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How can we Improve the Physical and Social Environment of the School to Promote Student Resilience? Evidence from the Resilient Children and Communities Project in China

Keywords: school environment; health-promoting environment; health-promoting school; resilience; mental health promotion

Introduction

There is concern about the increasing global prevalence of mental ill-health in children, estimated at between 20% and 30% (Stephens *et al*, 1999). Many children have multiple problems (Chen *et al*, 2000; China Internet Information Center, 2003; Falbo & Poston, 1993). China is no exception to this trend, with an estimated 15–20% of children having

mental health problems (XY Sun, 2003).

Numerous programs have been developed to reduce or alleviate problem behaviour or disorders and/or assist positive youth development (Browne *et al*, 2004), the majority of these intervention programs focusing on behaviour, or treating child mental health disorders and symptoms such as attention-deficit hyperactivity. Over the last 28 years, a holistic approach has received increasing emphasis, underpinned by Bronfenbrenner's ecological theory (Bronfenbrenner, 1979, 1989), and a growing body of evidence indicates that the school environment plays a critical role in children's

A B S T R A C T

Debate on the relationship between mental health and environment is of long standing. Resilience, as a core aspect of mental health promotion, has been described as the interaction between risk and protective factors present in the environment (Rutter, 1987). Central to the concept is that protective factors – those factors in the individual or the environment that enhance an individual's ability to resist problems and deal with life's stresses – can be fostered and promoted. The paper specifies aspects of the school environment in a holistic, or ecological setting, drawing on a

multi-strategy health promotion project in primary schools in Hefei and Nanjing in China. A prospective intervention study design was used to collect data in pre-intervention and post-intervention phases, and to analyse it to establish the effectiveness of the intervention in improving the health-promoting environment in Chinese primary schools. The results indicate a significant intervention effect on the physical and social school environment in primary schools, and these results can be used in forthcoming comprehensive work to improve school mental health and well-being.

development. However, relatively few programs have accepted the significance of a comprehensive, universal, context-focused approach (Browne *et al*, 2004), despite research that has confirmed associations between children's social-contextual experiences in schools and mental health.

The effects of an adverse social environment are likely to be cumulative. The Kauai Pregnancy Study (Werner, 1992), for example, examined the impact of perinatal stress and the quality of the environment on children's physical, intellectual and social development. At 10 years of age, social class was found to be significantly associated with achievement, intelligence and emotional problems. Early environmental deprivation had an even greater impact at ten years of age than at two years of age, indicating that the effect increases with age. The significance of the school at this age has also been recognised, and in a range of studies effects have been found of school structural variables, characteristics of school principals/teachers, and aspects of the school policy relating to student achievement and well-being.

A growing and promising body of research indicates that, in addition to changing behaviour from within, positive health outcomes are achieved by planned social interventions and by altering the organisational structure of the environment (Maes & Lievens, 2003). In health terms, such an ecological approach has been incorporated into the 'health promoting school' (HPS) concept (WHO, 1986). This concept not only includes the school curriculum, but also considers the physical and social environment (of the school) and the influences, particularly of parents and family, of the wider community.

To achieve maximum benefit, these school contextual and environmental characteristics need to encompass:

- the formal health curriculum that gives school-aged children the essential knowledge and social skills that will allow them to make enlightened choices affecting their physical and psycho-social health
- the school environment, which refers to the quality of the physical environment and the social environment, the health services and policies of the school
- school/community relationships.

The HPS approach requires a substantial change in the way schools, their staff and students engage with health. It involves moving from practices that rely mainly on classroom-based health education models to a more comprehensive, integrated construct of health promotion that focuses both on children's attitudes and behaviours and on their environment (Stewart *et al*, 2004; Sun & Stewart, 2007).

Evaluation data regarding the operationalisation of some of the HPS dimensions is still limited and inconclusive, particularly for schools in China, despite a history of implementing health promoting school approaches for over a decade (Stewart & Sun, 2004). There is evidence that most HPS programs currently in place use individual strategies to develop personal skills in children and young people, but few concurrently employ strategies that focus on the school environment or community participation (Deschesnes *et al*, 2003). Very little is known yet about the way to implement a comprehensive, integrated approach effectively for the school environment (Allensworth & Kolbe, 1987). A survey of the literature by Lynagh and colleagues (1997), based on various studies of school-based health promotion programs carried out between 1983 and 1995, reveals that most of them focus on only one of the school context/environment domains suggested in the HPS approach, namely the health-related curriculum.

