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THE RELATIONSHIP OF SCHOOL-WIDE POSITIVE BEHAVIOR SUPPORT TO ACADEMIC ACHIEVEMENT IN AN URBAN MIDDLE SCHOOL

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An emerging literature on school-wide Positive Behavior Support (PBS) in urban settings suggests the utility of PBS in addressing student social development while decreasing the need for disciplinary actions (i.e., office disciplinary referrals [ODRs]). This research represents a significant addition to, and expansion of, this literature by examining the relationship of school-wide PBS-induced reductions in out-of-class referrals to student academic achievement. School-wide PBS was implemented in an urban, inner-city middle school in the Midwest over a 3-year period. Data on ODRs, suspensions, standardized test scores, and treatment fidelity were gathered and analyzed. Results demonstrated significant reductions in ODRs and suspensions and increases in standardized math and reading scores. Additionally, regression analyses suggested a significant relationship between student problem behavior and academic performance. Treatment adherence to PBS procedures was significantly correlated with reductions in problem behavior. These findings are discussed in terms of helping urban schools address challenging behavior. © 2006 Wiley Periodicals, Inc.

Schools today face a number of challenges in educating students. In addition to the responsibility of effectively teaching academic subjects such as math, reading, science, the arts, and writing, educators must increasingly deal with nonacademic factors that influence the instruction they provide. Among these factors, one of the most challenging is emotional and behavioral disorders. It is estimated that approximately 10% of children and adolescents in the United States suffer from some form of mental illness that significantly impairs their ability to function in everyday settings (Burns et al., 1995; Shaffer et al., 1996). Although not all students who present with challenging behavior have a diagnosable disorder, emotional and behavioral problems, especially disruptive and violent behavior, certainly consume a great deal of teacher and school resources (Sugai & Horner, 1994).

Traditionally, schools have addressed challenging behavior by increasing the number and intensity of punitive disciplinary procedures (Sugai & Horner, 2002; Utley, Kozleski, Smith, & Draper, 2002). Such strategies have increased substantially in the wake of the heavily reported school shootings throughout the 1990s. These include adopting zero tolerance policies, hiring security officers, using metal detectors, expelling and suspending students, and placing students in alternative educational facilities. Unfortunately, the effectiveness of such strategies has not been sufficiently examined, and some researchers have even suggested that reactive and punitive procedures can increase problem behavior (Mayer & Sulzer-Azaroff, 1990; Noguera, 1995; Shores, Gunter, & Jack, 1993).

In contrast, a growing body of research demonstrates the utility of proactive and preventative approaches to dealing with challenging behavior in schools (Aber, Brown, & Jones, 2003; Flannery et al., 2003). Recent efforts at the federal level to improve school climate and reduce violence have focused on emphasizing a proactive disciplinary approach, establishing clear expectations for students, and supporting appropriate behavior (Dwyer, Osher, & Warger, 1998). Two other federal initiatives seeking to evaluate interventions directed at reducing youth violence and its risk factors (Thornton, Craft, Dahlberg, Lynch, & Baer, 2000; U.S. Department of Health and Human Services, 2001) concluded that effective school-based programs focus on (a) increasing positive

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student behavior through monitoring and rewards, (b) teaching social/life skills, and (c) utilizing nonpunitive methods of control.

Other reviews of school-based interventions to reduce problem behavior have also found behavioral monitoring and reinforcement of appropriate behavior to be effective in improving school behavior (Catalano, Arthur, Hawkins, Berglund, & Olson, 1998; Miller, Brehm, & Whitehouse, 1998). In summary, although the use of reactive and crackdown tactics have increasingly been applied in schools to manage challenging behavior, evidence cited above suggests that efforts to support prosocial behavior, establish clear guidelines, and utilize behavior management techniques are more effective in changing student behavior.

