

SCHOOL QUALITY, SAFE SCHOOLS: AN EMPIRICAL ANALYSIS

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1. INTRODUCTION

American public schools are among the safest places for both children and adults (see for example, Verdugo 2000a). Data from the U.S. Department of Education's annual survey of school crime and violence point out as much (Devoe *et al.* 2002). Between 1992 and 2000, for example, non-fatal crimes in schools declined from 3.4 million to 1.9 million, or a decline of 43 percent. In addition, the percentage of students ages 12-18 who reported being a victim at school declined by four percentage points between 1995 and 2000. There is no denying that schools are safe.

Though school-related crime and violence have declined, many issues related to school safety continue to draw the attention of both the public and education decision makers. In response to these problems, educators have undertaken many efforts in the hope of finding solutions. Regardless of how well-intentioned these efforts might be they all face one important problem--they tend not to be "education friendly." By this we mean that past school safety efforts have not been integrated into the daily routines of educators or the schooling process and are thus seen as "add-ons" to the already heavy workload faced by education employees. Because safe school activities are loosely yoked to the schooling process, their effect in making schools safer has been minimal. What is needed is a plan that merges safety activities with the schooling process. Such a plan does in fact exist.

Merging safety activities with the schooling process, we argue, is best accomplished by implementing a school quality/effective schools model. A review of the school quality literature suggests to us that quality schools have traits that are either well suited for assimilating school safety activities or they tend to include traits that lead to school safety. The purpose of our paper is to begin the process of establishing the theoretical and empirical link between school quality and school safety. In pursuing this goal, we (1) review and synthesize both bodies of research, (2) develop our main theoretical proposition, and (3) examine our proposition among teachers within their school settings.

2. BACKGROUND

2.1. School Safety

By school safety we mean that schools have created an environment in which students and adults are safe and feel safe from both psychological and physical harm. In this section we examine data pertaining to the safety of students and teachers, and we discuss and review the two major approaches to school safety.

2.1.1. Students, Teachers, and School Safety

Are schools safe? Our examination of data for students suggests that they are, but this does not obfuscate the fact that problems still exist. Data indicates that significant declines, as well as persistent problems characterizing many American schools. For example, between 1992 and 2000, the number of non-fatal crimes in schools declined by 43 percent. In contrast, school-related homicides remained the same between 1992 and 1998. Indeed, in 1992 there were 34 school-related homicides of youth ages 5 - 19; in 1998, there were 33 homicides.¹

The threats students face in school, physical fights, and being bullied in school are additional indicators of school safety. In 1993, 7.3 percent of students in grades 9 to 12 reported being threatened or injured with a weapon on school property. By 2001, the figure increased to 8.9 percent. In 1993, 16.2 percent of students in grades 9 to 12 reported being in a physical fight, and by 2001 the figure declined to 12.5 percent. Being bullied in school is also an issue, and in 1999, 5.1 percent of students in grades 9 to 12 reported being bullied at school, and in 2001 the figure jumped to 7.8 percent, or an increase of 53%.

Adults in school, such as teachers are also prone to being victims of crime and violence. Data on teachers are somewhat difficult to acquire, so we have aggregated information over the years 1996 to 2000. The data we have acquired suggest some nagging problems faced by school teachers. For example, the total number of non-fatal crimes against teachers from 1996 to 2000 was 74 per 1,000 teachers. Of this figure, there were 46/1,000 thefts; 28/1,000 violent incidents; and 3/1,000 serious violent incidents. In addition, in 1993, 11.7 percent of teachers reported being threatened or injured by a student; by 1999, the figure declined to 8.8 percent. In 1993, 4.1 percent of teachers reported being physically attacked by a student, and by 1999 the figure virtually remained the same at 3.9 percent.

In summary, national data on school crime and violence indicate that there has been a marked improvement and that the vast majority of schools are safe. Nevertheless, these data also indicate that problems exist and that there is a need for education decision-makers to take steps toward making schools safer. In fact, this is an important issue because schools have been the proving grounds for hundreds of safe school programs, and results are mixed at best (Gottfredson 1997; NSBA 1993; U.S. General Accounting Office 1995; Verdugo 2000b). It is our contention that safe school activities must be integrated into an overall framework about school organization in order for them to be successful. An important framework that is conducive to the task is a school quality framework.

2.1.2. Approaches to School Safety

Many efforts have been undertaken in order to make schools safer. Generally, these activities may be grouped into two categories: strategies and programs. Most safe school activities are what would be characterized as programs. They are activities undertaken without any thought to placing them under some larger theoretical umbrella. That, in fact, is the difference between a strategy and a program. The former is a theory that guides a set of activities for a given set of goals, while the latter is a set of specific activities aimed at remedying a problem. In this section we briefly summarize what is known about programs and strategies.

¹ Data for both students and teachers are from Devoe *et al.* (2002).

a. Safe Schools Programs. Safe school programs entail a set of activities aimed at addressing a specific problem or problems in school. Safe school programs have focused on one or more of the following topics: school climate, the school physical plant, and student behavior.

Some programs attempt to address the school climate. School climate programs develop policies that focus on the expectations teachers and students have about one another, about classroom instruction, about beginning and ending school times, and other related topics focusing on school organization. The focus is on school normative structures. For example, programs that focus on improving teacher expectations of students, norms about how students speak to other students and teachers (e.g., no racist comments). The interest is to create a normative culture that is conducive to civility and enhances stability in the teaching and learning environment.

The focus of a second set of safe school programs is the school physical plant. Thus, school appearance, design, and other policies about entry and leaving school grounds are important pursuits. Other physical plant activities include policies against offensive graffiti, and activities that focus on keeping school grounds clean and neat. Three broad issues are important for safety programs focused on the school physical plant:

- Visibility is an issue. Educators need to have clear views of students and their activities. Some schools use television monitors or cameras, better lighting in hallways, the removal of barriers or obstructions. In building new schools some have designed them with curved hallways rather than squares to insure greater visibility.
- Some schools have organized themselves so that a receptionist is the first person a visitor encounters upon entering the school building. Other schools have turned to using school resource officers or security guards.
- Entering and exiting school grounds is an important topic because it involves locking doors, using metal detectors, and installing metal bars on windows. These activities tend to be controversial, but many schools have used them in addressing safety problems.

