Abstract Title Page

Not included in page count.

Title:

A School Staff Opinion Survey Predicts Student Achievement in Victoria, Australia: Evidence from a Structural Equation Modeling Analysis

Authors and Affiliations:

Tedra F. Clark, McREL International
Roger Goddard, The Ohio State University

Background / Context:
Effective school reform requires communication with and buy-in from key stakeholders. In recent years, stakeholder surveys have become increasingly prominent tools for promoting better understanding of how school factors contribute to student success. Specifically, surveys are employed by researchers, practitioners, and policy makers to inform policy development and improvement, to evaluate the effectiveness of reform (e.g., U.S. Department of Education, 1998), to examine the prevalence of effective practices (e.g., Garet, Porter, Birman, Desimone, & Yoon. 2002), to make international comparisons (e.g., Schmidt, McKnight, & Raizen, 2001), and to compare conditions of teaching and teachers across districts and states (Desimone, Smith, & Frisvold, 2010). Survey data are also commonly used to measure implementation in large-scale studies of state and local efforts such as comprehensive school reform (e.g., Ross et al., 1997).

Research suggests that thoughtful, well-designed surveys are an effective tool for gaining key insights into school climate, culture, and practices (Desimone and Le Floch, 2004). Both the National Association of Secondary School Principals (NASSP) and National Education Association (NEA) recommend regular use of stakeholder surveys to promote healthy learning environments for students (NASSP, 2014; NEA, 2012). Considering the prominent role of surveys in educational research and policy decisions, scholars and practitioners have placed a strong emphasis on assessing and increasing the reliability and validity of survey data.

The current study is based on a collaboration between McREL International (McREL) and the Victorian Department of Education and Early Childhood Development (DEECD) to incorporate current research on what matters most to student success into a next generation school survey for the educators of Victoria. The intent of the survey is to provide school leaders state-wide with intuitive, practical guidance that they can immediately apply to improve their own leadership behaviors, school climate, teaching, and ultimately, student learning. Through a process of rigorous field testing and psychometric analysis, McREL created the new School Staff Opinion Survey with the intent to meet the highest possible standards of validity and reliability. To produce an essential tool for improving school and student performance, survey items were linked to behaviors and factors than have been related through research to student engagement and learning.

Purpose / Objective / Research Question / Focus of Study:
The key purpose of this study was to investigate the relation between Victorian school scores on the School Staff Opinion Survey and student achievement as measured by The National Assessment Program – Literacy and Numeracy (NAPLAN). As a matter of background, during 2013, researchers at McREL developed a new Staff Opinion Survey at the request of DEECD with modules in five vital areas of school functioning: 1) School Climate, 2) School Leadership (the leadership of teams), 3) Professional Development, 4) Staff Safety and Well-being, and Teaching and Learning

The goal of the survey development project, which was completed in 2014, was to measure multiple constructs with research suggesting their linkages to valued outcomes in each of the areas above and, where possible (i.e., supported by psychometric evidence), to combine the construct measures within each module to produce a single overall module Index score. Psychometric analyses supported the construction of an Index score combining each of the modules' scores except for Teaching and Learning. For this reason, the items were combined to create overall Index scores for School Climate, School Leadership, Professional Learning, and

Staff Safety and Well-being but not for Teaching and Learning[1]. Thus, the analyses reported here employ index scores where available.

The main research question for this predictive validity study was: How do various measures included in the Victorian new Staff Opinion Survey relate to one another and to student achievement outcomes on the NAPLAN assessment?

Setting:
Surveys were administered by McREL via an online survey platform to staff members in 64 schools throughout the state of Victoria. Student NAPLAN data were collected by the DEECD from participating schools and delivered to McREL for merging with school-level staff survey data.

Population / Participants / Subjects:
To conduct this study with sufficient representation of the Victorian primary schools, McREL researchers purposefully over-sampled primary schools during the trial of the new Staff Opinion Survey. As a result, the data for this study are comprised of a stratified random sample of 62 primary schools in Victoria that are representative of the population of primary schools in Victoria in terms of size and socioeconomics.

Intervention / Program / Practice:
To provide Victorian educators with insights and how-to guidance they can apply to focus continuous school improvement efforts, the items and subscales for each survey module were refined through triangulation with extant research, expert review, field tests with Victorian staff, and rigorous statistical analysis of items trialed in the pilot sample of Victorian schools. As a result, McREL produced a framework with empirical and theoretical support linking the survey modules to one another and to student outcomes, a design for school reports, and a How-to-Guide to help schools plan improvement based on their individual survey data.

