participation due to educational limitations (n = 1), resulting in a total of 1132 students included for analyses. Assumptions for normality, linearity, and homogeneity of variance were examined to ensure that all assumptions were met to perform the statistical tests. The Target Expressive Pre-test data was found to be right-skewed and kurtotic; therefore, individual scores more than 3.29 standard deviations above the mean (above 7.8) were transformed to one half point higher than the highest value before the cutoff (Tabachnick & Fiddell, 2013). That is, values above 7 were transformed to 7.5. Once transformed, the data met assumptions of normality.

The Repeated-Measures Multivariate Analysis of Variance (RM-MANOVA) and Multivariate Analysis of Variance (MANOVA) both violated assumptions; therefore, the more robust Pillai's trace was used to determine multivariate

significance. Additionally, the descriptive statistics were examined using means and standard deviations. Correlational analyses were then run to examine the associations between all variables to address research question 1. Research questions two and three were tested by RM-MANOVA and MANOVA, respectively, and post hoc Tukey HSD analyses for MANOVA values that were statistically significant. All of the analyses were conducted using SPSS 22.

Relationship Between Student Behavior and Vocabulary Knowledge Outcomes

The first research question about the strength and direction of a relationship between student behavior (as measured by the teacher BESS rating form) and vocabulary knowledge outcomes (as measured by the Target Receptive, Target Expressive, PPVT, and EVT) was investigated using Pearson product-moment correlation coefficient. As outlined in Table 2, there was a weak, negative correlation between the behavior rating variable and all vocabulary knowledge outcome variables; the Target Receptive is most correlated with behavior ($r = -0.180$, $p<0.001$). Thus,

Table 2.
Pearson Correlation Coefficients for Student Behavior and the Dependent Vocabulary Knowledge Measures

Measures	1	2	3	4	5
1. BESS Teacher					
2. Target Receptive	-0.180*				
3. Target Expressive	-0.144*	0.567*			
4. PPVT-4	-0.141*	0.312*	0.175*		
5. EVT-2	-0.105*	0.295*	0.258*	0.666*	

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

hypothesis 1's expected relationship between student behavior and vocabulary knowledge outcomes is confirmed, where increased classroom behavioral risk is associated with lower vocabulary knowledge outcomes, however, only weakly.

Student Behavior and Vocabulary Knowledge Outcomes By Group

To explore how behavior rating differences affect vocabulary knowledge across student groups, a two-way RM-MANOVA was performed along with Tukey's post-hoc tests to identify main effects; all pre- and post-testing (Time 1 and Time 2, respectively) vocabulary knowledge outcome measures were entered simultaneously as dependent variables along with classroom behavior and group designation as independent variables. Partial eta squared (η^2) statistics are reported to provide an estimate of effect size.

The RM-MANOVA revealed a significant multivariate between-subjects main effect for group, and behavior, but not the group by behavior interaction, on the combined dependent variables (Table 3). That is, group membership (Intervention, Control, Reference) affects vocabulary knowledge outcomes independently, as do classroom behavior risk groupings (Normal, Elevated, Extremely Elevated), but their combined effects do not have a significant effect on vocabulary outcomes.

There is a statistically significant difference between intervention, control, and reference groups on the dependent variables that produced a small effect, Pillai's Trace = .525; $F(8, 1042) = 46.39$, $p < 0.001$; $\eta^2 = .263$. When the results for the dependent variables were considered separately, there were statistically significant differences between groups for all four vocabulary knowledge variables (Table 4).

Table 3.
Summary of RM-MANOVA Results of Group and Behavior Ratings for the Vocabulary Knowledge Outcome Variables

	Effect	Pillai's Trace	*F*	*df*	*p*	η^2
Between	Group	.53	46.39*	(8, 1042)	<.001	.26
Subjects	Behavior	.03	2.20	(8, 1042)	.025	.017
	Group * Behavior	.03	.93	(16, 2092)	.53	.007
Within	Time	.68	273.11*	(4, 520)	<.001	.68
Subjects	Time * Group	.22	15.74*	(8, 1042)	<.001	.11
	Time * Behavior	.03	1.88	(8, 1042)	.06	.014
	Time * Group * Behavior	.03	1.10	(16, 2092)	.34	.008

*p<0.01.

Given the significant overall MANOVA findings and the significant follow-up ANOVA findings for each of the dependent variables, the univariate between-group effects were examined. Pairwise mean score examination for significant differences on the Target Receptive measure revealed that the Intervention and Reference groups performed similarly, both better, about two more correct answers, than the Control group, $F(2, 522) = 34.1$, $p < .001$, $\eta^2 = .115$; however the effect was very small. The mean score differences were significant, but had a very small effect on the Target Expressive measure, identifying differences between all groups; the Intervention group performed best while Control group was worst. Pairwise examination revealed that the Intervention group scores were about six points higher than the Control group and two points higher than Reference; the Reference group scores were also about three points higher than the Control, $F(2, 522) = 28.78$, $p < .001$, $\eta^2 = .099$. The PPVT indicated significant differences and a moderate effect; pairwise comparisons revealed

Table 4.
Summary of ANOVA Results by Group for Each Dependent Variable.

