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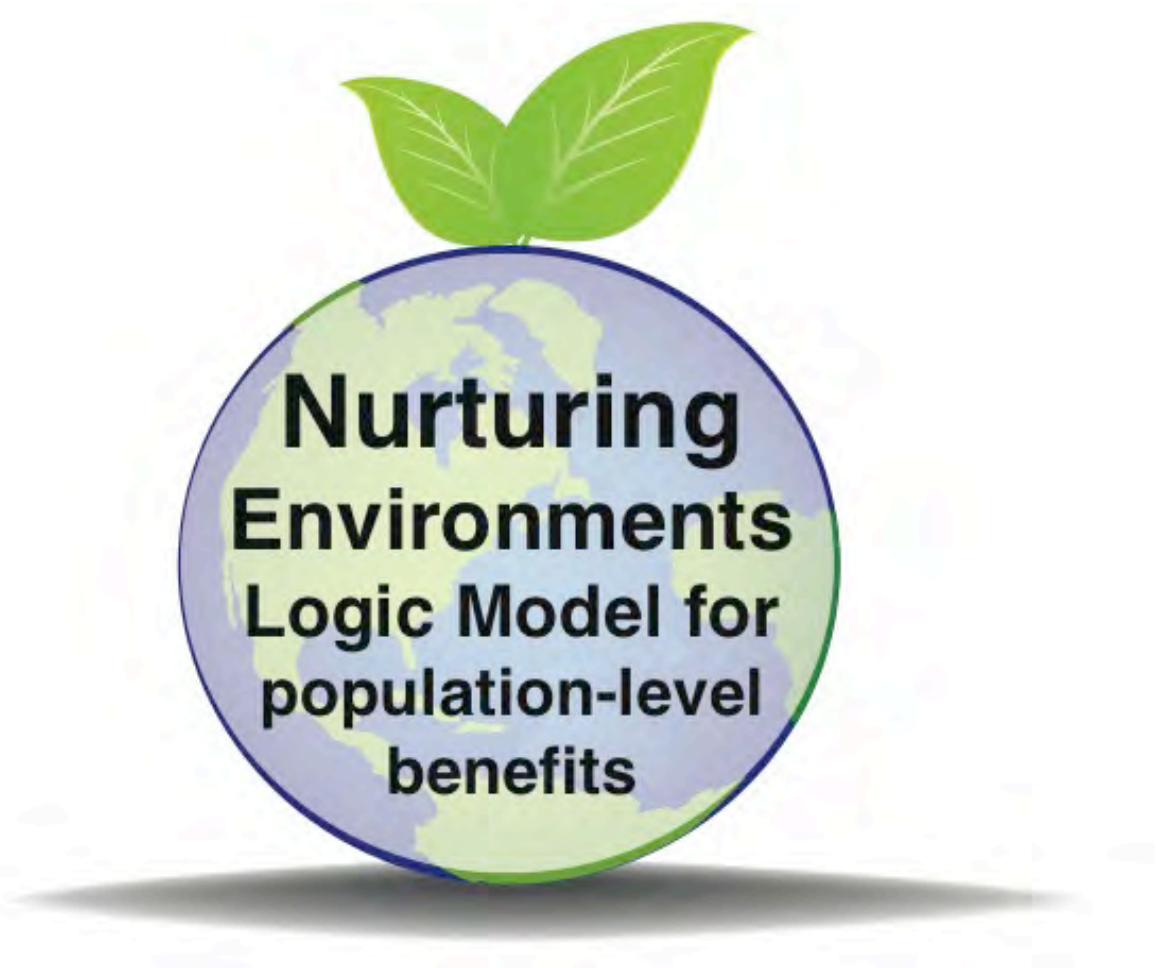
A Public-Health Approach to Create Nurturing Environments in Schools: A Case Example of the PAX Good Behavior Game



Nurturing Environments(1, 2) can achieve population-level protection human developmental outcomes by richly reinforcing pro-social behavior, limiting problematic behaviors, reducing toxic influences, and increasing psychological flexibility widely in homes, schools and community settings. This is a case example of how to do so, based on multiple experimental tests and experiences.

