Positive Behavior Interventions and Supports in South Dakota: Impact of Implementation on Academic Achievement for Elementary Schools

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Challenges Unique to Rural School Psychology

*Introduction to School Psychology: Controversies and Current Practice*
Why is Rural important?

- Rural schools make up more than 32.9% of all public schools in the United States (Johnson, Showalter, Klein, & Lester, 2014)
- In rural settings, greater distances separates students and service providers
- Although significant population exists, a “glaring absence of literature” exists on the subject (Clopton & Knesting, 2006 p.1)
### Key considerations

Adapted from Hughes and Fagan (1985)

<table>
<thead>
<tr>
<th>Geographic Isolation</th>
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<tr>
<td>Scattered Populations</td>
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<td>Transporting students</td>
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<td>Limited number of low incidence disabilities</td>
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<td>Traditional Rural Values/Distrust of Outsiders</td>
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<td>Limited Number/Sudden Overpopulation of English Language Learners</td>
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<td>Perception of Services to be Provided</td>
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<td>Professional Shortages</td>
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New Directions in the Field

- Review of Prevention Literature
  - Risk Factors and Protective Factors (Doll & Cummings, 2008)
- Population-based service models
  - Building local capacity for services
  - Universal, selected, and indicated prevention
- Considerations of Recruitment and Retention of high quality service providers
- Applications of the School Psychology Practice model for rural environments
POSITIVE BEHAVIOR INTERVENTIONS AND SUPPORTS IN SOUTH DAKOTA:

A PRELIMINARY STUDY ON THE IMPACT OF IMPLEMENTATION ON ACADEMIC ACHIEVEMENT FOR ELEMENTARY SCHOOLS
Statement of Problem

- Critical need to understand the relationship between implementation of PBIS and academic achievement

- Need to explore which critical features of PBIS are most important to academic outcomes for elementary school students in South Dakota

- Using existing data from elementary schools that applied for and received grants from the South Dakota Department of Special Education during the 2014-2015 school year
Research Question 1 and Hypothesis

1. What is the extent to which attainment of critical features of PBIS impact the levels of student achievement, as measured by Smarter Balanced testing in elementary schools in the State of South Dakota?

It is hypothesized that schools with higher implementation scores indicating that critical features of PBIS are in place will have higher Smarter Balanced achievement scores as consistent with current research outcomes (Bradshaw, Mitchell, & Leaf, 2010; Horner, Sugai, Smolkowski, Eber, Nakasato, Todd, & Esperanza, 2009; Lassen, Steele, & Sailor, 2006; Muscott, Mann, & LeBrun, 2008; Sadler & Sugai, 2009; & Simonsen, Eber, Black, Sugai, Lewandowski, Sims, & Myers, 2012).
Research Question 2 and Hypothesis

2. Are the attainment of some of the critical elements of PBIS (PBIS team, behavioral support coach, defining behavioral expectations, teaching behavioral expectations, system for rewarding behavioral expectations, system of responding to inappropriate behavior, and a system to collect, analyze, and make data-based decisions [Bradshaw, et al., 2008]) more predictive of academic achievement than other elements for schools implementing PBIS in the State of South Dakota?

It is hypothesized that some elements will demonstrate higher beta weights related to academic achievement. This is exploratory in nature as this question has not yet been evaluated in research.
Definition of Terms

**ODRs:** Office Discipline Referrals. Student behavior that is deemed major and requires administrative intervention.

**PBIS:** Positive Behavior Interventions and Supports. A universal prevention system that creates a more positive staff and student school environment through systematically improving systems and procedures (Bradshaw, Koth, Bevans, Ialongo, and Leaf, 2008).

**SET:** School-wide Evaluation Tool (SET). The SET is composed of 28 questions that look at the seven core features that give light to the fidelity of implementation of PBIS in schools (Todd, Lewis-Palmer, Horner, Sugai, Sampson, & Phillips, 2012).

**Smarter Balanced Testing:** Statewide accountability achievement testing administered to students grades 3-8 and 11. Students are assessed in English Language Arts and Mathematics. Students in grades 5 and 8 also are assessed in Science.

