POSITIVE BEHAVIOR INTERVENTIONS AND SUPPORTS IN A THIRD GRADE CLASSROOM AND THEIR EFFECT ON MATHEMATICS ACHIEVEMENT

By

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Abstract

Acting-out behaviors are a deterrent learning in schools across the country. This research review examines a multitude of research performed regarding the effects PBIS interventions have on school climate and mathematics achievement in third grade classrooms. Findings suggest strong evidence supporting Social Stories™, functional behavior assessments and behavioral intervention plans as playing an important role in the creation of positive school environments and promoting positive gains amongst third grade mathematics students. By using positive behavior interventions and supports (PBIS), school administrators are able to create a safe and positive learning environment for third grade students, leading to positive academic gains in mathematics. Further research is necessary to determine the effectiveness of PBIS amongst various school demographics.

Key Words: Positive behaviors interventions and supports, Student engagement, Academic achievement, Social Stories™, Elementary students, Positive school climate, Behavioral intervention plan, Functional behavior assessment
Chapter I: Introduction

Statement of the Problem

The major problem examined in this study is whether a school-wide implementation of positive behavior interventions and supports (PBIS) create a better school climate leading to higher mathematics achievement in third grade classrooms. Although schools throughout the country are being encouraged to implement PBIS as a way to improve the behavioral climate, safety, academic achievement, and social culture, research is still needed to determine if these changes will result in a valued academic change (Horner, Todd, Lewis-Palmer, Irvin, Sugai, & Boland, 2004). Handling disciplinary procedure can take up a substantial amount of instructional time from teachers and evaluation time from administrators. Students in poorly managed classrooms receive less academic instruction and are more likely to have long-term negative academic, behavioral, and social outcomes than students who are in well-managed classrooms (Reinke, Herman, & Stormont, 2012).

Additionally, school safety is an important aspect of school climate. Youth violence has been rising drastically in the last few years and school personnel hold problem behavior as a high priority (McIntosh, Campbell, Carter, & Zumbo, 2009). A valid and reliable measurement of behavior is a necessity for schools in identifying students for additional intervention and obtaining school-wide support.

Research Question

What SW-PBIS interventions, if any, have been successful to increase climate in a third grade classroom and achievement in mathematics?
Definition of Terms

The following terms pertain to the topic of school-wide positive behavior interventions and supports (SW-PBIS). This process positively affects academic achievement and school climate. Definitions retrieved from various research essays listed after each item promote further understanding of significant topics discussed later on.

**Elementary Students.** Students in grade levels K-6 (Pas & Bradshaw, 2012).

**Academic Achievement.** Extent to which a student, teacher, or institution has achieved their educational goals; often measured through grade point average and a wide range of achievement test scores (Rhode, & Thompson, 2006).

**Positive Behavior Interventions and Supports (PBIS).** Non-curricular universal prevention strategy that aims to alter the school environment by creating improved systems and procedures that promote positive change in staff and student behaviors (Bradshaw, Koth, Bevans, Ialongo, & Leaf, 2008).

**Positive School Climate.** The quality and character of social interactions at school as shaped by the norms (Klein, Cornell, & Konold, 2012).

**Behavioral Intervention Plan (BIP).** Individualized positive behavior intervention based on functional assessment data (Hagermoser-Sanetti, Luiselli, & Handler, 2007).

**Social Stories™.** Stories teachers write to help children successfully negotiate specific social situations frequently encountered by children (More, 2011).

**Functional Behavioral Assessment (FBA).** A variation of procedures to ascertain the purpose of reason for behaviors displayed by individuals with severe cognitive or communication disabilities (Killu, Weber, Derby, & Barretto, 2006).
**Student Engagement.** The student’s psychological investment in and effort directed toward learning, understanding, or mastering of knowledge, skills, or crafts that academic work is intended to promote (Newman, Wehlage, & Lamborn, 1992).
Chapter II: Review of Literature

PBIS contains multiple intervention strategies. Intervention use is dependent upon each child’s situation. Social Stories™ and behavioral intervention plans are two such interventions. Results from interventions can lead to positive gains in school climate, student behavior, student engagement, teacher burnout and self-efficacy, and mathematics achievement amongst third grade students.

