

RESEARCH ARTICLE

Health-Promoting School Culture: How Do We Measure it and Does it Vary by School Neighborhood Deprivation?

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ABSTRACT

BACKGROUND: The context in which school-based health-promoting interventions are implemented is key for the delivery and success of these interventions. However, little is known about whether school culture differs by school deprivation.

METHODS: Using data from PromeSS, a cross-sectional study of 161 elementary schools in Qu bec, Canada, we drew from the Health Promoting Schools theoretical framework to develop four measures of health-promoting school culture (i.e., school physical environment, school/teacher commitment to student health, parent/community engagement with the school, ease of principal leadership) using exploratory factor analysis. One-way ANOVA with post-hoc Tukey-Kramer analyses was used to examine associations between each measure and social and material deprivation in the school neighborhood.

RESULTS: Factor loadings supported the content of the school culture measures and Cronbach's alpha indicated good reliability (range: 0.68-0.77). As social deprivation in the school neighborhood increased, scores for both school/teacher commitment to student health and parent/community engagement with the school decreased.

IMPLICATIONS FOR SCHOOL HEALTH POLICY, PRACTICE, AND EQUITY: Implementation of health-promoting interventions in schools located in socially deprived neighborhoods may require adapted strategies to address challenges related to staff commitment and parental and community involvement.

CONCLUSION: The measures developed herein can be used to investigate school culture and interventions for health equity.

Keywords: health-promoting interventions; school culture; health promoting schools; measurement; social inequalities; cross-sectional study.

Citation: Kalubi J, Riglea T, O'Loughlin EK, Potvin L, O'Loughlin J. Health-promoting school culture: how do we measure it and does it vary by school neighborhood deprivation?. *J Sch Health*. 2023; DOI: 10.1111/josh.13304

Received on August 2, 2022

Accepted on February 5, 2023

Social inequalities in health are prevalent in high-income countries¹ and intervening early in childhood is key to reducing health inequalities in adulthood.² Because most children, regardless of socioeconomic background, spend much of their time at school, school-based health-promoting interventions have the potential to

reach all students and thus to help alleviate the effect of social inequalities in health.^{3,4} Implementation scientists are increasingly concerned with studying the school context and assessing the fit between interventions and the context in which they are implemented.⁵ In the health promoting schools (HPS) framework developed by the World

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*This study was supported by the Qu bec Ministry of Health and Social Services. J.K. and T.R. each hold a Doctoral Scholarship from the Qu bec Order of Nurses (Ordre des infirmi res et infirmiers du Qu bec). E.K.O.L. holds a post-doctoral salary award from the FRQ-S. J.O.L. held a Canada Research Chair in the Early Determinants of Adult Chronic Disease 2006-21. L.P. holds the Canada Research Chair in Community Approaches and Health Inequalities (CIHR 950-232541). Funding sources were not involved in the study design, data collection, analysis or interpretation, or the preparation of the manuscript for publication.

Health Organization (WHO), school health promotion is conceptualized as a whole school approach wherein health is not only promoted through interventions, but also through the school environment.⁴ School culture is part of the school context and is defined as the way a school functions and the values, norms, beliefs, and behaviors shared between staff, students, and the school community.^{6,7} A supportive school culture denotes what is expected, supported, and rewarded within the school, and has been identified as a facilitator for the implementation of health-promoting interventions.^{8,9} Understanding which specific elements of the school context facilitate health promotion is crucial to helping all schools, and especially schools serving disadvantaged students, implement well-adapted, effective health-promoting interventions for their students. In this study, our focus was two-fold: (1) the measurement of a health-promoting school culture, which embodies the specific organizational values, expectations, and policies that influence implementation of health-promoting interventions, and (2) the association between dimensions of a health-promoting school culture and school deprivation.

