

# Anxiety and Emotional Discomfort in the School Environment: The Interplay of School Processes, Learning Strategies, and Children's Mental Health

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## 1. Introduction

Children and adolescents try to look strong and beautiful to their peers, deal with the pressure to succeed in sports, achieve good grades, and develop positive and lasting relationships. School is the place where children spend most of their daily hours, trying to meet these challenges while they define their identities. Consequently, experiences at school influence every aspect of development during childhood and adolescence, ranging from the construction of their intellectual capital to their emotional and physical well-being to the establishment of peer and child-adult relations (Eccles & Roeser, 2011).

Recently, researchers and educators have directed more attention to the relationship between the quality of learning environments – particularly effective teaching – and problems experienced by students in middle and high schools – such as disengagement, dissatisfaction with their schooling experience, and dropping out (Bowlby & McMullen, 2003; Pope, 2001; Willms, 2003). Relatively little attention has been paid to the role of schools in the identification of mental health problems or in helping to alleviate these problems, although the consequences of mental health problems on school attendance and achievement are palpable. As an example, the 2003 U.S. National Survey of Children's Health assessed emotional, cognitive, and behavioural problems in over 100,000 children and youth 0 to 17 years of age and found that children with chronic emotional, behavioural, and developmental problems that persisted for at least a year missed more than 10 days per year at school, three times that of their peers without these problems (Blanchard et al., 2006).

In most countries studied in the Program for International Students Assessment (PISA), there was considerable variation among schools in students' academic achievement and sense of belonging at school. Some of this variation is attributable to measureable aspects of classroom and school climate and structural features of the school system (Willms, 2003). However, PISA and other large-scale international studies do not consider variation in mental health outcomes such as anxiety and depression. It is not only large scale assessments which miss the mark of monitoring mental health and emotional well-being

of the students; even national educational reforms also tend to ignore, or discard, this matter. In the United States, for instance, the No Child Left Behind Act (NCLB) placed increased pressure on schools to improve the academic achievement of students by requiring schools to track students' standardized achievement. At the same time, the budgets for preventive health services in schools were cut, and attention to symptoms related to poor emotional well-being, such as experiences of depression and anxiety, was neglected. Although there are legislative provisions that focus specifically on externalizing behaviors, such as the Gun-Free Schools Act, the Pro-Children Act, and the Safe and Drug Free Schools and Communities Acts, efforts to improve emotional well-being have received far less attention (Sznitman et al., 2011). The lack of attention to emotional well-being in the education policy discussion is particularly problematic in relation to growing evidence indicating that many early stressors can interfere with school achievement, compromise school completion, and lead to adverse mental health outcomes later in life, including chronic mental illness.

Depression is now the leading cause of disability in the world (Murray & Lopez, 1996); research on anxiety and depression in the school environment may be essential if we are to end what some have called the depression pandemic (Seligman et al., 2001). In fact, about one-half of adult mental health issues start before the mid-teens, but often treatment does not occur or is delayed until well into adulthood (Kessler et al., 2005; Wang et al., 2005). The number of children experiencing mental health problems is significant; results based on Canada's National Longitudinal Survey of Children and Youth (NLSCY) indicate that the prevalence of children and youth with anxiety problems ranges from 2% at age 2 to 12% at age 11, based on parents' assessments, and is higher prevalence for children aged 10 to 15, based on youth's self-assessments (Bagnell et al., 2009). There is also considerable variation in the prevalence of depression, ranging from 2% to 8% across the age range from 12 to 21, based on youth's self assessments (Willms, 2008). Earlier studies suggested that the prevalence of mental health problems for children and youth of this age is about 15% (Waddell et al., 2002). With some developmental differences, childhood depression is manifested in much the same fashion as adult variants; it impacts every facet of psychosocial functioning, including the family system, parent-child relationships, peer relationships, and school functioning. In extreme cases it can lead to suicide (Stark & Smith, 1995).