Research Design:
Most of the constructs found in the new Staff Opinion Survey were developed through extensive item-writing, cognitive interview, and expert panel review processes. Several of the constructs had been validated in extant research that has examined their relations to one another and student outcomes. In particular, Goddard, Goddard, Kim, and Miller (in press) recently showed that all of the direct and indirect relations connecting instructional leadership to student outcomes through teacher collaboration and collective efficacy are positive and statistically significant. In addition, there has been extensive research on the measures of Trust in Students and Parents (Goddard, Tschannen-Moran, & Hoy, 2001; Goddard, Salloum, & Berebitsky, 2009), and academic emphasis (e.g., Goddard, Sweetland, & Hoy, 2000) linking both to student outcomes. We leveraged this extant support by including these validated measures in the School Leadership and School Climate modules and by examining the correlations among the Index Scores for the School Climate, School Leadership, Professional Learning, and Staff Safety and Well-being modules. We also examined the degree to which the Index scores are related to student NAPLAN scores.

Data Collection and Analysis:

---

[1] Results from the Teaching and Learning module are omitted from this presentation due to the lack of psychometric support for the construction of an Index score. Results from individual Teaching and Learning subscales are discussed elsewhere (McREL International, 2015).

Data describing the participating trial schools and the students they served were obtained from the Victorian DEECD. These included the numeracy and literacy NAPLAN scores of grade 5 students in 2014 and the 2012 NAPLAN grade 3 scores for the same students, where available. The Staff Opinion Survey module data in the areas of School Climate, School Leadership, Professional Learning, and Staff Safety and Well-being were provided by McREL, which administered the trial survey data collection. The psychometric properties of the scores used in these analyses were generally strong and have been reported extensively elsewhere (McREL International, 2014).

The main analyses were multilevel models that tested the predictive validity of all module index scores (climate, leadership, professional learning, and staff safety and well-being). The general form of the hypotheses we tested was: "What is the relationship between the construct measured and differences among Victorian Primary schools in student outcomes?" (i.e., X➔Y). Multilevel modeling was chosen as the primary analytic method because it properly estimates standard errors and avoids the problems of aggregation bias associated with single-level analyses. 2014 (grade 5) student NAPLAN scores in numeracy and literacy served as the outcome variables. 2012 (grade 3) student NAPLAN scores in numeracy and literacy served as statistical controls for prior achievement in the assessed content areas and ensured that our analyses examine *learning*. We also included student-level demographic variables for gender, indigenous status, cultural or linguistic background other than English, parent education, and parent occupation. At the school level, we included a socioeconomic status indicator and a measure of school size, however, the school size indicator was dropped because it was unrelated to student outcomes.

We also tested several mediated relationships that are central to the Department's ongoing school improvement efforts. For example, the research on education leadership demonstrates clearly that because principals do not teach, their impact on student outcomes is largely indirect, flowing through their impact on school climate, the professional development they provide teachers, and so on. Our own research also indicates that while there is not a strong direct statistical link between measures of leadership and student outcomes, leadership is related to student outcomes through important school climate variables. Therefore, we tested several plausible indirect, or mediated, relationships. Similar to the predictive validity tests above, we employed multilevel structural equation modeling (ML-SEM) to test these relationships. As with multilevel modeling, ML-SEM allows the simultaneous estimation of a within-schools model to address student outcomes and a between-schools model to estimate the impact of school-level factors, particularly Staff Opinion Survey measures, on differences among schools in student outcomes. An example mediated model of the type we tested is depicted graphically in Figure 1.

Findings / Results:

Student NAPLAN literacy and numeracy scores collected in the same year were correlated relatively low (only 43% statistical overlap). This means that a variable that is a significant predictor of one academic outcome is not as likely to predict the other as strongly. This manifested in larger effects (on average) for the Staff Opinion Survey scores on literacy than on numeracy. That said, the direction of the effects of the Staff Opinion Survey measures was consistently positive for both content areas.

Correlational analyses showed that the Index Scores for School Leadership, School Climate, Professional Learning, and Staff Safety and Well-being were highly interrelated. In other words, schools that scored high in one area tended to score high in the other areas. Furthermore, Grade 5 (2014) numeracy and literacy NAPLAN scores collected after the administration of the Staff

Opinion Survey trial were positively and significantly correlated with Index scores for School Climate, School Leadership, and Staff Safety and Well-being. The Professional Learning Index Score was significantly and positively related to Grade 5 (2014) numeracy outcomes but not literacy. The module Index score most strongly related to differences among schools in student outcomes was School Climate (see Table 2).