A third kind of safe school program places the emphasis on controlling and shaping student behavior. Thus, schools using such programs have focused on peer mediation, policies and standards about no bullying and harassing, and policies about school dress and language. In addition, schools have instituted policies against weapons, drugs, and alcohol on school premises. Students who violate these rules are quickly sanctioned. The focus, then of student behavior programs is on social behavior and the presentation of self while on school grounds.

b. Safe School Strategies. While programs are narrow and single focused, strategies are broad and comprehensive. Strategies operate under two major assumptions: (1) school safety problems are complex and require comprehensive approaches, and (2) schools can't make schools safer alone, they need help.

Table 1. Key components of two safe school strategies

| us General Accounting Office | Drug Strategies, Inc. | Synthesis |
|--|---|---|
| 1. Comprehensive approach. | 1. Activities against violence, aggression, and bullying | 1. Comprehensive approach with activities against violent, aggressive, and bullying student behavior. |
| 2. Early start and long-term commitment | 2. Skills training based on a strong theoretical foundation | 2. Early start and long-term commitment to skills development based on a strong theoretical base. |
| 3. Strong leadership and disciplinary policies | 3. Comprehensive, multifaceted approach | 3. Leadership and reasonable/equitable and positive school climate. |
| 4. Staff development | 4. Promotion of a positive school climate | 4. Staff development/training. |
| 5. Parental involvement | 5. Long-term commitment to skills | |

| | | |
|---|---|--|
| 6. Interagency partnerships and community linkages | development | 5. Parent and community involvement. |
| 7. Cultural sensitivity and developmental appropriateness | 6. Interactive teaching | 6. sensitive and developmentally appropriate materials and activities. |
| | 7. Developmentally tailored interventions | |
| | 8. Culturally sensitive materials | |
| | 9. Teacher training | |

Two studies reviewed numerous approaches to school safety and determined that the best approaches were what we would call strategies (The US General Accounting Office 1995; Drug Strategies, Inc. 1998). Table 1 presents each study's assessment of what they believe were significant traits of good strategic approaches to school safety.

Our synthesis of both these strategic approaches is based on the attempt to merge concepts from both surveys in as parsimonious manner as possible (see column 3). Our analysis of both surveys suggests a synthesis of six primary traits:

- Comprehensive approach with activities against violent, aggressive and bullying student behavior.
- Early start and long-term commitment to skills development based on a strong theoretical base.
- Leadership and reasonable/equitable and positive school climate.
- Staff development/training.
- Parental and community involvement.
- Culturally sensitive and developmentally appropriate materials and activities.

It is these six traits that form the first part of our attempt to merge the safe schools and the school quality research. We now turn to a review of the school quality literature.

2.2. School Quality

2.2.1. Charles Bidwell: Schools as Organizations

Education historians are fond of reminding us that school reform movements have been perennial activities in America's history (Callahan 1962; Tyack 1974). However, addressing school reform from an organizational perspective has not been a constant in education history and can be traced to the seminal work of Charles Bidwell (1965).

Drawing on the work of Max Weber and other organizational theorists, Bidwell argued that schools were characterized by certain bureaucratic elements and that schools "applied universalistic principles of conduct because they had certain standardized tasks to perform" (cited in Dreeben 1994: 34). However, because the school population was quite diverse, it was teachers' daily judgements that characterized the actual organization of schools. Two important traits emerged from this kind of behavior: first, schools were internally differentiated so educators could deal with a diverse student population; second, schools were loosely structured. The second insight by Bidwell exerted the more powerful effect on later school quality research.

By loosely structured Bidwell meant that schools were characterized by ambiguities about purpose and the exercise of power, difficulties in dealing with technologies, and the frequent occurrence of unanticipated events. In essence, educators were seen to operate in a vacuum, with little if any contact, and there was no connection between educational activities among teachers and the overall mission of the school. Under such conditions, other theorists argued, it was no wonder that

schools were ineffective (Dreeben 1970; Jackson 1968; Lortie 1975). Bidwell's analysis not only provided an explanation for a major problem facing schools, but also provided a theoretical framework for others to follow. Indeed, efforts to reform schools through the 1970s to the present have been guided by Bidwell's seminal analysis and have focused on three organizational forms: bureaucratic, communitarian, and the systemic.

2.2.2. Post Bidwell: Bureaucracy, Community, and Systems

a. Schools as Bureaucracies. The bureaucracy perspective takes its cue from the great German Sociologist Max Weber. Weber observed as work and industry became increasingly complex, the need for greater rationality also increased. The greater the complexity of work, the greater the need to organize and regulate both the process of work and the job-related behaviors of workers. Weber (1978, pp. 956-958) was able to define bureaucracy in terms of six traits:

- Jurisdictional areas are governed by rules and regulations: the regular and official activities of employees are governed by official duties, that the authority to discharge official duties is governed by rules, and that there are provisions that allow employees to carry out their official duties.
- Hierarchical system and channels of appeal: appeals stipulate a clear and established system of super- and sub-ordination in which there is a supervision of the lower offices by the higher ones.
- Written documents: the management of bureaucracies is based on written documents--rules and regulations are codified.
- Training: management in bureaucracies are thoroughly trained in a field of specialization.
- Employees' activities go beyond the working day, if necessary.
- General rules: management of the office follows general rules which are more or less stable, more or less exhaustive, and which can be learned.

Many schools were transforming themselves into bureaucracies. In many schools, a strict division of labor emerged, teaching roles came to be defined on at least two criteria (subject taught and the kind of students one taught); rules and regulations, thought to be neutral, governed social relations and narrowed the range of initiative in teachers' work and how it was to be performed; and an authority structure emerged that was tied not to the teacher but to the role a teacher occupied (Lee, Bryk and Smith 1993). States followed suit by mandating tighter controls on teaching (Furhman, Clune, and Elmore 1988; Rowan, Edelstein, and Leal 1983).

b. Schools as Communities. During the 1980s it became clear that bureaucratic organizational practices were not creating quality schools.² In response to issues of alienation, frustration, and heavy-handed practices by administrators, which fettered rather than facilitated teaching and learning, researchers began to notice that quality schools had traits associated with communities. A number of factors were identified as indicators of schools as communities: staff consensus on goals, teachers' involvement and influence on the work environment, collegiality, and administrative support for experimentation with innovative teaching techniques (Bryk and Driscoll 1988; Chubb 1988;

² Note that Verdugo *et al.* (1997) found that teachers expressed greater job satisfaction in communitarian schools than in bureaucratic environments.

