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Different measures, different informants, same outcomes? Investigating multiple perspectives of primary school students' mental health

Katherine L Dix, Helen Askill-William, Michael J Lawson

Centre for Analysis of Educational Futures, School of Education, Flinders University, South Australia

Address for correspondence: katherine.dix@flinders.edu.au

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ABSTRACT

Student wellbeing is of central concern for parents and teachers and for state and national governments. Policies on wellbeing are now articulated within all educational systems in Australia (e.g. DECS 2008). Effective enactment of policy depends in part on the suitability of judgements made about students' mental health.

This paper investigates teacher and parent/caregiver assessments of students' mental health based upon data from the evaluation of the KidsMatter mental health promotion, prevention and early intervention pilot Initiative in 100 primary schools across Australia. Goodman's (2005) Strength and Difficulties Questionnaire (SDQ) was completed by parents/caregivers and teachers of almost 4900 primary school students in KidsMatter schools. The SDQ was developed as a brief mental health screening instrument and is widely used in many nations, including Australia (Levitt, Saka et al. 2007). A second measure, the Flinders Student Competencies Scale (SCS), which was specifically developed for this study, canvassed the five core groups of indicators of students' social and emotional competencies identified by the Collaborative for Academic, Social and Emotional Learning (CASEL 2006), namely, self-awareness, self-management, social awareness, relationship skills, and responsible decision making, as well as students' optimism and problem solving capabilities. This second measure was also completed by the students' teachers and parents/caregivers. A third measure was based on a non-clinical assessment by teachers and school leadership staff, who identified students in their school who were considered to be 'at risk' of social, emotional or behavioural problems.

The first focus of this paper investigates how closely the three measures of identification of the mental health status of students correlate. The second focus of this paper investigates relationships between teachers' and parent/caregivers' ratings using the SDQ and the Flinders SCS.

Results indicate that significant associations were found between the three measures of students' mental health. This suggests that non-clinical ratings, by teachers and leadership staff in the school, can provide one means of identifying students 'at risk', according to comparisons with the SDQ and the Flinders SCS. In triangulating the three sources of measurement, we provide a detailed picture of the mental health status of primary school students in the 2007-2008 KidsMatter schools.

This paper provides a national snapshot of the mental health status of Australian primary school children. It also contributes to the growing body of literature examining the psychometric characteristics of the SDQ in the Australian setting, and to alternative measures for assessing student mental health in school settings.

INTRODUCTION

The issue of people's Mental Health status is coming into increasing focus. The recent Australian Research Alliance for Children and Youth report card ranks Australians' mental health status at 13th out of 23 OECD countries: The ranking for Indigenous Australians is much worse, at 23rd. Reports from Sawyer and colleagues (Sawyer, Sarris et al. 1990; Sawyer, Arney et al. 2001; Sawyer, Miller-Lewis et al. 2007) record the prevalence of mental health disorders for Australian children and adolescents at approximately 13 to 21 per cent, according to self-report or parent/caregiver information.

In Australia and overseas, attention is being given to the possibility of working through families and schools to improve the mental health of children. The KidsMatter pilot Initiative (KMI) was implemented in 100 primary schools in Australia in 2006-2008 to develop and trial an intervention to improve mental health outcomes for primary school students. This pilot program involves school-based interventions in four areas where schools were assumed to be able to strengthen students' mental health. The four areas for intervention comprise: 1) A positive school community, 2) Social and emotional learning programs for all students, 3) Parenting education and support, and 4) Early intervention for students who are at risk of experiencing mental health difficulties. Intervention in these four areas is predicted to strengthen protective factors, and weaken risk factors that reside in (a) the school context, (b) the family context and (c) the psychological world of the child. Fundamental to the KidsMatter strategy is a model that proposes that the identified risk and protective factors are related to student mental health.

A key feature of the KMI is an evaluation program, undertaken by our team at Flinders University, which is designed to (a) generate and examine data relevant to the KMI conceptual framework, (b) identify key features of the implementation of the KMI in schools, and (c) report on the impact of the initiative on student mental health outcomes. The evaluation is designed to gather major survey data from teachers and parents/caregivers across the two-years of the KidsMatter pilot phase and also to undertake a smaller scale in-depth qualitative study involving teachers, parents and students toward the end of the pilot initiative. An overview of the research design is presented in Figure 1 and serves to illustrate the complexity of this longitudinal evaluation, involving multiple informants, using multiple measures, on multiple occasions. The focus of this paper, however, is concerned with those quantitative measures (presented in bold in Figure 1) that examine aspects of student mental health on the first data collection occasion (baseline).

An initial task for the evaluators was to find ways of measuring the success of the KMI. We determined that one possible indicator (among many) of the success of the KMI could be changes in students' mental health status that might occur in response to the KMI. In other words, students' mental health status could be an outcome measure to be used in the evaluation. This required us to identify ways of measuring the mental health status of students in schools.

In this paper, we present the three measures of students' mental health status that we gathered as part of the evaluation of the KMI. The three measures are: 1) the Strengths and Difficulties Questionnaire (SDQ, Goodman 2005); 2) the Flinders Student Competencies Scale (SCS), which is a purpose built set of items based upon social and emotional constructs identified in the literature; and 3) school teacher and leadership staff identifications of students in their school considered to be 'at risk' of social, emotional and behavioural difficulties. We describe the three measures of students' mental health status, and we investigate how closely the three measures correlate. A second focus of this paper investigates relationships between teachers' ratings and parent/caregivers' ratings using the SDQ and the Flinders SCS.