Limited Evidence on Social Inequalities in School Culture

School-based health promotion is an important strategy to improve the health of children; it is especially critical for students growing up in socioeconomically deprived neighborhoods, who are disproportionately affected by health issues and learning difficulties.¹⁰ Yet in previous work, we identified a negative social gradient in student health needs and the availability of health-promoting interventions across schools serving students from advantaged and disadvantaged backgrounds.¹¹ Schools serving more disadvantaged students may face additional barriers in implementing interventions such as lack of material, financial and human resources, higher workloads, and heavier student health and social needs, all of which could result in less commitment within the school community for health promotion programming.^{12,13} Although establishing a health-promoting school culture may be more challenging in disadvantaged schools, few studies have investigated this association. Markham and Aveyard reported that among schools serving disadvantaged students, those with a culture providing more effective support and boundaries had a lower smoking prevalence among their students compared to schools with a lower-rated culture.¹⁴ They hypothesized that students in these schools were more likely to adopt the school's health-promoting values. Despite their call for further studies on school culture as a target for prevention interventions and to narrow social inequalities in health, research in this realm remains scarce.

Lack of Consensus and Psychometric Evaluation of School Culture Measurement

This gap may in part relate to the fact that methods for measuring school culture are highly variable and rarely evaluated for construct-related or criterion-related validity and reliability.¹⁵ Multiple terms and definitions are used to refer to school culture including school ethos, school climate, and organizational culture. Often, components of school culture are measured as part of a broader school health construct which may include student demographics, health issues, and lifestyle habits such as substance abuse,¹⁶ and quality of life at school.^{17,18} Few studies are grounded in theory, although some authors have developed scales to evaluate implementation of the HPS approach in schools and included school culture-related concepts.¹⁵ Situating school culture measures theoretically is important to assess construct validity and interpret new findings in relation to established frameworks. Further, a recent systematic review of school health assessment tools identified only 7 of 649 studies on health-promoting schools that assessed the psychometric properties of the scales used.¹⁵ These shortcomings make comparisons between studies difficult and hinder evidence building in this field.

Study Objectives

The objective was to examine whether dimensions of health-promoting school culture were associated with socioeconomic deprivation of the school neighborhood. The study was conducted in two phases with the following specific objectives: (1) to develop a theoretically informed and reliable measure of health-promoting school culture drawing on the HPS theoretical framework; and (2) to investigate whether scores for dimensions of health-promoting school culture differed according to social and material deprivation.

METHODS

Data for both phases were drawn from the PromeSS Study, a cross-sectional survey conducted in 2016-2019, that aimed to investigate social inequalities in school-based health-promoting interventions.¹¹ The PromeSS sample of schools for this current study was selected from among all 1807 elementary schools in the province of Québec, Canada. Private schools (i.e., where tuition is paid in part by students' families), schools serving only special needs students with intellectual impairments and learning difficulties, and schools that were not assigned a deprivation indicator by the government (because they served fewer than 30 students) were excluded. Three school boards (now known as

service centers) were excluded because they exclusively served Northern or Indigenous communities or held special status. All remaining 69 school boards were approached and 32 (46%) approved recruitment of schools in their jurisdictions. Of 594 eligible elementary schools, 291 (49%) responded to initial contact and of these, 171 (59%) agreed to participate.

Data were collected in structured telephone interviews with school informants, administered by trained interviewers in French or English. School principals were asked to select 1 key informant (i.e., themselves or a nominated staff member familiar with the process of planning and implementing health-promotion in the school) who had worked in the school for at least 6 months. School informants received a copy of the questionnaire prior to the interview. Data were collected across 3 academic years (2016-2017, 2017-2018, 2018-2019). Questionnaire development was guided by the PromeSS conceptual model.¹¹ Questionnaire items were drawn/adapted from questionnaires used in previous work^{19,20} or developed *de novo* using peer-reviewed and gray literatures. Full details on sampling and data collection procedures have been previously published.¹¹

The PromeSS Study received ethics approval from the Centre hospitalier de l'Universit  de Montr l (CHUM) Ethics Review Committee and the CHUM certificate of ethics approval (2013-4130, CE 12.307) was available to all eligible schoolboards and school principals on request. The current study received ethics approval from the Comit  d' thique de la recherche en sciences et en sant  (CERSES) at the University of Montreal (CERSES-21-056-R).