The literature offers a wide range of reported prevalence of behavioural disorders in children and youth, with estimates typically ranging from 10% to 20%. In a review by Roberts et al. (1998), the range across 52 studies was from 1% to 51%. When studies were clustered across age groups, the median rates of behavioural disorders were 8% in pre-schoolers, 12% in preadolescents, and 15% in adolescents. Results vary because of the method of sampling, how psychopathology is defined, and the cut-point used to indicate psychopathology.

If we are to analyze the effect of the context of schooling on students' mental health and emotional well-being, a useful conceptualization of school context comes from Eccles and Roeser (2011). They view it as a bridge between the macro-level of society and culture that shapes district policies and the practice of education from afar, and the middle-and micro-levels of the district, the school as an organization, and the classrooms within a school whose people, through daily acts of leadership, teaching, and social interaction, affects children's and adolescents' learning and development in immediate ways (Eccles and

Roeser, 2011, p. 255; Roeser et al., 2009). In this study, we focus on the on the middle- and micro-levels of the context of schooling, looking in particular at teaching approaches and effectiveness, teachers' expectations for success and relationships with students, and classroom disciplinary climate. Moreover, we observe at the micro-level the interaction between students' perception of the challenge of the curriculum and students' toolkit of skills and abilities to cope with it. The learning process emerges from the tension between exposure to new, and therefore challenging, material and activation of solving and decoding skills. At the same time, students' anxiety and depression stem or are exacerbated from the mismatch between challenge and skills. To formally approach the study of the micro-level interactions between students' abilities and learning challenges, we propose the use of Csikszentmihalyi's (1991) theory of flow. Csikszentmihalyi's idea of *flow* provides a useful tool for considering emotional outcomes resulting from different combinations of learning processes and students' skills. Csikszentmihalyi (1997) describes flow as deep absorption in an activity that is intrinsically interesting. Flow is believed to occur at the point of balance between the challenge inherent in the task at hand and the skills required to accomplish it. Applied to education, Csikszentmihalyi theorized four general relationships between skills and instructional challenge in students' experience of learning:

- Low-Skills/Low-Challenge – students are more likely to feel apathetic about learning because they find themselves in learning situations where they have low skills and the tasks they are asked to perform are of low-challenge. These students tend to give up because school work is inconsequential.
- Low-Skills/High-Challenge – students are more likely to feel worried in learning situations because they have low confidence in their skills and the tasks they are asked to perform are perceived as too challenging.
- High-Skills/Low-Challenge – students are more likely to feel that the challenges of learning are too few in relation to their skills, and they are unable to identify how they can make the experience more challenging. This leads to boredom and disengagement because they see little relevance in what they are asked to learn.
- High-Skills/High-Challenge – students generally feel that their skills and the challenges of the tasks they are asked to perform are in balance. These students frequently experience *flow*.

According to this theory, when students experience flow, the relationship between skills and challenge is symbiotic, where skills are neither too low nor too high in relation to the challenge at hand. Student engagement is conceived as the culmination of concentration, interest and enjoyment, as opposed to boredom or apathy (Shernoff et al., 2003).

In this study we offer estimates of the prevalence of anxiety and depression for boys and girls in middle and high schools in Canada, based on data collected from students in middle and high school using the Tell Them From Me (TTFM) survey. Students self-rated their feelings of depression and anxiety on a 3- point rating scale. We also estimate the extent to which the prevalence of anxiety and depression varies among middle and high schools, and ask whether experiencing anxiety and depression is related to children's socioeconomic status and their perceptions of skills and challenge as described by Csikszentmihalyi. Finally, we consider whether anxiety and depression are related to aspects of classroom and school climate that are known to be 'drivers' of student achievement.

We seek to answer the following questions:

1. What is the prevalence of children suffering mild to severe anxiety and depression?
2. Does the prevalence of anxiety and depression vary with grade level and between the sexes?
3. What is the relationship between anxiety and depression and students' grades?
4. What aspects of the school environment, such as teacher-student relations, the quality of instruction, classroom learning climate, expectations for success, and advocacy at school, are related to levels of anxiety and depression, after controlling for students' family socioeconomic status?