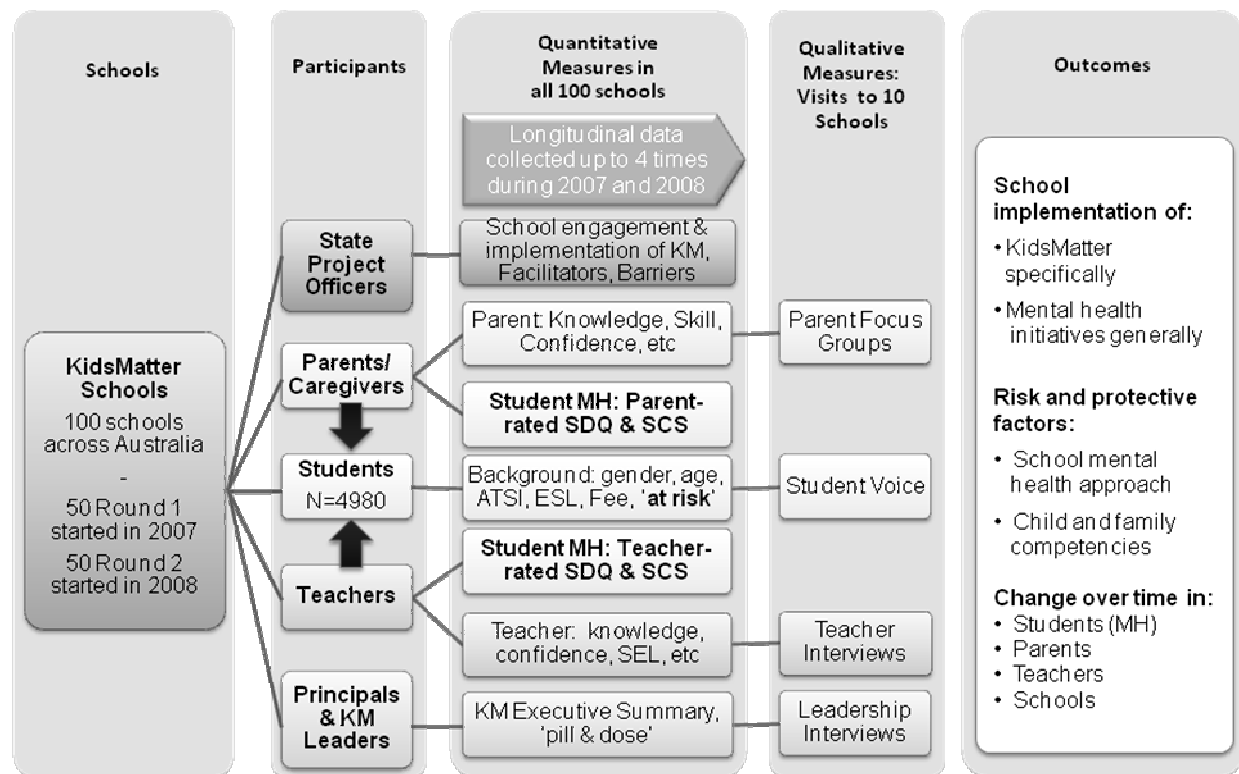


Figure 1. The KidsMatter Evaluation broad research design

THE KIDSMATTER INITIATIVE

The KMI was developed in collaboration with the Australian Psychological Society, the Australian Principals Association Professional Development Council (APAPDC), *beyondblue: the national depression initiative* and the Australian Government Department of Health and Ageing, and has been supported by the Australian Rotary Health Research Fund.

KidsMatter aims to:

- Improve the mental health and well-being of primary school students,
- Reduce mental health problems among students (e.g., anxiety, depression and behavioural problems),
- Achieve greater support and assistance for students experiencing mental health problems.

The conceptual framework for KidsMatter proposes that risk and protective factors for children's mental health lie in three key areas: the psychological world of each child; the micro context of the family environment; and the contexts of school environments. Protective factors, that involve both the attributes of children and the children's environments, are considered to promote successful child development (Rutter & Rutter 1992). The KMI model of protective factors recognises that children's development is situated in complex and dynamic systems (Bronfenbrenner & Morris, 1998; Ford & Lerner, 1992; Slee & Shute, 2003). Thus, the KMI seeks to work in school settings to influence children's mental health outcomes through making a positive impact upon the three key areas.

CONCEPTUALISING AND EVALUATING MENTAL HEALTH

Kazdin (1993), and later, Roeser, Eccles and Strobel (1998) proposed a definition of mental health that conceptualises mental health as consisting of two domains, namely a) the absence of

dysfunction (impairment) in psychological, emotional, behavioural and social spheres, and b) the presence of optimal functioning in psychological and social domains. Note particularly that this conceptualisation, which specifically focuses on the absence of dysfunction *and* the presence of optimal functioning, is more comprehensive than definitions of mental health that focus only upon the absence of dysfunction.

As noted above, a task for the evaluation was to determine if there were changes in students' mental health outcomes that could be related to the KMI. This raised the issue of defining the outcome measure(s) of student mental health to be used in the evaluation. We were advised by our clients that there was some interest in using the Strengths and Difficulties Questionnaire (Goodman 2005) to measure student mental health outcomes. The stated purposes of the SDQ were more for clinical screening applications, rather than as a whole school, contextually diverse, measure of student mental health (Youth in Mind 2004). However, we were also aware that the SDQ had been used in other large scale studies in Australia and internationally, such the *Every Family* study (Sanders et al. 2007) and the *Growing Up in Australia* study (Wake et al. 2008). The possibility of making comparisons between the data collected for the KMI evaluation and other studies convinced us to include the SDQ as one of our evaluation instruments.

However, cognisant of the abovementioned concerns, we were also aware that the SDQ operationalises the difficulties' subscales in order to calculate a total mental health difficulties score (the pro-social scale of the SDQ is excluded in calculating the total mental health score). This appeared to overlook the second dimension of mental health defined by Roeser et al (1998) above, namely, the positive expression of mental health strengths. Therefore we also set out to create a scale that specifically measured positive expressions of mental health. We reviewed the literature (e.g. Krosnick 1999; Konu and Rimpela 2002; Levitt, Saka et al. 2007) and also tapped into our clients' experiences in the design of similar questionnaire items. For the purposes of the KMI evaluation, we developed the Flinders Student Competencies Scale (SCS). The items in the SCS were submitted for iterative feedback to our clients, and trialled with teachers and parents at local schools (not KidsMatter schools).

During the development of the SCS and negotiations with KidsMatter schools about the KMI evaluation it also became clear that teachers and leadership staff were well placed to make observations of their students. Leading from this, teachers and leadership staff, as a result of their professional training and school-based experience, were in a position to identify students exhibiting social, emotional and behavioural difficulties that might operate as indicators of students who could be 'at risk' of developing mental health difficulties. Although in no way would it be intended that such judgements should take the place of more formal clinical assessments, nevertheless, with a view to promoting early intervention for students at risk, it seemed reasonable to recognise the role that teachers and leadership staff play in the early identification of students exhibiting signs of social, emotional or behavioural difficulties. Therefore, as a third measure of student mental health, we asked teachers and leadership staff in KidsMatter schools to nominate (yes or no) those students in their school who were 'at risk' of exhibiting social, emotional or behavioural difficulties.