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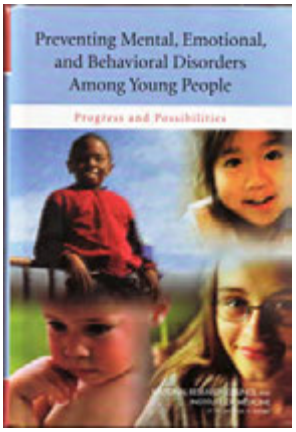
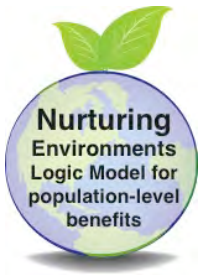
The Critical Role of Nurturing Environments in Human Development: An Act of Conscious Intention Made Real



The 2009 Institute of Medicine Report on the Prevention of Mental, Emotional, and Behavioral Disorders Among Young People (*3*) provided profound evidence that virtually every mental, emotional and behavioral disorder may be preventable. The IOM report details powerful, evidence-based strategies proven to achieve that goal, which may be downloaded at http://bit.ly/IOM2009. The Nurturing Environments paper provides core principles to act upon to achieve that goal.

A. Nurturing Environments Framework

In an issue of the *American Psychologist (1)*, four noted prevention scientists introduced an important conceptual framework for understanding how to protect against, prevent, avert or reduce the array of related mental, emotional, behavioral and related physical disorders among contemporary child, youth and young adults. Here is the abstract of the paper:



The recent Institute of Medicine report on prevention (National Research Council & Institute of Medicine, 2009) noted the substantial interrelationship among mental, emotional, and behavioral disorders and pointed out that, to a great extent, these problems stem from a set of common conditions. However, despite the evidence, current research and practice continue to deal with the prevention of mental, emotional, and behavioral disorders as if they are unrelated and each stems from different conditions.

This article proposes a framework that could accelerate progress in preventing these problems. Environments that foster successful development and prevent the development of psychological and behavioral problems are usefully characterized as nurturing environments.

- *First, these environments minimize biologically and psychologically toxic events.*
- *Second, they teach, promote, and richly reinforce pro-social behavior, including self-regulatory behaviors and all of the skills needed to become productive adult members of society.*
- *Third, they monitor and limit opportunities for problem behavior.*
- *Fourth, they foster psychological flexibility, and the ability to be mindful of one's thoughts and feelings and to act in the service of one's values even when one's thoughts and feelings discourage taking valued action.*

The evidence is reviewed to support this synthesis and describe the kind of public health movement that could increase the prevalence of nurturing environments and thereby contribute to the prevention of most mental, emotional, and behavioral disorders. This

article is one of three in a special section (see also Muñoz Beardslee, & Leykin, 2012; Yoshikawa, Aber, & Beardslee, 2012) representing an elaboration on a theme for prevention science developed by the 2009 report of the National Research Council and Institute of Medicine.

This article can be downloaded at http://bit.ly/NurturingEnviron. More information may also be found at www.nurturingenvironments.org.

The Nurturing Environments framework is more flexible and inclusive, with greater sensitivity to context, than lists of 20-to-50 specific risk or protective factors. For example, common lists of risk and protective factors don't include the risk impact of historic disparities or dietary deficiencies on epigenetic mechanisms or the protective effects of evidence-based practices as environmental strategies. The quadrant is highly responsive to inherently cultural differences, as they are metaphorically like the four amino acids that scaffold DNA.