Phase 1: Measures of Health-Promoting School Culture

We drew on the HPS theoretical framework⁴ to conceptualize health-promoting school culture as characteristics of the school environment that facilitate implementation of health-promoting interventions. Three key principles were used to guide development of our health-promoting school culture measures: (1) health-promoting interventions and health education objectives are formally incorporated in the curriculum; (2) the school social environment (i.e., values shared and embodied by staff, emphasis on health promotion in school policies) as well as physical environment (i.e., facilities and equipment available for health-promoting interventions and that facilitate healthy lifestyle habits) informally support student health and well-being; and (3) the school cultivates links to engage parents and the wider community to improve student health.^{4,21}

Measures. Four health-promoting school culture scales were developed. The first three (i.e., school/teacher commitment to student health, school physical environment, and parent/community

engagement in the school) were developed using exploratory factor analysis (EFA) of 18 items selected because they aligned with contextual elements in the HPS framework.⁴ Variable names and descriptive statistics for each item are presented in Table S1. Response options included strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree. Responses were recoded from 1 (strongly disagree) to 5 (strongly agree). Scale-building procedures are described in the Data analysis section.

The fourth scale, ease of principal leadership, included 7 items: "In this school how difficult is it for the principal to ... (1) demonstrate leadership for change, (2) establish a climate of openness to innovation, (3) ensure that instructional goals are clearly communicated to everyone, (4) secure resources for health-promoting interventions, (5) foster respect, (6) establish a safe and orderly school environment, (7) guide the staff in the process of solving problems." Response options included very easy, easy, neither easy nor difficult, difficult, and very difficult, which we recoded from 1 (very difficult) to 5 (very easy). Responses were summed and divided by the number of items responded to, to create a mean score for ease of principal leadership.

Data analysis. We conducted an EFA estimated by maximum-likelihood extraction with Oblimin rotation, to test structural validity and multidimensionality (i.e., to identify among the 18 items considered, items that are strongly correlated one with the other, but weakly correlated with the other items; and to group these items into separate factors).^{22,23} We used a 3-factor model to examine whether all 18 items loaded onto the expected three dimensions inspired by the HPS framework. Items retained were summed and divided by the total number of items responded to, in order to create a mean score for each dimension and labeled "school/teacher commitment to student health," "school physical environment," and "parent/community engagement in the school." Cronbach's alpha was computed to assess internal consistency of each resulting scale, as well as the ease of principal leadership scale, with alpha >0.6 which is considered acceptable.²⁴

Phase 2: Association between Health-Promoting School Culture and School Deprivation

Measures. Socioeconomic deprivation of the school neighborhood was estimated using the Pampalon et al. deprivation indices,²⁵ which are based on census statistics pertaining to the dissemination area corresponding to each school postal code. Dissemination areas are the smallest geographical units for which the 2016 Canadian Census data from Statistics Canada are available. Social deprivation (i.e.,

fragility of social networks in the community) was measured based on: the proportion of people living alone among those ≥ 15 years old; the proportion of people who are separated, divorced, or widowed among those ≥ 15 years old; and the proportion of single-parent families. Material deprivation (i.e., lack of access to everyday goods and amenities) was measured based on: the proportion of persons ≥ 15 years old without a high school diploma or equivalent; the employment to population ratio among those ≥ 15 years old; and the average income of the population ≥ 15 years old. Values were categorized into population-weighted quintiles (i.e., 5 groups with approximately the same population size) from least deprived (first quintile) to most deprived (fifth quintile). To describe our sample, we dichotomized the quintiles into low deprivation (1-3) and high deprivation (4, 5).