Effective Interventions

Using Behavioral Plans to Promote Positive Behavior

The use of behavioral intervention plans occur when students are exhibiting negative behaviors. Handling behavioral issues effectively and properly is essential due to direct impact these issues have on academics. Provisions within the Individuals with Disabilities Education Act (IDEA), later renewed with the Individuals with Disabilities Education Improvement Act in 2004 (IDEIA), declare that when a student’s disability impedes his/her ability to learn, the individualized education program team must conduct a functional behavior assessment (FBA) (Appendix A). Upon completion of the FBA, the team must implement a behavior intervention plan (BIP) (Appendix B) (Cook, Mayer, Wright, Kraemer, Wallace, Dart, Colins, & Restori, 2012). These plans target a wide range of negative behaviors such as noncompliance, inappropriate verbalization, verbal outbursts, tantrums, leaving activities without permission, and other behaviors that put students at risk or negatively affect academic outcomes. Although advancements in behavioral technology such as online training with virtual clients to help identify and treat various ailments like depression, anxiety, personality disorders, etc., have allowed for improvements in student behavior, many limiting factors still exist in completed FBAs and BIPs. Lack of time and support, differences in philosophies toward discipline and
behavior management, and a lack of knowledge pertaining to assessments and intervention planning can interfere with effective development and implementation of BIPs (Killu, Weber, Derby, & Barretto, 2006).

Creation of a behavioral intervention plan has been a challenge to many educators. Multiple studies completed deal with not only the design and implementation of these plans, but also the impact the implementation had on student outcomes. The Office of Special Education Programs Technical Assistance Center on Positive Behavioral Interventions and Supports as well as the Center of Effective Collaboration and Practice, two organizations funded by the United States Department of Education’s Office of Special Programs (OSEP), developed a series of documents describing effective practices in FBA, BIPs, and PBS (Killu, Weber, Derby, & Barretto, 2006). The U.S. Department of Education reviewed the suggestions produced in terms of compliance with IDEA and determined the documents may serve as guidelines and standard practice in FBA and BIP development and implementation. In a study done with 49 of the 50 state education agencies responsible for the overseeing the design of BIPs, 73% of the states indicated the importance of completing an FBA prior to the development of a BIP (Killu, Weber, Derby, & Barretto, 2006). Using assessment to ensure a target behavior is vitally important in developing an effective BIP. After developing the BIP, oversight and follow-up must occur to ensure the best chance at positive change in student behavior and academic outcome.

By studying implementation results of BIPs, researchers and educators are effectively able to suggest best practices when dealing with challenging behavior problems. Studies done using a longitudinal design to obtain quantitative results provide insight on quality BIPs. Designing a quality BIP is the first step to successful implementation. Research shows a positive correlation exists between BIP quality and student outcomes can be suggested (Cook et al.,
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2012). Once a high quality BIP is in place, educators must use consistent verbal and graphic positive feedback to ensure the implemented plan has the best possible chance to succeed. Positive verbal and graphic feedback allows students to have increased appropriate behavior during targeted activities (Hagermoser-Sanetti, Luiselli, & Handler, 2007). Having a quality BIP developed accompanied with positive verbal and graphic praise is not enough to change undesirable behavior. Integrating the plan with integrity is the most important aspect of an affective BIP. Evidence-based quality of BIPs relate significantly and positively to the degree of which plans are implemented as intended (Cook et al., 2012).

Reports of findings relating to the development and quality implementation of BIPs are available. In 1972, the court in Mills v. Board of Education of the District of Columbia found students were being excluded from educational activities due to issues connected to negative behaviors. A result from the court’s decisions was the IDEA legislation, which is meant to strip schools of unilateral authority traditionally employed to exclude emotionally disturbed students from school. IDEA declares a functional behavioral assessment must be completed if (1) a child has a disability, (2) is removed from school for more than 10 school days due to behavior, (3) exhibits behavior that interferers with the learning environment, or (4) for misconduct that either is a manifestation of the child’s disability, not a manifestation of the child’s disability, or involves weapons, drugs, or serious bodily injury. A quality BIP will support these federal mandates. A longitudinal study done using 139 volunteer Positive Environments Network of Trainers (PENT) participants used the Behavioral Support Plan-Quality Evaluation Scoring Guide (BIP-QE) to determine a relationship between BIPs and student outcomes. This quantitative scoring rubric used a Likert-type scale to determine integrity of BIPs. Based upon this study, suggestions have been made pertaining to a strong relationship (p = .22) between
evidence-based BIPs and student outcomes pertaining to reductions in identified problematic behaviors, increases in generally positive behaviors, increases in appropriate replacement behaviors, and improved academic performance (Cook et al., 2012). Coupling BIPs with other evidence-based intervention strategies will open many doors for students having a hard time seeing past perceived limitations.

**Using Social Stories™ to Promote Positive Behavior**

Creating Social Stories™ is another intervention, identified by empirical research, to be effective. Social Stories™ result from teachers using data collected from FBAs to make data-driven decisions. Most often, this intervention accompanies students on the Autism spectrum to decrease distracting behaviors such as crying, crawling around the room, and screaming. Autistic children often display a weak theory of mind which relates to an inability to understand others have different thoughts, beliefs, and emotions as one’s own (Beh-Pajooh, Ahmadi, Shokoohi-Yekta, & Asgary, 2011; Reynhout & Carter, 2006; More, 2012). Effective Social Stories™ portray actual situations a child will encounter within a day. This intervention is a set of sentences and illustrations used to best create a situation. Figure 1 shows an example of a Social Story™ written for a student who has trouble keeping quiet when indoors. Although illustrations were not originally recommended due to being distractive or portraying an inaccurate interpretation of the situation, illustrations are now suggested as long as the drawing reflects consideration of the age and personal learning characteristics of the child (Reynhout & Carter, 2006).