	Intervention	Control	Reference	ANOVA Results		
Variable	*M (SE)*	*M* (*SE)*	*M (SE)*	*F (2, 522)*	*p*	η^2
Target Receptive	8.9 (.16)	6.9 (.18)	8.8 (.23)	34.1	<.001*	.115
Target Expressive	9.5 (.45)	4.3 (.51)	7.1 (.63)	28.78	<.001*	.099
PPVT-4	87.9 (.48)	88.2 (.54)	100.8 (.68)	138.9	<.001*	.347
EVT-2	92.8 (.73)	92.6 (.82)	101.6 (1.0)	30.2	<.001*	.104

**p<.001.*

that the Reference group performed far better, nearly thirteen points higher, than both the Control and Intervention groups, $F(2, 522) = 138.9$, $p < .001$, $\eta^2 = .347$. Finally, mean scores on the EVT were significantly different, but had a very small effect, indicating that the Reference group performed the best, while Intervention and Control groups performed similarly below that; pairwise comparisons demonstrated that the Reference was approximately nine points higher than the Intervention group and nearly ten points higher than the Control group, $F(2, 522) = 30.2$, $p < .001$, $\eta^2 = .104$.

There is also a significant difference between behavior ratings on the dependent variables, but negligible effect sizes found, Pillai's Trace = .033; F(8, 1042) = 2.2, p=.025; $\eta^2 = .017$. Statistically significant differences were found between behavior risk ratings for only the Target Receptive measure. Pairwise comparisons revealed that students rated in both the Normal Risk and Elevated Risk categories performed one point higher than the Extremely Elevated Risk students on the Target Receptive measure, F(2, 522) = 7.746, p<.001, $\eta^2 = .029$ (Table 5). Therefore, hypothesis two was partially confirmed; between group differences were found

Table 5.
Summary of ANOVA Results by Behavior for Each Dependent Variable.

	Normal Risk		Elevated Risk		Extremely Elevated Risk		ANOVA Results		
Variable	*M*	*SE*	*M*	*SE*	*M*	*SE*	*F (2, 522)*	*p*	η^2
Target Receptive	8.7	.11	8.5	.17	7.6	.27	7.75*	<.001	.03
Target Expressive	7.8	.29	7.3	.45	5.7	.75	3.42	.03	.01
PPVT-4	93.1	.91	92.9	.49	90.9	.81	3.01	.05	.01
EVT-2	97	.47	96.1	.73	93.9	1.21	2.91	.06	.01

**p<.001.*

between intervention, control, and reference groups on vocabulary knowledge measures and within-group differences were found across vocabulary knowledge variables from Time 1 to Time 2. Behavioral risk ratings were also found to have significant differences among Normal, Elevated, and Extremely Elevated risk groups. However, the impact of the interaction of group and behavior was not statistically significant, so that portion of hypothesis two cannot be supported.

Additionally, there is a statistically significant, but very small multivariate effect across the within-subjects interaction of group and time point (Table 3), Pillai's Trace = .22; $F(8, 1042) = 15.744$, $p < 0.001$; $\eta^2 = .108$. As evidenced by Table 6, vocabulary knowledge scores, regardless of group, significantly improved for all four vocabulary measures at Time 2 when compared to their baseline (Time 1), suggesting an improvement in overall vocabulary knowledge (PPVT, $F(1, 523) = 67.69$, $p < .001$; EVT, $F(1, 523) = 81.65$, $p < .001$; Target Receptive, $F(1, 523) = 1047.69$, $p < .001$; Target Expressive, $F(1, 523) = 409.52$, $p < .001$). Scores on both standardized

Table 6.
Summary of Within-Subjects ANOVA Results by Time for Each Dependent Variable.

	Time 1	Time 2	ANOVA Results		
Variable	M (SE)	M (SE)	*F (1, 523)*	*p*	η^2
Target Receptive	5.0 (.11)	11.7 (.18)	1047.7*	<.001	.67
Target Expressive	1.2 (.10)	12.7 (.58)	410.4*	<.001	.44
PPVT-4	90.3 (.25)	94.2 (.52)	67.7*	<.001	.12
EVT-2	93.6 (.54)	97.7 (.55)	81.7*	<.001	.14

*p<.001.

measures, the PPVT and EVT, improved by an average of nearly four points at Time 2. Scores on the target word measures, which are more sensitive to changes in knowledge, showed even higher levels of improvement; the Target Receptive scores improved by an average of seven points at Time 2 while Target Expressive scores improved by an average of eleven points.

The univariate group by time within-subjects interaction effects were also examined and found to be significant for three of the four vocabulary knowledge variables: PPVT (Figure 1), Target Receptive (Figure 2), and Target Expressive (Figure 3). The differences on the EVT were not significant (Figure 4). This suggests a number of differences in improvement scores according to PPVT, Target Receptive, and Target Expressive when examined within Intervention, Control, and Reference groups. It would appear that there is greater improvement in PPVT scores across time for Intervention and Control groups than Reference, $F(2, 522) = 10.73$, $p < .001$; although there is generally lower performance for Intervention and Control groups overall. Improvements in both Target Receptive, $F(2, 522) = 37.59$, $p < .001$, and Expressive, $F(2, 522) = 39.87$, $p < .001$, scores for the Intervention group are better

than both Reference and Control groups, where Intervention gains the most and Reference makes larger gains than Control on both measures. There was no interaction between time and group for the EVT, $F(2, 522) = 1.47$, $p = .231$.