Rosenholtz 1985; Rosenholtz, Bassler, and Hoover-Dempsey 1986). The pervasive thought was that quality and community were inextricably linked.

Schools as communities were small societies: they were characterized by informal and enduring social ties, and they are driven by a shared, common ethos (Lee *et al.* 1993). The main thrust of the communitarian perspective is that teaching is a non-routine activity; rather it was complex and eventful. Under such circumstances, instruction had to rely on teachers' judgment and expertise for success (Berliner 1988; Brophy and Everston 1976; Shulman 1987; see also Bryk and Driscoll 1988 for a review and logic of the communitarian perspective). Teachers are an integral part in the communitarian perspective.

c. Schools as Systems. In the 1990s, school quality reform focused on systemic, site-based restructuring of the public schools. Such a perspective, however, has many dimensions. For instance, site-based decision-making has been interpreted as calling for (a) school boards' heightened influence on school issues (Danzberger, Kirst, and Usdan 1994), (b) greater teacher influence in decision making (see Lieberman 1990), and (c) a sense of all participants sharing in the restructuring process (Boyer 1995). Such ambiguity led to many different approaches to "systemic" school reform.

At the end of the 1990s and into the 21st Century, the focus has been on vouchers, privatization, and charter schools. Marshall and Tucker (1992) have argued that three key points are essential for developing quality schools: school districts must be organized and managed so that everyone in the district is striving to improve student performance; schools must create systems of educational standards; and schools must create a system of rewards so that when standards are met, they are rewarded. In the new approaches, one can see a focus on the integration of system parts so they all work in unison. However, the central problem with these approaches is that they fail to describe quality schools as cultural, people-centered organizations. It is our belief that until this issue is addressed, most solutions have little chance of success.

2.3. Quality Schools and the KEYS Project

The KEYS project, a program initiated by the National Education Association to improve public schools drew its framework from three fields of theory and practice: industrial management, the effective schools research, and Total Quality Management.

From the field of Industrial Management, quality systems are multi-dimensional. This was an important notion for the Keys research team. Garvin (1984) was able to generate a number of traits of quality industrial systems, but with some modification one can see how they apply to education:

- Performance: students demonstrate knowledge acquisition and application.
- Transferability: students translate what they learn to solving other problems.
- Reliability: students use what they have learned from one instance to the next.
- Equity: all students (not just a few) demonstrate high-quality work.
- Durability: students gain lasting skills and competencies, which enable them to flourish after the formal schooling experience.
- Serviceability: what students need to know and how students learn are constantly assessed and updated for a future in which change is the only constant.

- Aesthetics: all participants (e.g., students, parents, and all school staff) are pleased with the school life and the educational experiences provided by the school.
- Perception: the school has a reputation for quality within and beyond its walls.

A school must reach high ranking on all these traits to be considered a quality/effective school.

Since Bidwell's seminal paper, the education world has been massaging the quality/effective schools concept. In fact, the effective/quality schools research is a real departure from earlier educational theory, which proposed that the problems of schooling in America could be solved by spending more money, by perfecting new curricula that would be made to work under any conditions, or by changing the student socioeconomic status ratio (e.g., busing). In contrast, effective schools research (Brookover *et al.* 1978; Edmonds 1982; Lezotte 1990) found that all academic learning takes place within an organizational, social psychological context. Effective schools research defines that context as having:

- A productive school climate and culture emphasizing the importance of learning, high expectations about student achievement, high expectations about teacher quality, and a general problem-solving orientation.
- A strong leadership guiding the instructional program, with a continual striving by teachers and administrators to improve instructional effectiveness.
- A focus on student acquisition of central learning skills, with curriculum based on clear goals and objectives.
- A grouping of students to promote effective appropriate instruction with heterogeneity in required courses and enriched learning as the norm.
- A school day in which time is used for learning activities.
- A learning process that is both pleasant and closely monitored.
- An orderly environment in which discipline is firm and consistent.
- A positive relationship between the community and the school.

Research has documented that many of these conditions are related to student achievement (Brookover & Schneider 1975; Henderson *et al.* 1997; Rosenholtz 1989). There are, however, three important problems with that body of research. First, this body of research fails to address how one gains and maintains commitment from school participants. Second, it fails to address how one monitors such a system. Third, the guiding principles are so broadly stated, confusing, and contradictory that some educationally ineffective behaviors have been described as effective. The first two problems can be easily addressed by apply the SPC techniques advocated in the TQM approach.

Statistical Process Control (SPC) is based on the premise that all workers participate in the decision-making process. There are two significant reasons for such participation. First, such participation tends to increase workers' commitment. Second, SPC is used to maximize product quality through control of work processes rather than through post-production inspection (Ishikawa 1982; Messina 1987). Graphic tools are used in combination with group problem-solving methods (e.g., brainstorming) and nominal group interview techniques (e.g., focus groups) to statistically control processes by identifying and removing common and specific causes that take a system out of stability. Once a process has attained a state of statistical control or equilibrium, it is expected to consistently

provide defect-free products or services. Manufacturing products and services without defects eliminates waste and rework costs and minimizes inspection costs. Ultimately such a process leads to increased productivity. We have, of course, simplified the description of SPC. For an elaboration, see Deming (1988), Ishikawa (1982), and Messina (1987). However, if this body of research can be summarized in a short phrase, it would be: the making of good decisions, greater worker involvement in decision making, and a focus on the system rather than on individuals.

While TQM principles appear sound for schooling, they tend to be so broad that they allow different interpretations and definitions that may negate the development of positive school environments. We suspect this is especially the case for developing safe school environments.