Sociodemographic variables used to describe the study sample included size of community which was measured using the population center index developed by Statistics Canada with data from the 2016 Canadian Census. Population centers are groupings of dissemination areas and are classified into four groups: rural area; small population center (population between 1000 and 29,999); medium population center (population between 30,000 and 99,999); and large urban population center (population of 100,000 or more).²⁶ PromeSS school postal codes were matched to population center data and the variable was dichotomized as rural/small population center and medium/large population center. School informants provided data on language of instruction (French; English), principal turnover in the past three years (0-1 change; ≥ 2 changes), teacher turnover in the past 3 years (low or none; high), and number of students in the school. School informant characteristics included current position in the school (principal; vice-principal; teacher), and number of years of experience in current school (less than 1; 1-3; 4-6; 7-9; > 10). Finally, the “Indice de milieu socioéconomique” developed by the Québec Ministry of Education²⁷ to characterize the socioeconomic status of the student body for each school was used for descriptive purposes. It is computed by summing composite scores calculated for each student in the school using their mother’s education and parental employment. Schools are categorized in decile ranks with higher scores representing higher levels of deprivation.²⁸ We re-categorized this variable as schools serving advantaged students (ranks 1-3), moderately advantaged students (4-7) or disadvantaged (8-10) students. Table S2 provides details on all study variables including questionnaire items used to obtain the data, response options and recoding of response options for analysis.

Data analysis. One-way ANOVA with post-hoc Tukey-Kramer analyses were used to compare means

for each of the four dimensions of health-promoting school culture across schools by five levels of social and material deprivation separately. Analyses were performed using SPSS, Version 27.0 (Released 2020. IBM SPSS Statistics for Macintosh, Version 27.0. Armonk, NY: IBM Corp.).

RESULTS

The sample comprised 161 elementary schools with available Statistics Canada data for computation of the school deprivation indices. Over half (57%) of schools were located in rural/small population centers and 43% were located in medium/large population centers. One-fifth (21%) of school informants reported high principal turnover, and 42% reported high teacher turnover. Pampalon indices indicated that half (50%) of schools were in high material deprivation (quintiles 4-5) and 38% were in high social deprivation (quintiles 4-5) settings. Based on the “Indice de milieu socioéconomique,” our sample of schools was similar to all eligible elementary schools in Québec ($n = 1795$). Specifically 21% of schools in our sample served very advantaged students vs. 24% of all eligible elementary schools; 44% vs. 39% served moderately advantaged students, and 36% vs. 38% served disadvantaged students.²⁹ Most schools provided instruction in French (83%), which was similar to the population of all eligible elementary schools in Québec (90%), and the median number of students per school ($n = 267$) was similar to that in all eligible schools ($n = 259$).²⁶ School informants were principals (93%), vice-principals (4%), or teachers (3%). The mean length of time spent working in the current school was 3.4 (SD = 2.6, range = 1-10) years.

Phase 1: Measures of Health-Promoting School Culture

All items selected for EFA were normally distributed; kurtosis of most items was < 2.0 and skewness was < 1.35 (Table S1). Analysis of the rotated pattern matrix showed that items loaded onto 3 factors as expected (Table 1). Two items did not load on any factor and were removed. These included “Physical activity is provided on all days when there is no physical education class to all students (not including activities during lunch, recess or before/after school)” and “Access to indoor and outdoor facilities for physical education, extracurricular and other physical activities belonging to other schools or community/private organizations is available to all students (does not include municipal parks).” Scores were computed for school/teacher commitment to student health (4 items), school physical environment (7 items), and parent/community engagement in the school (5 items).