Figure 1.
Univariate Within-Subjects Vocabulary Outcomes on PPVT by Time

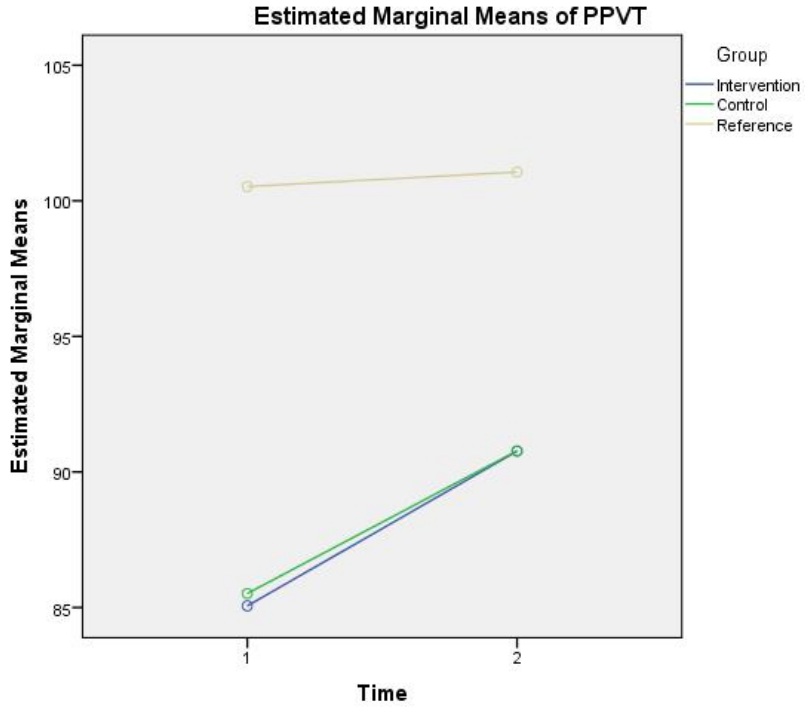


Figure 2.
Univariate Within-Subjects Vocabulary Outcomes on Target Receptive by Time

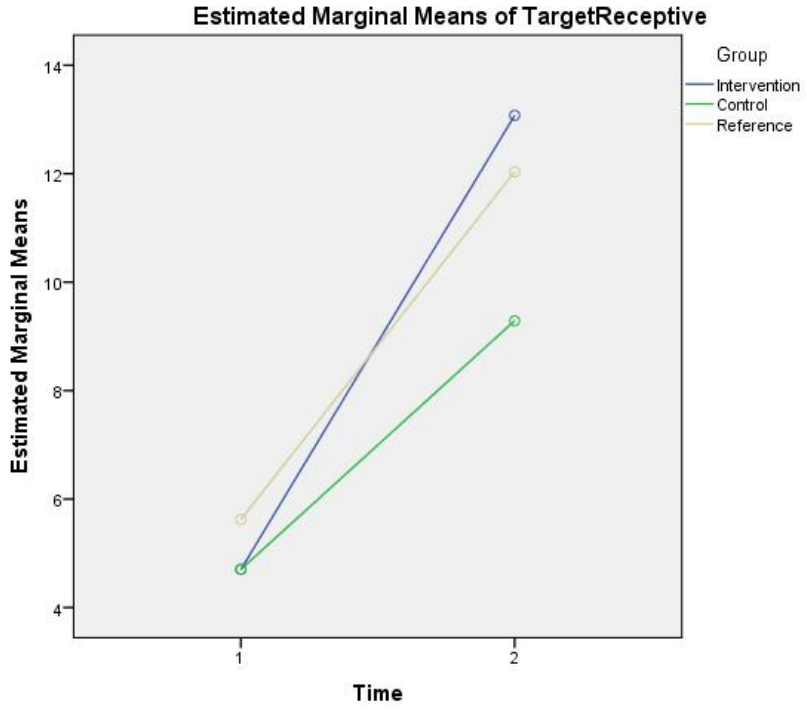


Figure 3.
Univariate Within-Subjects Vocabulary Outcomes on Target Expressive by Time