Study of health promotion shows that schools work well with community health services in reduction of deficiencies related to depression, anxiety, and externalising/ internalising or other psychological/social problem, but there is little evidence of a productive partnership in mental health promotion seeking to develop protective factors by increasing the supportive environment (Browne *et al*, 2004). Most of the studies published on the effect of school health promotion policies deal with only one behaviour (mainly smoking, or alcohol and drug use) and few with aspects of community and intersectoral partnerships and school support system (Browne *et al*, 2004). The review by Wells and colleagues (2003) suggested that long-term interventions that promote the positive mental health of all students and involve changes to the school climate are likely to be more successful than brief, class-based mental illness prevention programs, but no statistical evidence was provided to support this finding.

Accordingly, the intention of this paper is to examine how the physical and social context of an intervention focused on resilience as an entry point can exert an influence on an intermediate health outcome (a resilience-enhancing environment). It is hypothesised that an intervention aiming to promote resilience using an HPS approach will lead to supportive structural/organisational and environmental improvements in school settings.

Methods

This paper is concerned with all school staff, both teaching and non-teaching, in ten primary schools in Nanjing and four primary schools in Hefei. Nanjing is the capital city of Jiang Su province, and Hefei is a capital city of Anhui province in

China. Data collection was carried out in November and December 2004, in the pre-intervention phase, and in March 2006, for the post-intervention phase. Data collection for the staff sample was carried out by two project officers, by distribution of a questionnaire at staff meetings organised by the school principals.

Specific written instructions were issued to staff, describing the administrative procedures to be followed. Participants were informed clearly about the study and asked to provide their consent to participate. Participation was voluntary and a guarantee of anonymity was given. There was a high staff response rate in both pre- and post-intervention phases of the study. In the pre-intervention phase, 347 staff from Hefei and 477 staff from schools in Nanjing were invited to participate in the study. There were 429 staff (response rate of 90%) in Nanjing Schools and 298 staff (response rate of 86%) in Hefei schools. In the post-intervention phase, 529 staff from Nanjing Schools and 339 staff from Hefei schools were invited to participate in the survey, with responses from 477 staff (response rate of 90%) from Nanjing schools and 263 staff (response rate of 78%) from Hefei schools.

Intervention strategies and activities

The intervention was implemented in 10 intervention schools from August 2004 to August 2006. The intervention schools were required to use an HPS approach (WHO, 1995) to develop intervention activities, with a focus on the organisational change processes required in a school. Strategies that promote a healthy school climate, or environment, were identified as those that encourage personal skill-building in students, staff and parents, foster positive relationships in school and family social networks, and endorse supportive environments within the school. The intervention activities were developed around the issues identified by each school community to do with resilience, such as communication skills, social emotional skill, parenting skills, self-esteem, confidence and development of problem-solving skills.

The intervention strategies using health-promoting school principles in 10 intervention schools emphasised a number of themes, summarised in **Table 1**, overleaf.

Measures

A number of scales were adopted, modified or developed. They included the following.

Health Promoting Environment Scale (HPES)

Health Promoting Environment Scale (HPES) was devel-

oped to measure the school environment through the study. The structure of HPES was based on factors identified in the Ottawa Charter (WHO, 1986) and items for the staff survey were based on a review of the literature in relation to the key features of the HPS that best described these factors (Deschesnes *et al*, 2003; Rogers *et al*, 1998; Scriven & Stiddard, 2003). There are a total 54 items for the HPES scale. Items in the HPES scale, designed to assess aspects of the school that help to promote health, include mental health service provision and partnerships, resilience curriculum, physical and social environment, school organisational structure, health policy, mental health policy and provision of positive life experience in schools. For example, a question from the HPS scale, 'To what extent is your school actively putting into place the following policies...?', was followed by a series of options such as '... preventing the use of alcohol, tobacco and illicit drugs' and '... policy to promote good social-emotional skills'. A 5-point Likert scale format was used, wherein 1 indicated 'not at all' and 5 indicated 'a great deal'.