Positive Behavior Support (PBS) is an approach to dealing with challenging behavior that incorporates many of these evidence-based methods. It includes a wide range of systemic and individualized strategies aimed at improving individual quality of life (Carr et al., 2002). PBS was initially designed to reduce problem behavior in individuals with developmental disabilities (Carr et al., 1999); recent efforts have focused on expanding PBS to general school populations (Lewis, Powers, Kelk, & Newcomer, 2002; Lewis, Sugai, & Colvin, 1998; Lewis & Sugai, 1999; Todd, Horner, Sugai, & Sprague, 1999). In general, the components of school-wide applications of PBS include the following (Sugai & Horner, 2002; Warren et al., in press): (a) establishment of a planning team, (b) definition of school-wide behavioral expectations, (c) teaching of behavioral expectations directly to students, (d) development of procedures for acknowledging appropriate behaviors and discouraging inappropriate behavior, and (e) monitoring and ongoing evaluation of relevant outcomes.

Results from this growing body of research on school-wide PBS suggest that it is an effective approach to reducing student problem behavior and improving the overall climate of the school (Lewis et al., 2002; Todd et al., 1999). In a 4-year longitudinal study, Luiselli, Putnam, and Sunderland (2002) evaluated school-wide PBS efforts in a rural public middle school. Collapsing the school's disciplinary codes into three main categories (Disruptive-Antisocial Behavior, Vandalism, Substance Use), the authors reported a reduction in disciplinary detentions in all categories from Year 1 to Year 4. In addition, except for Year 2 Vandalism detentions, the number of detentions in each category was reduced each year.

Most recently, urban schools have begun to address behavior problems by implementing school-wide applications of PBS. Urban, inner-city areas pose an especially challenging atmosphere in which to intervene because of increased rates of poverty, crime, violence, substance use, poor nutrition, and unemployment (Cauce, Stewart, Rodriguez, Cochran, & Ginzler, 2003; Netzel & Eber, 2003). Increased student problem behavior also is a critical factor in urban schools. Comparison of the percentages of students with problem behavior in "typical" suburban middle schools (Sugai & Horner, 1999) and in several urban middle schools (Warren et al., 2003) indicates that challenging behavior is not only more frequent in urban schools, but often occurs in more severe forms. In reviewing their work with urban schools, Turnbull et al. (2002) concluded that in order to effectively address this high percentage of student problem behavior, urban schools might require more intensive support for all students than would rural or suburban schools.

The relatively few empirical studies that have examined school-wide PBS in urban schools have generally found reductions in the frequency of overall problem behavior (McCurdy, Mannella, & Eldridge, 2003; Scott, 2001; Warren et al., 2003; Warren et al., in press), as measured primarily by office disciplinary referrals (ODRs; Sugai, Sprague, Horner, & Walker, 2000). ODRs have been used as main outcome measures in schools for a variety of reasons (i.e., importance and relevance to schools, availability of office referral data). However, although ODRs are a fundamental indicator of how much problem behavior is occurring in a given school, this metric does not yield a complete picture of how well a school is functioning. ODRs do not capture other

important factors that PBS seeks to impact, such as indicators of successful community functioning, academic achievement, or the overall climate of the school.

One primary indicator that schools use to gauge how well they are functioning is student performance on standardized achievement tests. Although there are many complex and interactive factors that account for student academic scores on such tests, emerging research suggests that one such factor is student problem behavior (Morrison & D'Incau, 1997; Scott, Nelson, & Liaupsin, 2001). Because disruptive behavior typically results in lost instructional time and, thus, compromised learning, interventions that recover and maximize instructional time by keeping students in class should produce improvements in academic areas. Horner, Sugai, Todd, and Lewis-Palmer (in press) report on preliminary descriptive data that suggest a relationship between school-wide PBS and changes in academic performance, noting the need for further analysis of this area.

The current literature on urban applications of school-wide PBS includes only one study that reported data from more than 1 year of intervention (McCurdy et al., 2003). This lack of longitudinal data is problematic in light of the previously mentioned challenges unique to urban, inner-city areas. It has been suggested by urban school researchers that, due to increased behavior problems in inner-city schools located in high-poverty areas, it may take longer to effectively implement PBS on a school-wide basis (Turnbull et al., 2002). Thus, brief, single school-year examinations of school-wide PBS in urban communities are unlikely to provide accurate or sufficient information regarding implementation or ultimate outcomes.