The subscales in the School Climate module most strongly related to student outcomes were collective efficacy, trust in students and parents, academic emphasis, and parent and community involvement. These constructs combined to represent a construct called academic optimism which permeates the school and reaches into the community. Academic optimism was predicted strongly by the degree to which staff reported collaborating on instructional improvement. In addition, the degree to which staff reported collaborating on instructional improvement was strongly predicted by the strength of their school leadership team's instructional leadership.

The findings of the most complex of our tests yielded a promising model that replicated the findings of Goddard, Goddard, Kim and Miller (in press) and explained over 75% of the variance among schools in student outcomes as follows:

School Leadership → Teacher Collaboration → Academic Optimism → Year 5 NAPLAN Literacy.

The results of the model above suggests that the schools with the greatest levels of collaboration for instructional improvement were those in which teachers reported strong school leadership on the part of the school leadership team (see Table 3). In turn, these were the most academically optimistic schools and the ones with systematically higher levels of year 5 literacy outcomes.

Conclusions:
The findings of the predictive validity study indicate that the School Climate, School Leadership, Professional Learning, and Staff-safety and Well-being scores were highly interrelated and positively correlated with student NAPLAN outcomes. A key finding is that the academic optimism measure (collective efficacy, trust in students and parents, academic emphasis and, parent and community involvement) was the strongest predictor of literacy outcomes and that academic optimism tended to be greater in schools where staff reported collaborating on instructional improvement and professional development. In addition, such staff collaboration was more likely where school leadership was stronger. This suggests that instructional leadership and professional collaboration are possible pathways to improving instruction and student learning. Thus, the Staff Opinion Survey appears to have succeeded in measuring aspects of School Leadership, School Climate, Professional Learning, and Staff Safety and Well-being that are positively interrelated and that can be used to predict literacy outcomes in the primary schools of Victoria. The results of this study will help guide future initiatives set forth by the DEECD to leverage school-level predictors of student achievement throughout the state of Victoria. In addition, the results of the mediated models replicate research conducted in the U.S. (Goddard, Goddard, Kim and Miller, in press) and therefore have broad implications for educational policy and school practice world-wide.

Appendix A. References

Desimone, L. M., & LeFloch, K. (2004). Probing the "trickle down" effect of standards and assessments: Are we asking the right questions? *Educational Evaluation and Policy Analysis, 26*(1), 1–22.

Desimone, L. & Smith, T., & Frisvold, D.: Survey measures of classroom instruction: Comparing student and teacher reports. *Educational Policy, 24*(2), 2010.

Garet, M., Porter, A., Desimone, L., Birman, B., & Yoon, K. (2001). What makes professional development effective? Analysis of a national sample of teachers. *American Education Research Journal, 38*(3), 915–945.

Goddard, R.D. & Clark, T. (2015). *School Staff Opinion Survey Predictive Validity Study.* Unpublished manuscript, McREL International, Denver, CO.

Goddard, R. D., Goddard, Y. L., Kim, E. S., & Miller, R. J. (in press) Coherent evidence: The roles of instructional leadership, teacher collaboration, and collective efficacy beliefs. American Journal of Education.

Goddard, R. D., Salloum, S. J., & Berebitsky, D. (2009). Trust as a Mediator of the Relationships Between Poverty, Racial Composition, and Academic Achievement Evidence From Michigan's Public Elementary Schools. Educational Administration Quarterly, 45(2), 292-311.

Goddard, R.D., Stewart, J., & Clark, T. (2014). *Development of a school climate staff opinion survey: Psychometric analysis of trial data.* Unpublished manuscript, McREL International, Denver, CO.

Goddard, R. D., Sweetland, S. R., & Hoy, W. K. (2000). Academic emphasis of urban elementary schools and student achievement in reading and mathematics: A multilevel analysis. Educational Administration Quarterly, 36(5), 683-702.

Goddard, R. D., Tschannen-Moran, M., & Hoy, W. K. (2001). A multilevel examination of the distribution and effects of teacher trust in students and parents in urban elementary schools. The Elementary School Journal, 3-17.

National Association of Secondary School Principals (2014, April). *Safe Schools.* http://www.nassp.org/Content.aspx?topic=47111.

National Education Association (2012). *Bullying Prevention in Public Schools.* http://www.nea.org/assets/docs/Bullying-PreventioninPublicSchools-PolicyBrief.pdf

Ross, S., Troutman, A., Horgan, D., Maxwell, S., Laitinen, R., and Lowther, D. (1997). The success of schools in implementing eight restructuring designs: A synthesis of first-year evaluation outcomes. *School Effectiveness and School Improvement, 8*(1), 95–124.