**SDPBIS:** South Dakota Positive Behavior Interventions and Supports.

**SDDOE:** South Dakota Department of Education.

**Traditional Discipline:** Negative discipline strategies, such as zero tolerance and exclusionary practices that are aimed at decreasing problematic behavior (Mayer, 1995).
Limitations and Delimitations

1. Individual factors impacts generalizability
2. The demographics may uniquely contribute to academic achievement for students.
3. The SET is designed to measure primary levels of prevention and schools may be more developed in other tiers that were not measured
4. There are extraneous variables that may contribute to academic achievement that are not measured in this study.
5. This is a convenience sample drawn from schools who applied for and received a grant to implement PBIS.
Literature Review

(1) Positive Behavior Interventions and Supports (PBIS)
(2) Critical Features of PBIS
(3) Measuring Implementation of PBIS,
(4) PBIS and behavioral outcomes
(5) PBIS and academic achievement, and
(6) PBIS in South Dakota
Positive Behavior Interventions and Supports (PBIS)

- PBIS is a system of prevention and response that applies behavioral principles to school-wide settings to increase positive outcomes for students (Sugai & Horner, 2002)

1-5% Tier 3/Intensive Interventions
- Individual students,
  - Assessment based, intense, durable procedures

5-15% Tier 2/Selected Interventions
- Some students (at-risk)
  - High efficiency, rapid response, small group
  - Some individualizing

80-90% Tier 1/Universal Interventions
- All settings, all students
  - Preventive, proactive

*Figure 1. What is school-wide PBIS? (Illinois PBIS Network, 2008)*
Critical Features of PBIS

1. PBIS team
2. Behavioral support coach
3. Defining behavioral expectations
4. Teaching behavioral expectations
5. System for rewarding behavioral expectations
6. System of responding to inappropriate behavior
7. System to collect, analyze, and make data-based decisions (Bradshaw, et al., 2008)
## Measuring Implementation of PBIS

<table>
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<tr>
<th>Measures of Schoolwide Implementation of PBIS</th>
<th>Authors</th>
<th>Use</th>
<th>Reliability</th>
<th>Validity</th>
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<tr>
<td>School-wide Evaluation Tool (SET)</td>
<td>Horner, Todd, Lewis-Palmer, Irvin, Sugai, &amp; Boland, 2004</td>
<td>External evaluation measure of universal implementation</td>
<td>Internal consistency $\alpha = .96$, Test-retest Inter-observer agreement = 97.3%</td>
<td>Construct Validity, SET with Effective Behavior Support (EBS) Survey $r = .75$ p≤ .01</td>
</tr>
<tr>
<td>Team Implementation Checklist (TIC)</td>
<td>Sugai, Horner, &amp; Lewis-Palmer, 2001</td>
<td>Progress monitoring tool for assessing universal PBIS</td>
<td>Internal consistency $\alpha = .93$</td>
<td>No studies available</td>
</tr>
<tr>
<td>Benchmarks of Quality (BoQ)</td>
<td>Kincaid, Childs, &amp; George, 2005</td>
<td>Self-assessment survey used to identify areas of success/areas of needed improvement</td>
<td>Internal consistency $\alpha = .93$, Test-retest $r = .94$, p = &lt;.01, Inter-observer agreement = 89%</td>
<td>Concurrent validity $r = .51$, p &lt; .05</td>
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<td>Tiered Fidelity Inventory (TFI)</td>
<td>Algozzine, Barrett, Eber, George, Horner, Lewis, Putnam, Swain-Bradway, McIntosh, &amp; Sugai, 2014 Validation Studies: McIntosh, Massar, Algozzine, George, Horner, Lewis, &amp; Swain-Bradway, 2016</td>
<td>A combination of existing PBIS fidelity measures into one instrument of implementation of PBIS across all tiers</td>
<td>Internal consistency $\alpha = .96$</td>
<td>Content Validity Index = .92 Correlations between TFI and all existing measures of fidelity of PBIS were statistically significant p &lt;.05</td>
</tr>
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<td>Self-Assessment Survey (SAS)</td>
<td>Sugai, Horner, &amp; Todd, 2000 Validation Studies: Hagan-Burke, Burke, Martin, Boon, Fore, &amp; Kirkendoll, 2005 and Safran, 2006</td>
<td>Staff survey evaluating implementation of PBIS</td>
<td>Hagan-Burke et al. (2005) internal consistency $\alpha = .94$, Safran (2006) internal consistency reliability on two sets of items $\alpha = .85$-.94</td>
<td>No studies available</td>
</tr>
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PBIS and Behavioral outcomes

- Primary behavioral outcomes that have been evaluated are office discipline referrals, suspension and expulsion rates, as well as perceptions of school safety

- **ODRs** (Taylor-Green et al., 1997; Lohrmann-O'Rourke et al., 2000; Luiselli, Putnam, Handler, & Feinberg, 2005; Bradshaw, Mitchell, & Leaf, 2010; Sprague, Sugai, Horner, & Walker, 1999; Sugai, Sprague et al., 2000; Nelson et al., 2002; and Horner et al., 2005)