Table 1. Factor Loadings for 18 School Culture-Related Questionnaire Items, PromeSS Study 2017-2019

Items	Rotated Pattern Matrix Factor Loadings*		
	1	2	3
Meetings with teachers are well attended by parents	0.01	-0.37	0.04
Parents attend school-sponsored events	0.15	-0.70	-0.07
PPO (parent participation organization) or home and school meetings are well attended by parents	0.13	-0.66	-0.08
Parent volunteers are easy to recruit	0.07	-0.71	0.08
Community partners (eg, community organizations, etc.) are involved in the planning and implementation of joint activities or interventions	0.00	-0.35	0.24
Teachers in your school are innovative, always seeking out new ways to facilitate students' progress	0.54	-0.09	-0.05
Teachers in your school have a real interest in the health of the students	0.78	-0.03	0.04
Teachers in your school are committed to promoting healthy behaviors in their students	0.79	-0.08	0.03
The amount of emphasis on health promotion in your school's educational project is sufficient	0.33	-0.14	0.12
Area provided for eating meals is pleasant and inviting	0.02	-0.01	0.44
Food distribution (including cafeteria, daycare, outside food suppliers, nutritional support programs) prioritizes foods of good nutritional value	-0.05	-0.03	0.36
Measures are in place to foster active transportation (eg, crossing guards, secure bike racks, etc.)	0.09	0.04	0.30
Physical activity is provided on all days when there is no physical education class to all students (not including activities during lunch, recess or before/after school) [†]	0.09	0.11	0.18
Indoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students	0.03	0.10	0.63
Outdoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students	-0.15	-0.19	0.69
Indoor school physical activity facilities are available to all students outside the class timetable	0.15	0.04	0.48
Outdoor school physical activity facilities are available to all students outside the class timetable	-0.08	-0.18	0.64
Access to indoor and outdoor facilities for physical education, extracurricular and other physical activities belonging to other schools or community/private organizations is available to all students (does not include municipal parks) [†]	0.12	-0.08	0.23

Bold indicates factor loadings >0.3.

*Exploratory factor analysis of school-culture related items aligned with the Health Promoting Schools framework supported grouping items as (1) school/teacher commitment to student health, (2) parent/community engagement with the school, and (3) school physical environment. Factor loadings can be interpreted as correlation coefficients between items and factors.

[†]Item did not load onto any factor and was removed.

Table 2. Descriptive Statistics and Internal Consistency of 4 Measures of Health-Promoting School Culture, PromeSS Study 2017-2019

Dimension	Number of Items	Mean (SD)	Median	Range	Cronbach's Alpha	Correlation Between Measures		
						1	2	3
1. School/teacher commitment to student health	4	4.11 (0.53)	4.00	2.00-5.00	0.703	-	-	-
2. School physical environment	7	3.62 (0.64)	3.71	1.17-5.00	0.676	0.382	-	-
3. Parent/community engagement in the school	5	3.76 (0.64)	3.80	1.75-5.00	0.730	0.413	0.292	-
4. Ease of principal leadership	7	3.84 (0.50)	3.86	2.57-5.00	0.767	0.485	0.232	0.303

SD = Standard deviation. Statistically significant correlations between measures at $p \leq 0.01$ are indicated in bold.

Cronbach's alpha coefficients for the three HPS-based dimensions of health-promoting school culture and the ease of principal leadership measure ranged from 0.68 to 0.77 (Table 2). Correlation coefficients among the 4 scales ranged from 0.29 to 0.49 and kurtosis and skewness for all 4 measures were <1.6.

Phase 2: Association between School Deprivation and Health-Promoting School Culture

One-way ANOVA results indicated that the mean scores for 2 of the 4 school culture scales investigated (i.e., school physical environment and ease of principal

leadership) did not differ across schools according to our indices of social and material deprivation (Table 3). Despite an omnibus test p -value of 0.075, there was a gradient in school/teacher commitment to student health by social deprivation. Specifically, school/teacher commitment decreased from 4.23 to 3.95 from the first to the fifth quintile of the school social deprivation indicator. Finally, there was a statistically significant difference in scores for parent/community engagement with the school according to social deprivation ($F(4, 156) = [4.661]$, $p = 0.001$). The Tukey-Kramer post hoc test for