Appendix B. Tables/Figures

Table 1. Primary Schools Trial Sample Design

Group	SES	School Size	Number of eligible schools	Number of schools sampled	Percentage of schools sampled
1	High	Large	310	16	5%
2	High	Small	310	16	5%
3	Low	Large	293	16	5%
4	Low	Small	292	16	5%
Totals			**1,205**	**64**	**5%**

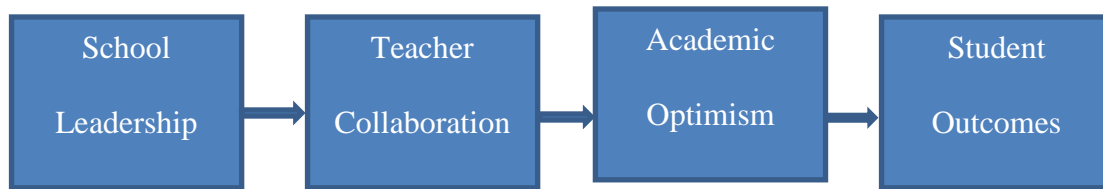School Leadership → Teacher Collaboration → Academic Optimism → Student Outcomes

Figure 1. Mediated model tested in the current study

Table 2. Correlations among Survey Module Index Scores for School Climate, Leadership, Professional Learning and Staff Safety/Wellbeing and Numeracy and Literacy Baseline (Grade 3 2012) and Outcome (Grade 5 2014) Scores

		Leadership Index	Professional Learning Index	Staff Safety and Wellbeing Index	Grade 3 (2012) Numeracy Score	Grade 3 (2012) Literacy Score	Grade 5 (2014) Numeracy Score	Grade 5 (2014) Literacy Score
School Climate Index	Pearson Correlation	.820**	.682**	.819**	.114**	.112**	.151**	.151**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000
	N	2595	2595	2606	2141	2134	2349	2344
Leadership Index	Pearson Correlation		.849**	.903**	.077**	.046*	.113**	.070**
	Sig. (2-tailed)		.000	.000	.000	.036	.000	.001
	N		2595	2595	2131	2123	2338	2333
Professional Learning Index	Pearson Correlation			.745**	.017	.001	.050*	.012
	Sig. (2-tailed)			.000	.421	.948	.016	.562
	N			2595	2131	2123	2338	2333
Staff Safety and Wellbeing Index	Pearson Correlation				.103**	.072**	.126**	.094**
	Sig. (2-tailed)				.000	.001	.000	.000
	N				2141	2134	2349	2344
Grade 3 (2012) Numeracy Score	Pearson Correlation					.688**	.748**	.629**
	Sig. (2-tailed)					.000	.000	.000
	N					2105	2030	2028
Grade 3 (2012) Literacy Score	Pearson Correlation						.593**	.755**
	Sig. (2-tailed)						.000	.000
	N						2028	2026
Grade 5 (2014) Numeracy Score	Pearson Correlation							.656**
	Sig. (2-tailed)							.000
	N							2320

*Notes. *p <.05 ** p <.01; Baseline achievement is from Year 3, 2012 NAPLAN*

Table 3. Mediated Model: Leadership → Teacher Collaboration → Academic Optimism → Achievement Numeracy and Literacy Outcomes Model

	Leadership → Teacher Collaboration → Academic Optimism → Achievement Model					
	Estimate	**S.E.**	***p*-value**	**Estimate**	**S.E.**	***p*-value**
Leadership → Teacher Collaboration	0.71	0.07	.000**	---	---	---
Teacher Collaboration → Academic Optimism	0.85	0.12	.000**	---	---	---
Leadership → Teacher Collaboration → Academic Optimism	0.61	0.10	.000**	---	---	---
Academic Optimism → Achievement	**Numeracy**			**Literacy**		
Between School						
High SES	-0.52	4.02	.896	8.82	5.04	.080
Baseline Achievement	0.79	0.11	.000**	0.73	0.11	.000**
Academic Optimism Index Score	3.54	2.72	.194	7.89	2.29	.000**
R-Square	0.81	0.12	.000**	0.72	0.10	.000**
Indirect Effects:						
Teacher Collaboration → Academic Optimism → Achievement	3.01	2.34	.199	6.72	2.12	.002
Leadership → Teacher Collaboration → Academic Optimism → Achievement	2.15	1.64	.191	4.79	1.62	.003

Notes. *p <.05 ** *p* <.01; Baseline achievement is from Year 3, 2012 NAPLAN