Four basic sentence types exist in a Social Story™: descriptive (When people are inside, they walk.), directive (I will try to walk when inside.) (Figure 1), and perspective (Running inside could hurt me or other people.) (Reynhout & Carter, 2006; More, 2012). Stories must
describe the situation more so than direct behavior and contain specific positive reinforcement and behavioral responses. Instead of telling the student what not to do, display what the student should do. “I will use my quiet voice inside” as opposed to “Don’t yell when indoors”. The student should be included in the creation of the intervention. Two other types of sentences that can be included are control and cooperative sentences. To create control sentences, the student uses personal information to create personal strategies that are easy to recall in actual situations. The use of cooperative sentences identifies what others will do to assist the student. Once the story is developed, producing a book comes next. If a child has difficulty reading, stories can be audio recorded or videotaped, properly conforming to necessary needs of the student.

Figure 1. Quiet Voice Social Story™ Using Directive Sentences

**QUIET VOICE**

My teacher talks to the class. I am quiet.

I am quiet when I work.

I am quiet in the hall.

Friend can listen when I am quiet.

I can use a loud voice outside.
Implementation of Social Stories™ is a progression through multiple steps. Implementation of this intervention can occur with individual students or in small groups depending on the severity of the disability and common academic skills such as literacy. In a one-on-one situation with a literate student, the teacher begins by reading the story to the student, being sure pictures are clearly visible. Ensuring pictures are visible will obtain higher levels of student engagement and have resulted in positive short term results such as increased targeted social skills and response to verbal directions. Decreases in vocal tantrums, inappropriate social interaction, and anxiety levels have also been reported (Cullain, 2002; Lorimer, Simpson, Myles, & Ganz, 2002; Rogers & Myles, 2001; Swaggart, Gagnon, Bock, Earles, Quinn, Myles, et al., 1995; Thiemann & Goldstein, 2001). A teacher holding the student’s attention is essential. Several methods are effective to hold the attention of the child. Teachers can give clues that lead to the child guessing about the book, ask the child what they know about the topic, sing a song related to the book, relate through previous experience, or preview pictures before reading the story (More, 2012). Planned reading time must occur as closely to the expected social situation as possible. A great time to read a story involving proper ways of playing with classmates is right before recess. Multiple studies performed with an accumulation of 72 elementary students with autism portray support for performing the intervention right before the triggering event takes place. The experimental designs were single-subject studies using a percentage of non-overlapping data (PND) to obtain results. PND is the number of treatment points that exceed the highest baseline data point, divided by the total number of treatment data points and multiplied by 100. A PND between 91 and 100 indicates a highly affective intervention, between 71 and 90 moderately effective, between 51 and 10 mildly effective, and between 0 and 50 being ineffective (Reynhout and Carter, 2006). Reading Social Stories™ directly before the targeted
event was to happen showed a decrease in precursors to tantrum behavior during the intervention and received a PND of 95 (Kuttler, Myles, Carlson, 1998).

Allowing student access to the book will enable a sense of ownership to develop. Anytime a child is able to read the story again is an opportunity for the child to obtain new information. After several readings, the student should be able to retell stories to the teacher. Allowing a student to retell the story or share personal experiences relating to the story are vital in creating a set or norms for the child to live by. Allowing children to practice in a role-play situation will provide the involved parties an opportunity to practice the skill and become more comfortable before a real-world situation occurs (More, 2012). Immediate and specific positive feedback is vital when a child exhibits a desired behavior from one of the stories. If a child walks up to a group and asks to play, the teacher can tell the child what a great job they did asking to join the playgroup.