THE THREE MEASURES OF STUDENTS' MENTAL HEALTH

Accordingly, three measures of students' mental health were gathered from the parents/caregivers, teachers and leadership staff of almost 5000 students enrolled in the 100 KidsMatter primary schools across Australia. The first measure was Goodman's (2005) Strength and Difficulties Questionnaire (SDQ), which was completed by each participating child's parent/caregiver and teacher. The second measure, the Flinders SCS, specifically developed for this study, canvassed the five core groups of indicators of students' social and emotional competencies identified by the Collaborative for Academic, Social and Emotional Learning (CASEL 2006), namely, self-awareness, self-management, social awareness, relationship skills, and responsible decision

making. The third measure was based on a non-clinical assessment by teachers and leadership staff in each school, who identified students in the school considered to be 'at risk' of displaying social, emotional or behavioural difficulties.

The three different types of data collected provided the opportunity to identify if there was any comparability between the three different assessments of students' mental health. Concurrence between different sources of data about the same construct is a key technique for establishing the validity and reliability of the research instruments. In addition, triangulation of different participants' responses can provide different perspectives on the same construct. For example, a study by Russo and Boman (2007) matched students' self-reports of resiliency against the students' teachers' reports of the students' resilience. The authors found that, even though the teachers expressed confidence in their abilities to recognise resilience in their students, there were substantial differences between students' self-reports and teachers' assessments of those same students' resiliency. From the data collected for the KidsMatter evaluation we were able to triangulate the three measures (the SDQ, the Flinders SCS, and staff 'at risk' assessment) and also make comparisons with two groups of informants (teachers and parent/caregivers). This rich source of data allowed us to undertake investigation into instrument reliability and inter-rater reliability in order to address the following research questions:

1. What is the nature of the relationships between teachers' and parent/caregivers' ratings on the SDQ and the SCS, and teacher/leadership staff non-clinical assessment of students 'at risk'?
2. How closely do the two measures of student mental health status correlate in each group across informants?

METHOD

Ethics

We submitted all data collection instruments, including the SDQ, the Flinders SCS, collection of demographic data including the teacher/staff "at-risk" nomination, and other questionnaire and interview items (not reported in this paper but outlined in Figure 1 above), to the Flinders University Social and Behavioural Research Ethics committee and also to the relevant ethics committee in each school jurisdiction in each Australian State (30 ethics applications in total). In particular, we outlined stringent procedures for de-identification of data, with clear separation of student enrolment lists from student ID codes and data. The goodwill demonstrated by each of the ethics jurisdictions to support research into the national KidsMatter project greatly facilitated the efficient processing and approval of the extensive ethics applications.

The KidsMatter Schools

A request for expressions of interest to take part in the KidsMatter pilot Initiative was sent to all Australian primary schools. In response, schools submitted applications to join KidsMatter for 2007-2008. It was made clear to the school applicants that an embedded component of the KMI was the evaluation being lead by Flinders University. The KMI pilot was designed to accommodate 100 schools, which were selected from the large pool of applicants through negotiation between the funding bodies, the Australian Principals Association Professional Development Council, and the evaluation team. The aim of the selection process was to ensure a diverse, representative sample based on the schools' State, location (metropolitan, rural or remote), size, and sector type.

The selected schools ranged in size from 11 students with one staff member to 1085 students with 100 staff. There were individual school populations that had no students with English as a Second Language (ESL), through to populations with 94 per cent ESL. Some schools had no Aboriginal or Torres Straight Island (ATSI) students, and some had more than 75 per cent ATSI students.

The profile of the schools involved in the KidsMatter Initiative is presented in Table 1 and shows the distribution of the demographic measures across the states and territories.

Table 1: Profile of schools involved in the KidsMatter Initiative

Sector	Location	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	Total
Government	Metro	3	6	2	5	7	3	4	6	36
	Rural		4	1	9	2	2	4	2	24
	Remote		1	1		2	1			5
Catholic	Metro	1	4	1	1	1		8	4	20
	Rural		4		1			4		9
Independent	Metro	2				1			1	4
	Rural			1					1	2
Total		6	19	6	16	13	6	20	14	100

The students

Based on school enrolment lists, up to 50 students aged 10 years (some schools had fewer than 50, 10-year-old students enrolled) were randomly selected from each of the 100 KidsMatter schools. A stratified random sampling procedure, based on gender and age, was developed to select equal numbers of male and female students, turning 10 years of age in 2007, to participate in the evaluation. The 10 year-old students were targeted as it was not clear at the beginning of the KMI whether all schools would be able to roll out the KMI to all year levels in the first instance. It was agreed that if a staged roll out was required, due to school resourcing, structural or other issues, then the first group to be targeted by the KMI would be the 10 year-old students. Hence these students were the first focus of evaluation. In addition, up to 26 additional students of all ages were selected from each school to ensure, through oversampling, that students in identified subgroups of interest were included in the evaluation. Results from this oversampled group are not reported in this paper.

In Phase One (of four phases) of data collection, responses were received from the parents/caregivers and teachers of 4890 students, resulting in a 70 per cent return. Following preparation of the data, a subset of 2536 students was formed using only the randomly selected 10 year-old cohort of students and constitutes the database on which the analysis reported in this paper is conducted. The profile of the sample is presented in Table 2, and provides a gender comparison on a number of measures, including student age presented in years, 'at risk' status based on staff identification of students at being 'at risk' of social, emotional or behavioural difficulties, Aboriginal or Torres Strait Island (ATSI) background, Government assistance status (e.g., School card), and English as a second language (ESL) background.

Table 2. Background characteristics of 10-year-old student cohort

		Male	Female
Gender	N=2536	46.3%	53.7%
Age	Mean (SD)	10.5 (0.3)	10.5 (0.3)
At risk	Not at risk	34.1%	45.0%
	At risk	12.9%	8.0%
ATSI	Not ATSI	45.6%	49.6%
	ATSI	2.2%	2.6%
Fee	Not assisted	39.9%	45.8%
	Assisted	7.2%	7.1%
ESL	English	39.7%	42.6%

Since the KidsMatter schools formed a sample of convenience through a process of application and selection, rather than a random sample, they are not representative of other primary schools in Australia and therefore school or state weights are not applied to the analysis of the data reported herein.

Instrumentation: The Parent/Caregiver and Teacher Questionnaires

We designed two extensive questionnaires, one for each of the targeted students' parents/caregivers and the other for each of the students' teachers. The questionnaires contained items about school, family and child factors, along with the outcome measures of student mental health. Items were trialled with parent/caregiver and teacher groups.