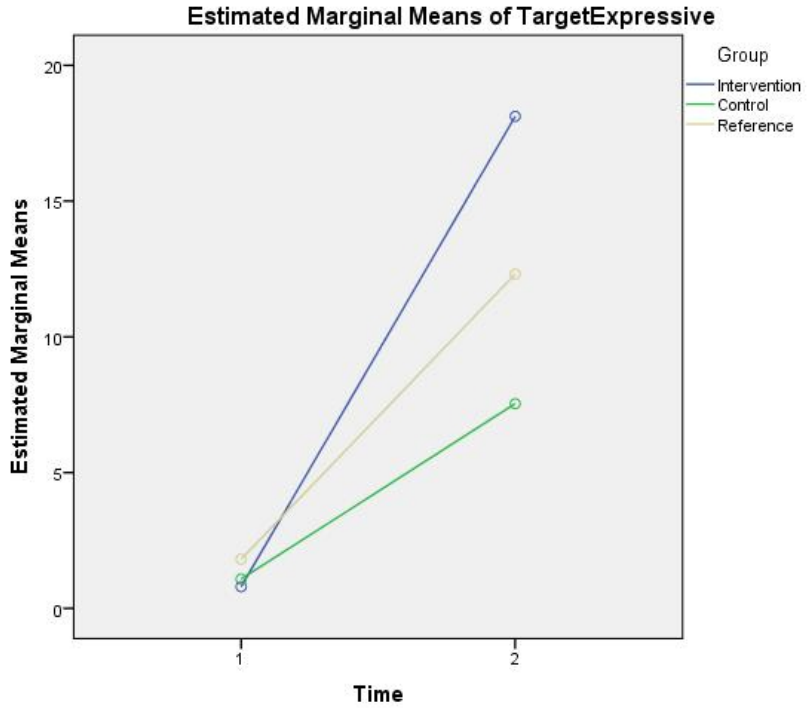
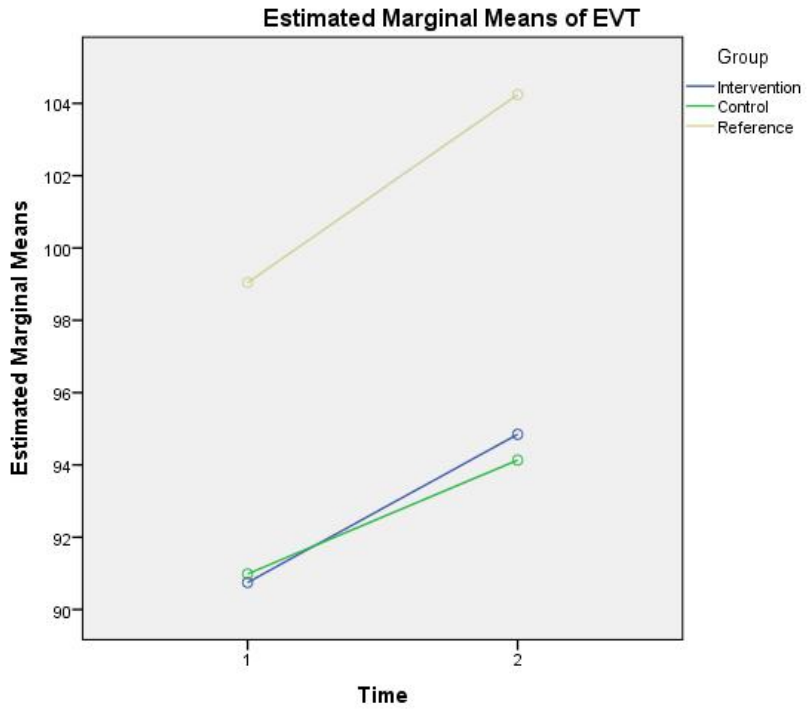


Figure 4.
Univariate Within-Subjects Vocabulary Outcomes on EVT by Time



Intervention Students' Behavior By Setting and Vocabulary Knowledge Outcomes

To examine the effect of student behavior ratings by setting, whole-class and small group (Normal, Elevated, Extremely Elevated ratings within each setting), on vocabulary knowledge outcomes, a three-by-three factorial MANOVA was run with only the intervention group. Partial eta squared (η^2) statistics are reported to provide an estimate of effect size.

The MANOVA revealed a significant multivariate between-subjects main effect for whole class behavior, Pillai's Trace = .054; F(8, 646) = 2.237, p=.023; η^2 = .027. However, neither small group behavior nor the whole-class by small group

interaction was significant on the combined dependent variables (Table 7). Meaning there were differences in the combined vocabulary knowledge outcomes based on whole class behavior ratings (Normal, Elevated, and Extremely Elevated); however, the contribution of only small group behavior ratings was not significant enough to influence outcomes, nor was the combination of whole-class and small group behavior ratings. Only whole-class behavior ratings appear to impact the overall vocabulary knowledge outcomes for the intervention students. Therefore, hypothesis three was partially confirmed; statistically significant between-group differences were found between whole-class behavior risk groups on vocabulary knowledge measures in the current study.