Using Social Stories™ as an intervention has shown a decrease in challenging behaviors such as loud screaming, humming, yelling, chair-tipping, inappropriate looking at members of the opposite gender and other distractive noises during class time. Robert, an eight-year old boy who had problems with yelling out and being unable to sit still during circle time, improved his behavior with Social Stories™. Robert ranged from 11-40 screams with an average of 21.5 screams during a 20-minute circle time with an average time of sitting quietly of 4.8 minutes prior to the intervention. Using a two-phase intervention system, which centered on Social Stories™, Robert’s screams decreased to a range of 1-19 with a mean of nine screams. The longest interval of sitting quiet was 21.5 minutes, with a range of 6.5 – 21.5 minutes. Upon the removal of the intervention, Robert continued to sit longer without causing distractions (Agosta, Graetz, Mastropieri, & Scruggs, 2004). Varieties of experimental studies performed on children
ranging in age from six to fifteen years old provide insight on effectiveness of Social Stories™. Results portrayed in a quantitative manner depict effectiveness of the intervention. Data are obtained by an inter-observer agreement calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. After performing observations and analysis of the Social Stories™ administered, 90% of participants showed significant improvement in behavior (Beh-Pajooh, Ahmadi, Shokoohi-Yekta, & Asgary, 2011; Agosta, Graetz, Mastropieri, & Scruggs, 2004; Kuttler, Myles, & Carlson, 1998; Scattone, Wilczynski, Edwards, Rabian, 2002). One participant determined to have not had a significant increase in behavior has a diagnosis of a more severe impairment in social interactions, language, and reading skills (Beh-Pajooh, Ahmadi, Shokoohi-Yekta, & Asgary, 2011). Social Stories™ were shown to decrease disruptive behaviors such as chair-tipping and inappropriate staring at members of the opposite sex with anywhere from 91% to 100% procedural reliability (Scattone, Wilczynski, Edwards, Rabian, 2002).

Teachers completed an intervention rating profile (IRP-15) as to determine social validity of the intervention. IRP-15 generates scores between 15 and 90 with scores above 52.5 showing acceptability of treatment. Data revealed an IRP-15 score of 72 for the first participant, 72 for the second participant and 78 for the third participant. All teachers reported approval of Social Stories™ as a sufficient intervention. Even though the study showed no positive effects on one of the pupils studied, the teacher indicated high acceptability for the intervention plan. Consistent results were evident amongst all of these studies suggesting the use of Social Stories™ is a promising intervention that is relatively straightforward and efficient to implement with application to a wide variety of behaviors (Reynhout & Carter, 2006). Enabling students to
possess effective social skills is a leading indicator of success in elementary school (More, 2011).

**Effects of School Climate on Emotion and Self-Efficacy of Staff**

School climate plays a vital role in the success of an educational institution. Schools must be welcoming environments people are excited to come to everyday. A huge aspect of positive school climate deals with the effectiveness of the discipline program in place. Teaching expected behaviors and rewarding positive outcomes is vital in creating a positive learning environment. Only five months into the implementation of PBIS at an elementary school in Illinois, team members reported perception of a decrease in the number of disruptive incidents they saw daily (Sinnott, 2009). Evidence mounts concerning the importance of school climate and healthy development of students. Negative school climate promotes high levels of mental/emotional exhaustion of teachers.

Emotional exhaustion occurs when teachers are physically and emotionally no longer able to provide effective instruction and mentoring for students due to overwhelming feelings of fatigue and stress (Grayson & Alvarez, 2007). Not only are students negatively affected by teacher mental exhaustion, the cost to the school can be substantial as well. Turnover rates can increase as well as teacher absenteeism, mental health and medical claims, deteriorating performance, and early retirement. Teachers who portray high levels of burn out show a reduced tolerance for problematic behaviors. A survey-based study showed a significant association between burnout and ratings of antisocial and oppositional student behaviors (Grayson & Alvarez, 2007). Thus, teachers experience higher degrees of stress and are less tolerant to challenging student behavior. Teacher negativity may exacerbate negative student behavior, which further strengthens the bi-directional aversive relationships between teachers and students.
Various PBIS methods such as posting clearly stated classroom rules and expectations, effective instruction, reinforcing student appropriate behavior, and responding to behavioral violations will effectively enable an educator to run a classroom with minimal limiting behaviors. Through observation and the use of the teacher version of the Maslach Burnout Inventory, researchers suggest teachers who report higher rates of positive than negative interactions experience less emotional burnout (Reinke, Herman, & Stormont, 2012). PBIS is a protective factor and an important positive asset in reducing student risk-taking behaviors that can cause teacher burnout. These findings align with the philosophy and goals of PBIS as a whole-school prevention strategy that aims to promote positive interactions between teachers and students (Klein, Cornell, & Konold, 2012).

**Examining Academic Effects**

**Determining PBIS Fidelity**

Troubling behavior has a profound negative impact on success in third grade mathematics. Not only are acting out behaviors causing distractions leading to class-wide disengagement, diminished time available for students to learn, teachers to teach and administrators to lead are all residual effects. Many administrators work to curtail negative behaviors by using the “get tough” method. Not only is this reactive strategy ineffective, those types of general approaches may actually exacerbate negative behaviors (Sherrod, Getch, & Ziomek-Daigle, 2009). Schools should be comprised of nurturing leaders who create a safe environment for learning. Disruptive and aggressive behaviors portrayed by students, especially at a young age, are associated with an increased risk for academic problems, placement in special education programs, school dropout, substance abuse problems, and antisocial behavior (Bradshaw, Waasdrop, & Leaf, 2012). The successful implementation of PBIS limits acting out
behaviors as well as teaches desired replacement behaviors. For the system to truly work as intended and provide an increase in student achievement through a decrease in behavior issues, implementation of the program must contain a high level of fidelity.