## 2. Methods

Data from the Fall term of 2011 Tell Them From Me (TTFM) survey were analyzed applying hierarchical linear modelling (HLM) for dichotomous outcomes (Raudenbush & Byrk, 2002). The original dataset consisted of 277,836 children attending 802 schools, and enrolled in grades 4 to 12. For the purpose of this study, we focused on 272,987 students attending grades 6 to 8 (middle school) and grades 9 to 12 (high school). Multilevel analyses were weighted at level 1 in order for students to match the socioeconomic distribution of the Canadian student population.

The TTFM measures for anxiety and depression are based on sets of six Likert items each. For example, the items for anxiety pertain to children's feelings of fear, intense anxiety, and worry about particular social events or situations, while the items for depression pertain to children's feelings of sadness, discouragement and inadequacy, and a failure to experience joy and happiness in activities at school and at home. For each item, students had to assess the frequency of that experience on a 4-point scale: 0 = "Never or hardly ever", 1 = "About once a week", 2 = "About 2 or 3 times a week", and 3 = "Every day or almost every day". Therefore the raw scores range from 0 to 18 on each scale.

The raw scores were transformed into continuous variables for anxiety and depression using a Samejima Item Response Theory (IRT) model (Hambleton et al., 1991; Linden & Hambleton, 1997). For the continuous measure of anxiety, a cut-off score was set to classify students as experiencing anxiety *versus* not experiencing anxiety. The cut-off score corresponds to an IRT score for a student that responded "Every day or almost every day" to the three easiest items and answered "About 2 or 3 times a week" to the three most difficult items. The same approach was used for classifying students as depressed *versus* not depressed.

A typology based on Csikszentmihalyi's four general relationships between skills and instructional challenge in students' experience of learning was created by means of a 2x2 tabulation. The instructional challenge dimension was assessed via six Likert items expressing the extent to which students felt challenged in their language arts, mathematics, and science classes. The scores were averaged across the three subjects and scaled on a ten-point scale. Students with scores at or above 5.0 (i.e., neutral or higher) were considered to have a high level of challenge, while those with scores below 5.0 were considered "low challenge". The skill dimension was assessed by students' GPA in language arts, mathematics, and science classes. Students obtaining an average GPA of 3.0 and above were labeled as having high skills, while those with scores below 3.0 were considered to have low skills.

The analysis also used the TTFM measure of socioeconomic status which is derived from student data on parents' education, a set of educational and cultural possessions in the home, and whether the student was living in a one-parent or two-parent family.

Several studies have shown that the learning climate of the school has an effect on students' academic achievement, even after taking account of students' family backgrounds (Willms, 2010). From its inception, TTFM survey has included a number of aspects of school climate that "drive" schooling outcomes, based on findings from a number of large-scale national and international assessments. These include quality of instruction, teacher/student relations, the disciplinary climate of the classroom, and expectations for academic success (for comprehensive reviews, see: Rutter, 1983; Sammons, Hillman, & Mortimore, 1995; Scheerens, 1992). The survey also includes a measure of student advocacy at school. However, very few studies have examined whether students' anxiety and depression are also related to these key aspects of classroom and school climate. Our analyses discern whether these factors are related to student anxiety and depression after controlling for students' family background.

### 3. Results

Table 1 reports the numbers of schools and students enrolled in each grade. On average the sample includes about 45,000 children per grade, with the exception of grade 6, which includes nearly 10,000 children.

For each grade, still with the exception of grade 6, students are nested in about 600 schools.

Grades	Number of students	Number of schools
6	9962	416
7	39455	667
8	40016	691
9	50270	649
10	50573	573
11	45660	534
12	37051	516

Table 1. Description of sample by grades

Hierarchical linear models were fit separately to data for the sub-samples of students attending middle and high schools. These included 41,715 students nested in 432 middle schools, and 72,818 students nested in 446 high schools.