Table 3. Association Between School Deprivation and Each of 4 Dimensions of School Culture, PromeSS Study 2017-2019

	n	Mean (SD)	One-Way ANOVA Omnibus Test p-Value
School/teacher commitment to student health			
Social deprivation quintiles*			0.075
Q1 (least deprived)	33	4.23 (0.54)	
Q2	35	4.25 (0.45)	
Q3	32	3.99 (0.62)	
Q4	32	4.10 (0.54)	
Q5 (most deprived)	29	3.95 (0.47)	
Material deprivation quintiles*			0.082
Q1 (least deprived)	18	4.19 (0.48)	
Q2	27	3.87 (0.59)	
Q3	35	4.08 (0.58)	
Q4	36	4.23 (0.46)	
Q5 (most deprived)	45	4.16 (0.51)	
School physical environment			
Social deprivation quintiles*			0.939
Q1 (least deprived)	33	3.72 (0.72)	
Q2	35	3.64 (0.59)	
Q3	32	3.64 (0.66)	
Q4	32	3.59 (0.57)	
Q5 (most deprived)	29	3.60 (0.63)	
Material deprivation quintiles*			0.117
Q1 (least deprived)	18	3.91 (0.47)	
Q2	27	3.66 (0.53)	
Q3	35	3.45 (0.63)	
Q4	36	3.71 (0.69)	
Q5 (most deprived)	45	3.61 (0.65)	
Parent/community engagement in the school			
Social deprivation quintiles*			0.001
Q1 (least deprived)	33	4.04 (0.57) ^a	
Q2	35	3.99 (0.53) ^b	
Q3	32	3.68 (0.65)	
Q4	32	3.64 (0.57)	
Q5 (most deprived)	29	3.52 (0.66) ^{ab}	
Material deprivation quintiles*			0.584
Q1 (least deprived)	18	4.00 (0.55)	
Q2	27	3.81 (0.68)	
Q3	35	3.72 (0.58)	
Q4	36	3.78 (0.58)	
Q5 (most deprived)	45	3.74 (0.68)	
Ease of principal leadership			
Social deprivation quintiles*			0.196
Q1 (least deprived)	30	4.00 (0.52)	
Q2	29	3.87 (0.49)	
Q3	28	3.86 (0.55)	
Q4	28	3.77 (0.47)	
Q5 (most deprived)	24	3.68 (0.42)	
Material deprivation quintiles*			0.453
Q1 (least deprived)	18	3.92 (0.52)	
Q2	27	3.67 (0.45)	
Q3	35	3.87 (0.52)	
Q4	36	3.86 (0.52)	
Q5 (most deprived)	45	3.87 (0.49)	

Tukey-Kramer post hoc test: means with the same letter (^{b,c}) indicate a significant difference. Any difference between 2 means carrying different letters is significant at $p > 0.05$.

*The distribution of social and material deprivation of the school neighborhood was divided into quintiles by the Institut national de sant e publique du Qu ebec (INSPQ) and used as is; 1st quintile is least deprived and fifth is most deprived. The mean (SD) was computed separately for descriptive purposes; the variable was used continuously in the models.

multiple comparisons suggested that the mean value of parent/community engagement with the school was significantly higher in quintile 1 than in quintile 5 ($p = 0.007$, 95% C.I. = [0.099, 0.933]). Similarly, the mean value was also higher in quintile 2 compared to quintile 5 ($p = 0.018$, 95% C.I. = [0.0539, 0.878]).

DISCUSSION

In this study, we drew on the HPS theoretical framework to develop measures of health-promoting school culture and investigate the association between these measures and school deprivation. We built four psychometrically validated scales to assess four dimensions of health-promoting school culture including school/teacher commitment to student health, school physical environment, parent/community engagement with the school, and ease of principal leadership. We then studied the associations between these scales and school deprivation and detected an association between social deprivation in the school neighborhood and parent/community engagement with the school. In addition, the data suggested that there may be a gradient in school/teacher commitment to student health according to school-level social deprivation.

