

**Positive Behavior Support:
A Case Study of the 4J and Bethel School Districts**

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1. Introduction

Problem behavior in classrooms has a great effect on the quality of education that students receive. In the past, most of the discipline procedures in schools have focused the teachers' or administrators' attention ON the student causing the particular disturbance. This not only takes away from the amount of time the teacher is providing instruction, but it is distracting to the other students in the classroom. Recently there has been a shift to a more proactive approach to dealing with problem behavior in the classrooms, a movement towards preventing the behavior rather than punishing the student after they have acted out. The school-wide proactive discipline systems “define, teach, and support appropriate behaviors in a way that establishes a culture of competence within schools.” (pbis.org)

Positive Behavior Support (PBS) is a school-wide behavioral support program that was developed by the Institute on Violence and Destructive Behavior at the University of Oregon. This program is based on giving students a clear understanding of what is expected of them, recognizing them when expectations are met, and correcting them when expectations are not met. PBS has been put into effect in various schools within the 4J and Bethel school districts, with data covering the effects of the program for the last five years. Using data about the Office Discipline Referrals (ODR) issued, school demographic information, and implementation surveys of the program, we will perform a case study of the 4J and Bethel schools where PBS has been implemented. We will examine the results that PBS has produced in an attempt to quantify the benefits that these schools have realized. Accounting for the demographic information of each school and the timeline of implementation we will create a model that could be used to estimate

the benefits that other schools around the country would be likely to realize from the implementation of the PBS program.

2. What is Positive Behavioral Support?

PBS is a school-wide discipline system that moves away from the reactionary method of discipline traditionally used in public schools, where teachers react to the disruptive behavior after it has already occurred and interrupted class time. Instead PBS uses a more proactive approach that involves teachers, staff, administration, parents and students working together to put guidelines in place that work to stop the disruptive behavior before it begins. These systems address student's behavior not only in the classroom, but also outside the classroom environment (playgrounds, bathrooms, hallways) as well. According to Lewis and Sugai (1999) the ultimate goal of PBS is to increase the school's ability to address the behavioral support needs of the students efficiently and effectively.

PBS is a team-based approach for problem solving and planning, where a team made up of school staff and administrators is provided with training in management and instructional practices and principles, that can be used at the school-wide, individual student, classroom and outside-classroom settings. These teams set up regular meetings to discuss the implementation and progress of the PBS program.

Lewis and Sugai (1999) outline the implementation of PBS and how it occurs on three broad levels within the school. First, the leadership team must work to develop school-wide management strategies that are implemented consistently throughout all school environments. The strategies include behavioral expectations put in short and

simple terms that are taught to students. Examples of these expectations are “Be Respectful, Be Responsible, Be Safe, etc” from PBIS.org. These strategies allow the staff and families of students to have a common set of terms that can be modified to fit the needs of settings in and outside the classroom. Teachers and administrators tend to ignore the children who do not cause disturbances. These universal interventions are for all students in the school, not just the less-well behaved children. An effective PBS focuses on the universal training of the strategies and reinforcement of the behavioral expectations (Sugai et al., 2000). The implementation of these universal strategies is critical to the success of the PBS program. A majority of the student body will respond to these expectations if they are presented in a clear and concise manner. Second, group-based strategies are developed for interventions that target students who show specific characteristics (e.g.; low academic performance) and require repeated changes in their learning environment to be successful. These types of strategies can include academic support, scheduling changes and more adult supervision for children who require a more focused behavioral intervention (Sugai et al., 2000). Finally, specific support systems are developed for students who consistently participate in problem behavioral situations and do not respond to the universal and group-based strategies developed in the previous implementation stages. These support systems provide specialized and targeted strategies to interact with this relatively small percentage of the student population (1%-7%). The type of intervention used for each problem behavior should match the complexity of the disturbance; there isn’t one level of intervention that will serve all students. Schools must have at least these three levels of intervention to have a successful school-wide implementation of PBS (Sugai et al., 2000).

These three levels of intervention are used across four different systems within schools: school-wide, non-classroom, classroom, and the individual students. The effectiveness of the implementation of the non-classroom and individual student levels depend highly on the efficiency and effectiveness of the implementation at the school-wide and classroom levels. Exhibit 1 in the appendix shows a visual representation of the four different systems that PBS is implemented in. As you can see from this vin-diagram from PBIS.org, the school-wide implementation is the most universal level.