The underlying assumption of the HPS measure was that the school, as a setting in which not only children but also many adults spend a very substantial part of their day, is the best place to promote all school members' health and well-being. Factors that may contribute to resilience at the school community level are contextual, and include school ethos, social environment and physical environment. Opportunities for all school members to access health services and resources, opportunities for personal development and co-curricular participation contributed to the health-promoting environment. Principal component analysis was used to assess the variances explained by the scale, and Cronbach's α was used to examine the internal consistency of the scale. The factor analysis revealed seven constructs: mental health service and partnership, curriculum on resilience, school physical and social environment on resilience, school organisation and structure, health policy on physical health, mental health policy, and opportunity for positive life experience. The staff HPS scale demonstrated high internal consistency of the component items, with Cronbach's α at 0.95, and variance explained for the scale is 69%.

Analytical method

The differences between pre- and post intervention phase (time), differences between intervention and control groups (group) and interaction between time and group on seven HPES subscales were analysed, using multivariate analysis of variance. If there was significant interaction between time and group on HPS environment subscales, the univariate

TABLE 1 *Intervention Activities*

Themes	Activities
Professional development for staff and parents	<p>Run workshop and training for staff and parents in:</p> <ul style="list-style-type: none"> ■ resilience ■ parenting skills in relation to parent–student relationship development, communications between school and families, parental engagement in school activities
Student resilience building	<p>Through various activities and curriculum to develop students’:</p> <ul style="list-style-type: none"> ■ problem-solving skills ■ social skills ■ communication skills ■ peer relations ■ assertiveness skills
School environment	<p>Decoration of school to develop physical and social environment to address issues of:</p> <ul style="list-style-type: none"> ■ safety ■ anti-bullying ■ friendship ■ respect ■ good student–teacher relationship ■ good student relationship ■ assembly to celebrate success and give awards to students with good behaviours and social-emotional competence
Community partnerships	<p>Intervention schools build partnerships with:</p> <ul style="list-style-type: none"> ■ local communities ■ psychological associations ■ police office ■ parent association ■ youth club
Curriculum development	<p>Resilience issue is addressed in key learning areas:</p> <ul style="list-style-type: none"> ■ maths ■ literacy ■ English ■ health and social study ■ drama ■ sports
Extra-curricular development	<p>The resilience skills were addressed through extra-curriculum activities:</p> <ul style="list-style-type: none"> ■ excursion ■ family activities in barbecue, picnics ■ parent–student activities
Psychological counselling	<p>Develop psychological counselling centre:</p> <ul style="list-style-type: none"> ■ provide psychological support when students need help <p>Referral service:</p> <ul style="list-style-type: none"> ■ liaise with local psychological counselling service when students have behavioural and emotional problems

analysis of variance (Univariate ANOVA) was used to identify the questions of each of the seven HPES subscales which might contribute to the differences between the intervention and control groups.

Potential confounding factors such as staff role in the school and years of working experience in the school were thought to have the potential to influence performance on seven HPES subscales; these factors were adjusted by multivariate analysis of variance.

Results

The demographic variables for staff (role in the school and years of working experience) were found to differ between intervention and control schools across the pre- and post-intervention phases of the study (*Table 2*, below).

As all school staff participated in the study, the staff sample was predominantly female (86%), and 68 % were teaching staff. Most of the staff had worked in the same school for between six and ten years. The proportion was similar in both intervention and control schools, at both pre- and post-intervention phases. Chi-square tests showed that there were significant ($p < .05$) differences between intervention and control schools in the proportion of staff with respect to staff role and years of working experience. The staff job role and years of working experiences were therefore adjusted in the analysis of intervention effect on HPS variables.

The MANOVA analysis on the intervention effect on seven dimensions of the HPES Scale is presented in *Table 3*, overleaf.

MANOVA analysis on the interaction between time and group shows that there is a significant time and group interaction. This indicates that the intervention is significant for the intervention group for all HPES dimensions except health policy. This is indicated by the significant improvement in intervention schools in all HPES subscales except health policy, and control schools showed significantly decreased scores in all HPES subscales except health policy in the post-intervention stage.