B. Why Nurturing Environments in Classrooms and Schools

The Nurturing Environments model focuses on triadic domains of development: family, school, and community because their documented evolutionary and developmental significance in both longitudinal and experimental studies, as well as cross cultural anthropological studies that inform us much about the evolution of human behavior in societies. Around the age of 5 in most cultures, children start spending most of their waking hours in the company of other children

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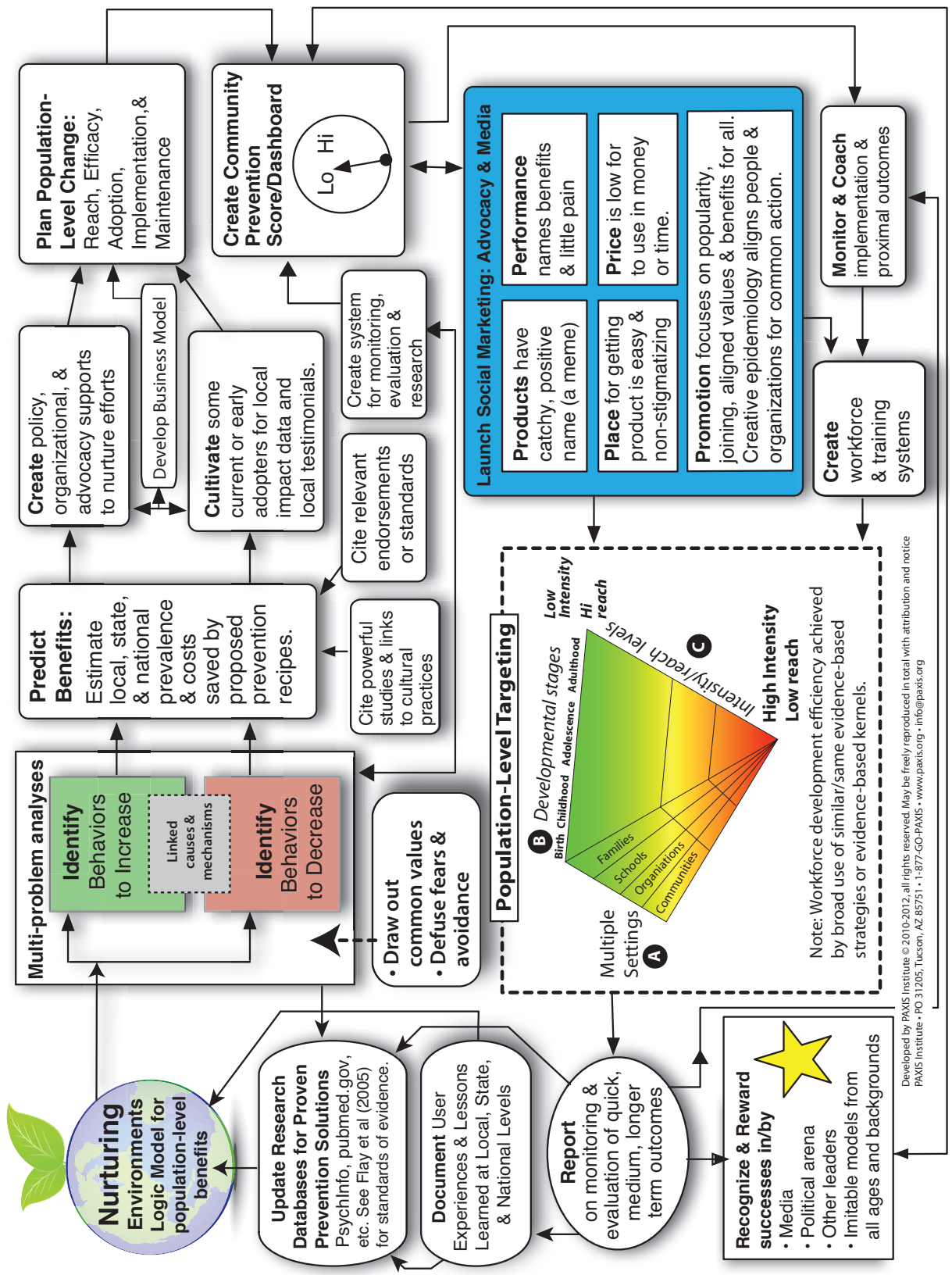

See: Biglan, A., Flay, B. R., Embry, D. D., & Sandler, I. N. (2012). The critical role of nurturing environments for promoting human well-being. American Psychologist, 67(4), 257-271.