- **Suspension/Expulsion rates** (Horner et al., 2005; Bradshaw et al., 2010; Luiselli et al., 2001; Scott, 2001; Scott & Barrett, 2004, Turnbull et al., 2002, and Nelson et al., 2002)

- **School Safety** (Horner et al., 2005 and Bradshaw, Debman, Koth, & Leaf, 2009)
<table>
<thead>
<tr>
<th>Reference</th>
<th>Sample</th>
<th>Behavior measure</th>
<th>Academic measure</th>
<th>Result</th>
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<tr>
<td>Betts, Hill, &amp; Surface, 2014</td>
<td>Third-Fifth grade students (N = 86) with teacher implemented PBIS in an Omaha School</td>
<td>Universal Behavior Screen Category (Browning-Wright &amp; Cook, 2011)</td>
<td>Fountas and Pinnell (2011) Reading Level Scores</td>
<td>Implementation of classroom PBIS was associated with higher reading scores (ES = .47 to .54)</td>
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<td>Bradshaw, Mitchell, &amp; Leaf, 2010</td>
<td>Thirty-seven Maryland public elementary schools from five school districts</td>
<td>Schoolwide Evaluation Tool (Sugai, Lewis-Palmer, Todd, &amp; Horner, 2001) and Effective Behavior Support Survey (Sugai, Todd, &amp; Horner, 2000)</td>
<td>Maryland School Assessment (MSA)</td>
<td>Fifth grade students had greater gains in math scores than students in non PBIS schools [t = 1.67, df = 35, p = .105, d = .54]</td>
</tr>
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<td>Childs, Kincaid, &amp; George, 2010</td>
<td>Five hundred Florida schools implementing PBIS Tier 1 universal supports (2004-2007)</td>
<td>Benchmarks of Quality (BOQ; Kincaid, Childs, &amp; George, 2005)</td>
<td>Florida Comprehensive Assessment Test (FCAT)</td>
<td>Percentage reading proficient in PBIS schools was 62.67% as compared to state average of 55.67%</td>
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<td>Gottfredson, Gottfreson, &amp; Hybl, 1993</td>
<td>Eight middle schools in Charleston, SC (N = 5,719)</td>
<td>Classroom Environmental surveys, teacher ratings, Effective School Battery (BSB; G.D. Gottfredson, 1984)</td>
<td>Teacher ratings of attending to academic work</td>
<td>High Implementing Schools noted improvement in students attending to academic work (ES = .09)</td>
</tr>
<tr>
<td>Horner, Sugai, Smolkowski, Eber, Nakasato, Todd, &amp; Esperanza, 2009</td>
<td>Sixty elementary schools (K-5) in Illinois and Hawaii from 2002-2006 (N = 60 Schools)</td>
<td>Schoolwide Evaluation Tool (Sugai, Lewis-Palmer, Todd, &amp; Horner, 2001)</td>
<td>Illinois State Achievement Test (ISAT) and the Stanford Achievement Test (SAT)</td>
<td>Schools implementing PBIS saw increased third-grade reading performance, Cohen’s d = .58</td>
</tr>
<tr>
<td>Nelson, Martella, &amp; Marchand-Martella, 2002</td>
<td>One School District with Thirty-Five Elementary Schools in Pacific Northwest (Mean enrollment = 492)</td>
<td>Student Safety Survey (SSS; Spokane Public School District, 1997)</td>
<td>Comprehensive Test of Basic Skills (CTBS) and Washington Assessment of Learning Outcomes (WASL)</td>
<td>CTBS had significant improvements in reading, language arts, spelling, science, and social studies, F(1, 34), p &lt;.05. WASL showed improvements in reading and math, F(1, 34), p &lt;.05.</td>
</tr>
<tr>
<td>Lassen, Steele, &amp; Sailor, 2006</td>
<td>Large urban middle school in Kansas (N = 623)</td>
<td>Schoolwide Evaluation Tool (Sugai, Lewis-Palmer, Todd, &amp; Horner, 2001)</td>
<td>Kansas State Assessment (KSA)</td>
<td>Statistically significant gains in math achievement, F_{3,48} = 6.67, p &lt; .01 Reading scores were not significant, F_{3,48} = 8.8, p &gt; .05</td>
</tr>
<tr>
<td>McIntosh, Chard, Boland, &amp; Horner, 2006</td>
<td>One School District (six Elementary Schools) in Pacific Northwest (N = 1.653)</td>
<td>Schoolwide Evaluation Tool (Sugai, Lewis-Palmer, Todd, &amp; Horner, 2001)</td>
<td>Dynamic Indicators of Basic Early Literacy Skills—Sixth Edition (DIBELS; Good &amp; Kaminski, 2002)</td>
<td>Elementary schools implementing universal systems with fidelity, 97% of students scored proficient in reading skills by the end of third grade</td>
</tr>
<tr>
<td>Muscott, Mann, &amp; LeBrun, 2008</td>
<td>Twenty-eight Early Childhood -12th grade in New Hampshire in 2002 (N = 15,515)</td>
<td>Schoolwide Evaluation Tool (Sugai, Lewis-Palmer, Todd, &amp; Horner, 2001)</td>
<td>New Hampshire Educational Improvement and Assessment Program (NHEIAP)</td>
<td>73% [n = 22] of schools found improvement in math achievement, 41% [n = 22] found improvement in reading achievement</td>
</tr>
<tr>
<td>Sadler &amp; Sugai, 2009</td>
<td>One School District in Portland, OR (Ten elementary schools, three middle schools, two high schools, one alternative school (N = 12,000)</td>
<td>Schoolwide Evaluation Tool (Sugai, Lewis-Palmer, Todd, &amp; Horner, 2001)</td>
<td>Dynamic Indicators of Basic Early Literacy Skills—Sixth Edition (DIBELS; Good &amp; Kaminski, 2002) and Oregon State Assessment (OSA)</td>
<td>Students in deficit range on DIBELS decreased from 8% to 3% at kindergarten level and from 21% to 10% at first grade level. Additionally, students with zero to one office discipline referrals were likely to meet reading standard.</td>
</tr>
<tr>
<td>Simonsen, Eber, Black, Sugai, Lewandowski, Sims, &amp; Myers, 2012</td>
<td>274 elementary (K-6), 46 (K-8), 91 middle (6-9), and 17 high (9-12) schools in Illinois from 2000-2008</td>
<td>Schoolwide Evaluation Tool (Sugai, Lewis-Palmer, Todd, &amp; Horner, 2001)</td>
<td>Illinois State Achievement Test (ISAT)</td>
<td>ISAT Math ES = .43, p = .01, ISAT Reading ES = .27, p = .41</td>
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PBIS in South Dakota