Determining PBIS fidelity can be effectively measured using a School-Wide Evaluation Tool (SET). The SET is an objective, research-validated instrument. This tool is the most valid and reliable measure of the extent of fidelity in the implementation of PBIS (Muscott, Mann, & LeBrun, 2008). A trained evaluator, who examines school documents and physical spaces, holds interviews with administrators, at least 10 staff, and at least 15 students, to collect the SET data. Analysis of seven features takes place. Each feature is scored on a two-point scale: zero (not in place), one (partially in place), and two (in place). Each SET takes about two hours to complete and analyzes if expectations are defined, behavioral expectations are taught, evidence of an ongoing reward system exists, the system is appropriately responding to violations, decision making is being monitored, management, and the presence of district level support (Horner et al., 2004). The SET yields an Average of Features summary score obtaining a percentage rating from 0% to 100%. The attainment of a SET rating 80% or higher is necessary to consider PBIS implementation effective. To maintain a high level of fidelity, staff members should attend a two-day summer training course. A developer of PBIS leads the summer sessions before the first year of implementation to become familiar with everything involved in the program. Consequently, staff members should also attend a two-day booster-training event annually. School districts should also receive monthly on-site support and technical assistance from a trained behavior support coach. Multiple schools who have received an 80% SET score have been studied to determine the effect of PBIS implementation on behavior and academics.
PBIS Effect on Office Discipline Referrals

Qualitative experiments done with 13 elementary schools (Muscott, Mann, & LeBrun, 2008), 37 elementary schools containing 12,344 students (Bradshaw, Waasdorp, & Leaf, 2012), and a school containing 468 students (Sherrod, Getch, & Ziomek-Daigle, 2009) have all portrayed the implementation of PBIS as having positive effects on student discipline and academic success. These schools were chosen based on the obtained benchmark SET ratings. Administrators, staff members, and students all provided consent to partake in the study. Office discipline referrals (ODRs) and suspension rates were shown to have decreased significantly. Office discipline referral rates dropped by 21% (Muscott, Mann, & LeBrun, 2008) and 26% (Sherrod, Getch, & Ziomek-Daigle, 2009) allowing for significant more instructional time in two schools. Children in PBIS schools are 33% less likely to receive an ODR than those in comparison schools (Bradshaw, Waasdorp, & Leaf, 2012). A decrease in ODRs and suspensions means students are learning how to behave as respected citizens. Due to proper implementation of PBIS, a Southeastern suburban elementary school, who rated 10% of the student population in need of tier three tertiary intervention, saw a 43% reduction in students not following directions, 40% reduction in physical aggression, 53% reduction in bus referrals, and a 66% reduction in inappropriate behavior (Sherrod, Getch, & Ziomek-Daigle, 2009). Reports of substantial academic gains were obtained. Of schools containing third grade students taking state standardized tests, 92% of schools had a higher number of students achieve basic or above skill level scores in mathematics after PBIS implementation (Muscott, Mann, & LeBrun, 2008). Although a variety of factors can contribute to these academic gains, implementation of PBIS was declared to have a heavy influence on achievement scores. Students in poorly managed classrooms receive less academic instruction and are more likely to have long-term negative
academic, behavioral, and social outcomes than those in a well-managed classroom has been suggested (Reinke, Herman, & Stormont, 2012).

**Time in Relation to Teaching, Learning, and Leading**

For every ODR a student receives, they lose 45 minutes of classroom instructional time, teachers lose 10 minutes of teaching time, and administrators lose 15 minutes of leadership time. These numbers escalate with the administration of suspensions. For each suspension administered, students lose 360 minutes of instructional time (equivalent to a full school day), teachers lose 15 minutes of teaching time, and administrators lose 45 minutes of leadership time (Muscott, Mann, & LeBrun, 2008). Lost minutes turn into lost hours and can accumulate to substantial loses throughout a school year. Upon successful implementation of PBIS, 13 elementary schools in the state of New Hampshire gained 584 hours of learning, 130 hours of teaching, and 195 of leadership time over a two-year period. These schools have also gained 162 hours of learning, 7 hours of teaching, and 20 hours of leadership due to decreases in suspensions (Muscott, Mann, & LeBrun, 2008). All of the time saved by those schools directly relate to the proper implementation of PBIS. Researchers also studied schools who had not implemented PBIS to determine intervention strategies and outlook on behavior.