Another important issue that has not adequately been addressed in the research on urban applications of school-wide PBS is the role of treatment fidelity. Again, only one published study has included a measure of fidelity to PBS procedures and principles (McCurdy et al., 2003). This is somewhat surprising in light of the emphasis on defining critical features of PBS (Carr et al., 2002; Sugai & Horner, 2002) and the provision of extensive training to ensure adherence to PBS protocol (i.e., through PBS State Training Teams). Being able to answer the question, "Did the intervention occur as intended?" (Hogue, Liddle, & Rowe, 1996) is not only crucial to being able to articulate treatment processes, but is also an important component of developing empirically supported interventions that are able to be effectively disseminated in a variety of settings (Kazdin & Kendall, 1998; Schoenwald, Henggeler, Brondino, & Rowland, 2000).

The present study was designed to add to the existing PBS literature by (a) replicating previous results of school-wide PBS obtained in urban schools, (b) tracking outcomes in an urban middle school over a 3-year period, (c) examining the relationship between student problem behavior and academic achievement, and (d) investigating the relationship between PBS adherence and a broader range of indicators of overall treatment outcomes. It was hypothesized that the school's level of adherence to PBS principles and procedures would be associated with reductions in problem behavior and improvements in school functioning. School-wide problem behavior, as measured by ODRs, was expected to decrease over the 3-year study period. Finally, it was hypothesized that improvements would be observed in standardized achievement test scores and that there would be a positive relationship between achievement test scores and problem behavior.

Method

Participants

This study represents a 3-year longitudinal project involving multiple schools in a low-income, inner-city area. Results are presented in a case study format, using one school as the unit of analysis. The target middle school is located in a large urban area in the Midwest. The average annual enrollment for the middle school during the study was 623, with 26% of the students identified as African American, 40% Hispanic, 30% White, and 4% Asian Pacific Islanders. The

average age of the students was 12.5 years and the proportion of male students averaged 54% across the 3-year study period. In comparison, statewide ethnicity data indicate a much less diverse population, but similar enrollment statistics in terms of age and gender (Kansas State Department of Education, 2005). Approximately 80% of the entire school population were economically disadvantaged, based on the proportion of students eligible for free or reduced-price lunch. Comparative statewide data indicated substantially lower numbers of economically disadvantaged students (32%).

Outcome Measures

A variety of outcome measures were used during the study to assess student problem behavior and overall school functioning. ODR and suspension data were used as the primary indicators of problem behavior. ODRs were both the most common form of discipline and the best documented. When a student received an ODR, he or she met with either the principal or assistant principal. Disciplinary action was then assigned at the discretion of the administrator and entered into the school's student management database. Suspensions, one of the more punitive and serious sanctions resulting from student problem behavior, removed the student from the school (usually beginning the next day) and restricted them from school grounds for as many as 5 days.

It should be noted that there are both advantages and limitations to using such incident-report data as indicators of student problem behavior. These data are clearly reflections of multiple influences within schools (i.e., tolerance for certain behaviors, teacher bias, administrator perceptions and decision making) and changes in these data could reflect changes in school-wide disciplinary policy, for example, rather than changes in student behavior per se. However, there is a growing literature supporting the use of such measures as a valid indicator of student behavior and school functioning (Irvin, Tobin, Sprague, Sugai, & Vincent, 2004; Skiba, Peterson, & Williams, 1997; Wright & Dusek, 1998).

In order to examine adherence to PBS procedures, the School-wide Evaluation Tool (SET; Horner et al., 2004) was administered prior to intervention and at the end of Year 3. The SET is designed to assess and evaluate the features of behavioral support systems within a school over time. The survey contains 28 questions and involves gathering information from multiple sources, including a review of permanent products (i.e., school improvement plan, discipline handbook), observations, and staff and student interviews. The seven subscales of the SET represent the seven key features of school-wide PBS: (a) School-wide behavioral expectations are defined, (b) school-wide behavioral expectations are taught to all students in the school, (c) rewards are provided for adhering to school-wide behavioral expectations, (d) a consistently implemented continuum of consequences for problem behavior is in place, (e) problem behavior patterns are monitored and the information is used for ongoing decision making, (f) an administrator actively supports and is involved in the school-wide behavior support effort, and (g) the school district provides support to the school in the form of functional policies, staff training opportunities, and data collection options (Horner et al., 2004).