The first set of questions of interest to this paper, contained in the Flinders SCS, were sourced from the five core groups of social and emotional competencies recommended by CASEL (2006), from a search of relevant literature (e.g. Levitt et al. 2007), from discussion with our clients, and from our own research and practical experiences with schooling, families, and student wellbeing (e.g. Askell-Williams et al. 2007, Russell et al. 2003). These 10 items were presented as attitudinal or belief statements and required participants to respond using a seven-point Likert scale of Strongly Disagree (1) to Strongly Agree (7).

The second set of questions was Goodman's (2005) Strengths and Difficulties questionnaire, parent/caregiver or teacher informant for 11 to 17 year old youths¹. The SDQ is a brief behavioural screening questionnaire that examines five attributes, four of which are used as measures of mental health status (Levitt, et al. 2007). The four attributes relating to student mental health are measured using 20 items requiring responses on a three-point Not True (0), Somewhat True (1) and Certainly True (2) scale. The four attributes examine Hyperactivity, Emotional symptoms, Conduct problems, and Peer problems.

The third measure was to request the teachers and leadership staff to nominate, from a school enrolment list, the identification codes of students in their school who appeared to be 'at risk' of experiencing, emotional, social or behavioural difficulties. This 'at risk' identification formed a dichotomous variable, scored as 'not at risk' (0) and 'at risk' (1), and was a non-clinical assessment based upon teacher/staff professional judgement and classroom and school-based experiences with their students.

PREPARATION OF THE SCS AND SDQ SCALES

Management and preparation of almost 10,000 questionnaires on the first data collection occasion into a single database was a substantial task. Questionnaire data extraction and compilation was undertaken using Remark Office OMR Version 6 scanning software (Principia 2005). The statistical analyses conducted for this paper were undertaken with the use of the software program SPSS for Windows (SPSS 2001).

Treatment of missing data

Following the scanning and cleaning of the parent/caregiver and teacher questionnaires, analysis of missing data revealed an acceptable range below 20 per cent across the scales. The pattern of missing data on the items of interest in this paper was random, mainly due to participants inadvertently missing an item. For all items apart from those comprising the SDQ, missing values were not replaced in this early stage of data analysis. In this case, we decided to enter all four

¹ Note that over the 2 years of the evaluation, the targeted 10 year-old students would turn 11. We considered whether to use the 11 to 17 youth version, or the child version of the SDQ, and decided on the Youth version. The wording of the two forms is very similar.

phases of data before undertaking multiple imputations, in order to accommodate a complex sample, where design effects take place due to the nested nature of students within schools within states. Regarding the SDQ, and in accordance with Goodman's (2005) recommendation, when at least three of the five SDQ items in a scale were completed, then the remaining two scores were replaced by their mean. When more than three items were missing in a scale then the participant was excluded from the analysis.

Validity and Normality

In order to indicate how accurately the observed values reflect the concept being measured, construct validity analysis was undertaken using factor analytic techniques (Trochim, 2000). Accordingly, principal component analysis with varimax rotation was used as a preliminary method to examine the items and their factor loadings on a preferred construct (Stevens, 1996). The Kaiser-Meyer-Olkin (KMO) index of sampling adequacy with value greater than 0.6, provided a general measure of identifying acceptable scales, as recommended by Tabachnick and Fidell (1996). Item inspection and principal component analysis supported the homogeneity of the 10 items comprising the SCS to form a single measure of student competencies. The psychometric structure of the SDQ was scrutinised and found to be generally similar to that discussed by Mellor (2005) with an Australian sample. However, for the purposes of this paper, the four subscales (excluding the pro-social subscale) of the SDQ were used intact as a total measure of mental health, as intended by Goodman (2005). The SCS variable was constructed by averaging the items (max=7), while the SDQ variable was constructed by summing the items from the four subscales together (max=40).

Preliminary descriptive analysis of the baseline data was undertaken in order to ascertain the distributional characteristics of the SCS and SDQ. Early analysis of the SDQ and SCS items and the resulting variables raised concerns about non-parametric distributions. These concerns were highlighted by Gregory et al. (2008), who cautioned against the use of statistical methods that depend on assumptions of normal distribution of data.

In a normally distributed random sample, the values of skewness and kurtosis are close to zero. However, absolute values of three and eight, respectively, are still considered acceptable (Kline, 1998). The absolute values of skew and kurtosis of the KMI data were beyond even these generous conditions. A summary of the variables is presented in Table 3 and shows the number of items comprising each measure, the scale validity using the Kaiser-Meyer-Olkin Measure of Sampling Adequacy, and deviations from normality as indicated by skewness and kurtosis.

Table 3. Descriptive statistics for the parent/caregiver and teacher-rated measures of student mental health, SDQ, SCS and 'at risk'

Variable	Description	N	Items	KMO	Mean	SD	Median	Skewness ^a	Kurtosis ^a
PSDQ	Parent-rated SDQ	2081	20	0.89	8.77	6.26	7	19.69	8.85
TSDQ	Teacher-rated SDQ	2420	20	0.91	7.29	6.82	5	24.61	11.97
PSCS	Parent-rated SCS	2097	10	0.94	5.62	1.04	6	-16.68	7.85
TSCS	Teacher-rated SCS	2430	10	0.95	5.42	1.26	6	-15.45	1.96
'At risk'	Teachers' nomination	2536	1		0.21	0.41	0		

^a Showing absolute values of skewness and kurtosis

Accordingly, it should be stressed that the non-parametric distribution of the items on both the SDQ and SCS scales cautions against the use of factor analytic techniques that assume a normal distribution. Therefore, the Principal component results were only used as a guide to ascertain construct validity, and other methods such as item reliability analysis using the Cronbach alpha coefficient were avoided (Kuder and Richardson, 1937).

RESULTS: STUDENT MENTAL HEALTH OUTCOMES

The Flinders Student Competency Scale (SCS)

In developing items for this scale we considered the child protective factors identified in the conceptual framework for KidsMatter, which include social and emotional competencies, sense of mastery and control, and sense of optimism. In addition we devised items related to the five core groups of indicators of students' social and emotional competencies identified by the Collaborative for Academic, Social and Emotional Learning (CASEL 2006), namely, self-awareness, self-management, social awareness, relationship skills, and responsible decision making. Likert type scales were developed to ask parents/caregivers and teachers to reveal the extent to which children were developing competencies for wellbeing.