C. Map the Multiple Proximal, Medium-Term, and Long-Term Outcomes Predicted From the Localized Application

The Table below is the basis for a worksheet, which helps map the localized implementation (based also on developmental and longitudinal studies) that account for risk or protection. We provide some examples in the table.

Table 1: Example Predicted Measures

Temporal Sequence	Outcomes to Increase	Outcomes to Decrease
Immediate/Proximal	• *Sustained attention* • *Peer attention for prosocial peer behaviors* • *Bids for positive attention based on prosocial behavior* • *Noticing positive group behaviors by peers and adults*	• *Disturbing, disruptive, inattentive behaviors* • *Transition time Peer and adult attention to negative behavior* • *Harsh or punitive vocalizations* • *Emotional outbursts* • *Withdrawal Illness behaviors*
Medium-Term	• *Attendance by children and adults* • *Peer efforts to support and include new children or excluded children* • *Benchmark tests scores or early indicators of increased academic success* • *Teacher and parental reports of student mental, emotional, and behavioral disorders* • *Improved biological indicators of health such as BMI, self-reported well being/happiness*	• *Visits to school nurse or school clinics* • *Complaints about illnesses Referrals for clinical or support services* • *Vandalism or stealing* • *Teacher and Parent reports of increased prosociality and other competencies by students.* • *Lower indicators of physiological indicators of mortality and morbidity (e.g., dinural cortisol) that effect epigenetics.*
Longer Term	• *Higher standardized test scores Improved indicators of resiliency* • *Matriculation from HS and increased university entry* • *Delayed vaginal intercourse*	• *Lower placement in special education services* • *Lower rates of diagnoses for mental, emotional, behavioral, and related physical disorders* • *Lower levels of risk sex Lower arrest, drug, mental illness and suicide cases*

D. Create Evidence-Based Predictions of the Impact Locally

Published research outcomes on PAX GBG are impressive, of course. The outcomes are more impressive when translated to your setting. Political leaders, educational leaders, policy advocates want to know how this will be benefit US (the people) in the political division. PAXIS institute has good templates for this, based on the numbers of grade-one children in your political division. Current research shows that PAX GBG can benefit ANY grade level in terms of reducing problematic behaviors and increasing academic engagement. Only the first-second grade data can be used to forecast lifetime benefits with any scientific integrity. The following is a sample of predicted benefits for 1,000 grade-one children some 20 years later based on current outcome publications.

Table 2: Estimated Impact per 1,000 First Grade Children by Age 21

Numbers	Sample Outcome Indicators
86	Fewer young people will need any form of special education services
56	More boys will likely graduate from high school.
67	More boys will likely enter university
89	More girls will likely graduate from high school
69	More girls will likely enter university
10	Fewer young people will commit and be convicted of serious violent crimes
96	Fewer young people will develop serious drug addictions
66	Fewer young people will become regular smokers
35	Fewer young people will develop serious alcohol addictions
49	Fewer young women will contemplate suicide
66	Fewer young men will contemplate suicide

Across the 1,000 students affected as they grow to adulthood, current U.S. cost-benefit analyses show that each child, his or her family and community will accrue about $13,050 in net benefits (*4*). The documentation at the Washington State Institute for Public Policy could be used to customize projections in other countries, based on local cost data. The predicted benefits should be linked to current and localized cultural practices to the maximum extent possible, including other cost-studies published about local conditions and trends. In context of these cost benefits, it is extremely useful and important to link the outcomes to current standards, other initiatives and even consensus endorsements. For example, a government may have an initiative to reduce social determinants or historic disparities, which PAX addresses.

A sensitivity is that other stakeholders may see this effort as "competition", and its far better to build links of expanding mutual interests. For example, many political jurisdictions in the US have Positive Behavioral Interventions and Supports (PBIS) or other education initiatives, whose supporters might object that PAX competes with. These issues require diligence to understand how strategies interact so that diverse support emerges.