Univariate analysis of variance (ANOVAs) showed the question items which contributed to the significant intervention effect of six HPS subscales. This is shown in *Tables 4* to *9* on the following pages.

Table 3 shows that the intervention program using an HPS approach significantly promoted all areas of mental health service provision to the schools. The intervention program significantly improved the level of parents', local community and service providers' participation in promoting resilience activities.

Table 4 shows that the intervention program using an HPS approach significantly promoted all areas of provision of mental health service in partnership. The intervention program significantly improved the partnership between school, families, local communities and health services providers.

For resilience curriculum development (*Table 5*), the intervention program significantly promoted and enhanced curriculum development relating to resilience in all curriculum areas in the intervention schools. This improvement is reflected in the following items.

- Curriculum has been developed to develop students'

TABLE 2 Staff Characteristics

		Pre-intervention		Post-intervention		χ^2	df
		Intervention schools	Control schools	Intervention schools	Control schools		
Gender	Male	79	61	63	62	1.36	3, 1369
	Female	322	250	298	234		
Staff role	Principal	2	3	4	5	48.67***	15, 1355
	Deputy principal	17	9	43	35		
	Teacher	354	275	278	225		
	Support staff	16	7	10	8		
	Administration	8	9	13	13		
	Other	3	7	8	3		
Years of working	< 1 year	44	24	16	23	86.63***	18, 1366
	1–2 years	31	17	47	20		
	3–5 years	92	39	62	24		
	6–10 years	107	82	120	81		
	11–15 years	53	46	53	60		
	16–20 years	30	38	30	37		
	> 20 years	44	63	33	50		

*** $p < .001$

TABLE 3 *Health Promoting Environment*

Questions	Pre-intervention		Post-intervention		Time	Group	Time x Group interaction	df
	Intervention (n = 148)	Control (n = 219)	Intervention (n = 327)	Control (n = 351)				
Service and partnership	3.44 (.80)	3.51 (.78)	3.52 (.78)	3.16 (.80)	6.09***	7.87***	2.33**	14, 1343
Curriculum	3.74 (.72)	3.96 (.75)	3.72 (.77)	3.52 (.79)	3.36**	1.55	3.71***	313, 1079
School environment	4.13 (.58)	4.34 (.57)	3.72 (.77)	3.52 (.79)	4.20***	4.09***	3.16***	6, 1386
School organisation and structure	3.85 (.72)	3.96 (.66)	3.81 (.69)	3.70 (.78)	2.31*	4.97***	2.52*	6, 1360
Policy on health	4.11 (.76)	4.13 (.81)	3.85 (.86)	3.82 (.92)	24.27***	0.08	1.57	4, 1086
Policy on mental health	4.14 (.64)	4.36 (.65)	4.03 (.73)	3.99 (.75)	6.81***	2.35*	5.57***	5, 1089
Positive life experience	4.34 (.50)	4.47 (.54)	4.13 (.66)	4.07 (.72)	5.89***	2.05	2.57*	4, 1384

* $p < .05$, ** $p < .01$, *** $p < .001$ **TABLE 4** *Provision of Mental Health Service in Partnership*