For PBS to be effective, schools must keep adequate records. This data is important to the development of strategies and the implementation process because it can be a useful estimator of the effectiveness of PBS. The analysis of the records on a regular basis can show patterns in the behavior of students and help school officials make necessary modifications of the school-wide systems' implementation process. Without a regularly scheduled analysis of the records it is hard to catch inefficiencies that may exist within the system and prevent the elimination of such practices that may lead to a lack of effectiveness of the program. It is also harder to catch the ineffective portions of the program and make the necessary adjustments before the practices become too engrained within the system.

Schools that implement the PBS program record data in the School-Wide Information System (SWIS) database. School administrators enter information regarding each behavioral disturbance resulting in an Office Discipline Referral (ODR). Information such as the time of the violation, location, people involved, student identification number, and the time of the occurrence is entered into the database, and using this information SWIS can generate reports that allow for the analysis of student

behavior. These reports can aid in the identification of the portions of the school-wide program that may not be effective enough, so that resources are properly and efficiently used.

3. Literature Review

3.1 Peer Effects

A student who engages in challenging behavior takes up the instructors' time in ways that are not useful to other students and affects not only his own learning, but also education of the other students' in the class is affected as well. The proactive approach to discipline prescribed by PBS works to maintain academically conducive behavior in the classroom, which can increase the likelihood of positive academic engagement of all students in the classroom.

An important paper in the economics literature on this issue, *Educational Production*, Edward Lazear discusses the idea that education is a public good with congestion effects and negative externalities that are created by other students¹. The cost of adding additional students to the classroom can be considered congestion effects and the peer effects are the negative externalities. When a student misbehaves the student and his/her classmates are not learning because the teacher must divert their time from teaching to focusing on the student(s) causing the disturbance. Therefore in his model:

P = the probability that any given student is impeding his own or other's learning at any moment in time.

¹ Another interesting study examining peer effects is E.A. Hanushek, et. al., paper entitled "Does Peer Ability Affect Student Achievement?" This analysis of peer effects takes into account the issues of omitted and mismeasured variables, where other studies have focused more on the issues regarding simultaneous determinations of peer effects.

$P^n = \text{the probability that all students in the class size } n \text{ are behaving}$

$1 - P^n = \text{probability of disruption occurrence}$

If you think of P as the proportion of time that any given student does not halt the learning of other students in the classroom, then the assumption can be made that once a student misbehaves they destroy the ability of all students, including themselves, to learn in that time period. Lazear assumes that schools are profit maximizing and increase the class size to reduce the cost per student until the addition of a single student will have a negative effect on the others. In order to examine the negative externalities of problem behavior in the classroom you must assume that each school is not profit maximizing.

By using a more evolved model than the model outlined above, which takes into account the value of a unit of learning (V), number of students (Z), with teachers and classrooms (m), and the rental value of the teacher and her classroom are represented by (W), Lazear can make a few propositions regarding the relationship between class size and the amount of educational output. It is optimal to reduce the class size when students are less well-behaved. Once the optimal class-size is established the educational attainment and production per student is higher in larger classes with well-behaved students than in the smaller classes with less well-behaved students. If schools vary class size because of the behavior of students, then the larger classes will have the students who are more well behaved, making a positive relationship with educational output and class size. Lazear also includes other factors that affect student learning like strict discipline, classroom etiquette, the effects of transient students and the relationship between teacher salaries vs. quality of teaching in his model. These influences on a

student's educational attainment are important to mention because the effects of these influences can affect many students.

While we are not focusing specifically on the peer effects of individual classrooms in this study, peer effects can have a significant effect on our macro-level analysis of the effectiveness of the PBS Program. Our model will use the number of ODRs issued during specific time periods to evaluate how effective the PBS program is, but if a student in a classroom constantly acts out it is possible that the negative effects of a specific child's behavior will cause other children within the classroom to act out as well. When the instructor has to stop class to handle the child engaging in the problem behavior their attention is diverted from the other children in the classroom, "good" students could begin to act out to get the attention of the instructor.