PAXIS Institute has an estimator that localities can use to make projections of likely impact for any number of first grade children. Localities need to ascertain the number of first graders in the local education agencies (LEA's) that that a proposed for the project

timeline. The figure below is the estimator, which will be available as "Flash" utility on line in late 2014 on GoodBehaviorGame.org. Otherwise, call PAXIS Institute and we can easily run the numbers for you. Here is an example calculation a real school district.

Figure 1: Example of an Actual Larger School District Impact Using Its Actual 1st Grade Enrollments

Predicted Benefits of PAX GBG in Your School, District, or Community When First Grade Students Reach Adulthood After 1-2 Years of PAX GBG Exposure*

Enter number of First Graders at school, district or community>>>>>>	**1,846**	**<<< Enter number of First Graders**

159	Fewer young people will need any form of special education services
103	More boys will likely graduate from high school.
123	More boys will likely enter university
164	More girls will likely graduate from high school
128	More girls will likely enter university
18	Fewer young people will commit and be convicted of serious violent crimes
177	Fewer young people will likely develop serious drug addictions
121	Fewer young people will likely become regular smokers
65	Fewer young people will likely develop serious alcohol addictions
90	Fewer young women will likely contemplate suicide
121	Fewer young men will likely attempt suicide

$24,034,920	**Predicted financial net savings to students, families, schools, communities, state/federal governments**
$23.67	**Estimated Cost of PAX GBG Materials Per Child for Lifetime Protection**
$22.00	**Estimated Cost of External Training & Technical Supports Per Teacher Prorated per Child's Lifetime**
$26.80	**Estimated Cost of Internal Supports for Implementation and Maintence by Teachers Prorated per Child's Lifetime**

Note: The forecasts are based on multiple randomized, longitudinal control trials of the active ingredients of this evidence based practice. Benefits will vary as consequence of the quality of implementation, training, supports, commitment, and other variables; the predicted impact is greater for first-grade children with higher entering risks for internalizing and externalizing disorders. The cost-savings and lifetoime benefits increase if trained teachers use this evidence-based based strategies in succeeding years for new entering cohorts of grade one children. While PAX GBG has well-documented immediate benefits for students, teachers and schools in other grades, limited randomized longitudinal data exist to forecast similar benefits for other grades at this time.

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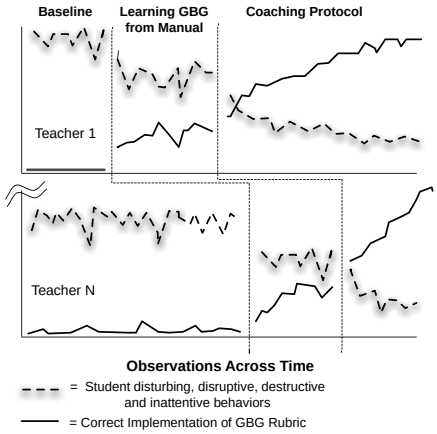
E. Create a Credible Local Demonstration Project.

PAX GBG has the rate ability to be easily replicated in rather quickly, and produce important scientifically proven indicators of success. A credible local demonstration project has the added value of helping build local capacity, with modest costs. Major new, large initiatives in large educational agencies political divisions, countries should only be undertaken after a credible local demonstration for any number of reasons. The credible local demonstration can be organized as follows:

An interrupted time-series (multiple-baseline) across classroom sites is an excellent choice.

What is a multiple-baseline? A "multiple baseline" design tracks more than one subject or group, behavior, or setting over time repeatedly and, following a baseline (before-intervention) condition, intervenes in each case, but at different or staggered times (*5-12*). "Baseline" in a "multiple baseline" study has two meanings. First, as with all designs, it refers to pre-treatment or existing conditions — the conditions that existed before the intervention or new treatment is imposed. Second, in a "multiple" baseline design, it refers to a particular subject or group, behavior, or setting that will be tracked throughout the study, independent of other "baselines."