Table 7.
Summary of MANOVA Results of Whole-Class and Small Group Behavior

Setting	Pillai's Trace	*F*	*df*	*p*	η^2
Whole-Class Behavior	.054	2.24	(8, 646)	.023	.03
Small Group Behavior	.04	1.65	(8, 646)	.11	.02
Whole-Class*Small Group Interaction	.06	1.30	(16, 1300)	.19	.02

Given the significance of the overall test, the univariate between-group main effects were examined for the only significant contributor: whole-class behavior. When the results for the dependent variables were considered separately, there were statistically significant differences between whole-class behavior ratings for three of four vocabulary knowledge variables (Table 8); however, small effects were observed. Mean scores on the Target Receptive were significantly different, with pairwise

comparisons indicating that the Normal Risk students performed an average of one point higher than the Elevated Risk students and an average of two points higher than the Extremely Elevated Risk students, $F(2, 332) = 5.565$, $p=.004$, $\eta^2 = .033$. The Target Expressive scores indicated significant differences; specifically, the pairwise comparisons established that Normal Risk students performed, on average, nearly eight points higher than students in the Extremely Elevated Risk group, $F(2, 332) = 4.073$, $p = .018$, $\eta^2 = .024$. The PPVT indicated differences, $F(2, 332) = 3.727$, $p=.025$, $\eta^2 = .022$; pairwise comparisons demonstrating the Normal Risk group performed an average of four points higher than students in the Extremely Elevated Risk group. However, when examined pairwise, the differences were only trending significance (p=0.035).

Table 8.
Summary of ANOVA Results by Whole-Class Behavior for Each Dependent Variable.

	Normal	Elevated	Extremely Elevated	ANOVA Results		
Variable	*M (SE)*	*M (SE)*	*M (SE)*	*F (2, 332)*	*p*	η^2
Target Receptive	14.1 (.31)	12.9 (.32)	12.4 (.48)	5.57	<.004*	.033
Target Expressive	18.9 (1.6)	15.4 (1.7)	10.4 (2.6)	4.07	<.018*	.024
PPVT-4	92.8 (1.1)	91.3 (1.1)	87.4 (1.6)	3.73	<.025*	.022
EVT-2	95.3 (1.1)	93.3 (1.2)	92.1 (1.8)	1.45	<.237	.009

**p<.01.*

CHAPTER 4

DISCUSSION

The purpose of the present study was to investigate the impact of student behavior on vocabulary knowledge development across groups in kindergarten. Although differences in academic performance from classroom behaviors have been documented (Putnam, Horner, & Algozzine, 2006; Spira, Bracken & Fischel, 2005), research had not yet fully examined the effects of student behavior specifically on vocabulary knowledge outcomes in early academic years. Accordingly, the primary objective was to examine whether students who are determined to be at risk for delayed vocabulary development have significant differences on behavior ratings and vocabulary growth from their typically achieving peers.

Student Behavior and Vocabulary Knowledge Outcomes By Group

Ultimately, significant effects were found across groups of students and their behavior on vocabulary knowledge outcomes. A weak, negative correlation between behavior and the vocabulary knowledge outcome measures was established, similar to multiple empirical findings (Hamre & Pianta, 2001; Gutman et al., 2003; Nelson et al., 2004, Finn et al., 1995; Maguin & Loeber, `996; McEvoy & Welker, 2000), which also suggest increased behavioral problems negatively relate to and are reciprocal with academic performance. These findings support evidence outlining the negative impact high-risk behavior has on academics (McLeod & Kaiser, 2004; Sektnan et al., 2010; Clark, Pritchard, & Woodward, 2010) and the small effect sizes are acceptable when

considering the myriad influences and contributions toward academic success that might overpower any effects of classroom behavior. Such significant influences on later academic achievement include socioeconomic status, including more distal poverty effects and environmental influences, as well as parenting styles, for example (Burchinal et al., 2011; Burchinal et al., 2010; Sepanski et al., 2010; Brooks-Gunn & Markman, 2005; Goldstein et al., 2005). So, behavior has a definite role to play related to academic outcomes, but can appear to create minor influences, if any, within the larger context of a child's development toward academic success.

Further, the RM-MANOVA showed a significant multivariate between-subjects main effect for group and for behavior, but not for the group by behavior interaction. In other words, group assignment (Intervention, Control, Reference) affects vocabulary knowledge outcomes independently, as do classroom behavioral risk ratings. However, when considered together, group and classroom behavior do not have a combined significant effect on vocabulary outcomes. Overall, students in the Intervention group performed better than the Control group on most vocabulary knowledge measures, often fairing comparably to the Reference students. For the target word knowledge measures that specifically measured words taught in the vocabulary curriculum and small group instruction, the Intervention students performed the best by gaining the most knowledge by the end of the program. For instance, mean score examination for significant differences on the Target Receptive measure revealed that the Intervention and Reference groups performed similarly, both better than the control group. The Intervention group performed best, correctly providing definitions to more items than the other groups, while Control group was

worst on the Target Expressive measure. Further, the significant differences between behavior ratings on the dependent variables directly compliments and supports current empirical evidence (McClelland et al., 2007; von Suchodoletz & Gunzenhauzer, 2013; Wanless et al., 2011); behavior regulation abilities in the classroom significantly impact the level and growth in emergent academic skills, like vocabulary knowledge, in this study.