Psychometric Properties of School Culture Measures

To the best of our knowledge, no other study has used the HPS framework to develop theoretically grounded measures of health-promoting school culture. Our conceptualization of school culture was grounded in HPS theory and the EFA 3-factor model supported the structural validity of the measures that we developed^{29,30} (i.e., that the measures are an adequate reflection of the dimensionality of the health-promoting school culture construct to be measured³¹). In comparison, one study used different theoretical definitions to operationalize a quality of school life scale unspecific to school culture, which included items on teacher-student relationships, school activities, physical environment, and negative and positive feelings toward the school.¹⁸ Others have developed measures to evaluate the HPS approach in schools, but the authors did not explicitly link them to a theoretical foundation³²; they did not assess the psychometric properties of their scale^{33,34}; they focused on one dimension only³³; or they included items or dimensions beyond school culture. The Scale for Health Promoting Schools (SHPS) was highlighted in a systematic review by Kazemitabar et al. as a reliable and comprehensive tool to describe schools based on the HPS framework.¹⁵ Although it was not developed specifically to measure school culture, 2 of the 7 dimensions identified in factorial analysis of the 50-item SHPS mirror the dimensions identified in our study.³⁵ Specifically, “community links” parallels our

parent/community engagement dimension, and the “school physical environment”³⁵ was identified in both studies. Among other dimensions in this scale, some items referred to healthy school policies and teacher support for health-promoting interventions, but no dimension specifically measured school/teacher commitment to student health or principal leadership.

The health-promoting school culture measures developed herein are structurally valid and internally reliable and in addition, are not exclusively intended for use in contexts where comprehensive school health approaches (such as HPS) have been implemented. If the internal reliability of these measures is replicated, we suggest that they can be integrated into school health promotion research (e.g., to assess whether school culture relates to intervention effectiveness, to identify whether factors such as social inequality relate to school culture, to assess changes in school culture after implementation of interventions). In other studies using the same PromeSS dataset, our measures were associated with success of health-promoting interventions as perceived by school informants³⁶ as well as with institutionalization of health-promoting interventions.³⁷

Health-Promoting School Culture and Social and Economic Deprivation

Parent/community engagement differed between the most and least socially deprived schools. It is possible that resources in community organizations located in disadvantaged neighborhoods are more limited in quantity and/or quality,^{38,39} which could limit schools in developing partnerships with the community. In addition, known challenges for parent involvement in school life include lack of time,⁴⁰ especially for parents from lower socioeconomic backgrounds who may work long hours or at multiple jobs.⁴¹ Parents and other community members may also be hesitant to become involved in school life if they do not anticipate being treated as equal partners by school staff.⁴² Building strong connections with parents and the community can lead to an increased sense of community identity and empowerment⁴³ which can represent important social resources for health promotion in disadvantaged schools. Interestingly, we did not detect an association between school neighborhood material deprivation and parent/community engagement with the school in this study. It is possible that the social deprivation variable captures social inequality related to income inequality, and also reflects the challenges of single-parent families (e.g., difficulty finding time and childcare resources to attend school meetings and to become involved in school activities⁴⁴) and community organizations in socially deprived neighborhoods (e.g., higher social deprivation is associated with lower social cohesion and social capital⁴⁵).

We note that scores for school/teacher commitment to student health varied by material deprivation but did not show a linear increase or decrease. There was, however, a gradient by social deprivation in this scale. Although not detectable at the 0.05 level, this finding could be important given that other studies have identified staff commitment and school prioritization of health as key factors for health promotion effectiveness.^{36,46,47} Factors that might explain why commitment is lower in more deprived schools include staff facing urgent social and educational needs which take precedence over health needs, and staff having lower confidence that any intervention will make a difference for students. In a qualitative study of principals and school health coordinators in elementary schools, although staff held strong beliefs in the synergistic importance of health and learning, many felt that the pressure on schools to deliver health promotion was a challenge, particularly in deprived neighborhoods.⁴⁸ Better integration of school, parental, and societal components in school health promotion was identified as an urgent need to address these challenges.⁴⁸ Whole-school programs that benefit from funding and partnerships could encourage shared responsibility for health promotion in the whole school community and alleviate the burden on teachers.