In-depth qualitative interviews conducted with seven kindergarten teachers and 13 first-grade teachers determine perception on behavior management and intervention strategies. Many of the teachers had similar ideas on things such as behavior development as well as what constitutes negative behavior. Differences in the way teachers handled individualized and group discipline within the classroom surfaced. Most of the 20 educators were unaware of PBIS. Although some of the individual teacher strategies mirrored that of PBIS, no group cohesiveness was present. PBIS requires a group perspective on behavior management that emphasizes the
whole school as a system (Tillery, Varjas, Mayers, & Collins, 2010). Although the teachers in this study were provided ample time to discuss views on behavior and its management, some responses were very limited which may reflect limited knowledge regarding these areas of behavioral management (Tillery, Varjas, Mayers, & Collins, 2010).

Schools are reporting 20% to 60% reductions in ODR, improved school climate, and improved academic performance when engaging in PBIS practices. Defining positive behavioral expectations, teaching those expectations to all students, maintaining ongoing strategies to acknowledge and reward appropriate behavior, establishing a consistently implemented continuum of consequences for inappropriate behavior, and gathering and using behavioral data for active decision-making are examples of PBIS practices used (Horner et al., 2004). Combining the positive effects properly implemented PBIS has on school climate and acting out behaviors suggest a positive contribution to third grade mathematics achievement. The more students who are in the classroom feeling safe and focused on the topic at hand as opposed to feeling anxiety over their well-being and distracted by inappropriate behaviors, the more apt quality learning is to take place.

**Student Engagement**

For a high level of learning to take place, students must actively engage in lessons. A lack of student engagement can result in gaps forming amongst the information. These gaps are missing pieces to the puzzle of understanding. A strong linear association exists between higher participation and academic achievement. The theory of engagement measures student engagement. Four levels are present when determining student engagement. The first level exists when a student is paying close attention in class, coming to school prepared, and appropriately responding to questions asked by the teacher in class. Students at the second level initiate
questions, dialogue with the teacher spend more time on learning activities in and out of the classroom, and participate in academically related clubs or activities. The third level of engagement consists of involvement in social, extracurricular, and athletic clubs or events. A student at the fourth level participates in student government, academic goal setting, and involvement in disciplinary decisions (Finn, 1993). Using hierarchical data analysis, students found to be at higher levels of engagement are more successful in mathematics achievement (Park, 2005). Higher levels of participation amongst students produce higher academic achievement in reading, mathematics, science and social studies (Park, 2005; Finn, 1993).

Properly managing classroom behavior is a key cog in maintaining students focus. Obtaining high levels of mathematics achievement is difficult when 58% of instructional time in a classroom is lost due to problematic behavior (Benner, Kutash, Nelson, & Fisher, 2013). In general education classroom settings, youth are engaged and successful only 17% of the time. This results in one hour of quality education time during a 6-hour school day (Benner, Kutash, Nelson, & Fisher, 2013). The learning window is open even less for students with disabilities or other limiting factors. PBIS is in use to limit acting out behaviors, thus providing a better learning environment for everyone involved.

By implementing PBIS, a positive, safe, and consistent environment exists. A positive environment in educational facilities is one that is predictable. Teaching expectations and consistently enforcing consequences can stabilize an environment. With every student knowing the outcomes for every action, distractions from acting-out behavior will minimize. Coercive interaction between staff and students will minimize through short verbal warnings or non-verbal cues. A rigorous study involving a randomized controlled trial of 70 elementary students revealed lower levels of problem behavior (ES = -.99) and higher rates of on-task behavior (ES =
.61) for students learning under the PBIS model. These results are in comparison to students in the controlled group (N = 26) (Benner, Kutash, Nelson, & Fisher, 2013). Lower levels of problematic or acting out behavior can directly result in higher levels of mathematics achievement in third grade classrooms.
Chapter III: Results and Analysis Relative to the Problem

Gaining higher levels of mathematics achievement in third grade is a process. Many parts must work together to create a safe and positive learning environment free of distractions. PBIS interventions play a vital role in allowing these academic gains to take place. By improving student behavior in schools, teachers have more time to teach, administrators have more time to lead, and students have more time to learn. The increase in student engagement time creates a substantial opportunity for third graders to achieve higher scores in mathematics.

PBIS Interventions Lead to Improved Behavior

Social Stories™, FBAs, and BIPs are key components in improving positive behavior amongst third grade students. FBAs and BIPs work hand in hand. An effective FBA can often lead to a high quality BIP. Using FBAs is a key component in creating an effective BIP (Killu, Weber, Derby, & Barretto, 2006). By determining the type and severity of a student’s disability through an FBA, staff members can then formulate an effective BIP to limit student’s acting out behaviors. A positive correlation exists between quality BIPs and positive student outcomes in terms of behavior (Cook, et al., 2012). Implementing an evidence-based BIP with integrity will increase likelihood of reducing problematic behaviors, increasing positive replacement behaviors, and academic improvement in mathematics.