There were within-subjects factors that were significant in the current study. As expected, all vocabulary knowledge scores, regardless of group, significantly improved following completion of the program at the end of the school year (Time 2) when compared to their baseline (Time 1), suggesting an improvement in overall vocabulary knowledge. While the current study cannot claim that improvements on the standardized measures, PPVT-4 and EVT-2, are directly related to the methods, the target word measures better outline the impact of improvements in knowledge (NICHD, 2000). Scores on both standardized measures improved by nearly four standard score points at Time 2. Scores on the target word measures, which are more sensitive to changes in word knowledge, showed even higher levels of improvement; both the Target Receptive and Target Expressive scores improved by large margins. The univariate group by time within-subjects interaction effects were also found to have greater improvement in scores across time for Intervention and Control groups than Reference. The Intervention group gained the most and Reference made larger gains than Control on both Target Receptive and Target Expressive measures.

Intervention Students' Behavior and Vocabulary Knowledge Outcomes By Setting

The secondary research objective was to compare student behavior by setting, whole-class or small group, to examine the differences in impact on vocabulary outcomes. Because it was predicted that behavior in both whole-class and small group settings would be different across risk groups, the intervention group was examined, as they were the only group to receive instruction in both whole-class and small group formats. In contrast with existing findings supporting the academic benefit of small group instruction for students as well as their behavior regulation (Polloway et al., 1986; Vaughn, et al., 2001; Hertz-Lazarowitz et al., 1980), the current study revealed non-significant results. Maguin and Loeber (1996) specifically established how academic interventions reduced negative behaviors; however, that finding was not replicated in the current study. This study did establish whole-class behavior rating differences in vocabulary knowledge outcomes for intervention students; however, small group behavior ratings were not significant, nor were the combination of whole-class and small group behavior. In other words, whole-class behavior has a small impact on intervention student outcomes, while small group behavior, as well as the combination of whole-class and small group, do not.

Effectiveness of Supplemental Instruction

The results of this study showed that, overall, despite a correlation, classroom behavior did not directly affect vocabulary learning, as evidenced by vocabulary knowledge outcome measures. The results, however, do support that small group instruction appears to enhance the vocabulary knowledge of students initially

identified with low vocabulary skills in addition to potential struggles with appropriate classroom behaviors, like the intervention students. These findings are in the context of classrooms in which students were already receiving high-quality whole-class read aloud instruction that incorporated direct and explicit vocabulary and comprehension instruction. In other words, the small-group intervention effect on increased vocabulary knowledge was an added value above and beyond the benefit of the whole-class instruction alone.

Such findings are similar to a previous study by Loftus et al. (2010), which found that at-risk students made greater gains in word knowledge on target words when they received supplemental instruction as compared to only whole-class instruction. Further, the at-risk students receiving supplemental instruction demonstrated gains that approached those of their peers receiving just whole-class instruction. This finding was replicated in the current study, where students in the Intervention group performed as well if not better than their Reference group peers. Despite having moderate instructional time, the small group intervention was designed with a high level of instructional intensity (e.g.: scaffolded responses and immediate feedback to students) with a strategic focus on vocabulary and a systematic progression of skills and content across the intervention. This resulted in large word-knowledge gains made by students receiving the supplemental instruction, which suggests the intervention may provide critical knowledge increases of target words to the students who began with lower vocabulary knowledge. The positive effects of the intervention on target word learning in this study are consistent with previous research findings that direct vocabulary instruction can lead to gains in target vocabulary

knowledge as early as kindergarten (Beck & McKeown, 2007; Coyne et al., 2007; Ewers & Brownson, 1999). The students in the current study began the intervention with no appreciable target word knowledge. Following the completion of the intervention, however, students demonstrated knowledge of target words, both receptively and expressively.

Study Limitations

The results of this study have limited generalizability; students were not selected to be representative of the entire United States, nor were they selected to be representative of the states in which they are located. Differences by gender, language status, or race/ethnicity are not examined in the current study and may also limit the generalizability of the findings; the RM-MANOVA and MANOVA results of the current study can only generalize to the populations from which we randomly sampled: kindergarten students enrolled in school.

Further, sample size was large, but when broken into comparison groups, the samples were unequal; therefore larger sample sizes are needed to provide clear further support for the reported results. Thus, the present study may be seen as a pilot study that can stimulate a discussion on the research questions raised, and additional data is needed to shed further light on the issue. Perhaps more equal samples would be acquired after combining the data for multiple kindergarten cohorts within the larger Project Early Vocabulary Intervention study.

Additionally, the effect sizes for some significant results were very small; thus, likely barely greater than chance on most of my comparisons. This limits the significant findings that were found in the current study, especially related to the

univariate findings on individual vocabulary knowledge measures. Potential contributors to the resulting small effect sizes were the variable comparisons themselves. Methodologically, according to Tabachnick & Fidell (2013), MANOVA works best with highly negatively correlated DVs and is less attractive when correlations among DVs are very highly positive or near zero. Our DVs were moderately positively correlated in pairs (PPVT & EVT; Target Receptive & Target Expressive), which is also notably acceptable, but less ideal. Further, using repeated measures MANOVA method has its own limitations. Excluding cases with any missing data significantly limits the overall sample size, so there is a potential sample bias (Gueorguiva & Krystal, 2004). Plus there were violations of assumptions of MANOVAs in the current study, so adjustments in methodology should be made for future comparisons of similar combinations of variables.