Questions	Pre-intervention		Post-intervention		Time	Group	Time x group interaction
	Intervention (n = 310)	Control (n = 372)	Intervention (n = 327)	Control (n = 351)			
A26 Involvement of local community organisations in delivery of programs to the school	3.15(1.04)	3.24 (.97)	3.43 (.90)	3.08(1.06)	1.23	5.95*	16.09***
A27 Development of curriculum activities that encourage children's involvement in the community	3.53 (.96)	3.48 (.90)	3.65(1.11)	3.26 (.99)	.72	16.45***	9.78**
A28 Participation of parents in all school activities	3.15(1.02)	3.19 (.95)	3.45 (.97)	3.10(1.05)	3.71	8.25**	12.98***
A29 Raising local community awareness of school-based health promotion initiatives	3.64 (.98)	3.71 (.95)	3.79 (.92)	3.38(1.03)	3.16	10.74**	20.38***
A34 Professional programs for parents and care-givers	3.03(1.13)	3.24(1.00)	3.28(1.02)	3.06 (.98)	.32	.00	14.17***
A35 Information, resources, services to support the personal health of staff	3.27(1.14)	3.52 (.98)	3.62(1.07)	3.38 (.97)	3.54	.00	18.57***
A45 Regular information exchange between families, local community and school	3.31 (1.04)	3.40 (.98)	3.46(1.00)	3.14 (.96)	.92	4.83*	14.23***
A46 Local mental health services are accessed for counselling and referral	2.82(1.20)	2.90(1.12)	3.31(1.24)	2.78(1.11)	8.39**	12.68***	23.37***
A47 Support services are available for socially and emotionally disturbed students	3.21(1.13)	3.37(1.05)	3.67 (.96)	3.40(1.16)	17.10***	.91	13.41***
A48 Access to basic health promotion and counselling services for staff (conflict/stress management)	3.15(1.18)	3.22(1.07)	3.50(1.16)	3.06(1.07)	2.59	9.12**	18.05***
A49 Parents are involved in several ways in the life of the school	3.40 (.99)	3.41 (.91)	3.49(1.05)	3.19(1.04)	1.54	7.40**	7.67**
A50 The curriculum contains activities which involve students interacting with their families	3.59 (.97)	3.58 (.91)	3.69 (.90)	3.37(1.01)	1.08	10.04**	8.28**
A51 Local community groups participate collaboratively in school activities	3.10(1.16)	2.92(1.05)	3.42(1.01)	2.81(1.11)	2.99	45.28***	13.64***
A52 Parents are encouraged to be involved in decision making and policy development in school	3.51(1.08)	3.42(1.03)	3.65(1.09)	3.19(1.07)	.76	22.38***	10.65**

* $p < .05$, ** $p < .01$, *** $p < .001$

resilience skills in self-esteem, decision-making, problem solving, and assertiveness.

- Time to deliver the resilience curriculum is provided.
- Resilience issues are embedded in all key learning areas.
- Staff are provided with professional development opportunities in relation to development of the resilience curriculum and resilience skills.
- Resilience curriculum development considers student gender and cultural background.

For the school environment subscale (*Table 6*), in six questions, four items have contributed significantly to the intervention effect in intervention schools. These improvements are reflected in developments in both the physical

environment and the social environment in resilience-related activities. For example, space and areas are provided in intervention schools to promote student activities, interactions and games, and to encourage parents and staff involvement in resilience activities. Supportive student and staff relationships were encouraged. However, there was no significant improvement in physical environment planning relating to general health concerns such as strategies to minimise injuries, for example ergonomic seating or safe play equipment.

For the school organisation and structure subscale (*Table 7*), four of six items contributed significantly to the intervention effect in intervention schools; the school recognises cultural, religious and ethnic diversity in students, the school provides students with positive social experiences

TABLE 5 *Curriculum*

Questions	Pre-intervention		Post-intervention		Time	Group	Time x group interaction
	Intervention (n = 168)	Control (n = 249)	Intervention (n = 327)	Control (n = 351)			
A30 Development of a comprehensive school-based health curriculum	3.65 (.95)	3.97 (.94)	3.62 (.88)	3.51 (.98)	17.23***	3.04	13.51***
A31 Integration of relevant mental health and resiliency curriculum across key learning areas	3.82 (.90)	4.11 (.85)	3.82 (.94)	3.64 (.10)	15.55***	.95	16.11***
A32 Time for health-enhancing activities is provided	4.08 (.86)	4.32 (.78)	3.94 (.92)	3.93 (.90)	22.73***	4.32*	5.11*
A33 Professional development specifically promotion relevant to resiliency and mental health for teachers	3.52 (.95)	3.88 (.95)	3.61 (.99)	3.34 (1.04)	13.13***	.58	25.28***
A36 Program for students, relevant to their age and culture of mental health	3.54 (.98)	3.90 (.92)	3.74 (.98)	3.46 (1.00)	3.80	.36	27.38***
A37 Program for students, relevant to their age and culture of personal and cultural identity	3.86 (.78)	4.15 (.75)	3.86 (.88)	3.70 (.93)	18.32***	1.35	17.73***
A38 Program for students, relevant to their age and culture of friendship and relationships	3.75 (.85)	3.95 (.85)	3.76 (.90)	3.48 (.95)	17.05***	.52	17.84***
A39 Program for students, relevant to their age and culture of dealing with failure and frustration	3.56 (.88)	3.82 (.93)	3.64 (1.03)	3.38 (.98)	8.86**	.00	17.89***
A40 Opportunities for students to acquire skills in communication and assertiveness	3.71 (.88)	3.87 (.88)	3.70 (.88)	3.52 (.91)	10.59**	.05	8.71**
A41 Opportunities for students to acquire ability in decision making/problem solving	3.60 (.91)	3.76 (.92)	3.64 (.98)	3.40 (.94)	7.14**	.46	11.28**
A42 Opportunities for students to acquire skills in stress management	3.50 (.93)	3.75 (.92)	3.59 (.96)	3.28 (.97)	9.64**	.29	21.74***
A43 Opportunities for students to acquire skills in esteem building	3.89 (.85)	4.02 (.87)	3.84 (.91)	3.66 (.97)	12.61***	.30	7.28**
A44 Opportunities for students to develop and maintain social relationships	3.63 (.85)	3.75 (.89)	3.68 (.92)	3.50 (.96)	3.02	.37	6.88**