3.2 Methods of Evaluating the Effectiveness of PBS (Cost of ODR in units of time)

The purpose of our project is to evaluate the effectiveness of the PBS program at various stages of implementation. There are few studies that have been done that analyze the effectiveness of the school-wide implementation of the PBS program beyond the individual level. While data exists that suggest the program decreases problem behaviors among individuals, there are not many studies that show how this program affects the system as a whole. One method to evaluate the effectiveness of the PBS program is to evaluate the time that the students and staff were engaged in disciplinary procedures. In their paper from the Journal of Positive Behavior Interventions, Terrance Scott and Susan Barrett used the amount of time it took for staff and students to stop disturbing behavior to perform a cost analysis of the school-wide PBS program. The school studied had the

school-wide PBS program fully implemented by the beginning of the school year in 2000. Data was collected on all behavioral intervention and the System-Wide Evaluation Tool: School-Wide (Sugai, Lewis-Palmer, Todd & Horner, 2001) was used in the fall of 2001 and spring of 2002 to determine the extent of the PBS implementation. The procedures that were followed during implementation are similar to the procedures outlined in Lewis and Sugai, 1999. A team of school administrators identified the lost time from working on disciplinary issues as a main reason that the positive engagement level that was believed to be critical to achieving the desired systemic outcomes could not be easily attained. The goal set was to achieve a reduction of 25% in number of ODRs and a 25% reduction in student suspensions.

Recall that the goal of PBS is to increase the capacity to address effectively and efficiently the behavioral support needs of all students in staff (Lewis and Sugai, 1999). The amount of time that a student is away from class or the teacher must stop instruction is the cost of a disciplinary action. The conversion from time to a dollar figure was an attempt to evaluate the value of time saved by the PBS program, and the assumption was made that time equals money. Since the instructors earn a set dollar amount, or salary, for their time in the classroom each minute of time spent in the classroom can be calculated. For the dollar savings calculated in this study to be realized the school administrators would have to be employed for less time or the number of days in the school year would need to be cut. We will use the same assumption when performing the cost analysis for the 4J and Bethel School Districts. Because not all of the schools in our study have achieved full implementation at the school-wide level we will be able to show the benefits realized, in terms of time, for different levels of implementation.

An analysis of past data indicated that the processing time for an ODR by an administrator was approximately 45 minutes, while the time the student was out of the classroom was approximately 20 minutes. The salary for the administrator in charge of discipline was obtained, as well as the cost per student, from the school district. Using these facts the study found that student behavior problems decreased until the second year of implementation. Due to the decrease in student problems, the amount of administrator time spent processing student suspensions decreased from 3,465 to 1,440 minutes in the first year and 990 minutes in the second year. The amount of time the students spent in the classroom gaining instruction increased about 27.7 days during the first year and 31.2 during the second.

To perform the fiscal analysis, staff time was converted to dollars by dividing the administrator's salary by the number of required working days (190, in this case), which equaled \$412.66. This total was then multiplied to the number of days saved by implementing the PBS program. This represents the total dollar savings of implementing the PBS program. To calculate instructional time the cost per student was divided by the total number of school days (180). This number was then multiplied to the number of days saved each year, which equaled the total savings by the PBS program. The total savings from the first implementation was calculated to be \$9,106.92, and the total savings from the second implementation is \$10,667.74.

This study also examines one particular school whereas our study examines several different schools, making estimation efforts more challenging. Since more than one school is involved on our case study an aggregate estimation would have to be made

for all schools involved. This would produce a general cost savings for school districts with similar demographics to those the 4J and Bethel districts.

3.3 Implementation of PBS in schools with different demographics (An urban perspective)

The unique demographics of schools can change the implementation of the PBS program. To account for these differences within each school, the program calls for a leadership team comprised of representatives from the school staff and administration to take an active role in the implementation of the PBS program. While the perspective of the members of the school can aid in the effectiveness of the implementation of the PBS program, researchers found that PBS programs are inefficient in addressing the needs of inner-city schools. While there are no inner-city schools in our data set, it is important to recognize how a school with different demographics than the ones in the 4J and Bethel school districts evaluate the effectiveness of PBS.