Other aspects of the school-wide program were also regularly monitored. One of the components of a school-wide PBS approach is the acknowledgment of positive and appropriate behavior. In the present school, students were given positive referral tickets by teachers and staff for exhibiting appropriate behavior. The number of positive referral tickets that teachers and staff handed out to students was calculated each quarter. Although teachers and staff were not monitored in terms of how they used the tickets (e.g., using them in the prescribed manner), it is assumed that the number of tickets given to students is a broad, yet reliable indicator of the degree of participation in the school-wide program. It also constituted one of the central interventions within the school.

In addition, measures of academic performance were collected to broaden the examination of the effects of school-wide PBS. Academic performance was assessed using standardized test data on reading and math scores. Seventh-graders completed the Kansas State Assessment for reading and eighth graders completed the Kansas State Assessment for math during each year of the study.

Procedures

Contact with the target school, which was initiated in Year 1 (2000–2001) before the school year began, consisted of the researchers gaining an understanding of the organization of the school and learning about the specific school culture. This was done by visiting classrooms, talking with teachers, and meeting with school administrators. The school's disciplinary policies and procedures were also examined to ensure that they were outlined in a clear fashion and would support a school-wide PBS approach. These policies, including the school's system for processing ODRs and suspensions, were found to be clearly stated and defined in the school's policy handbook. No changes were made to these policies and procedures during the study period. Researchers then provided a professional development activity to present the basic tenets of PBS and basic functional behavioral assessment techniques, describe what the researchers had found that the school was currently doing regarding problem behaviors, and show how the school's current system for behavior management compared to PBS methods.

Consistent with the fundamental components of PBS, implementation focused on the following areas: (a) evidence-based practices (e.g., positive reinforcement, teaching social skills), (b) systems improvement (e.g., team-based action planning, data-based decision making), and (c) implementation support/facilitation (e.g., coaching, ongoing staff development). For example, during the middle of the Year 1 school year, a training session was held with teachers and administration to begin the implementation of school-wide PBS efforts. First, teachers and administrators developed a list of six behavioral expectations for the school. The new "Steps to Success" were (a) Be Responsible, (b) Be Respectful, (c) Be Ready to Learn, (d) Be Cooperative, (e) Be Safe, and (f) Be Honest. These expectations were designed to establish a standard set of behavioral expectations for the entire school. Second, a training session was held for a group of teachers and administrators who were to be instrumental in the direct application of the school-wide PBS system. During this training session the group devised plans for teaching the new student expectations and determining how this instruction could be generalized outside the classroom setting (i.e., the cafeteria, the hallways, during student assemblies). For example, the group discussed what "Being Responsible" would look like in the classroom, the hallways, and the cafeteria. Next, the group discussed what not "Being Responsible" would look like in the same settings. The purpose of the training was to operationalize the behavioral expectations, which would improve the likelihood of effectively modifying negative behaviors. Finally, during the 3rd quarter of Year 1 another training session was held for the entire school staff. This instruction included the introduction of the new "Steps to Success" and different methods for teaching the expectations to students across school settings.

The intervention was initially scheduled to start at the beginning of Year 2, but the administration felt a pressing need to begin implementation sooner due to significant student problem behavior. Although not completely prepared to alter the timeline of the project in this way, the investigators decided to comply with the school's request. This decision was made to allow the school to tailor PBS to its specific needs.

After initial training on the school expectations was completed, "Step to Success" posters were displayed in hallways, the cafeteria, the office, the gymnasium, and each classroom. Teachers then taught the expectations to the students, through direct instruction and role-playing. For example,

teachers role-played what it looks like to be (and not to be) respectful in the classroom and hallways.