In 1988, the National Education Association undertook a project on the working conditions of teachers. After reviewing both the effective schools and the TQM literatures, the research team reached the conclusion that an excellent framework would involve a melding of these education and productivity theories. A starting point was the translation of the Deming principles for a quality organization and the effective schools traits into 11 Educational Quality Points (EQP). Since then, these points have been synthesized into six quality school traits. The six traits are:

- **Shared understanding and commitment to high goals:** Everyone connected with the school has a shared common understanding of what is trying to be accomplished, that all students share the ability to achieve at very high levels.
- **Open Communication and Collaborative Problem Solving:** Total non-threatening communication between all people inside the building, and people inside the building, the community and the rest of the school system.
- **Continuous Assessment for Teaching and Learning:** On a very regular basis everyone in the school poses the question, informally and formally: is what we are doing going to get us to our commonly held goals?
- **Personal and Professional Learning:** Ongoing state of the art high quality staff development, and is set around the commonly held goals.
- **Resources to Support Teaching and Learning:** Having the right resources to do the job, and not just spending money; the resources to do the job that we agree has to be done.
- **Curriculum and Instruction: The emphasis on high levels of student learning and instruction that** will accomplish that learning.

2.4. Quality Schools, Safe Schools: A Thesis

Our review suggests that there is much overlap between efforts to make schools safer and to create quality/effective schools. The overlap leads us to formulate a thesis about quality and safety. Specifically, we hypothesize that quality schools are safe schools. In drawing such a hypothesis, we have one very large issue to address.

The causal direction between quality and safety is an issue. Some might argue that safety drives quality, but this seems erroneous to us. Rather, it seems to us that quality drives safety. We have two reasons for this viewpoint. First, an emerging body of research points out that quality has some direct effects on issues related to school safety. For example, Verdugo and Schneider (1999) using a large national education database, found that quality school indicators were directly related to school safety: the better the quality school indicators, the safer the school. Paul Barton and his

colleagues at ETS (Barton *et al.* 1998) found that lower student achievement was related to school violence. Second, research has found that school safety is an important trait of quality schools, not only in the US but in other countries as well (Townsend 1997). Our general hypothesis, then, is:

H₁: The better the school quality, the safer the school.

In the present paper we attempt to examine the above hypothesis by using national data from an ongoing school quality project being conducted by the National Education Association. Our results tend to confirm our notion about the relationship between school quality and school safety.

3. METHODS

3.1. Data

Data for this project are from an ongoing school quality project being conducted by the National Education Association. Data used are submitted by schools after they have taken a survey of teachers and other education employees about their views about the school culture. Data forms are returned to the NEA and are input into an ever-expanding data set. After some brief analysis, a report is generated by the NEA and sent back to the school for discussion and possible activities for making it a better teaching and learning environment.

At the time of this study, the senior author downloaded the entire data base. At that point in time there were 6,316 usable teacher respondents representing 390 schools).

3.2. Variables

The dependent variable in this study is a school safety index (SAFE). The variable was constructed by taking a linear combination of three other variables. These variables are: the existence of safe school policies, whether or not the principal supports teachers with student discipline, and the amount of influence teachers had with setting standards for student discipline.

The predictor variables in the model at the teacher level (Level 1) are the Keys factors centered on their school means. Note that we were unable to use all six Keys factors because of a collinearity problem. After some testing of various models we decided to drop Keys5 and Keys6 from further analysis because they proved not to be significant predictors of safety. At the school building level (Level 2), we have included grade level in which a respondent teaches: elementary school (Elem), middle school (Middle) and high school (High). Two dummy variables are used to measure each of these categories—the omitted grade level is elementary school (Elem). In terms of the Keys variables, a complete explanation may be found in appendix A. Alpha reliabilities, means and standard deviations for all items in the analysis may be found in Appendix B (note that Keys means in appendix A are not centered).

Our analysis plan calls for presenting the results of two models: a null model with only the intercept as a predictor, and a second model that includes both Level 1 (teacher) and Level 2 (school) analyses. A multilevel approach to this problem allows us to comprehensively evaluate the relationship between school quality and school safety. In other words, we can look at effects within and between schools. Since our data are nested—teachers within schools—traditional OLS analysis will yield biased estimates (Raudenbush and Bryk 1992; Kreft and De Leeuw 1999).

A Level 1 analysis, at the teacher level, introduces the Keys factors. Our analysis at this level allows us to assess the relationship between safety and teachers' assessment of their school's quality.

Our concern at this level is whether teachers' assessment of their school's quality is related to their assessment of their school's safety. We expect both assessments to be positively correlated.

A Level 2 analysis, the school level, allows us to examine the variability of intercepts and slopes, and the relationship between slopes and intercepts, after controlling for grade level. In other words, does the effect of school quality on school safety vary across schools, controlling for grade level, depend on the average school safety in a school? While some research suggests that middle school students are more problematic than students in other grades, little control is made for other extenuating factors (De Voe *et al.* 2000).

4. FINDINGS

Table 2. Multi-Level Results From a Model of School Quality and School Safety

| Null Model | | | |
|---------------------------------------|----------|-------|--------|
| Parameter | Estimate | SE | T |
| <u>Fixed Effects</u> | | | |
| Intercept | 9.774 | .060 | 162.78 |
| <u>Random Effects</u> | | | |
| Intercept | 1.096 | 0.097 | 11.25 |
| Residual | 3.270 | 0.059 | 54.55 |
| Full Model | | | |
| Parameter | Estimate | SE | T |
| <u>Fixed Effects</u> | | | |
| Model for School Means | | | |
| Intercept | 9.96 | .045 | 223.00 |
| Middle | -.09 | .048 | -1.82 |
| High | .14 | .073 | 1.98 |
| Key1 | 1.47 | .097 | 15.12 |
| Key2 | 1.45 | .104 | 13.93 |
| Key3 | -.17 | .092 | -1.88 |
| Key4 | .11 | .079 | 1.38 |
| Key1*M | -.03 | .141 | -.18 |
| Key1*H | -.17 | .206 | -.83 |
| Key2*M | .23 | .146 | 1.56 |
| Key2*H | .11 | .225 | -.47 |
| Key3*M | -.16 | .134 | -1.16 |
| Key3*H | .25 | .195 | 1.27 |
| Key4*M | -.14 | .116 | -1.19 |
| Key4*H | -.26 | .187 | -1.40 |
| <u>Random Effects</u> | | | |
| Parameter | Estimate | SE | Z |
| Model for Slopes and intercept | | | |
| ._00 | .399 | .041 | 9.77 |
| ._11 | .424 | .131 | 3.25 |
| ._22 | .498 | .153 | 3.25 |
| ._33 | .189 | .112 | 1.59 |
| ._44 | .060 | .081 | 0.75 |
| ._10 | -.105 | .055 | -1.90 |
| ._20 | -.267 | .062 | -4.32 |
| ._30 | -.081 | .049 | -1.66 |
| ._40 | .022 | .041 | .55 |
| Γ_{ij} | 1.804 | .036 | 49.91 |