Schools in urban areas face unique challenges compared to schools in suburban or rural areas. Things like budget cuts, size, high poverty rates and a diverse community can affect the behavior of students. In a study by Warren, et. al. of the application of school-wide PBS in an urban school, researchers learned that there were approximately 42 programs in place that related to student behavior. Because of the numerous programs already in place teachers and administrators were not receptive to the PBS program at first (Warren, Edmonson, et. al., 2003). Once administrators recognized the teams effort to built a rapport and become familiar with the school's culture they became more receptive and began to become active in the implementation process.

A study performed at another school in an urban area found that the experience of implementation at this particular school was unique, but within the recommendations from the leaders of the National Center on PBIS (Netzel and Eber, 2003). The findings of Warren, et. al. showed that it was important to have the building-level administration on board with the program. Both assistant-principals and principals have a large influence on the staff and are needed to instigate change. The teams must be willing to evaluate themselves and be open to learning from their mistakes. The use of data to evaluate the process can help keep decisions within the prescribed model. The leadership team must be willing to form a shared philosophy not only between themselves, but also with all staff and administration within the building. Finally, there has to be long-term commitment from building staff, building administration, and district administration².

While these lessons were in conjunction to a school with a very diverse student body and in a low-income urban area the factors that affect the implementation of the PBS program can be applied universally. It is important to recognize that each school is different and the success of the PBS program relies on the attitudes and dedication of the leadership team.

4. Data Analysis

Our study hopes to find a negative relationship between the average number of ODRs per student and the implementation of the PBS program. To show this relationship we need to get information about the number of ODRs per student, the demographics of

² Another paper regarding the implementation of PBS in urban area schools is, "Positive Behavior Support Urban Schools: Can We Prevent the Escalation of Antisocial Behavior?" by B.L. McCurdy, et. al. This paper analyzes the effects of PBS in the context of preventing antisocial behavior within urban area schools.

the school and implementation information of the PBS program. The data needed for our analysis of the PBS program comes from four different sources, each providing essential information. The School-Wide Information System (SWIS) provides us with the ODR information for the regression, the National Center for Educational Statistics (NCES) gives us demographic information for all of the schools in the 4J and Bethel School Districts, survey information from each school provides measures of implementation of the PBS program.

SWIS is a web-based information system that is designed to assist school personnel in making important decisions regarding school-wide and student discipline interventions. There are three main benefits of SWIS: it is an efficient information gathering system, it is a convenient web-based computer application for data entry, and gives school administrators a practical process for using information for decision making. These important elements of SWIS give schools the ability to evaluate individual student behavior or multiple students' behavior. The reports generated by SWIS show times and locations that problems occur, and presents the ODR information in multiple ways. For example SWIS can be generated that show the total ODR per location, total ODR per teacher, total ODR per student, etc. (<http://www.swis.org/index.php>).

Our data from the SWIS system includes all schools in the Bethel and 4J school districts that are currently implementing the PBS program and using the SWIS system. The data set contains information concerning every ODR recorded in the system since 2000 until March of 2004 for some schools. Each entry includes the school NCES ID, the student ID, educator ID, referral date, referral time, referral minute, school year, the location where the incident occurred, the problem behavior that occurred, the motivation

for the event, other people that were involved, the discipline decision by the school administration, the number of day suspended and whether the student was expelled. This information will be used to track the reduction in the number of ODRs issued during the implementation process of PBS.

Coupled with the demographic and implementation data we hope that we can provide a clear model that will be useful to other school districts that want to implement the PBS program. One issue is that schools began recording their ODR information at the time of PBS program implement. Thus, there isn't a non-PBS baseline for comparison within our dataset. We can only use the SWIS data to show the behavior of the ODRs as the program was implemented, we cannot show the before and after results. All schools keep records of ODRs to monitor student behavior and the effectiveness of any disciplinary action taken. The analysis of these records can lead to policy changes within the school. A problem with ODRs, however, is the way that a school defines and chooses to use them. For each school a behavior by a student could warrant a different response by the administration because of different policies or relationships between students and administrators (Sugai et al., 2000).