To aid in the application of the behavioral expectations, a reward system was developed to reinforce students for behaviors consistent with the "Steps to Success." Whenever a student was "caught" engaging in a behavioral expectation, he or she received a blue ticket. The tickets were then turned into the office, where they were placed in a box for a drawing held at the end of each week. Winners of the drawing were called to the office and received prizes (e.g., key chains, pens, books, etc.). In addition to the prizes, winners of the drawings had their pictures taken and displayed in a trophy case near the office.

School-wide PBS efforts were maintained through regular training by the researchers at quarterly training sessions during inservice meetings with teachers and administrators. These training sessions focused on providing teachers with classroom management strategies and techniques to effectively deal with challenging student behavior. Teachers were then encouraged to implement these classroom strategies. Additional supports were implemented at the classroom, nonclassroom, and group levels as needed. For example, classroom supports were implemented in one particular classroom where the teacher was dealing with significant problem behavior from multiple students. The researchers' efforts focused on reinforcing and intensifying direct instruction of the school-wide expectations in the classroom and providing other classroom management strategies as needed. Nonclassroom supports were effectively implemented through training that focused on teaching students appropriate cafeteria, hallway, and gymnasium behavior through role-playing and direct instruction. During Year 3, the school offered group-level support for students who had been identified by teachers and administrators as continuing to have serious behavior problems and not responding well to school-wide interventions. This intervention consisted of weekly group meetings with selected students to offer more intensive instruction on appropriate behaviors that were consistent with school-wide behavioral expectations.

One of the most important objectives for the researchers was to embed the PBS system into the existing framework of the school. This was especially important for the successful maintenance of PBS efforts in the school after the researchers left. By building sustainability within the school, PBS efforts could continue regardless of the presence of external personnel. This was addressed, in part, by providing training on PBS-related issues to a select group of teachers and administrators who had particular interest in addressing student problem behavior. Most of these individuals were members of the school's Student Improvement Team (SIT) who were also responsible for administering and monitoring school-wide PBS efforts. Specifically, the members of the SIT used referral, suspension, and blue ticket data to monitor the effectiveness of PBS procedures within the school, making modifications in implementation efforts based on the information provided by these data.

Results

Preliminary analyses indicated that the school's annual enrollment changed from 555 students to 632 between Baseline and Year 1, from 632 to 673 between Year 1 and Year 2, and from 673 to 634 between Year 2 and Year 3. To generate a standard for comparisons between years, totals for each outcome measure were multiplied by the percentage of change in enrollment between each respective year. For example, enrollment increased 1.14% from Year 1 to Year 2, so the total number of referrals, suspensions, and blue tickets was multiplied by .0114.

As an indicator of adherence to PBS procedures, blue ticket and SET data were examined. Cronbach's alphas conducted for the SET indicated adequate reliability for the SET (.77). First, the total mean score for the SET was examined at Baseline and Year 3. Results indicated that the percentage of critical PBS components implemented in the school increased from 24.97% at

Baseline to 69.64% at Year 3, and that increases occurred in all categories except for "System for responding to behavioral violations" (see Figure 1). Second, the average number of blue tickets given to each student from Year 1 to Year 3 was examined using a one-way analysis of variance (ANOVA). Results indicated a statistically significant difference in the number of blue tickets handed out each year from Year 1 to Year 3 ($F_{2,1936} = 9.0$, $p < .01$), and post hoc analyses indicated that teachers handed out significantly more blue tickets each successive year of the study.

To examine the average number of ODRs and long-term suspensions students received from Baseline to Year 3, two sets of analyses were conducted. First, detailed descriptive statistics were generated for both ODRs and suspensions for each year of the study (see Table 1). Second, a series of ANOVAs were conducted to determine if differences in the number of ODRs and suspensions for each year of the study were statistically significant. It should be noted that a more conservative alpha level of .025 was used for these analyses to control for family-wise Type I error. The results of the first ANOVA indicated a significant difference in the average number of ODRs per student from Baseline to Year 3 ($F_{3,\ 2490} = 1.98$, $p < .01$). Post hoc analyses showed a significant reduction in the mean number of ODRs per student each year from Year 1 to Year 3. These findings are particularly important when one considers that the number of ODRs per student significantly increased from 522 referrals per 100 students at Baseline to 684 ODRs per 100 students at Year 1, indicating that the average number of ODRs for students at the school was increasing (see Table 1). A second ANOVA, examining the change in the average number of long-term suspensions per student, was also significant ($F_{3,2490} = 1.19$, $p < .01$), with post hoc analyses showing that the number of long-term suspensions significantly decreased each year from Baseline to Year 3.