* $p < .05$, ** $p < .01$, *** $p < .001$

TABLE 6 School Environment

Questions	Pre-intervention		Post-intervention		Time	Group	Time x group interaction
	Intervention (n = 326)	Control (n = 391)	Intervention (n = 327)	Control (n = 351)			
A8 School environment is planned so that it supports the health of students and staff	4.10 (.84)	4.3 (.77)	4.04 (.84)	4.15 (.86)	6.46*	12.51***	1.50
A9 Adequate areas for students' activities, interactions and games	3.88 (.90)	4.17 (.81)	3.92 (.98)	3.93 (.97)	4.15*	9.12**	8.15**
A10 Strategies to minimise injuries, eg ergonomic seating, safe play equipment	4.08 (.86)	4.27 (.81)	4.01 (.97)	4.05 (.87)	9.59**	5.60*	2.34
A11 Areas which encourage participation between students, parents and staff	3.60 (.98)	3.76 (.97)	3.67(1.02)	3.58(1.02)	1.05	.36	5.84*
A12 Teachers are supportive of, and respectful to, students and other staff	4.25 (.72)	4.38 (.69)	4.21 (.71)	4.07 (.78)	19.21***	.01	11.72**
A13 Students are supportive of, and respectful to, students and staff	4.06 (.73)	4.23 (.69)	4.09 (.85)	4.02 (.87)	4.23*	1.49	8.98**

* $p < .05$, ** $p < .01$, *** $p < .001$

and success in various ways, and the school provides a structure to promote development of student social skills.

For policy on mental health promotion dimension (*Table 8*), three of five items contributed significantly to the intervention effect in intervention schools. These improvements focused mainly on policy development in relation to referrals for students who had mental and behavioural problems, and policy to promote positive relationships between students, staff and parents.

Table 9 shows that there were two items in the positive life experiences subscale that contributed significantly to the intervention effect in intervention schools. These two items reflected that new students and student with special

needs get the most benefit from positive life experience activities in intervention schools.

Summary and discussion

The purpose of this study is to investigate the significance of the school ecology, its social and environmental characteristics, for mental health promotion, characterised as the promotion of 'resilience'. The paper focused specifically on staff, and reports on an intervention project that used the HPS framework to promote resilience across the whole school community in two cities in China. School staff indicate

TABLE 7 Structure

Questions	Pre-intervention		Post-intervention		Time	Group	Time x group interaction
	Intervention (n = 311)	Control (n = 380)	Intervention (n = 327)	Control (n = 351)			
A16 Student involvement in school decision-making	3.08(1.11)	3.10(1.00)	3.27(1.14)	3.11 (.98)	3.18	1.59	2.26
A19 Recognition of cultural, religious and ethnic diversity	3.56(1.08)	3.57(1.01)	3.80(1.04)	3.52(1.09)	2.64	5.51*	6.21*
A20 Positive social experience for all students is promoted	3.79 (.97)	3.91 (.90)	3.93 (.86)	3.84 (.91)	.61	.08	4.37*
A21 Opportunities for students to experience success in a variety of ways	4.13 (.82)	4.36 (.71)	4.16 (.80)	4.20 (.87)	2.47	10.27**	4.85*
A23 Positive academic experience is promoted	3.77 (.96)	3.89 (.91)	3.86 (.82)	3.79 (.99)	.03	.15	3.63
A24 School structures competition experience to promote students' social ability	3.72 (.96)	3.94 (.87)	3.91(1.02)	3.76 (.94)	.02	.41	13.20***