Figure 2: Example Multiple Baseline



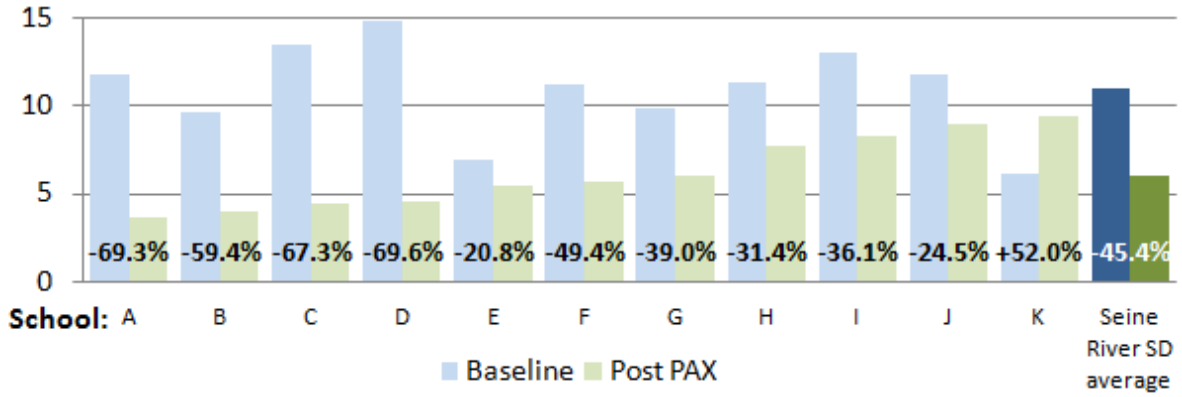
A "multiple baseline" design usually has the following characteristics: Two or more directly observable, well defined phenomenon are tracked throughout the study (called baselines); and the baselines can represent *different subjects* (e.g., people, families, groups, or communities), *or different behaviors* (e.g., paying attention, doing a task, not selling tobacco), or some combination of subjects and behaviors. Some characteristics hold true: Each baseline is tracked for an extended period before any intervention; After a stable and/or predictable pattern of baseline has been established, intervention is introduced to ONE of those baselines. The other baselines are left alone but tracked. After a stable and/or predictable pattern of performance has been established with the behavior to which intervention (treatment) was applied, the intervention (treatment) is applied to a second baseline.

One way to conduct a multiple-baseline is across grades levels across schools. This was the model of demonstration project in Manitoba in one school division of 12 schools, a substantial number of which are Francophone schools as was English speaking. Thus the observations and implementation were staged sequentially from grade one through grade 6 or 8, depending being an elementary or K-8 school.

The demonstration project happened during the last 10-weeks of the school year, with a training of grade-one teachers with administrators over two days with accredited national trainers, who then went to the 12 sites to up start up PAX in grade one and meet briefly the other teachers. Later, the grade one teams and their administrators helped other grades implement. Figure 1 shows the results on disturbing, disruptive, and inattentive behaviors (spleems) for all grade one classrooms among the 12 schools. Figure 2 shows the staged

effects across all grades during the 10 weeks, with the older students have on a few weeks of exposure from baseline to post training.

Figure 3: Average number of spleems per child per hour and per cent change in grade 1 classrooms in Seine River School Division, Spring 2011