Two of the 10 items were aligned to the CASEL skills and competencies Group 4 (Relationship skills), described as maintaining healthy and rewarding relationships based on cooperation. By way of example, the social competency items, *Is happy about his or her relationships with other students*, achieved a mean score of 5.6 by parents/caregivers, while the item, *Is happy about his/her family relationships*, was rated more positively by parents/caregivers, with a mean score of 6.1. Two behavioural items were aligned to the CASEL Group 3 (social awareness skills) and Group 5 (decision making skills). These items were described as being able to take the perspective of and empathise with others, and being able to make decisions based on consideration of ethical standards, safety concerns, appropriate social norms, respect for others, and likely consequences of various actions. For example, the first item, *Takes account of the feelings of others*, was positively rated by teachers with a mean score of 5.7, while the second statement, *Can make responsible decisions*, was rated only marginally lower with a mean score of 5.5. The remaining six items aligned to the CASEL Groups 1 (self-awareness) and Group 2 (self-management) and concepts of optimism, mastery and control. Those items described as accurately assessing one's feelings, interests, values, and strengths, included *Recognises his/her strong points* and *Feels good about himself/herself*. The other four items described as regulating one's emotions to handle stress, control impulses, and persevere in overcoming obstacles, included, *Can solve personal and social problems*, and *Generally thinks that things are going to work out well (is optimistic)*.

An individual child's social, emotional and behavioural competencies were measured by these 10 items that resolved into one distinct factor described as student competencies. Figure 2 presents the histogram of the averaged SCS items for parents/caregivers and teachers, positioned on the original Likert scale of strongly disagree (1) to strongly agree (7), and clearly shows a highly skewed distribution. The positive response to these statements, as shown in Figure 2, suggests that parents/caregivers and teachers generally feel that students in the KidsMatter schools have, on average, relatively well-developed competencies for positive mental health.

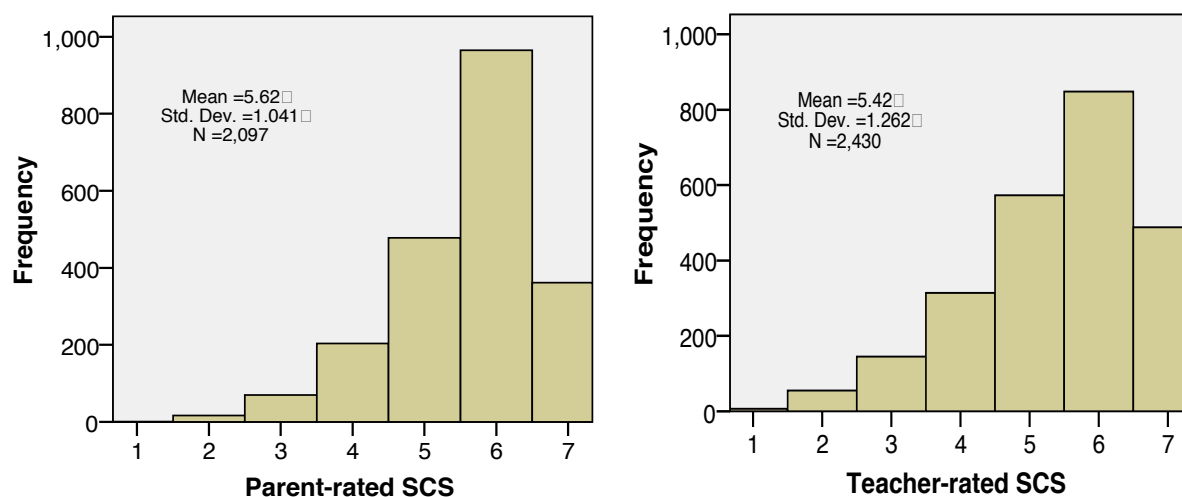


Figure 2. Parent/caregiver and teacher-rated Student Competency Scale (1=strongly disagree, 7=strongly agree)

The Strength and Difficulties Questionnaire (SDQ)

The SDQ was designed around five constructs, four of which are summed to provide a total measure of student behavioural difficulties. The SDQ is commonly used to assess child and youth mental health. The Emotional symptoms scale contained five negatively worded items, such as, *Often complains of headaches, stomach-aches or sickness*, and *Many fears, easily scared*. Mean scores for these items in the SDQ, rated on a scale of 0 to 2, ranged from 0.3, in response to the statements, *Often unhappy, depressed or tearful*, to 0.8 for the statement, *Nervous in new situations, easily loses confidence*.

The second measure comprised five items that addressed conduct problems and involved statements like, *Often fights with other young people or bullies them*, and *Often lies or cheats*. The highest mean score of 0.6 was in response to the statement, *Often loses temper*, while the statement *Steals from home, school or elsewhere*, received the lowest score of 0.1 (in the SDQ scale of 0 to 2). Conduct problems were least evident in the students in this sample.

Among the five items comprising the Hyperactivity scale, statements included, *Restless, overactive, cannot stay still for long*, and *Good attention span, sees work through to the end*. The statement with the lowest mean score of 0.4 (out of a possible score of 2) was, *Constantly fidgeting or squirming*, which suggests this was generally not true of most students. The statement with the highest mean score of 0.9 was *Thinks things out before acting*, which would indicate that this was somewhat true of most students. The spread of responses to these items in the SDQ indicates that hyperactive behaviour was more frequently reported, than the other subscales, for this group of students.

The final measure, the Peer problems scale, comprised five items, some of which included, *Would rather be alone than with other young people*, and *Generally liked by other young people*. The reversed mean score of 0.2 for the positively worded statement, *Has at least one good friend*, suggests that most parents/caregivers believe that their child has a friend. However, the mean score of 0.5, in response to the statement, *Picked on or bullied by other young people*, would indicate that according to parents/caregivers many students experience bullying. The low cumulative mean suggests that peer problems were less evident in this group of students.

Figure 3 presents a histogram of the parent/caregiver and teacher-rated SDQ, positioned on a cumulative scale across the four constructs of normal (0) to abnormal (40). The profiles show a highly skewed and truncated distribution, but this time, in the reverse direction (compared to the SCS, as expected). The low response to these statements, as shown in Figure 3, suggests that parents/caregivers and teachers generally feel that, on average, students in the KidsMatter schools are not experiencing extreme levels of difficulty.