- PBIS in South Dakota began in 2000 with passage of SD Administrative Rule 24:05:27:01:02 (Wienk & Christensen, 2010)
- South Dakota began implementation in 2007-2008 with assistance from Don Kincaid, PBIS TA Center Partner
- During the 2008-2009 school year, trained in-state trainers (Wienk & Christensen, 2010)
- In 2013, RtI for academics and PBIS were combined to create MTSS.
- Previous research conducted by Swartos (2012)
Summary

- PBIS increases school climate and has been shown to increase academic achievement.
- Evaluation of fidelity has not been evaluated in South Dakota.
- Because fidelity measures are now collected via a standardized instrument, individual critical elements can be analyzed and related to specific student achievement data.
- This study aims to take a look at a smaller scale, rural implementation of PBIS in elementary schools and look at its impact on student achievement.
Purpose of the Study

- Examine the relationship between the attainment of critical features of PBIS that may lead to increased academic outcomes.
- The study will use existing data from PBIS schools in the state of South Dakota who applied and received grants for implementation of PBIS.
- As part of the project, schools undergo fidelity measures to review the extent to which the school is implementing PBIS with fidelity.
- Additionally, schools annually take part in the Smarter Balanced test, which is the state achievement accountability measure administered to grades 3-8 and 11.
Methodology

• Participants
• Measures
• Procedures
Participants

- Thirty five elementary schools participating in the PBIS project during the school year 2014-2015
- Sample size was calculated by G*Power 3.1.
- Alpha level = .05, Power (1-β) = .90, IVs = 7 critical features, and expected coefficient = .5 (large effect)
- The result was $N = 28$. (Faul, Erdfelder, Buchner, & Lang, 2009)

<table>
<thead>
<tr>
<th>Ethnic Group</th>
<th>N</th>
<th>%</th>
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<tbody>
<tr>
<td>American Indian/Alaskan</td>
<td>2365</td>
<td>26.66</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>51</td>
<td>0.57</td>
</tr>
<tr>
<td>Black</td>
<td>84</td>
<td>0.95</td>
</tr>
<tr>
<td>Hispanic</td>
<td>523</td>
<td>5.89</td>
</tr>
<tr>
<td>White</td>
<td>5400</td>
<td>60.87</td>
</tr>
<tr>
<td>Two or More Races</td>
<td>449</td>
<td>5.06</td>
</tr>
<tr>
<td>Students on Free Lunch</td>
<td>4044</td>
<td>45.58</td>
</tr>
<tr>
<td>Students on Reduced Lunch</td>
<td>563</td>
<td>6.35</td>
</tr>
</tbody>
</table>

(National Center for Educational Statistics, 2016)
Measures

- **School wide evaluation tool.** The administration of the SET requires a review of permanent products, observations, a minimum of ten staff interviews, and a minimum of 15 student interviews.