Social Stories™ effectively limit distractive behavior no matter how a severe a child’s disability may be. Things such as yelling, screaming, chair tipping, inappropriate looking at members of the opposite gender, and following safety rules have been shown to improve though Social Story™ interventions (Beh-Pajooh, Ahmadi, Shokoohi-Yekta, & Asgary, 2011; Agosta, Graetz, Mastropieri, & Scruggs, 2004; Kuttler, Myles, & Carlson, 1998; Scattone, Wilczynski, Edwards, Rabian, 2002). Limiting distractive behaviors not only helps the student who is having
these problems, but others in the classroom as well. Continuing reinforcement of lessons contained within the Social Story™ will create positive habits. Teachers who have used this intervention have agreed with the effectiveness at limiting negative and distractive behaviors (Agosta, Graetz, Mastropieri, & Scruggs, 2004).

**Improved Behavior Leads to Higher Levels of Student Engagement**

Substantial amounts of instructional time, leadership time, and learning time can be saved through successful implementation of PBIS (Muscott, Mann, & LeBrun, 2008; Sherrod, Getch, Ziomek-Daigle, 2009; Bradshaw, Waasdorp, & Leaf, 2012; Reinke, Herman, & Stormont, 2012). On-task time has increased through the significant decrease in ODRs and suspensions reported by schools using PBIS framework. PBIS provides a school wide support system with disciplinary procedures and expectations consistent throughout every environment. With consistency comes routine. Students have a full understanding of what is expected and consequences attached to actions. Clear expectations and knowledge of disciplinary procedures lead to less acting-out behaviors (Benner, Kutash, Nelson, & Fisher, 2013; Horner, et al., 2004).

Increased positive behavior improves school climate, leading to an increase in teacher self-efficacy and a decrease in teacher burnout (Sinnott, 2009; Grayson & Alvarez, 2007; Reinke, Herman, & Stormont, 2012; Klein, Cornell, & Konold, 2012). Teachers experiencing burnout provide a lower quality of instruction to students than a teacher with high levels of self-efficacy. Negative attitudes and actions from teachers can exacerbate negative behavior in students leading to more acting-out behaviors. Less instructional time will result from an increase in negative student behavior. Interactions between teachers and students will become more positive with PBIS, leading to a positive and safe learning environment. Instructional, leadership, and student engagement time increases through successful implementation of PBIS.
Increase in these aspects can directly lead to higher mathematics achievement scores for third grade students.

**High Levels of Student Engagement Lead to Improved Mathematics Achievement**

Teachers are unable to communicate information effectively if students are not focusing during lesson presentation. Multiple distractions from acting-out behavior during classroom sessions limit student engagement. Students being on task play an essential role in high levels of mathematics achievement (Park, 2005; Finn, 1993; Benner, Kutash, & Fisher, 2013). Teachers can also become distracted when acting-out behaviors take place. Teachers’ inability to analyze student comments and questions and give effective feedback can result from teachers being distracted. PBIS can create a classroom climate where distractions are down and student engagement is up. With less problematic behaviors in class, students are able to engage in lessons with minimal distraction. Not only will limiting acting-out behaviors through PBIS increase student engagement, teachers will also be able to focus on lessons and portray positive behavior. Participation in extracurricular activities and goal setting can increase a student’s ability to produce higher scores in mathematics, reading, science, and social studies.
Chapter IV: Recommendations and Conclusion

Proper implementation of PBIS can lead to improved academic achievement and behavioral management in schools. When done with fidelity, this school wide plan can be groundwork for positive results in many different aspects of students’ educational experience. Although there is substantial research available supporting the use of PBIS, further research can help in determining better ways to implement the program and portray clear expected results. Many different school demographics exist. Without studying each possible scenario, there is no clear answer on whether or not PBIS will work in a school district.

Recommendation

Teachers must be mindful of how important effective classroom management is to third grade mathematics achievement. Educators must teach and reinforce positive behaviors systematically to obtain desired outcomes. Constant positive verbal and sometimes graphic reinforcement is important to do on a consistent basis to allow formation of new habits. Focusing solely on pointing out negative behaviors to correct a problem as opposed to praising positive behaviors is counterproductive. This reactive approach may temporarily fix problem behaviors, but will not result in a desired long-term solution. Teachers must strive for an optimal praise to reprimand ratio of 4:1 in all classrooms (Reinke, Herman, & Stormont, 2012). Repeatedly writing students office referrals with no corrective behavior education will not aid in correcting future misbehaviors. Constructing groundwork the first day students walk into the classroom will enhance opportunity for additional instructional time as the school year progresses. Presenting information regarding PBIS to teachers and allowing educators constructively to link the foundation of the program to previous knowledge will enable professionals to be much more successful upon implementation. If staff members legitimately buy into and work together to
effectively implement PBIS framework, an improved school climate and higher mathematics achievement amongst third graders may result.