4.1. The Null Model

Table 2 presents results for the null model and all other models in our analysis. The null model can be used to address variance within and between schools, as well as being a benchmark for other models. The null model equations are:

$$\text{SAFE}_{ij} = \mu_{oj} + r_{ij} \quad (1)$$

and

$$\mu_{oj} = \mu_{oo} + \sigma_{oj} \quad (2a)$$

Substituting (2a) into (1) we have

$$\text{SAFE}_{ij} = \mu_{oo} + \sigma_{oj} + r_{ij} \quad (2b)$$

$$\text{Where, } \sigma_{oj} \sim N(0, \sigma_{oo}^2) \text{ and } r_{ij} \sim N(0, \sigma_{ij}^2) \quad (3)$$

As equation (2b) suggests, there are three parameters of interest. First, μ_{oo} is the intercept and is the average safety score for schools for this sample of teachers. In the present case, $\mu_{oo} = 9.77$. (Note that this is not the average teacher safety score.)

The other two statistics (σ_{oo} and σ_{ij}^2) are measures of the between and within school variances, respectively. To begin with, $\sigma_{oo} = 1.096$ and $\sigma_{ij}^2 = 3.270$. Since both variance components are significantly different from zero, the implication is that schools do differ in the average school safety index (SAFE), and that there is even greater variation within school safety (3.270). The latter is important because it tells us that teachers within a school vary considerably in their assessment of school safety.

Pushing the topic a bit further, another way of addressing variation in SAFE is to compute the intra-class correlation, ρ . The intra-class correlation is a measure of clustering.

$$\rho = \sigma_{oo} / (\sigma_{oo} + \sigma_{ij}^2) = 1.096 / (1.096 + 3.270) = .25$$

Clearly, there is a fair amount of clustering within schools, and this is further confirmation that an multilevel model approach is appropriate rather than an OLS approach.

4.2. The Full Model

Our second model adds measures of school quality (our four Keys items). Our primary concern is whether school quality is related to school safety. We also include grade level taught (Level 2) because data on school safety in the US (Devoe *et al.* 2003) indicate that school safety varies considerably by grade level, with the greater number of incidents occurring in middle schools.

There are two levels in this model, as will become clear shortly: a Level 1 (teacher), and a Level 2 (school). The full model is:

$$\begin{aligned} \text{SAFE}_{ij} = & \mu_{oj} + \beta_{1j} \text{Key1}_{ij} + \beta_{2j} \text{Key2}_{ij} \\ & + \beta_{3j} \text{Key3}_{ij} + \beta_{4j} \text{Key4}_{ij} + r_{ij} \end{aligned} \quad (4a)$$

Where $r_{ij} \sim N(0, \sigma_{ij}^2)$, and

$$\begin{pmatrix} \mu_{0j} \\ \mu_{1j} \\ \mu_{2j} \\ \mu_{3j} \\ \mu_{4j} \end{pmatrix} \sim N \left(\begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \tau_{00}, \tau_{01}, \tau_{02}, \tau_{03}, \tau_{04} \\ \tau_{10}, \tau_{11}, \tau_{12}, \tau_{13}, \tau_{14} \\ \tau_{20}, \tau_{21}, \tau_{22}, \tau_{23}, \tau_{24} \\ \tau_{30}, \tau_{31}, \tau_{32}, \tau_{33}, \tau_{34} \\ \tau_{40}, \tau_{41}, \tau_{42}, \tau_{43}, \tau_{44} \end{pmatrix} \right)$$

The Level 2 model is:

$$_0j = _00 + _01 \text{ Middle}_{ij} + _02 \text{ High}_{ij} + u_{0j} \quad (4b)$$

$$_1j = _10 + _11 \text{ Middle}_{ij} + _12 \text{ High}_{ij} + u_{1j} \quad (4c)$$

$$_2j = _20 + _21 \text{ Middle}_{ij} + _22 \text{ High}_{ij} + u_{2j} \quad (4d)$$

$$_3j = _30 + _31 \text{ Middle}_{ij} + _32 \text{ High}_{ij} + u_{3j} \quad (4e)$$

$$_4j = _40 + _41 \text{ Middle}_{ij} + _42 \text{ High}_{ij} + u_{4j} \quad (4f)$$

We can begin the process of rearranging,

$$\begin{aligned} \text{SAFE}_{ij} = & (_00 + _01 \text{ Middle} + _02 \text{ High} + _0j) \\ & + (_10 + _11 \text{ Middle} + _12 \text{ High} + _1j) * \text{Key1} \\ & + (_20 + _21 \text{ Middle} + _22 \text{ High} + _2j) * \text{Key2} \\ & + (_30 + _31 \text{ Middle} + _32 \text{ High} + _3j) * \text{Key3} \\ & + (_40 + _42 \text{ Middle} + _43 \text{ High} + _4j) * \text{Key4} \\ & + r_{ij} \end{aligned}$$

Rearranging and separating fixed from random effects, leaves us with,

$$\begin{aligned} \text{SAFE}_{ij} = & \{ _00 + _10 \text{Key1} + _20 \text{Key2} + _30 \text{Key3} + _40 \text{Key4} + _01 \text{ Middle} \\ & + _02 \text{ High} + _11 \text{ Middle} * \text{Key1} + _12 \text{ High} * \text{Key1} \\ & + _21 \text{ Middle} * \text{Key2} + _22 \text{ High} * \text{Key2} \\ & + _31 \text{ Middle} * \text{Key3} + _32 \text{ High} * \text{Key3} \\ & + _41 \text{ Middle} * \text{Key4} + _42 \text{ High} * \text{Key4} \} \\ & + [_0j + _1j \text{Key1} + _2j \text{Key2} + _3j \text{Key3} + _4j \text{Key4} + r_{ij}] \end{aligned}$$

The first set delimited by “{}” is the fixed component, and the second set delimited by “[]” is the random component.