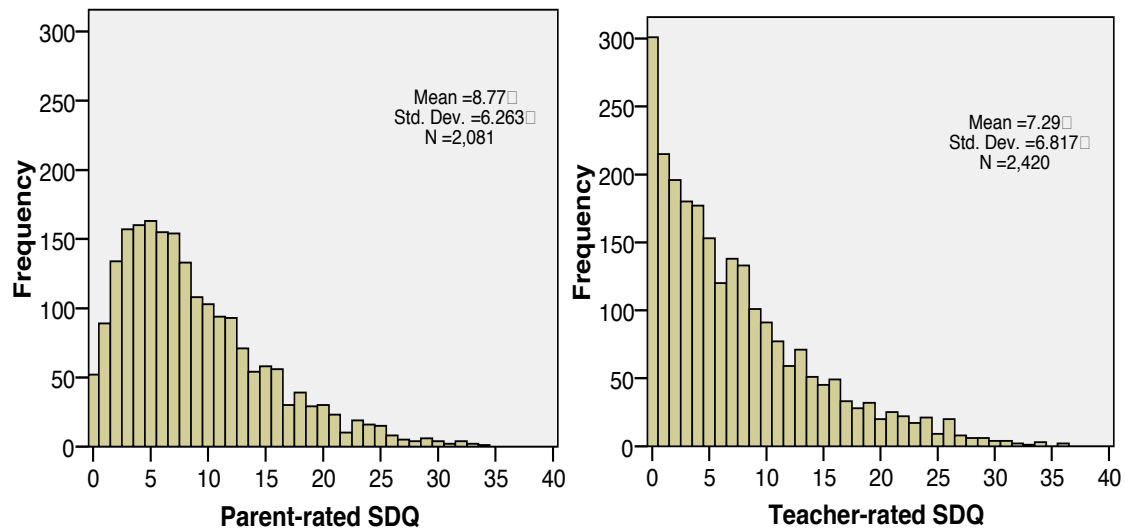


Figure 3. Parent/caregiver and teacher-rated SDQ (0=normal, 40=abnormal)

Teacher Nominated Students ‘at risk’ Status

The final measure asked teachers and leadership staff to identify (using ID codes) students in their school who were ‘at risk’ of experiencing, emotional, social or behavioural difficulties, based upon a non-clinical assessment, but nevertheless professional judgement and school-based interaction with their students. This ‘at risk’ identification formed a dichotomous variable, scored as ‘not at risk’ (0) and ‘at risk’ (1).

Figure 4 presents a graphic representation of the information given in Table 2 above, and shows the higher proportion of boys nominated as being ‘at risk’ in comparison to girls. Relative risk analysis was used as a measure of association for dichotomous variables (Garson 2008; Pallant 2001). With a relative risk of 181 per cent, boys were almost twice as likely as girls to be identified by teachers/staff as being ‘at risk’.

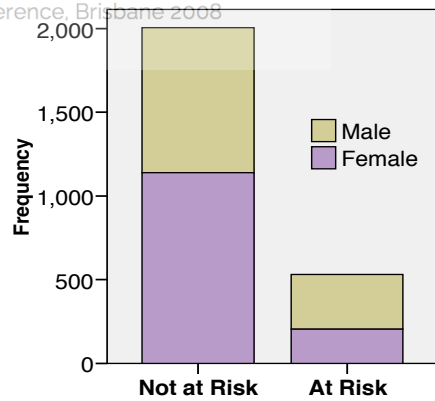


Figure 4. Teacher/leadership staff nominated students 'at risk' status

ANALYSIS: MEASURES, INFORMANTS AND MENTAL HEALTH OUTCOMES

Given the non-normal distributional properties of the SDQ and SCS (discussed above) and the binary nature of the teacher/staff 'at risk' nomination, we selected the conservative options of visual inspection and non-parametric statistical tests for identifying relationships between the three measures of student mental health, in order to address the first research question: What is the nature of the relationships between teachers' and parent/caregivers' ratings on the SDQ and the SCS, and teacher/staff non-clinical assessment of students 'at risk'?

Different Measures, Same Informant

By examining ratings given to students using different instruments, but with the same informants, we could investigate the relationship between the SDQ and the SCS and compare the instruments' validity. Moreover, the dichotomous variable of 'at risk' status allowed deeper interrogation of the data by separately presenting the 'not at risk' and the 'at risk' cohorts within the 10 year-old random sample. Since parents/caregivers were not asked to indicate whether their child was 'at risk' of social, emotional or behavioural problems, a comparison against that measure using parent informants was not made. Figure 5 presents the scatter-plot distributions of two informants and shows a clustering of students 'not at risk', which occurs at the low or 'normal' end of the SDQ and at the high or 'normal' end of the SCS.

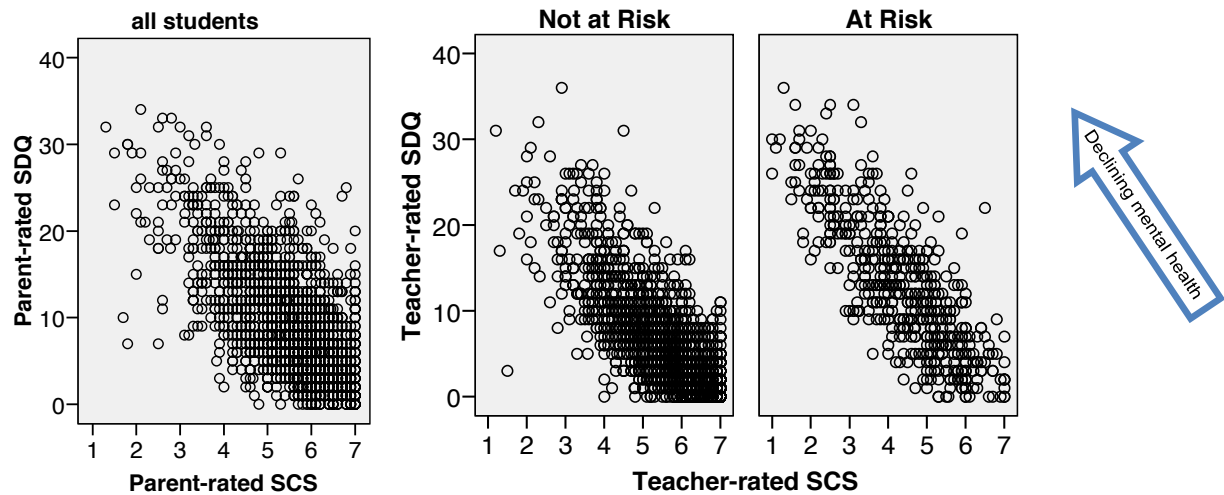


Figure 5. Different measures, same informant: scatter-plot comparisons of the SCS and SDQ for the same informant

The diagonal distribution in all plots in Figure 5, with the majority of students clustered at the 'normal' end (low SDQ, high SCS) suggests, as expected, a moderate correlation and reasonable agreement between the two instruments, namely, the SDQ and the SCS. In other words, students who were rated in the normal range of the SDQ generally were also rated in the normal range of the SCS. In the teacher-rated plots displayed in Figure 5, the 'at risk' students clearly show a

greater tendency to be rated towards the high or ‘abnormal’ end of the SDQ and at the low or ‘at risk’ end of the SCS.