IMPLICATIONS FOR SCHOOL HEALTH POLICY, PRACTICE, AND EQUITY

Schools may want to implement strategies to address challenges related to parental involvement, such as tailoring the schedule and style of parent-teacher meetings to better align with parental needs, providing childcare during meetings, hiring translators, and conducting home visits.⁴² Other strategies could include highlighting the benefits of community partnerships for school staff and encouraging them to become more familiar with organizations in the school neighborhood.⁴⁹ Principals and staff may feel unprepared to establish and engage with external partners,^{50,51} and learning from other schools who have successfully developed such partnerships can be beneficial.³⁹ School districts and/or school boards could provide training and help schools connect to share their experiences.

We noted that school physical environment and ease of principal leadership, which have been associated with health promotion effectiveness in other studies,^{36,46,47} did not vary by school deprivation in PromeSS. If confirmed, this has positive implications for school health promotion across schools. In Qu bec, it is possible that ministerial intervention to minimize the impact of deprivation (e.g., through targeted programs such as the "Strat gie d'Intervention Agir Autrement" (SIAA) which provides additional funding

and support to disadvantaged schools⁵²) help alleviate the effects of social inequalities on school culture, at least for these dimensions. Schools cannot eliminate social inequalities on their own, especially when it relates to issues affecting parents and the community, and systemic changes necessitate policies above the school level.^{53,54} Research is needed to discern whether social, financial, and material resources can decrease workloads so that school staff can devote more time to health promotion, make it easier for principals to coordinate whole-school initiatives, and facilitate building links with the community.³⁹

Limitations

Although our sample of schools was similar to all eligible elementary schools in Qu bec,^{11,27} the relatively low response proportion of eligible school boards and schools may have limited generalizability of the findings. The small sample size may have limited detection of some associations. Finally, data collected from a single school informant has drawbacks including the potential for social desirability bias and recall bias which may have resulted in an inaccurate portrayal of the school. Given that most informants were school principals, they may be at risk of overestimating their capacity and may or may not recognize teacher leadership for health promotion. However, the PromeSS questionnaire was sent to informants prior to the interview, and they were encouraged to consult other staff in preparation for the interview.

Conclusions

The development of psychometrically sound measures of health-promoting school culture will permit more in-depth study of school culture across jurisdictions and identification of actionable factors associated with school culture. We detected associations between social deprivation in the school neighborhood and each of parent/community engagement with the school and school/teacher commitment to student health. If replicated, these data will inform interventions that aim to reduce social inequalities in school health promotion.

Human Subjects Approval Statement

The PromeSS Study (CE 12.307) received ethics approval from the Centre hospitalier de l'Universit  de Montr al (CHUM) Ethics Review Committee. The CHUM certificate of ethics approval was submitted to all eligible schoolboards and school principals on request. The current study is part of JK's doctoral research (CERSES-21-056-R) and received ethics approval from the Comit  d' thique de la recherche en sciences et en sant  (CERSES) at University of Montreal.

Conflict of Interest

All authors of this article declare they have no conflicts of interest.

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SUPPORTING INFORMATION

The following Supporting Information is available for this article:

Table S1. Descriptive statistics for items used in exploratory factor analysis for the development of school culture scales based on the health promoting schools theoretical framework, PromeSS Study, Qu bec, Canada, 2017-2019

Table S2. Description of PromeSS study variables including questionnaire item(s), response choices and recoding choices for analysis, PromeSS Study, Qu bec, Canada, 2017-2019

Table S3. Reliability statistics and scale skewness and kurtosis for 4 scales of dimensions of health-promoting school culture (n = 171), PromeSS Study, Qu bec, Canada, 2017-2019

Additional supporting information may be found online in the Supporting Information section at the end of the article.