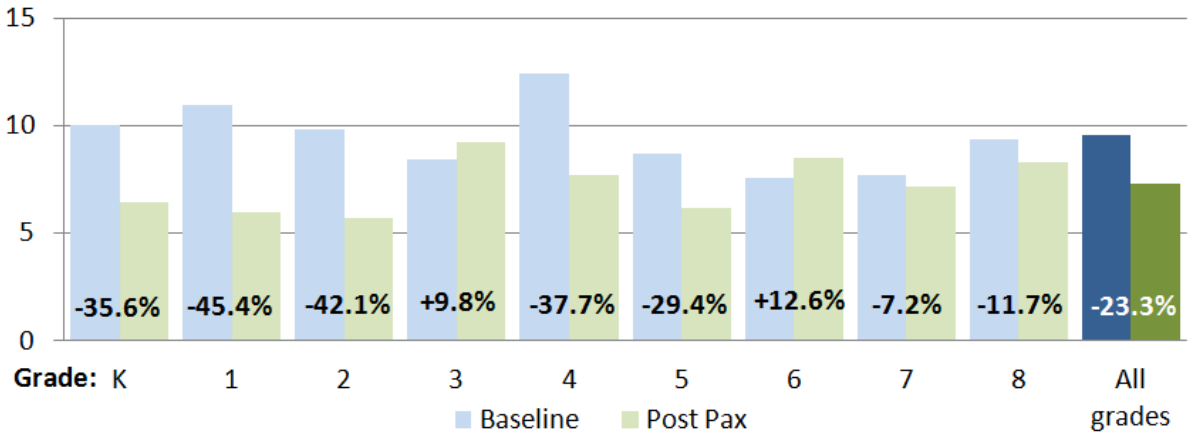


Note that one school, site K, had an increase in problematic behaviors compared to 11 that had a significant decrease. School K sustained a dramatic loss of administrative leadership about a month before school ended, and previous data from many sites shows that such problematic behaviors normally increase at the end of the school year. This is reminder that even the most proven evidence-based practice cannot necessarily overcome organizational or personal crises that happen as efforts are scaled up. Nevertheless, this was enough to persuade Provincial authorities to proceed with a provincial rollout, because this level of consistent change seen in behavior at the end of the school year had never been documented previously. The strength of the reduction did vary as a function of the enthusiasm of implementation.

Remember a key motto from Silicon Valley: Failure can teach you more than success. The reason that PAX GBG is largely successful in implementation today is because of the failures in the past that illuminated problems that were likely to crop up in the real world, which get covered over in "hot house" early studies where tons of resources are devoted.

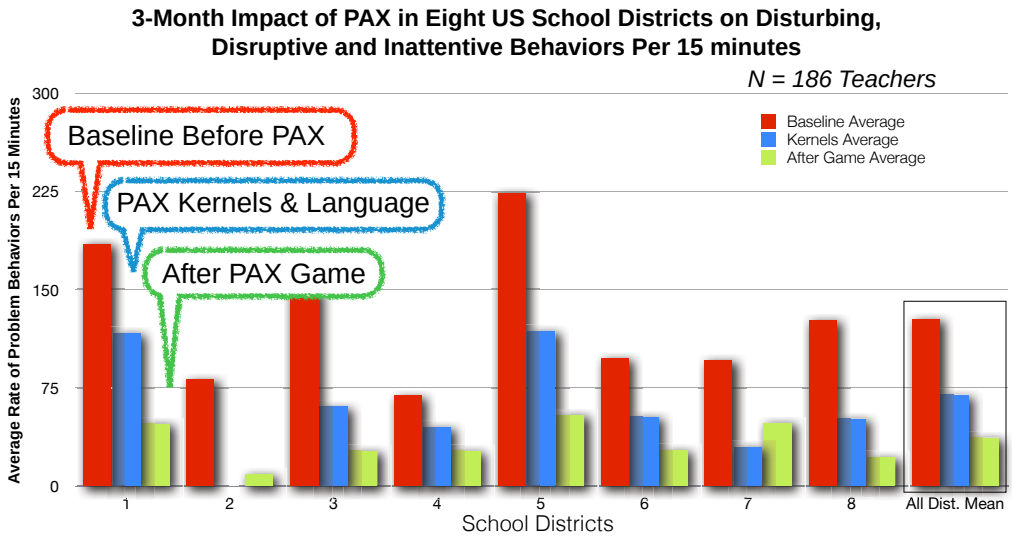
Testing PAX for Acceptability and Usability Before Extensive Translation. An important aspect of this demonstration involves use of PAX in the context of another language. Only the PAX materials used directly with children were translated into French, such as Tootle Notes, Posters, the See, Hear, Feel, Do Posters, Desk Cards, etc. in the interest of time. The training of teachers and staff was conducted in English. All of the trade names used in PAX GBG such as PAX™ (peace, productivity, health and happiness), Spleems™ (unwanted behaviors), Tootles™ (the opposite of tattles, which are written compliments), etc. staid the same. Subsequent to the successful demonstration project, the teachers' manual and related materials including training slides were translated into French so that training and lessons could be provided easily delivered in the two official languages of Canada, English and French. Manitoba is the second largest concentration of francophone speakers in Canada.