Same Measure, Different Informants

We also investigated the relationship between the ratings given to students using the same instruments, completed by different informants, namely, the students’ parents/caregivers and teachers. This provides a measure of reliability. Again, the dichotomous variable of ‘at risk’ status was used to more deeply interrogate the data by separating the ‘not at risk’ and ‘at risk’ cohorts. Figure 6 presents the set of scatter-plots. The SDQ looks at increasing difficulties, so most ratings are clustered around 0 in the ‘normal’ range or ‘not at risk’, while the SCS looks at increasing competencies, so most ratings are clustered towards the 7 for the ‘normal’ range. Comparison of the same instruments completed by different informants suggests that the correlation is weaker than displayed in Figure 5.

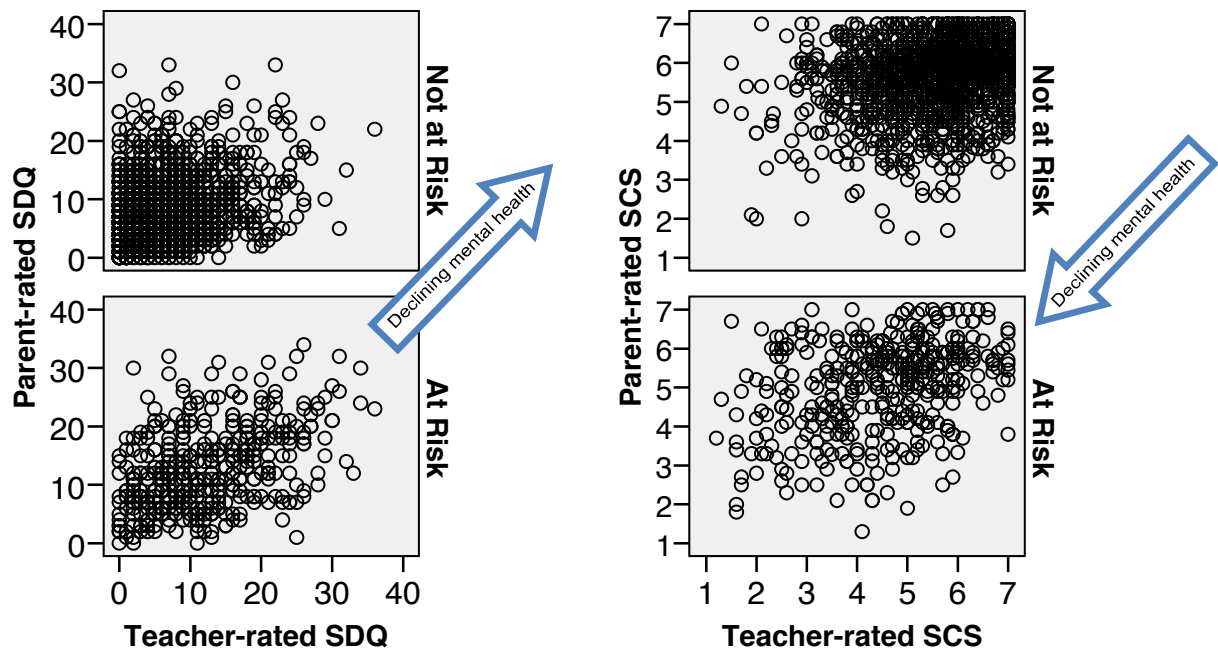


Figure 6. Same measure, different informants: Scatter-plot comparisons of parents/caregivers’ and teachers’ ratings for the same scales

The different distributions in these scatter-plots suggest that the teacher and leadership staff professional judgements about students in their school who may be ‘at risk’ does have merit, and that there is reasonable agreement between the three measures of student mental health. In addition, for a more definitive understanding of the relationships, all of these scatter-plots can be represented as a series of correlations.

Correlations Between SCS and SDQ

In order to better understand how closely the two measures of student mental health status correlate in each student cohort (at risk; not at risk) across informants, thus addressing the second research question, Spearman’s rho and Kendall’s tau were selected as appropriate correlation techniques for non-parametric data. As such, it was not appropriate to include ‘at risk’ status in the correlation, due to its dichotomous form (Garson 2008). Students’ ‘at risk’ status was included, however, by separately calculating the correlations for each cohort. Garson (2008, Correlation section) stated, “Prior to computers, rho was preferred to tau due to computational ease. Now that computers have rendered calculation trivial, tau is generally preferred”. Field (2005) proposed that Kendall’s tau provides a better estimate than Spearman’s rho of the actual correlation in the population. We have provided both measures for comparison.

Accordingly, Table 4 demonstrates that both Spearman's rho and Kendall's tau are significant at the 0.01 level for all relationships, and that all relationships are in the expected direction. The negative correlations reflect the opposite scoring of the SDQ and SCS as measures of mental health (i.e. 0 on the SDQ is 'normal', while 7 on the SCS is 'normal').

Using Spearman's rho, Parent-rated SDQ showed a moderate positive correlation of 0.39 with Teacher-rated SDQ for the 'at risk' group, and marginally weaker correlation of 0.33 for the 'not at risk' group. Supported by the scatter-plots presented in Figure 5 and Figure 6 above, this table suggests that there is stronger agreement within the 'at risk' group, than there is in the 'not at risk' group. Moreover, the correlation between the same informant on the different measures is stronger than different informants on the same measures, as expected. Most interestingly, it appears that teachers' ratings show greater concordance (shown in bold in Table 4) between the SDQ and SCS than parents/caregivers' ratings on these measures.