The prevalence of students suffering from anxiety and depression changes slightly by grade. Table 2 shows an increase in anxiety around grade 9 and 10, when children transition from middle to high school. The trend of depression is different: results show that there is a small but steady increase in reporting depressive feelings from grade 6 to grade 12.

The average prevalence across grades is about 7% for anxiety and 8% for depression

Grade	Anxiety	Depression
6	6.56	6.32
7	7.00	6.49
8	7.18	7.62
9	7.08	8.08
10	6.83	8.68
11	6.48	8.61
12	6.39	8.77
<b>Total</b>	6.80	8.03

Table 2. Prevalence of children suffering from anxiety and depression by grade

In Figure 1, we compare the prevalence of emotionally vulnerable students between middle and high school. With separate multilevel logistic regression models, we estimate the percentage of students classified as anxious and depressed in each school.

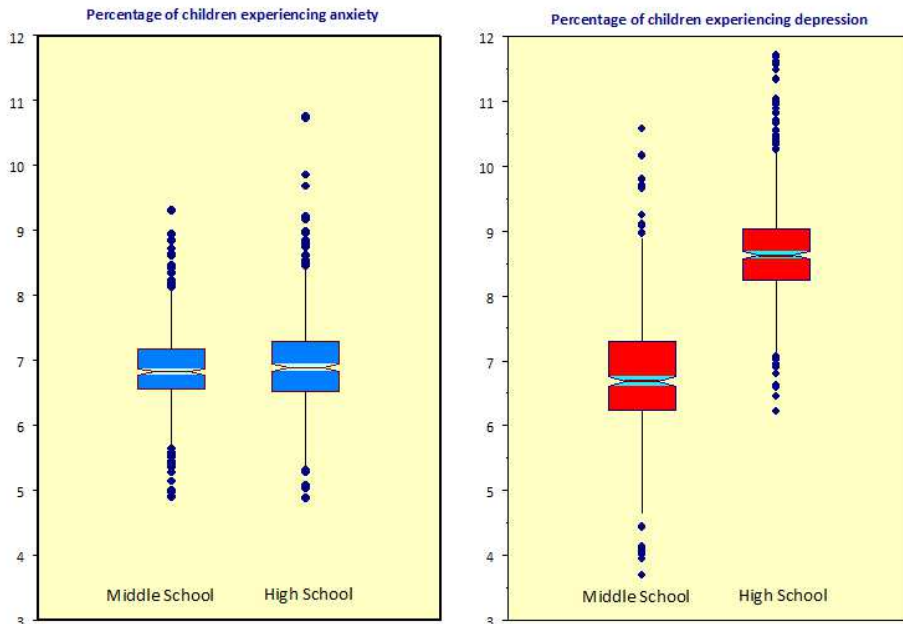


Fig. 1. Prevalence of vulnerable students in middle and high school

The graphs show that there is a significant difference in the median prevalence of vulnerable students in middle and high schools. The graphs also show the interquartile range in the prevalence of anxiety and depression for each type of school, and the presence of outliers.

Schools vary substantially in the prevalence of both anxiety and depression. While the median prevalence of anxiety is similar for middle and high schools, the range is greater for high schools. For depression the median prevalence is considerably higher for high schools than for middle schools - 6.7% compared to 8.9%. However, there is greater variability in the prevalence among middle schools.

Our next question is whether the prevalence of anxiety and depression varies as students make their way through middle and high school. Figures 2 and 3 show the trends in anxiety and depression by grade and sex.