Another limitation to the current study involves existing differences in inherent learning skills among students. Students' prior levels of word knowledge or other confounding variables may not be equivalent, but is somewhat accounted for in the repeated measures design. However, this pre-existing knowledge of specific words or their context may positively skew target expressive and receptive vocabulary knowledge outcomes for some students, especially if they have better-developed skills for acquiring new terms and using them more regularly.

Additionally, there may be environmental influences both in the classroom and in the small group interventions that are differentially effective across groups due to variables other than student behavior. Children in the different groups may receive instruction from teachers or interventionists with different levels of teaching

experience implementing whole-class or small group vocabulary intervention. Their tendency to recognize and style of managing student behavior may also be different from other individuals working with the students. The students who will work with teachers or interventionists with more experience or better abilities to manage behavior may make more gains, despite specific implementation training provided.

Finally, the measure of behavior, the BESS, itself is a limitation. This measure was utilized in the current study as a one-time behavior rating for each student from both teacher and interventionist upon completion of the entire vocabulary program. This measure does not allow for measuring changes in behavior from the beginning of a program to the end. Further, the BESS is likely not sensitive enough to differentiate subtle behavior differences seen across lesson settings, in this study the classroom and small group environment. Finally, this measure of behavior is likely also limited by teacher perceptions of and memory of student behaviors exhibited during the lesson. Some argue that standardized measures tend to limit the scope of behavioral information gathered by restricting the focus of those providing the data (Epstein, et al., 2004). Because the measure is a standardized rating scale and not as qualitatively oriented, it may again contribute to difficulty differentiating subtle differences observed for each student's behavior across the two settings.

Implications For Future Research

Future studies should examine the influence of student behavior by utilizing multiple measures of behavior throughout the implementation of the research program. Perhaps more frequent ratings of behavior throughout the program would provide a more accurate rating of student behavior for each setting observed. Further,

consideration for using a combination of rating scales and direct observation data from a third party may create an optimal composite of student behavior.

It would also be interesting to consider additional influences on specific vocabulary as well as more general academic outcomes, such as gender or ELL status, beyond the potential influence of classroom behavior. It has been well established empirically that the "ELL" label is associated with decreased vocabulary knowledge on standardized measures, as well as students who then require more instructional supports and may not respond similarly to instruction as their English-only peers (August, et al., 2005). Therefore, ELL students are at increased risk for delayed vocabulary development as well as lower performance on both vocabulary measures. Additionally, it has been established that gender differences exist in both behavior regulation (Ponitz et al., 2008; Ready et al., 2005) and early vocabulary and literacy achievement (Coley, 2001; Gambell & Hunter, 1999; Lummis & Stevenson, 1990; Ready et al., 2005).

Future studies should also consider more longitudinal follow-up beyond the year of the intervention to examine whether vocabulary knowledge increases and literacy knowledge were maintained through subsequent years of school. A one-time examination of vocabulary knowledge outcomes is helpful in establishing increases in knowledge following a specific program; however, it is important to also consider the long-term implications of such knowledge gains, especially for populations that are determined to be at-risk for later academic difficulty. Therefore, longitudinal follow-up would better identify the impact of early vocabulary intervention on later reading and literacy performance.

Finally, this study's findings begin to suggest this vocabulary intervention format is an effective way to supplement instruction with at-risk student populations without taxing the classroom teacher. The current study confirms the utility of an early vocabulary intervention initially established in previous studies (Loftus et al., 2010); however, a comparison between teacher-administered and trained lay-person-administered interventions has not been explored. Future studies that could potentially replicate such positive results with highly-trained, non-teacher staff would establish feasible means for delivering high-quality supplemental instruction to students without over-taxing both school financial and personnel resources.

Summary

The main goal of this study was to identify the impact of student behavior on their academic performance. It was found, however, that behavior had no impact when considering vocabulary knowledge increases across different groups of students within the course of an academic program. Further, behavior held little impact when individual comparisons of academic outcomes were considered. The minimal significance of behavior related to academic performance is important to note; this study addresses the potential lack of impact that behavior can have on academic outcomes, in spite of evidence indicating otherwise. Therefore, the findings from this study can be used to fuel future consideration of the impact of behavior on student outcomes.

APPENDICES

Appendix A: Consent Form

Passive Consent Form for Participation in a Research Project
University of Rhode Island

Principal Investigator: Dr. Susan M. Loftus

Study Title: Project EVI: Early Vocabulary Intervention

Your child is invited to participate in a kindergarten research study to help develop vocabulary and reading skills. Your child is invited to take part because your child's kindergarten class is participating in the project. The purpose of this project is to develop ways to help children increase vocabulary knowledge through listening to and talking about stories.

If you agree to participate, your child will be asked to take short language and literacy tests at the beginning and end of the project that will take approximately 30 minutes. Following the tests, your child may be placed in a group of two to four students to take part in reading activities. These activities will include listening to stories and talking about vocabulary words found in the stories. Activities will take place for 20 minutes per day, four days per week throughout the school year. Your child may also be randomly selected to take short language and literacy tests at the beginning and end of first and second grades.