4.2.1. Fixed Effects

Fixed effects for the Level 1 model are also found in Table 2. The intercept $_00$ is 12.85, the average school safety, when the Keys factors and grade level are all zero.

For ease of interpretation, we centered the four Keys items on their school means ($\text{Key}_{ij} - \text{Keys}_j$). For a complete discussion see Bryk and Raudensbush (1992). Our Level 1 (teacher) model indicates that all but one Keys item are significantly related to school safety. The one Keys item not

related to school safety is Key4, *Personal and Professional Learning*. Thus, there appears to be a statistically significant relationship between school safety and teachers' views about school quality.

There are two grade level dummy variables used in the model: Middle and High, representing, respectively, middle and high school. The omitted category is elementary schools. Results indicate that teachers in middle schools believe that their schools are less safe than elementary schools ($\beta_{01} = -.088$). In contrast, high school teachers are more likely than either elementary or middle school teachers to say that their schools are safe teaching and learning environments ($\beta_{02} = .145$). While additional research is needed, this is an important finding because it adds some weight to national data pointing out that middle schools are less safe than either elementary or high schools (Devoe *et al.* 2002).

We also included interaction terms in the model: each Keys item interacts with grade level (Middle or High). Of the eight possible interactions, not a single one is statistically related to school safety. That is, the effects of school quality on school safety, do not depend on grade level. School quality affects school safety across all grade levels.

4.2.2. Random Effects

With regards to the variability of slopes and intercepts, data are also reported in Table 2. These data tell us if intercepts and slopes vary across schools, and whether there is correlation between slopes and intercepts. The intercept variability (β_{00}) indicates whether the average school safety item varies across schools. The slopes data for the Keys items also informs us whether slopes vary across schools. Finally, we want to know whether slopes and the intercept are related. Data in Table 3 indicate that of the four Keys items (Key1 (β_{11}), Key2 (β_{22}), and Key3 (β_{33}) vary across schools); Key4 (β_{44}) does not vary across schools. There are two implications. First, that effects are not consistent across schools. Second, such inconsistency suggests that there is more within school variance that needs to be explained, and other variables need to be considered.

In addition, the intercept, average school safety, also varies across schools. In short, teachers' views about safety also vary across schools even after controlling for school quality and grade level. The implication is that additional research needs to be conducted to account for this variation.

Before drawing any conclusions we need to compare this statistic to that from the null model where the between school variance component was 1.096. In short, including Keys factors greatly reduced the explainable between school variance from 1.096 to .399. How much is this? Using the suggested equation by Bryk and Raudenbush (1992), we have:

$$(1.096 - .399)/1.096 = .69$$

Thus, about 70 percent of the explainable variance in school mean safety is accounted for by the Keys and grade level items.

Finally, we examine the interaction between slopes and intercepts. These data tell us whether Keys factors and their effect on school safety differ depending on the average school safety in the school. Data may be found below:

| Cov (β_i, β_{00}) | Estimate | Pr Z |
|-------------------------------|----------|-------|
| Key1 | -.105 | .057 |
| Key2 | -.267 | .0006 |
| Key3 | -.081 | .098 |
| Key4 | .022 | .584 |

There is substantial evidence that the effects of the keys factors (Key1, Key2, and Key3) on school safety differ depending on the average school safety in the school. What is interesting is that Keys effects are negatively correlated with average safety in the school ($\beta_{10} = -.105$, $\beta_{20} = -.267$, and $\beta_{30} = -.081$). The negative relationship between these Key factors and safety suggests to us that it is not enough to merely make schools average in their quality, efforts must be taken to achieve high levels of quality and school safety will follow.

How much of the within school variation is explained by the full model Compared to the null model? We can make such an assessment by comparing within school variances from both models.

$$(N_{-}^2 - F_{-}^2) / N_{-}^2$$

Where N_{-}^2 = null model within variance component, and F_{-}^2 = full model within variance component. Inserting the actual data leaves us with:

$$(3.270 - 1.804) / 3.270 = .45$$

Thus, the inclusion of grade level and the Keys factors accounts for about 45 percent of the explainable variation within schools.

Having conducted these analyses, we should point out that they refer to explainable variation; if that variation is small, then our results explain a lot about very little. So the question remains as to how much variation is left to explain. First, look at the residual variance component for intercepts (β_{00}). In this case, the Z value is 9.71 with a p value of $< .0001$, which suggests that there is additional explainable variation present. Second, we can compute the residual intraclass correlation (ρ):

$$\rho = .399 / (.399 + 1.804) = .18$$

ρ in this case is a measure about the similarity in school safety within schools after controlling for the effects of school quality and grade level. Clearly, there is some explainable variation available.

5. CONCLUSION

While the vast majority of US public schools are safe, problems exist that not only threaten the teaching and learning environment, but cause substantive problems for educators. Sensing that certain troubling student behaviors can lead to greater problems, schools have implemented many safe school programs and strategies. Unfortunately, these approaches are viewed as "add-ons" by the education community; that is, additional activities and work for them. What is needed is a framework where safe school programs and strategies are fully integrated into the schooling process. Such a framework exists, and the purpose of our paper has been to integrate the safe schools literature with the quality schools literature in developing such a framework.

We attempted to integrate both bodies of research by reviewing the main traits of the safe schools research as expressed by two large surveys. We then provided a brief history of the quality schools research and extracted a list of fundamental concepts from both bodies of research. A synthesis followed and led to an overriding proposition. The proposition suggests that safe school activities can be successful if they are part of the larger task of developing and sustaining quality schools. We pursued some aspects of this proposition by examining the relationship between school quality and school safety using a large national education database.