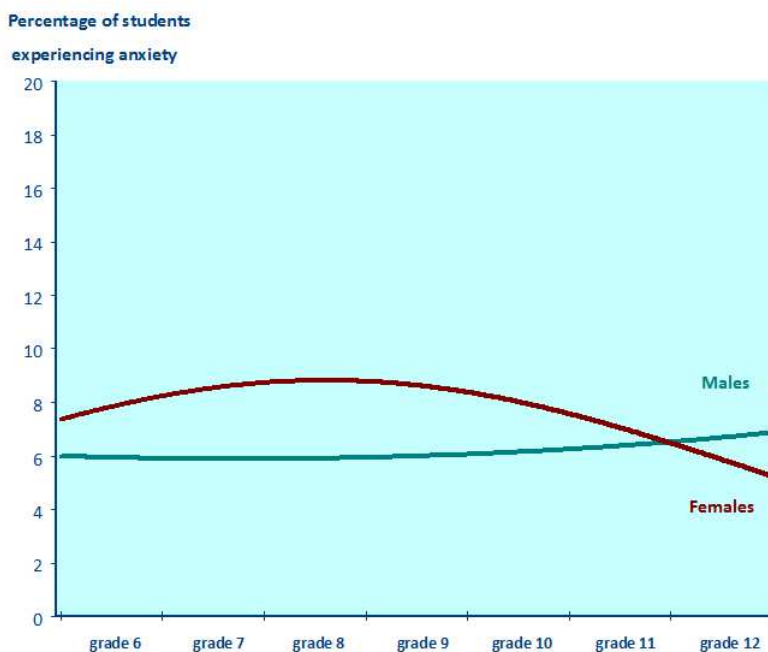


Fig. 2. Prevalence of anxiety by grade and sex

Throughout middle and high school, girls report consistently higher levels of anxiety than boys, particularly those enrolled in the last grade of middle school and those who have just entered high school. However, the prevalence of anxious girls declines by the end of grade 11, descending below the level of anxiety for boys.

The trend for depression is similar to that of anxiety, with the prevalence for girls higher than that of boys. However, the prevalence for both sexes increases considerably throughout

the middle and high school years, and after grade 10, the prevalence for girls falls through to the end of high school.

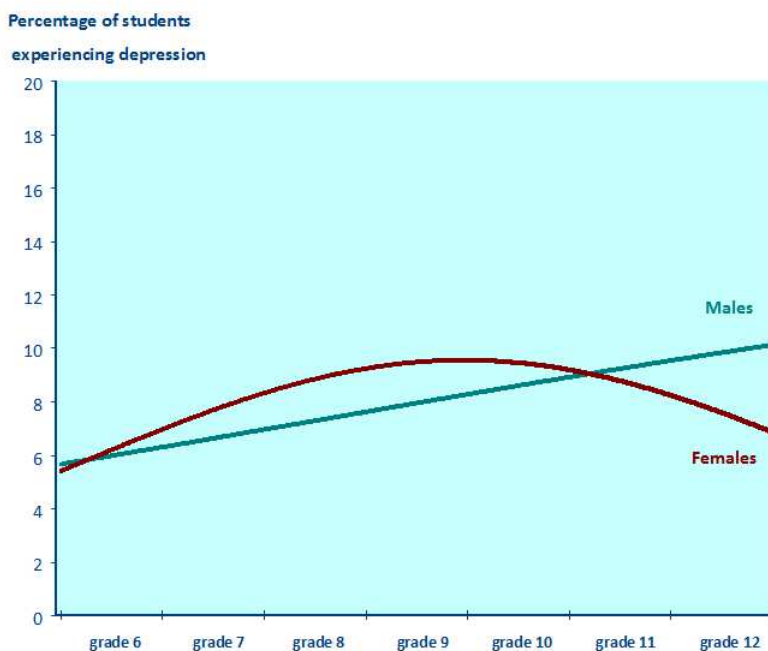


Fig. 3. Prevalence of depression by grade and sex

The next set of analyses examines the relationships between students' anxiety and depression and their learning experience in school. In Table 3, we report the percentage of students in each of the four quadrants of Csikszentmihalyi's typology, distinguishing between sex and type of school.

In middle schools, about 44% of girls and 45% of boys are in the desirable "flow" quadrant, with high challenge and high skills. For girls, 23% have low skills, and of these about two-thirds experience high levels of challenge while one-third experience low challenge. About one-third of all girls reported high levels of skills with low levels of challenge. For boys, a larger percentage – 31% – have low skills. About three-quarters of these boys reported high levels of challenge, with the remaining one-quarter – about 8% of the full middle school sample – reporting low skills and low challenge. About one-quarter of all middle school boys were in the high skills, low challenge quadrant.