We will try to keep classroom disruptions to a minimum. For example, all tests and reading activities will be scheduled at times so that your child will not miss the introduction of new material or special class activities. Benefits of participating in this project may include increased vocabulary knowledge and comprehension. There are no known risks to participating in this project.

Any information collected during this project that could identify your child will be kept confidential. Meaning, nobody outside of the project will be given information that could identify your child. The information will be stored in a locked cabinet, kept in the offices of Dr. Loftus at the University of Rhode Island, and will be available only to project staff. All information that could identify your child will be kept for three years and then destroyed. The information collected in this project may be shared with school administrators, published in professional journals or presented at professional conferences but no information that could identify your child will be included.

Your child does not have to be in this study if you do not want them to be. If you agree to have your child take part in the study, but later change your mind, you may drop out at any time. No one will be mad and your child will not suffer in any way if you decide that you do not want your child to participate. We will also

ask your child's permission to participate. Only if both you and your child give permission will your child be included in the study.

We will be happy to answer any question you have about this study. If you have further questions about this project, or you are not happy with the way this study is performed, you may contact the principal investigator Susan Loftus at 401-874-4246. If you have any questions about your child's rights as a research subject, you may contact the Office of the Vice President for Research, 70 Lower College Road, Suite 2, University of Rhode Island, Kingston, Rhode Island, telephone: (401) 874-4328.

At this time, if you do **NOT** want your child to participate in this study, please sign and have your child return this form to school at your earliest convenience.

Consent Form for Participation in a Research Project
University of Rhode Island

Principal Investigator: Dr. Susan M. Loftus

Study Title: Project EVI: Early Vocabulary Intervention

Authorization:

I am the parent or legal guardian of _____. I do **NOT** wish for my child to participate in the study.

_____
Signature/Date

_____
Printed Name

Appendix B: Measure of Target Word Knowledge

Early Vocabulary Intervention

EXPRESSIVE TARGET WORDS

Name _____ Sex: ❑F ❑M

School _____

Teacher _____

Examiner _____ Date

_____

DIRECTIONS:

I'm going to ask you about some words and I want you to tell me what they mean.
So if I said, "Tell me what the word cat means," you could say, "A cat is a furry animal that says meow."

Now you try: Tell me what the word dog means.

Question	**Response (verbatim)**
1. Tell me what the word fleet means.	
2. *Tell me what the word glimmer means.*	
3. *Tell me what the word drenched means.*	
4. *Tell me what the word peculiar means.*	
5. *Tell me what the word*	

timid means.	

6. *Tell me what the word stumble means.*	
7. *Tell me what the word collide means.*	
8. *Tell me what the word narrow means.*	
9. *Tell me what the word active means.*	
10. *Tell me what the word ancient means.*	
11. *Tell me what the word mischievous means.*	
12. *Tell me what the word desire means.*	

13. *Tell me what the word option means.*	
14. *Tell me what the word request means.*	
15. *Tell me what the word nestle means.*	
16. *Tell me what the word perilous means.*	
17. *Tell me what the word enormous means.*	
18. *Tell me what the word startle means.*	
19. *Tell me what the word slumber means.*	

20. *Tell me what the word stalk means.*	
21. *Tell me what the word scraggly means.*	
22. *Tell me what the word prod means.*	
23. *Tell me what the word gather means.*	
24. *Tell me what the word hatch means.*	
25. *Tell me what the word beacon means.*	
26. *Tell me what the word labor means.*	

Appendix C: Receptive Picture Vocabulary Measures of Target Words

Receptive Target Word Measure

SAY: Now I'm going to show you some pictures. I want to you point to the picture that shows the word I say.

Question	Response	
Point to the picture that shows narrow. (show stimulus sheet 1)	1	**narrow**
	3	4
Point to the picture that shows gather. (show stimulus sheet 2)	1	2
	3	**gather**
Point to active. (show stimulus sheet 3)	1	**active**
	3	4
Point to enormous. (show stimulus sheet 4)	1	2
	3	**enormous**
Point to stalk. (show stimulus sheet 5)	**stalk**	2
	3	4
Point to fleet. (show stimulus sheet 6)	**fleet**	2
	3	4
Point to peculiar. (show stimulus sheet 7)	**peculiar**	2
	3	4
Point to startle. (show stimulus sheet 8)	1	2
	3	**Startle**

Point to perilous. (show stimulus sheet 9)	1	2
	3	**perilous**
Point to prod. (show stimulus sheet 10)	1	**prod**
	3	4
Point to slumber. (show stimulus sheet 11)	1	2
	slumber	4
Point to nestle. (show stimulus sheet 12)	1	2
	3	**nestle**
Point to scraggly. (show stimulus sheet 13)	1	2
	3	**scraggly**
Point to stumble. (show stimulus sheet 14)	1	2
	stumble	4
Point to ancient. (show stimulus sheet 15)	1	2
	3	**ancient**
Point to drenched. (show stimulus sheet 16)	1	2
	drenched	4

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