Another function of the demonstration project was examine proof of concept for using PAX GBG in other grades, which was likely to become a request based on experience in other jurisdictions based on the success rollouts in grade one. While



The intervention process is repeated to all the baselines, each at a different point in time. Generally, once a treatment has been applied to a behavior, it is NOT terminated or removed. Here is an example of an illustration of multiple-baseline for a few teachers, testing the coaching or mentoring model. A real such study was done that served two purposes: 1) helping improve the manual so that more teachers were able to implement effectively with just the manual, and 2) to improve the effectiveness of coaching with the revised manual.

The example below is a summarized multiple baseline across 186 teachers in 8 diverse school districts. This is an example of a great policy presentation of a demonstration project over the course of three months proving that PAX GBG could be implemented rapidly with modest mentoring. That demonstration project led to a policy to implement PAX more widely in the United States. Here is the graph.



A carefully constructed demonstration project can avert many problems in large-scale population implementations of an evidence-based practice like PAX GBG.

F. Suggested Measures for a Demonstration Project

A demonstration project is not just for show in the context of planning larger implementations for school districts, communities, provinces/states, or even nations. It is a serious effort to discern what adaptations might be necessary for the social-cultural context, how PAX GBG can be best integrated with existing programs and practices, and to show that proximal benefits of PAX GBG are replicable and acceptable in the context of the community or communities. While this strategy is perhaps the single most scientifically proven strategy across cultural contexts (*13*), understanding potential fits and grit in implementation are important so that PAX GBG can be fine-tuned for maximum benefits for the children, staff, and families who are the intended beneficiaries. PAXIS Institute suggests the measures for a demonstration project:

- Repeated direct observation of disturbing, disruptive, inattentive and unwanted behaviors (Spleems) using the standardized definitions and data system (available from PAXIS).
- Repeated direct observations of implementation of PAX GBG using the PAX GBG Rubric (*14, 15*), also available from PAXIS.
- Weekly collection of No-Carbon Required (NCR) PAX Scoreboards, including calculated PAX Minutes.
- Pre-implementation survey/interview with staff of what they wish to see, hear, feel, and do more and less of in their classroom/school.
- Post-implementation survey/interview with staff of what they wish to see, hear, feel, and do more and less of in their classroom/school.
- *Suggested option*: Teacher completed Strengths and Difficulties Questionnaires on students pre and post (freely available in most languages at SDQinfo.org)
- *Suggested option*: Consumer satisfaction survey of staff
- Suggested *option*: Monitoring of relevant student indicators as appropriate to setting before during and after implementation, such as…
    - Attendance
    - Behavioral incidents, nurses office visits, or office referrals
    - Benchmark or academic scores that might be repeated measures
- *Suggested option*: Student interviews or surveys before and after about key behaviors

G. Cultivate Local Impact Testimonials Via Early Adopters.

A demonstration project needs not only to collect reasonable proximal data as above, but also capture written and oral testimonials from users for future training and recruitment. The budget should include funds for such videos produced by reasonably skilled persons. Example videos for the above eight districts can be downloaded to show others here: http://bit.ly/PAX-8-Districts. More videos are available at http://paxis.org/news/videos that involve First Nations and Francophone schools, as well as the interviews before and after implementation in the Manitoba demonstration effort involving 12 schools (Seine River School Division). Interviews with children (pairs) are exceptionally powerful, and parent stories can likewise be powerful. A most