The NCES is the primary federal agency that collects and analyzes data that is related to education in the United States. From the NCES we received the results from the Common Core of Data Public Elementary/Secondary School Universe Survey for the 1998-1999, 1999-2000, 2000-2001, 2001-2002 school years. This survey consists of data that is submitted annually to the NCES by state education agencies in the 50 states, the District of Columbia, and other American territories. The purpose of this survey is to provide a listing of all schools and agencies providing free public education at the

elementary and secondary levels in the U.S. and the associated territories, and basic descriptive statistical information on each school or agency listed.³

While the NCES attempts to provide data that is comparable throughout different states and school years there has been change to variable names and additional fields added that are helpful to our regression. As a result there are a few variables that occur in 2000-2001 that don't appear in 1999-1998. There were many variables that described the characteristics of each school in each year, and we chose to use variables that showed different characteristics of the school, the make-up of the student body, and the amount of staff.

We used the ID number assigned by NCES (NCESSCH) as the unique identifier for each school. NCESSCH was also used as an identifier for each school in the SWIS data so we used it to merge the two data sets together. Because not every school had a NCES code present in the SWIS data set, we lost some observations when we combined the two data sets. The name of the school (SCHNAM) was included for our benefit; it makes the identification of schools easier within the data set. The variable TYPE is a dummy variable that describes the kind of institution the school is. If TYPE equals; 1 then the institution is a regular school, 2 then the institution is a special education school, 3 then the institution is a vocational school, and 4 then the institution is a other/alternative school. This variable was included to measure the effect of PBS in each type of school; the different characteristics of the students, curriculum, and staff could have a significant influence on the implementation of the PBS program. In addition to the type of school the level of school was also included in the data set. This variable divides the schools into

³ Documentation to the NCES Common Core of Data Public Elementary/Secondary School Universe Survey

four categories: primary (PK – 3rd grade, Pk - 8th grade), middle (4th grade – 7th grade, 4th grade – 9th grade), high (7th grade – 12th grade, 12th only), and other (any other configurations of grade levels not included in the three categories above; including ungraded). The effects of the PBS program may vary across grade levels since the peer effects are more prevalent in the lower grade levels (Lazear, 2001), so it is important to capture these effects in our regression model. To capture the different effects of the location of the school the dummy variable LOCALE was included in our data set. Each value of the variable was equal to a number, 1 through 8, represented the distance of the school from a city and the size of the city the school was close too; a larger number indicates that the school is closer to a population center. The total number of students in each school was also included in the analysis, to see if larger schools had different ODR effects. We also chose to include the pupil to teacher ratio (PUPTCH), making the assumption that the larger the ratio the harder the implementation of the PBS program could be. All of these variables were included in our data set to uniquely identify each school and give information about their characteristics.

To catch the differences in the characteristics of the student body we included three different descriptive variables from the NCES data set. To account for the different income levels we use the number of students eligible to participate in the Free Lunch Program (FRELCH) and the Reduced-Price Lunch Program (REDLCH) as explanatory variables in our study. Students from families, which have a combined income under a certain level, are included in this variable. To capture the ethnicity membership of the school we include the total ethnicity of the school with the variable (TOTETH). This variable accounts for all students who do not self identify as White or Caucasian. These

variables will be used to explain the different demographics of each school within the study. This will account for variances in the number of ODRs issued because of different characteristics of the schools, i.e.: the pupil to teacher ratio.

The PBS implementation data comes from the results of the school-wide evaluation test (SET) survey, which is given to all participating schools. There are seven feature areas on which the SET grades the school:

- Expectations defined
- Behavioral expectations taught
- Acknowledgement procedures
- Correction procedures
- Monitoring and evaluation
- Management
- District-level support

In addition to the SET measures, we are also using a simple chronological measure of time since PBS implementation.

5. Methodology

After consolidating the ODR data by school and year, there were a total of 92 observations. This includes observations from 31 schools, an average of just fewer than 3 observations per school. A simple examination of the raw data on ODRs per student for schools over time indicates that there was no evidence of a downward trend. Indeed, it seems that in general, ODRs tended to increase (see Exhibit 2). Adding the NCES data to the ODR data caused the loss of some data points: there were three schools for which

there was no NCES data, and at the time that this paper was prepared, NCES data for 2002-03 had not been released, and we used historical data to make an estimate of 2002-03 figures. After dropping those schools for which NCES data was not available⁴, our observations numbered 84.