* $p < .05$, ** $p < .01$, *** $p < .001$

TABLE 8 Policy on Mental Health

Questions	Pre-intervention		Post-intervention		Time	Group	Time x group interaction
	Intervention (n = 171)	Control (n = 248)	Intervention (n = 327)	Control (n = 351)			
A5 Policy to promote good social–emotional skills	4.33 (.76)	4.46 (.79)	4.12 (.96)	4.26 (.97)	13.22***	5.16*	.01
A6 Policy to promote mental and emotional health in students	4.23 (.83)	4.42 (.79)	4.12 (.99)	4.14(1.06)	10.50**	3.07	2.14
A7 Referral policy for students with mental health and behavioural problems	4.08 (.92)	4.26 (.94)	4.00 (.95)	3.86(1.06)	14.93***	.13	7.16**
A14 Policy for students and staff to develop positive relationships	4.04 (.79)	4.38 (.67)	3.98 (.78)	3.89 (.85)	30.77	6.02*	18.84***
A15 Policy for parents to develop positive relationships with staff	3.94 (.85)	4.18 (.76)	3.94 (.93)	3.80 (.97)	11.39**	.85	10.71**

* $p < .05$, ** $p < .01$, *** $p < .001$

TABLE 9 Opportunities for Positive Life Experience

Questions	Pre-intervention		Post-intervention		Time	Group	Time x group interaction
	Intervention (n = 322)	Control (n = 391)	Intervention (n = 327)	Control (n = 351)			
A17 Friendly and welcoming environment for new students	4.02 (.89)	4.21 (.79)	4.05 (.92)	3.96 (.94)	5.20*	1.23	8.90**
A18 Students' healthy behaviours and positive attitudes to life and learning are encouraged	4.42 (.64)	4.51 (.62)	4.30 (.73)	4.28 (.80)	22.34***	1.13	1.90
A22 Positive physical activity experience for all students is promoted	4.33 (.69)	4.46 (.67)	4.29 (.80)	4.28 (.82)	6.95**	1.94	3.06
A25 Support for students with special needs	3.89 (.91)	3.96 (.90)	3.94(1.02)	3.76(1.03)	1.86	.97	6.06*

* $p < .05$, ** $p < .01$, *** $p < .001$

that they consider that there have been significant improvements in the physical and social environment in relation to curriculum development focused on resilience, on mental health service provision and partnership with the community and health service providers, on mental health policy development in their schools, on school organisational structure, and in promoting positive life experiences for students.

These broad environmental improvements are supported strongly by statistical evidence and are derived from a large population-based study. Despite the time constraints relating to the study period, this work is important, because it provides a baseline evaluation of the implementation of a comprehensive mental health promotion strategy in Chinese primary schools. This is one of the first such studies on mental health promotion in China. For increased confidence in the findings, an additional longer-term follow-up study is required to investigate the sustainability of the changes noted over the life of the intervention.

The study also gives strong support to the HPS approach

that links schools with relevant agencies and groups, embeds protective factors in the curriculum and encourages school members' participation. It also indicates the opportunities available for mental health promotion through school staff involvement in the intervention. The project indicates that a whole-school, HPS approach is effective in creating a healthy mental health promotion environment within primary schools in China.

School environment indicators, such as the school social environment, school–community relations and curriculum development, were all aligned with resilience. Intervention schools, in a relatively short time, showed effects compared with schools that were not using a holistic approach. This improvement was shown in all the mental health promotion areas that comprised the HPS scale.

The findings of this study add evidence from primary schools in two cities in China to the limited body of data relating to the implementation of HPS to promote mental health in primary schools. It adds statistical evidence to the discussion

of how the HPS works in practice and how confident schools should feel in their ability to operationalise such a comprehensive, integrated approach (Deschesnes *et al*, 2003).