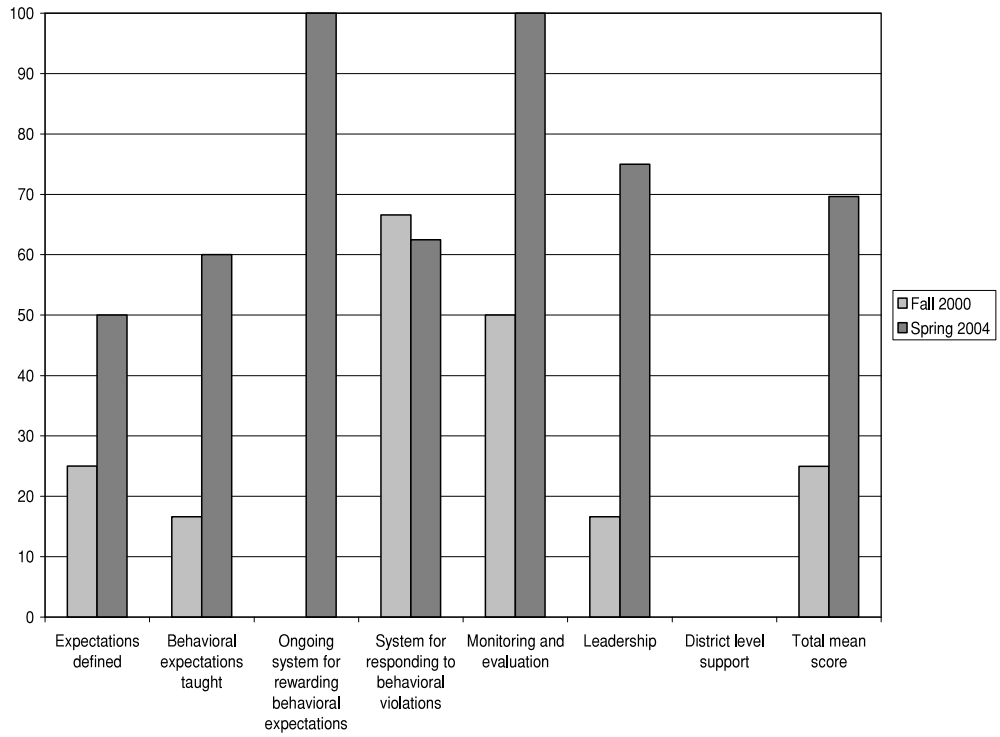

FIGURE 1. Mean score results for the School-wide Evaluation Tool (SET).

Table 1
Mean ODRs, Suspensions, and Academic Scores per Student

	Baseline			Year 1			Year 2			Year 3		
Variable	*M*	*SD*	Range	*M*	*SD*	Range	*M*	*SD*	Range	*M*	*SD*	Range
ODRs	5.22	7.56	0–35	6.84	4.83	0–26	5.26	6.50	0–31	3.70	3.65	0–23
Suspensions	.32	.99	0–5	.34	1.03	0–8	.27	1.12	0–5	.20	.61	0–3
Reading scores	72.27	11.74	43–92	70.67	11.74	41–92	70.76	11.51	47–94	72.19	11.93	38–96
Math scores	31.97	11.57	12–75	34.30	14.58	7–83	37.23	14.40	17–94	37.28	14.77	13–91

To determine if test scores significantly increased during the course of the study, two separate ANOVAs were conducted. Again, an alpha level of .025 was used for these analyses to control for family-wise Type I error. The first ANOVA indicated that the increase in standardized test scores for reading from Baseline to Year 3 was not significant ($F_{3,640} = .88$, $p > .05$). However, means plots for standardized reading scores indicated that test scores decreased from Baseline to Year 1 and increased each year from Year 1 to Year 3 (see Table 1). A second ANOVA indicated that standardized test scores in math increased significantly from Baseline to Year 3 ($F_{3,810} = 6.67$, $p < .01$). Post hoc analyses revealed that the improvement in math scores from Baseline to Year 2 was significant as was the improvement from Baseline to Year 3 (see Table 1).