An analysis of school quality and safety data collected by the NEA tentatively confirms our main proposition. We found that school quality is significantly related to school safety. Additional findings suggest that safety varies across schools, middle schools have more problems than either elementary or high schools, and that the effect of school quality on safety does not depend on grade level. Taken as a whole, the effect of school quality on school safety appears to be very robust.

In conclusion, in thinking about strategies and programs for improving some aspect of school safety, decision-makers may need to think long and hard about how their strategies might be integrated into their efforts at building quality school environments. Our findings provide some tentative confirmation that a framework that integrates safety activities into a larger theoretical schooling framework may lead to desired results. Of course, we should also add the caveat that further research is needed to confirm or negate our findings.

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APPENDIX A: OPERATIONALIZATION OF ITEMS IN MODEL

| Variable | Operationalization |
|----------|---|
| SAFE | Linear combination of three questions: Based on your own experience or impressions, please indicate how accurately each of the following describes your school (4 = True, 1 = False): My school has clear policies in place to provide a learning environment that is safe from crime and violence. Based on your own experience or impressions, please indicate how accurately each of the following statements describes the situation in your school (4 = False, 1 = True): Our principal supports teachers and other school employees with student discipline. |
| Key1 | A linear combination of the following items. Based on your own experience or impressions, please indicate how accurately each of the following describes your school (4 = True, 1 = False): a. My school has clear goals that provide a sense of direction and purpose for our daily efforts. b. My school has well-defined learning expectations for all students. c. My school has high standards for student achievement. d. My school has high standards for teaching. e. My school always focuses on what's best for student learning when making important decisions. f. My school has a school day that is organized to maximize instructional time. |

Based on your own experience or impressions, please indicate how accurately each of the following statements describes the situation in your school (4 = True, 1 = False):

- a. The district office administration shows a strong commitment to the continuous improvement of teaching and learning in my school.
- b. The district office administration believes that all students in my school can meet high standards.
- c. Our principal will make changes, when necessary, to improve the environment for teaching and learning.
- f. Our principal holds teachers and other school employees accountable for their performance.
- h. School staff members have a shared understanding of what the school's main goals should be.
- i. Teachers assume most of the responsibility when students fail.
- k. Students bring attitudes and habits to class that greatly reduce their chances for academic success.
- l. Students' success or failure in learning is due primarily to factors beyond the school's control.

Based on your own experience or impressions, how many TEACHERS In your school do each of the following? Most About Less None Nearly (4 = Nearly all, 1 = None):

- a. Set high standards for themselves
- b. Set high standards for students
- c. Implement state or district curriculum standards
- d. Implement state or district student assessment and performance standards
- e. Take responsibility for helping ALL students learn, not just those in their classroom
- f. Help maintain discipline in the entire school, not just in their classroom

Based on your own experience or impressions, please indicate how accurately each statement describes the situation in your school: (4 = True, 1 = False):

- c. The curriculum includes attention to the development of students' social skills and citizenship.
- d. The curriculum includes problem solving and critical thinking as valued components.
- e. Teachers use students' personal interests and goals to help develop the curriculum.

Based on your own experience or impressions, how much influence do each of the following groups have over your school's decisions about HOW TO ACHIEVE SCHOOL IMPROVEMENT GOALS? (4 = A lot, 1 = None):

- d. District office administration

Based on your own experience or impressions, please indicate how accurately each statement about STUDENT ASSESSMENT describes the situation in your school (4 = True, 1 = False):

- b. The district closely monitors my school's results on external assessments.

Keys2

Based on a linear combination of the following items.

Based on your own experience or impressions, please indicate how accurately each of the following statements describes the situation in your school (4 = True, 1 = False):

- d. Our principal talks with teachers frequently about their instructional practices.
- e. Our principal encourages teachers to try new ideas to improve the curriculum and instruction.

Based on your own experience or impressions, please indicate how accurately each statement describes the situation in your school (4 = True, 1 = False):

- a. School staff use data about school problems to make decisions about school improvement.
- b. School staff work together to identify problems with the implementation of school curriculum.
- h. I am comfortable voicing my concerns to school administrators.

Based on your own experience or impressions, please indicate how accurately each statement describes your school's ADMINISTRATORS (4 = True, 1 = False):

- a. School administrators use knowledge about child/adolescent development to create effective learning environments.
- b. School administrators are prepared to deal with individual student differences.
- c. School administrators work together with the district office and school board to try to solve problems that affect student learning.
- d. School administrators work together with teachers and other school employees to try to solve problems.

Based on your own experiences or impressions, please indicate how accurately each statement describes your school's TEACHERS (4 = True, 1 = False):

- a. Teachers talk about instruction in the teachers' lounge, at faculty meetings, etc.
- b. Teachers often use faculty meetings for problem solving.
- d. Teachers try to coordinate their teaching with instruction at other grade levels and/or subject areas.
- f. Teachers are prepared to deal with individual student differences.
- g. Teachers of THE SAME grade and/or subject area work together to try to solve problems that affect student learning.
- h. Teachers of DIFFERENT grades and/or subject areas work together to try to solve problems that affect student learning.
- i. Teachers work together with other school staff to try to solve problems that affect student learning.

Based on your own experience or impressions, how much influence do TEACHERS have over your school's decisions in each of the following areas? (4 = A lot, 1 = None):

- b. Determining the curriculum
- c. Determining books and other instructional materials used in classrooms
- d. Determining how students' progress is measured
- e. Determining the content of professional development programs
- f. Hiring new teachers and other professional personnel
- g. Hiring a new principal
- h. Deciding how discretionary school funds should be used

Based on your own experience or impressions, how much influence do each of the following groups have over your school's decisions about HOW TO ACHIEVE SCHOOL IMPROVEMENT GOALS? (4 = A lot, 1 = None):

- a. School staff other than teachers
- b. Parents and students
- c. Business and community representatives
- d. District office administration

Based on your own experience or impressions, please indicate how accurately each statement related to PARENTS describes the situation in your school ((4 = True, 1 = False):

- a. My school regularly communicates with parents about how they can help their children learn.
- b. My school encourages feedback about the curriculum and instructional methods from parents and the community.
- c. School staff work hard to build trusting relationships with parents.
- d. Teachers work closely with parents to meet students' needs.
- e. Teachers try hard to understand parents' problems and concerns about their children.
- f. Parents and teachers work together to promote school-wide improvement.