The next step was the attempt to combine the implementation data into the current dataset. There was one school for which there was no SET implementation data, and two more observations were lost, leaving us with 82 observations remaining. For several other schools, implementation data did not exist for some years; we interpolated these numbers using the available data.

There were some obvious outliers in the data which remained; schools which had 1 or 2 ODRs recorded for the first year, and over 1,000 ODRs recorded for the subsequent years (for an example, see Exhibit 3); other schools had ODRs fluctuating by a tremendous amount from year to year. After dropping these data points, our total number of observations for this data set was 74. Sixteen of these 74 observations are of middle schools (grades 6-8) and the remainders are elementary schools.

The elimination of the non-useful observations and the outliers was necessary in order to produce a meaningful interpretation of the data. In performing our analysis, it is desirable to have many observations of the same school in different years. However, the necessary elimination of certain observations decreased the proportion of schools for which we have four or five years of data (see Exhibit 4).

This 75-observation dataset is the one that was used to run our regressions and analyses. First, we looked at ODR trends by dividing the schools into two groups: those

⁴ The schools without NCES data had to be dropped, because without NCES data, we had no information on the school's size or composition (i.e., percentage of students eligible for free or reduced lunch).

schools which showed decreases in ODRs per student during the period in which they were surveyed, and those schools in which ODRs per student increased during the period in which they were surveyed. The results indicated that the greater number of schools experienced increases in ODRs per student, and that the mean change for increasing schools was greater than the mean change for decreasing schools. The breakdown is shown in Exhibit 5.

6. Regression analysis

The analysis up to this point had been a simple comparison of ODRs per student and whether they increased or decreased over time. The next step was to create a regression, and control for changes in school demographics. In order to control for other effects, we added variables that are likely to affect the number of ODRs per student a school is likely to experience. The variables which we believed to be most important were the pupil to teacher ratio, the percentage of students on free or reduced lunch, whether the school was a middle school or a grade school, the ethnic/racial makeup of the school, the number of students in the school⁵, the school's location, and some function of the implementation measures. In addition, we included dummy variables to keep track of years since PBS was implemented, to see if time since implementation (independent of survey results) was significant in explaining variation in ODRs.

There are a variety of options in choosing how to use the implementation measures in the regression: they could be used as individual variables, to see how they

⁵ Adding the number of students to a school when we are already measuring ODRs per student may seem redundant. However, it's addition is not to directly test whether or not more students lead to more ODRs, but to test whether or not larger schools (not to be mistaken with larger class sizes) have an effect on student problem behavior.

affect ODR behavior individually, or they can be combined into one term, either multiplicatively or additively. We tried using both of these methods, and several variations on each, to see which was the best fit for the data. The initial regression ran with separate variables for each implementation measure and including dummy variables for years since implementation did not yield any significant coefficients on these variables (these results are shown in column 1 of Exhibit 6). This indicates that trends in ODRs per student are relatively uncorrelated with both times since implementation and degree of implementation.

The next regressions were run including either the PBS implementation measures *or* dummy variables for years since implementation. These tests also did not result in significant coefficients on the relevant variables (columns 2 and 3 of Exhibit 6).

The next regression used a combined PBS implementation term, created by taking the average of the seven-implementation measures. This regression resulted in slightly higher adjusted R-squared and F-statistic values than the previous regressions, indicating that this regression was more significant in explaining variation in ODRs. However, the coefficient on the combination variable was still not significant. In fact, the sign on this coefficient was positive, indicating that increasing PBS implementation increases ODRs (see column 4 of Exhibit 6). The next regression (column 5 of exhibit 6) was the same as the previous regression, only without three of our control variables. Dropping these variables did not significantly affect the coefficient or significance of the PBS implementation variable (the usefulness of our control variables will be discussed later).

In our next regressions (columns 6 and 7 in Exhibit 6), we changed our dependent variable from “ODRs per student” to “serious ODRs per student”, which counted only

those ODRs which were for more serious offences. We considered serious offenses to be incidents of drug and alcohol use, vandalism and bomb threats. Categories, such as dress code infractions, that could be considered accidental rather than pre-meditated. Once again, the coefficient on the PBS implementation variable was not significant.

Multiplicative and other combinations of the PBS implementation variables were tried, but these regressions did not give significant results, and often had coefficients that were virtually meaningless. For this reason, we believe that using a simple average of PBS implementation measures is one of the best ways to measure the implementation level of the program.