Finally, in order to examine the relationship between specific disciplinary actions (e.g., ODRs and suspensions) and standardized math and reading test scores, four separate regression analyses were conducted. Due to the nature of the dataset, single linear regression was used instead of multiple regression The dataset, which did not include data points for every student on every variable (i.e., not every student had ODRs/suspensions), precluded a merging of variables for a multiple regression analysis. The first two regression analyses indicated that the number of ODRs a student had received significantly predicted scores on standardized tests of reading ($F_{1,642} = 6.78$, $p < .01$) and math ($F_{1,812} = 17.83$, $p < .01$), such that students with fewer ODRs scored higher on standardized tests of reading and math. The final two regression analyses indicated that the number of suspensions a student had was a significant predictor of standardized test scores for reading ($F_{1,642} = 9.08$, $p > .01$) and math ($F_{1,813} = 9.04$, $p > .01$). Consistent with the findings for ODRs, students who had fewer suspensions evidenced higher standardized test scores. Overall, the amount of variance in math and reading scores accounted for by ODRs and suspensions was between 1 and 2% (See Tables 2 and 3). Summaries for the regression analyses are presented in Tables 2 and 3.

Table 2
Summary of Regression Analysis for ODRs Predicting Reading and Math Scores

	Reading scores				Math scores			
Variable	*B*	*SE B*	β	R^2	*B*	*SE B*	β	R^2
Referrals	−.227	.087	−.102	.010*	−.317	.075	−.147	.021*

*$p < .01$.

Table 3
Summary of Regression Analysis for Suspensions Predicting Reading and Math Scores

	Reading scores				Math scores			
Variable	*B*	*SE B*	β	R^2	*B*	*SE B*	β	R^2
Suspensions	−1.43	.475	−.118	.014*	−1.55	−.516	−.105	.011*

*$p < .01$.

Discussion

The current study examined the effectiveness of a school-wide PBS intervention in an inner-city middle school over 3 years. It was hypothesized that reductions in student problem behavior and improvements in standardized test scores would be demonstrated during each year of the study. In addition, it was expected that the school's adherence to the intervention would be associated with any improvements in behavior and/or academic performance.

Consistent with hypotheses and the school-wide PBS literature, the number of ODRs per student was significantly reduced each year of the study. Not only does this reduction indicate a decrease in student problem behavior, but it also has implications for two other areas of school functioning. The amount of instructional time a student loses for each ODR incurred has been estimated to be 45 min (Horner & Sugai, 2003). This time begins when a student leaves a classroom to meet with an administrator in the office and ends when the student is back in the classroom. Even using a more conservative estimate of 20 min per ODR, this middle school has recovered approximately 659 instructional hours (or eighty-two 8-hour days) per year since implementing school-wide PBS. Certainly, schools function much more effectively, academically and behaviorally, when students are in class. Additionally, since administrators must personally deal with each ODR within a school, ODRs can also be viewed as depleting administrator time. From this perspective, decreases in ODRs can translate into considerable time added to administrators' schedules that can then be used in other, more preventative and positive activities (i.e., training teachers, acknowledging student achievements). Thus, reducing ODRs in a school is likely to produce a number of positive effects and result in overall improved functioning and performance.

As expected, the number of suspensions per student was also significantly reduced in each year of the study. Suspensions add an important dimension to a school's profile of student problem behavior that is rarely examined independent of other disciplinary actions. The reduction of suspensions in this study is an important finding because suspensions are typically reserved for the most severe problem behaviors within a school (e.g., carrying weapons, violence against students/staff) and are, therefore, a better indication than ODRs of severe problem behavior. Additionally, because suspensions also result in the removal of the student from the school and the loss of instructional time, reductions in suspensions will increase student exposure to academic material and allow resources to be allocated in more positive and preventative activities.