Areas for Further Research

To gain a further understanding of the effect PBIS can have on third grade mathematics achievement, performing a controlled experimental study providing quantitative results will be beneficial. Strategically selecting participants for the study is important in giving the study validity and minimizing limitations. Qualifications for participants in this study include students must be in third grade and attend a school located in a rural setting with similar funding. Using schools with similar funding and settings will minimize limitations dealing with resources available or differing environments. Schools participating in the study are also required to have adopted and implemented the new common core state standards, but not currently run under PBIS principles. Use of similar standards will eliminate limitations dealing with uneven curriculum. Schools will be introduced to the study in pairs (i.e.; two schools from the same rural area). In each pair of schools, one facility will be trained and adopt PBIS, while the other will continue with current disciplinary procedures (control group).

During week two of the school year, every school involved in the study will give the same mathematics pre-test to all third grade students. The test will measure students’ knowledge based upon third grade mathematics standards. The pre-test will serve as baseline measure for academic achievement. During the second to last week of the school year, all third grade students will take the same test as in the beginning of the year. Researchers will compare scores on the pre-test and posttest to gauge student improvement. Students who began attending school after November 1 will be discounted from the study. This study will last four years (assuming funding is sufficient). Following each school year, researchers will document ODRs and suspension data
from the entire school year. Researchers will look for trends regarding amount of ODRs, suspensions, and scores on the mathematics test between PBIS schools and control schools. SET scores will be given to school who implemented PBIS to determine fidelity of PBIS implementation. This study will provide useful data concerning effects of quality research-based PBIS implementation have on third grade mathematics achievement. Limitations include but are not limited to differences in teaching styles, fidelity of PBIS implementation, student’s personal backgrounds, and differing numbers of students with disabilities.

Summary and Conclusion

A properly implemented PBIS program offers abundant advantages for elementary schools by contributing to an improved school climate and third grade mathematics achievement. Reduction of challenging behaviors results in heightened mathematical achievement by allowing more time for student to learn, teachers to teach, and administrators to lead. In addition, a reduction in problematic behaviors can reduce teacher burnout, creating a higher level of instruction. All positive gains from proper implementation of PBIS make the program a worthy possibility for all schools.
References


Appendix A

Functional Behavior Assessment Template

Student Name: ____________________________ Meeting Date: ________________________

Student ID #: ____________________________ Disability: ________________________ Grade: ________________________

Home School: ____________________________ Case Manager: ____________________________

Team Members Present at Meeting:

__________________________ ____________________________
Name/Title Name/Title

__________________________ ____________________________
Name/Title Name/Title

__________________________ ____________________________
Name/Title Name/Title

**Student’s Strengths** (include a description of the student’s behavioral strengths, such as positive interactions with staff, ignoring the inappropriate behavior of peers, accepts responsibility, etc.):

**Description of Behavior** (include a description of the frequency, duration, and intensity of the behavior(s)): 
<table>
<thead>
<tr>
<th><strong>Setting(s)</strong> (include a description of the setting(s) in which the behavior occurs, i.e. – physical setting, time of day, persons involved):</th>
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<tr>
<th><strong>Antecedent(s)</strong> (include a description of the relevant events that preceded the behavior):</th>
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<tr>
<th><strong>Consequences and Educational Impact</strong> (include a description of the result of the behavior (i.e. – removed from class, not able to complete assignments/tests, etc.), and the impact on the student, peers, and the instructional environment):</th>
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<tr>
<th><strong>Other Potential Variables</strong> (include a description of any other factors/variables that may affect the behavior, such as medication, weather, diet, sleep, substance abuse, attendance, social factors, etc.):</th>
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<tr>
<th><strong>Prior Interventions</strong> (include a description of the behavioral interventions that have been implemented in the past, including the date(s) of implementation, length of intervention, the impact of the intervention on the student’s behavior, etc. Attach data summary, if appropriate):</th>
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<tbody>
<tr>
<td>Hypothesis of Behavioral Function</td>
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<tr>
<td>Summary/Recommendations</td>
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Appendix B

Behavioral Intervention Plan Template

Student Name: _______________________________  Grade: _________  Meeting Date: _______

Home School: _______________________________  Case Manager: _____________________

Team Members Present at Meeting:

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<tr>
<th>Target Behavior (behavior to be extinguished)</th>
<th>Intervention Strategies</th>
<th>Person(s) Responsible</th>
<th>Data Collection Procedures (Methods &amp; Timelines)</th>
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</thead>
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<td>Alternative Behaviors to be Taught/Reinforced</td>
<td>Reinforcers</td>
<td>Consequences for Target Behavior</td>
</tr>
<tr>
<td>Target Behavior (behavior to be extinguished)</td>
<td>Alternative Behaviors to be Taught/Reinforced</td>
<td>Reinforcers</td>
<td>Consequences for Target Behavior</td>
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