Table 4. Spearman and Kendall correlations of the scales and informants, grouped by student 'at risk' status

		Non-Parametric Correlation Coefficients					
		PSDQ	TSDQ	PSCS	TSCS		
AT RISK	Spearman's rho	PSDQ	1.00	0.28	-0.51	-0.27	Kendall's tau
		TSDQ	0.39	1.00	-0.22	-0.62	
		PSCS	-0.68	-0.32	1.00	0.22	
		TSCS	-0.38	-0.80	0.32	1.00	
NOT AT RISK	Spearman's rho	PSDQ	1.00	0.24	-0.41	-0.22	Kendall's tau
		TSDQ	0.33	1.00	-0.17	-0.57	
		PSCS	-0.55	-0.24	1.00	0.16	
		TSCS	-0.31	-0.73	0.23	1.00	

Note: Non-parametric correlations are significant at the 0.01 level (1-tailed) for all measures.

Although in most cases the correlation coefficients appear relatively low, this is typical of correlations in the messy reality of the social sciences, according to Lipsey (1989). Furthermore, Tabachnick and Fidell (1996) suggested a number of other situations relevant to our data that can deflate the correlation. For example, lower correlations can occur when one variable is truncated (as suspected of the SDQ by Gregory, 2008) or there is an uneven split in the distribution of the data, as is clearly the case in this data, with most students falling into the "normal" categories of the SDQ and the SCS. Taking these implications into account, the concordance of the two measures of mental health is substantial.

Percentage Agreement

Percentage agreement is perhaps the simplest of all measures of association. Although Cohen's Kappa corrects for chance agreements, and is therefore a better measure of agreement than simple percentage agreement, Cohen's Kappa is also affected by the unequal cell entries that arise from highly skewed data, and thus is not suitable for this KMI data (Bakeman & Gottman 1986). Before undertaking a simple percentage agreement analysis, the SDQ and SCS scales needed further preparation to reduce the parameters in order to place the two instruments into a common measurement framework.

Adopting Goodman's (2005) classification of parent-rated SDQ scores (with cut-points at 0-13, 14-16, and 17-40) and teacher-rated SDQ scores (with cut-points at 0-11, 12-15 and 16-40), the total SDQ scores were grouped into the three respective categories of 'normal', 'borderline', and

‘abnormal’. Based on these categories, normative data in the United Kingdom and Australia indicates that approximately 10 per cent of the child and adolescent population have a significant mental health problem, and another 10 per cent have a borderline problem (Mellor 2005). In order to enable a percentage agreement analysis, a similar approach was applied to the SCS scores. Cut-points were calculated using visual binning techniques in SPSS by using the same grouping strategy as Goodman. Accordingly for the Parent SCS, cut-points for the ‘abnormal’ group (bottom 10 per cent) were assigned from 1 to 4.2, while the ‘borderline’ group (the next 10 per cent) cut-points were assigned from 4.3 to 4.8. Analysis for the Teacher SCS resulted in low cut-points, similar to the shift recommended for the SDQ. The cut-point for the ‘abnormal’ group was 3.6 and for the ‘borderline’ group was 4.3.

Table 5 presents the percentage agreement across scales and informants, grouped by students’ ‘at risk’ nominations. The accuracy of identification suggests that 75 per cent of students were correctly identified by a nomination of ‘at risk’ status by teachers/leadership staff when compared against the students’ SDQ and SCS measures. Put another way, teachers/leadership staff appear to be correct in their professional judgment in this domain about 75 per cent of the time. The ability of the SCS and SDQ to correctly identify students (values given in bold) appears to be equally successful.

Interestingly, the Totals column in Table 5 presents the overall percentage of student ratings falling into each SDQ category (normal, borderline, abnormal). Given that the SDQ was designed to allocate a distribution of 80:10:10 to Normal, Borderline and Abnormal, our sample of 10 year-old students is generally consistent with Australian norms (Mellor 2005).

Table 5. Percentage agreement across the scales and informants, grouped by student ‘at risk’ status

Scales	Categories	Not at Risk %	At Risk %	Total %	Correctly identified	Wrongly identified
PSDQ	Normal	68.8	11.2	80.1	75%	17%
	Borderline	5.3	2.7	8.1		
	Abnormal	6.0	5.9	11.9		
PSCS	Normal	67.0	12.4	79.4	72%	18%
	Borderline	7.2	2.1	9.3		
	Abnormal	6.0	5.3	11.3		
TSDQ	Normal	67.8	10.0	77.8	75%	15%
	Borderline	5.8	3.6	9.3		
	Abnormal	5.4	7.5	12.9		
TSCS	Normal	68.9	11.2	80.0	75%	16%
	Borderline	5.8	3.8	9.5		
	Abnormal	4.4	6.0	10.4		
Total %		80.2	19.8	100.0		

DISCUSSION

In this paper we have illustrated that significant correlations exist between the two main measures of students’ mental health used in the KMI evaluation. This suggests that the non-clinical ratings by teachers and school leadership staff can provide one means of identifying students ‘at risk’, according to comparisons with the SDQ and the SCS measures. It is the value of those judgements for provoking early intervention that is an issue warranting further discussion as the KidsMatter evaluation progresses. In triangulating the three sources of measurement of student mental health, we provide a detailed picture of the mental health status of 10 year-old primary school students in

KidsMatter schools. We also attend to the positive, as well as the negative, dimensions of mental health, which provides a more comprehensive picture of student mental health status.

This paper provides a national snapshot of the mental health status of 10 year-old Australian primary school children. It also contributes to the growing body of literature examining the psychometric characteristics of the SDQ in the Australian setting, and to alternative measures for assessing student mental health in school settings.

LIMITATIONS AND FUTURE DIRECTIONS

We have referred to the limitations of the instruments used in this Evaluation, and indeed, it is the differential limitations of instruments that provoked us to collect more than one measure of student mental health. A second limitation arises with the teacher/staff 'at risk' nominations. Some of the teacher/staff nominations would be based upon information about students who have already been identified as exhibiting social, emotional or behavioural difficulties through other mechanisms in the school. For example, a child already seeing a psychologist, or a child already referred for agency support. Therefore, the teacher/staff nominations of students "at risk" are not entirely independent of extant information.

The combined use of non-parametric and dichotomous data requires further investigation as to the most appropriate statistical techniques to employ, many of which are beyond the capabilities of SPSS and require programs such as LISREL and SAS that don't assume normal distributions. Techniques such as Point-biserial correlation may be appropriate when correlating a continuous variable with a true dichotomy, but even then, power transformations would be required to normalise the non-parametric variables (Garson 2008).

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