It is useful to note that our control variables seem to indicate that our model is working correctly. For example, the coefficient on the “free and reduced lunch” variable is significant, and its sign (positive) is in the direction we expect in all regressions. However, as mentioned before, we decided to drop the non-white student, member, and locale variables for some of our regressions. We dropped these control variables for several econometric reasons. First, the data we received from our previous tests indicated that these variables were not significant. Second, when these variables were removed, they did not appear to grossly bias any of our coefficients, and our R-squared values increased. Third, and most importantly, we did not have a strong theoretical reason for leaving these variables in the model. The fact that our model is reacting to our variable changes in a reasonable way, along with our relatively high F-statistics, indicate that these regressions are significant in explaining variation in ODRs.

Throughout the regression analysis, no evidence emerged that either time since PBS implementation or an increase in implementation measures had a significant effect

on ODR behavior. The data indicates that PBS does not decrease ODRs per student for those schools for which it is implemented. There are some factors which seem to make this conclusion less conclusive: For all of the schools in our dataset, we had only a few years of data; this may not allow us enough time to see long-term trends develop. And the fact that some schools (the outlier schools, which were dropped) appeared to have recorded their data incorrectly leads us to question the reliability of the data collection procedures.

Even with these problems in our dataset, there is no real reason to believe that our conclusions are incorrect. Very likely, the incorrect reporting of ODR data is a random error, and has no systematic effect on our analysis. Longer datasets (more years of data for each school) would be very valuable in searching for trends, but with the data and trends that we currently have, there is no reason to conclude that this would have a systematic effect on our analysis.

7. Conclusion

Unfortunately, it seems that ODR measurement is not an effective way to assess the effectiveness of the PBS program. There is no indication that either initial implementation, time since implementation, or progress towards full implementation will decrease the ODRs that a school experiences.

There are some steps in data collection that could be taken to make future analyses more conclusive, as detailed below.

Collect ODR data before PBS is implemented: The analysis we performed had virtually no baseline; there were very few schools that had reliably collected ODR data

prior to the implementation of PBS. It is possible that the existence of several years of baseline data, prior to PBS implementation, would lead to different results when analyzing the effect that the program has on ODR behavior.

Ensure that ODR data is collected reliably right from the start: There were several observations which we had to drop because ODR data had apparently not been recorded correctly during the first year in which data was collected; these were the schools which went from one or two ODRs in the first year to 1,000 ODRs in the second year. The loss of this data harms the significance of any analysis. It would be worthwhile to look into the measures that are currently in place, and find better ways of insuring that data is collected correctly.

It is important to realize that in the end, our study did not have findings that found PBS to be ineffective. Our study determined that, with the data set that we used for our analysis, using ODRs to assess the effectiveness of the PBS program was inappropriate. The inconsistencies the data made it difficult to get a clear estimate of the long-run trend of ODRs. Since ODRs are a policy tool used in the implementation of the PBS program a more appropriate method of estimation would be to use estimators that capture the occurrences of vandalism, teacher turnover, and student/teacher absences. Hopefully our suggestions for data collection and preferred estimators will be a useful tool for future studies on the effectiveness of the PBS program.

Appendix

Exhibit 1

Photo Courtesy:

http://pbis.org/english/Schoolwide_PBS.htm

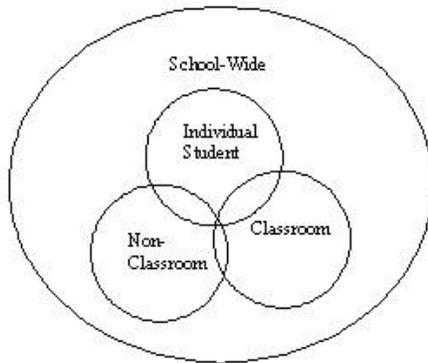


Figure 1- Four systems of a school-wide approach to discipline.