How often have you had conversations with school staff about each of the following during the past 12 months? (5 = Almost daily, 1 = Never):

- a. What helps students learn best
- b. Teaching techniques
- c. Concerns about your school's safety
- d. Development of new curriculum or changes in the curriculum
- e. Implementing district or state curriculum standards
- f. Implementing district or state student assessment and performance standards

For the students in your target class, how many of their parents ((6 = Nearly all, 1 = None):

- a. Attend parent-teacher conferences when teachers request them?
- b. Help raise funds for the school?
- c. Volunteer to help in the classroom?
- d. Attend school-wide special events?
- e. Contact school staff about their child by telephone?
- f. Provide a home environment supportive to learning?

Key 3

A linear combination of the following items.

Based on your own experience or impressions, please indicate how accurately each statement describes EDUCATIONAL PROGRAMS in your school (4 = True, 1 = False):

- a. Once we start a program we follow-up to make sure that it's working.
- b. We have so many different programs in my school that I can't keep track of them all.
- c. Many special programs come and go at my school.
- d. You can see real continuity from one program to another.
- e. The quality of all educational programs is assessed on a regular basis.
- f. Standards of program evaluation are clear and well specified.

How frequently are the following STUDENT ASSESSMENT techniques used in your School (4 = Regularly, 1 = Never)?

- a. Standardized tests
- b. Teacher-made tests
- c. Students' demonstration of their work
- d. Exhibition of students' work
- e. Student self-assessments
- f. Standards-based assessments

How frequently does your school use STUDENT ASSESSMENT RESULTS for each of the following purposes (4 = Regularly, 1 = Never):

- a. To modify the curriculum to address student needs
- b. To develop new programs or instructional strategies to address student needs
- c. To find out about the performance of specific subgroups of students
- d. To measure changes over time in the performance of individual students or subgroups
- e. To measure success of teaching strategies.

Based on your own experience or impressions, please indicate how accurately each statement about STUDENT ASSESSMENT describes the situation in your school:

- a. Teachers have the resources they need to interpret assessment results.
- b. The district closely monitors my school's results on external assessments.
- c. Failure to meet state or district standards on assessments has direct consequences for school administrators.
- d. Failure to meet state or district standards on assessments has direct consequences for teachers.
- e. Failure to meet state or district standards on assessments has direct consequences for students.

Key4

A linear combination of the following.

Based on your own experiences or impressions, please indicate how accurately each statement describes your school's TEACHERS (4 = True, 1 = False):

- e. Teachers have strong knowledge of their subject-matter areas.

How long is your typical regularly scheduled planning period with teachers or other colleagues? (4 = 1 hour or more, 1 = less than 15 minutes):

Less than 15 minutes 15 to 29 minutes 30 to 59 minutes 1 hour or more

How often do you meet with teachers or other colleagues for your scheduled planning period? (5 = 5 or more times a week, 1 = Less than once a week):

Less than once a week, Once a week, Twice a week, 3 or 4 times a week, 5 or more times a week

During the past 12 months, how often did you participate in the following activities related to teaching? (5 = At least once a week, 1 = Never):

- a. Regularly scheduled collaboration with teachers or other colleagues, excluding meetings held for administrative purposes.
- b. Being mentored by a teacher or other colleague in a formal relationship.
- c. Mentoring a teacher or other colleague in a formal relationship.

How well prepared do you feel to do the following? (4 = Very well, 1 = Not all prepared):

- a. Implement new methods of teaching.
- b. Implement state or district curriculum standards.
- c. Implement state or district performance standards.
- d. Use student performance assessment techniques.
- e. Address the needs of students from diverse cultural backgrounds.
- f. Address the needs of students with limited English proficiency.
- g. Address the needs of students with mild learning disabilities.
- h. Address the needs of students with severe learning disabilities.
- i. Integrate new technology into the classroom instruction.

During the past 12 months, how often did you (6 = 10 or more times, 1 = Never):

- a. Receive useful feedback on your performance from other colleagues?
- b. Receive useful feedback on your performance from your principal?
- c. Visit other teachers' classrooms?
- d. Have other teachers observe your classroom?
- e. Have the principal observe your classroom?

During the past 12 months, how often did you ((6 = 10 or more times, 1 = Never):

- a. Participate in workshops or courses sponsored by your DISTRICT (excluding required in-services)?
- b. Participate in professional development activities organized by your SCHOOL?
- c. Participate in a network with others outside your school?
- d. Participate in professional development activities sponsored by an educational employees' union or association?
- e. Discuss curriculum and instruction matters with an outside professional group or organization?

Based on your own experience or impressions, please indicate how accurately each statement describes the situation in your school (4 = True, 1 = False):

- a. Opportunities for school staff to learn or develop decision-making skills are available through my school or school district.
- b. Opportunities for school staff to learn or develop problem-solving skills are available through my school or school district.
- c. My school provides opportunities to school employees other than teachers to learn new skills or techniques.
- d. Most of my school's professional development programs deal with issues specific to the needs and concerns of the school's students and staff.
- e. School administrators and teachers work together to identify professional development needs.
- f. School administrators and teachers work together to plan and deliver professional development experiences.
- g. School administrators encourage participants to share what they have learned from professional development activities.
- h. Teachers and other school staff in my school are continuously learning and seeking new ideas to improve instruction.

Please indicate how accurately each statement describes your own PROFESSIONAL DEVELOPMENT EXPERIENCES over the past 12 months:

- a. Have been sustained and coherently focused, rather than short-term and unrelated.
- b. Included enough time to think carefully about, try, and evaluate new ideas.
- c. Have been closely connected to my school's improvement plan.
- d. Included opportunities to work productively with other staff in my school.
- e. Included action research, teacher research, other forms of school or classroom-based inquiry.
- f. Have improved my understanding of curriculum standards.
- g. Have improved my understanding of student performance standards.
- h. Addressed the needs of the students in my classroom.
- i. Helped me understand my students better.
- j. Deepened my understanding of subject matter.
- k. Led me to make changes in my teaching.
- l. Helped me align my teaching with district or state standards.