An emerging area of educational research is the relationship between student behavior and academic performance (Morrison & D'Incau, 1997; Scott et al., 2001). Results from the present study indicate that students' academic performance on standardized tests of reading and math during the study were predicted on the basis of behavioral indicators (i.e., office referrals, suspensions). It should be noted that, although the relationship between academics and behavior was statistically significant, the effect sizes were small, accounting for between 1 and 2% of the variance in math and reading scores (see Tables 2 and 3). Clearly, there are many factors that account

for academic performance on standardized tests. Instructional strategies, student motivation, and student test-taking skills certainly all play a role in academic outcomes. It is argued here, however, that one such factor is likely the amount of available learning time that a student spends each day in the classroom. When that instructional time is reduced through ODRs or suspensions, it seems probable to assume that academic progress will be compromised.

Standardized test scores in math increased significantly over the 3-year study period. While reading scores decreased from Baseline to Year 1, there was a notable increase in scores observed from Year 1 to Year 3. Anecdotal information obtained from the school indicates that gains have continued in both reading and math standardized test scores [J. Rios (principal), personal communication, April 30, 2004]. Such improvements provide support for the argument that as student time in instruction increases, there will be a corresponding increase in academic achievement.

Finally, as predicted, a relationship between the school's adherence to PBS procedures and reductions in problem behavior was observed. SET data indicated that there was an increase in the number of school-wide PBS components implemented in the school during the 3-year study period. Also, the number of blue tickets that school staff handed out to students increased significantly each year of the study, while ODRs and suspensions declined. Although these results are only descriptive and lack specificity (i.e., number of tickets per staff member by month/year, percentage of staff members who gave out tickets, patterns of use of tickets over time), they begin to address the issue of treatment fidelity in the implementation of school-wide PBS. Future research on school-wide PBS needs to more fully examine the issue of adherence to PBS protocol and its relationship to outcomes.

A number of factors may limit the generalizability of these conclusions. First, and perhaps most important, the lack of a control school prevents us from drawing firm conclusions regarding school-wide PBS as an effective intervention in urban middle schools. Unfortunately, this limitation could be applied to research on school-wide PBS as a whole. Future efforts will include control schools, permitting more precise conclusions. In addition, as previously noted, a reduction in ODRs may not necessarily indicate an increase in positive behavior. Other factors, including school policy and teacher tolerance of certain behaviors, may have been partly responsible for the observed outcomes.

Another limitation that prevents firm conclusions is the lack of specificity in positive referral ticket, ODR, and suspension data. It would be helpful, for example, to analyze patterns of positive referral ticket data per staff member by month and year. It would also be informative to examine ODR and suspension patterns in greater detail over time (i.e., by location, by type of problem behavior, by ethnicity). The Unified School District 500 in Kansas City, Kansas, has recently implemented a Web-based analysis tool that will allow for such detailed data to be readily accessible (http://www.softwareoutfitters.com/pbs/demo/).

Another limitation of this study that is relevant to research in school settings is the comparison of data across different cohorts of students. In the present study, data were obtained from a different cohort of students each year as they matriculated to the middle school from elementary school and from the middle school to high school. Because researchers examined a different group of students from year to year, results may or may not accurately reflect how particular students fared behaviorally and academically. This concern reinforces the call for a wide variety of research methodologies that can answer such questions (Kazdin & Kendall, 1998).

The major implications of this study are that school-wide PBS is an effective intervention in reducing student problem behavior in urban middle schools that have high rates of student misbehavior and that improvements can be sustained over a long period of time. Additionally, PBS may have a significant impact on improving academic performance, primarily through increasing the amount of time students spend in their classrooms. Understanding how PBS relates to academic

performance is an important question that researchers need to address more fully. The current study extends the existing literature on school-wide PBS by examining other indicators of school functioning, as well as demonstrating effectiveness in an ethnically diverse, inner-city school.

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