- **Smarter Balanced Assessment.** The Smarter Balanced Assessment is a group administered achievement assessment that is used for measuring the effectiveness of instruction at a national level.
Procedures

- Initial team/Booster team training provided in the summer of 2014
- Spring of 2015, an external evaluator administered the SET to each school.
  - Scores based on observations, interviews, and documents.
  - Each school obtained a score from 0%-100% based on evidence of practice in each critical feature.
- Schools administered the Smarter Balanced test in spring of 2015
  - 3rd grade – 8th grade, and 11th grade
  - Math, English Language Arts, and Total Achievement
Assumptions

- Normality
- Homoscedasticity
- Multicollinearity
Assumptions

- Data Screening included review of:
  - Normality
  - Homoscedacity
  - Multicollinearity

- Following analysis of assumptions, the researcher kept raw data intact
Results

- Question 1 Results
- Question 2 Results
Results for Question 1

- **Significant relationship between PBIS and ELA**
  \[ F(1, 25) = 2002.85, \text{MSE} = 24.15, p = .02, \eta^2 = .06. \]
  - Small effect (Keith, 2015)

- **No significant effect on Math**
  \[ F(1, 25) = 14.82, \text{MSE} = 10.94, p = .20, \eta^2 = .03 \]

- **No significant effect on Total Achievement**
  \[ F(1, 25) = 63.69, \text{MSE} = 59.79, p = .10, \eta^2 = .04 \]
Results for Question 2

- **Critical Features for PBIS and Total Achievement**
  - Expectations Taught \((SE = .14, \beta = .67)\)
  - District Level Support \((SE = .06, \beta = .37)\)
    - Large effect (Keith, 2015)
Results for Question 2

- **Critical Features for PBIS and ELA**
  - Expectations Taught ($SE = .07, \beta = .66$)**
  - Reward System ($SE = .06, \beta = -.56$)
  - District Level Support ($SE = .03, \beta = .34$)
    - **Significant at $p<.01$ with Bonferroni correction**
    - Large effect (Keith, 2015)

- **Critical Features for PBIS and Math**
  - Expectations Taught ($SE = .07, \beta = .63$)
  - District Level Support ($SE = .03, \beta = .37$)
    - Large effect (Keith, 2015)
Discussion

- Discussion
- Recommendations for practice
- Limitations
- Recommendations for future study
Discussion

- An important relationship between specific critical variables and academic achievement
  - Expectations taught, District level support
- May Inform school teams
  - Constructs to implement first
  - Which ones to implement later in the process
Discussion

- No prior studies have examined subparts of the PBIS process to see if individual constructs of implementation have a relationship with achievement.
- When looking to the value of critical features of PBIS:
  - Teaching Expectations + District Level Support
  - May lead to higher levels of achievement
Recommendations for Practice

- Implementation fidelity matters!
- Increased levels of fidelity of PBIS may increase student outcomes
- South Dakota only has five in-state trainers/limited infrastructure for budgetary support of this process
  - Can help trainers build local capacity for teams and prioritize training goals
Limitations

- Small sample size \((N=35)\)
- Cannot generalize to other populations
- Sample of convenience (applied and received grants)
- Correlational research
  - Confounding factors
    - Ex. Schools implementing PBIS practices might also be implementing other positive programming that impact achievement
  - Mediating factors
    - Ex. Positive school climate---attendance---achievement outcomes
- Aggregate data with restricted range
Recommendations for further study

- Impact of implementation on secondary schools
- Adding other student outcome measures
  - Behavioral referrals, suspension/expulsion rates, survey data/school climate data
  - Continued relationship with PBIS in SD has the potential to conduct these studies
- Studies to examine potential mediators
  - Ex. Attendance?
- Review of PBIS vs. non-PBIS schools to examine impact of formalized training
Conclusion

- Results are likely the results of the environment established by PBIS where teachers can deliver high quality instruction to engaged students
  - Prior Research (Kellam, Mayer, Rebok, and Hawkins, 1998; and Putnam, Horner, & Algozzine, 2006)
  - Validated hypothesis in a small scale, rural setting.
- South Dakota has only five PBIS trainers
  - Results still found with limited time and resources available
- Teaching Expectations, as well as having District Level Support
  - Stronger relationship to academic achievement
- Informs school teams which elements to implement first
Questions?
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