Numerous factors have the potential to influence the extent to which the physical and social environment of the school setting can influence health, broadly defined (Greenberg *et al*, 2003). The evidence from this study supports the contention that we must focus attention on changing organisation, physical conditions and social environment rather than focusing solely on the individual. The evidence relating to the significant improvement in school organisation in the study supports strategies that encompass the school environment, structural issues and organisational practice. Such areas should become key components of mental health promotion programs.

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References

- Allensworth DD & Kolbe LJ (1987) The comprehensive school health program: exploring an expanded concept. *Journal of School Health* **57** 409–12.
- Bronfenbrenner U (1979) *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge: Harvard University Press.
- Bronfenbrenner U (1989) Ecological systems theory. *Annals of Child Development* **6** 187–249.
- Browne G, Gafni A, Roberts J, Byrne C & Majumdar B (2004) Effective/efficient mental health programs for school-age children: a synthesis of reviews. *Social Science & Medicine* **58** 1367–84.
- Chen X, Chen H, Kaspar V & Noh S (2000) Adolescent social, emotional and school adjustment in Mainland China. *International Journal of Group Tensions* **29** 51–78.
- China Internet Information Center (2003) *Million adolescents in China were in mental sub-health*.
- Deschesnes M, Martin CL & Hill AJ (2003) Comprehensive approaches to school health promotion: how to achieve broader implementation? *Health Promotion International* **18** (4) 387–96.
- Falbo T & Poston JDL (1993) The academic, personality, and physical outcomes of only children in China. *Child Development* **64** 18–35.
- Greenberg MT, Weissberg RP, O'Brien MU, Zins JE, Fredericks L, Resnik H *et al* (2003) Enhancing school-based prevention and youth development through coordinated social, emotional, and academic learning. *American Psychologist* **58** (6/7) 466–74.
- Lynagh M, Schofield M & Sanson-Fisher R (1997) School health promoting programs over the past decade: a review of the smoking, alcohol and solar protection literature. *Health Promotion International* **12** 43–60.
- Maes L & Lievens J (2003) Can the school make a difference? A multilevel analysis of adolescent risk and health behaviour. *Social Science & Medicine* **56** 517–29.
- Rogers E, Moon AM, Mullee MA, Speller VM & Roderick PJ (1998) Developing the 'health-promoting school' – a national survey of healthy school awards. *Public Health* **112** 37–40.
- Rutter M (1987) Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry* **57** 316–31.
- Scriven A & Stiddard L (2003) Empowering schools: translating health promotion principles into practice. *Health Education* **103** (2) 110–8.
- Stephens T, Dulberg C & Joubert N (1999) Mental health of the Canadian population: a comprehensive analysis. *Chronic Diseases in Canada* **20** (3) 118–26.
- Stewart D & Sun J (2004) Health promoting school model. *Chinese Journal of Health Education* **20** (3) 243–5.
- Stewart D, Sun J, Patterson C, Lemerle K & Hardie M (2004) Promoting and building resilience in primary school communities: evidence from a comprehensive 'health promoting school' approach. *International Journal of Mental Health Promotion* **6** (3) 26–33.
- Sun J & Stewart D (2007) How effective is the health promoting school approach in building social capital in primary schools? *Health Education* **107** (6) 575–99.
- Sun YX (2003) Overview of children in China. *Journal of Family and Economic Issues* **24** (4) 331.
- Tseng WS, Tao K, Hsu J, Chiu J, Yu L & Kameoka V (1988) Family planning and child mental health in China: the Nanjing survey. *American Journal of Psychiatry* **145** (11) 1396–403.
- Wells J, Barlow J & Stewart-Brown S (2003) A systematic review of universal approaches to mental health promotion in schools. *Health Education* **103** (4) 197–220.
- Werner EE (1992) The children of Kauai: resiliency and recovery in adolescence and adulthood. *Journal of Adolescent Health* **13** 262–8.
- WHO (1986) *Charter adopted at an International Conference on Health Promotion The move towards a new public Health*. Ottawa: World Health Organisation.