Exhibit 2

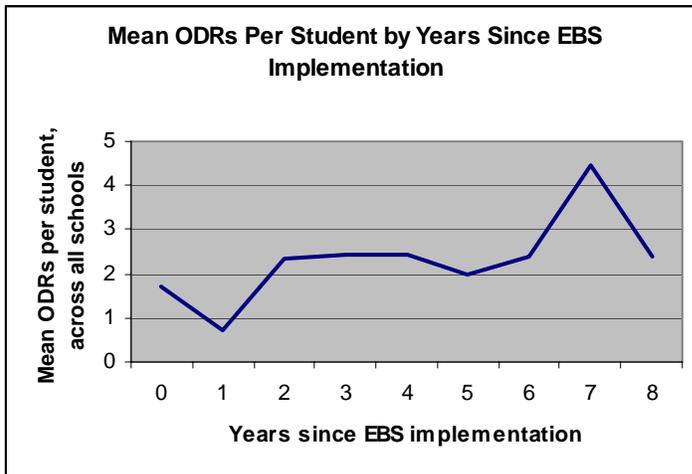


Exhibit 3

Example "outlier school"	
School Year	ODRs
1998-99	11
1999-00	561
2000-01	0
2001-02	1
2002-03	804

Exhibit 4

Initial Dataset (yearly)	
Years of ODR data	Number of Schools
1	4
2	7
3	7
4	11
5	2
31 schools 92 observations	
Final Dataset (yearly)	
Years of ODR data	Number of Schools
1	5
2	7
3	6
4	8
5	1
27 schools 74 observations	

Exhibit 5

Mean ODR changes, by increase or decrease in ODRs	
Number of schools which showed an increase in ODRs/student over the observation period	14
Mean increase per school	1.53 ODRs per student
Number of schools which showed a decrease in ODRs/student over the observation period	8
Mean decrease per school	.97 ODRs per student

Exhibit 6

	Annual Total ODRs per Student	Annual Serious ODRs per Student	Annual Serious ODRs per Student				
pbsyear1	-0.660 (1.558)	-0.667 (1.106)					
pbsyear2	0.662 (1.240)	0.539 (0.943)					
pbsyear3	0.677 (1.218)	0.638 (0.930)					
pbsyear4	0.701 (1.288)	0.528 (0.953)					
pbover4	0.464 (1.245)	0.594 (0.898)					
<u>PBS implementation</u>							
Expectations defined	0.019 (0.012)		0.016 (0.011)				
Behav. expc. taught	-0.016 (0.013)		-0.011 (0.012)				
Rewards system	0.019 (0.016)		0.019 (0.015)				
Violations system	-0.014 (0.017)		-0.006 (0.016)				
Monitor and evaluation	-0.006 (0.018)		0.001 (0.016)				
Management support	0.040 (0.030)		0.036 (0.027)				
District-level support	-0.353 (0.027)		-0.031 (0.025)				
Combination (average)				0.025 (0.015)	0.024 (0.014)	-0.005 (0.003)	-0.001 (0.004)
<u>Control Variables</u>							
Free/red. lunch (%)	3.440 (1.310)	3.344 (1.221)	2.984 (1.239)	3.035 (1.181)	2.765 (1.177)	1.103 (0.256)	1.250 (0.277)
Pupil to teacher ratio	-0.128 (0.115)	-0.142 (0.111)	-0.135 (0.110)	-0.148 (0.105)	-0.142 (0.101)	0.028 (0.023)	0.025 (0.025)
Middle school	-1.125 (0.747)	-0.716 (0.602)	-0.888 (0.674)	-0.672 (0.624)	-0.472 (0.533)	0.505 (0.135)	0.334 (0.132)
Non-white student (%)	-0.004 (0.007)	-0.003 (0.007)	-0.004 (0.007)	-0.003 (0.007)		0.005 (0.001)	
Number of students	0.005 (0.007)	0.003 (0.007)	0.005 (0.007)	0.004 (0.007)		-0.005 (0.001)	
Locale	0.115 (0.147)	0.107 (0.138)	0.106 (0.142)	0.081 (0.134)		0.050 (0.029)	
Observations	74	74	74	74	74	74	74
Adjusted R ²	0.1514	0.1852	0.1951	0.2263	0.2505	0.3973	0.23
F-stat (p-value)	1.71 (0.065)	2.51 (0.011)	2.34 (0.013)	4.01 (0.001)	7.02 (0.000)	7.78 (0.000)	6.44 (0.000)

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Suggested Supplements:

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