The pattern for high school students is similar, but with a higher percentage of girls with low skills. About 22% of girls and 34% of boys were in the high skills, low challenge quadrant.



	Percentage of Students			
	Females		Males	
	Low Grades	High Grades	Low Grades	High Grades
<b>Middle Schools</b>				
High Challenge	16.1	43.9	23.4	45.0
Low Challenge	6.9	33.2	7.8	23.8
<b>High Schools</b>				
High Challenge	27.0	38.9	17.0	35.4
Low Challenge	11.8	22.3	13.2	34.4

Table 3. Percentage of students in the four quadrants of Csikszentmihalyi's typology, by school type and students' sex

Tables 4 and 5 report the Odds-Ratios for experiencing anxiety and depression associated with sex and membership in each of the four quadrants of Csikszentmihalyi's typology. Boys *in flow* are the reference category.

	Middle school	High school
<b>Grades-Challenge Profile</b>		
High Grades-High Challenge (reference) (HG-HC)	1.00	1.00
High Grades-Low Challenge (HG-LC)	0.90	0.82
Low Grades-High Challenge (LG-HC)	1.79	1.30
Low Grades-Low Challenge (LG-LC)	1.56	1.38
Female	1.30	1.24
Female * HG-LC	1.00	1.27
Female * LG-HC	1.32	1.36
Female * LG-LC	1.33	1.23

Note. Results in bold text are statistically significant ( $p < 0.05$ ).

Table 4. Odds-Ratios for anxiety associated with the grades-challenge profile and sex

In middle schools, the odds of experiencing anxiety for a boy in the high grades, low challenge quadrant do not differ from a boy in flow – the odds ratio is 0.90 and is not statistically significant. However, boys in the two low skill quadrants are significantly more likely to experience anxiety, especially those in the low grades - high challenge group; their odds are 1.79 times that of boys in flow. Girls in flow are more likely to experience anxiety than boys in flow – the odds ratio is 1.30. Also, the increased anxiety associated with low skills is even more pronounced for girls than boys. For example, the odds of experiencing anxiety for girls with low grades, high challenge are  $(1.79 * 1.32 =)$  2.36 times that of boys in flow, while girls with low grades, low challenge had increased odds of  $(1.56 * 1.33 =)$  1.92. Girls in the high grades, low challenge group have the same likelihood of experiencing anxiety as boys in flow.

The same general pattern is evident at the high school level, although the effects are not as pronounced. Girls in flow are more likely to experience anxiety than boys in flow, and boys in the two low skills quadrants are also at increased risk of experiencing anxiety. For girls with low skills, the effect is even greater.

	Middle school	High school
<b>Grades-Challenge Profile</b>		
<b>High Grades-High Challenge (reference) (HG-HC)</b>	<b>1.00</b>	<b>1.00</b>
High Grades-Low Challenge (HG-LC)	0.91	1.04
<b>Low Grades-High Challenge (LG-HC)</b>	<b>1.60</b>	<b>1.31</b>
<b>Low Grades-Low Challenge (LG-LC)</b>	<b>1.77</b>	<b>1.65</b>
Female	0.97	1.01
Female * HG-LC	1.11	<b>1.22</b>
Female * LG-HC	<b>1.59</b>	<b>1.36</b>
Female * LG-LC	<b>1.36</b>	<b>1.20</b>

Note. Results in bold text are statistically significant ( $p < 0.05$ ).

Table 5. Odds-Ratios for depression associated with the grades-challenge profile and gender

Table 5 shows the results for depression. Middle school boys and girls who have low grades, irrespective of the challenge they have to deal with, are more prone to experiencing depression than those with high grades. For boys the odds are greater by a factor of 1.60 for those with high challenge and 1.77 for those with low challenge. The effect associated with low skills is even more pronounced for girls, with odds ratios of  $(1.60 * 1.59 =)$  2.54 and  $(1.77 * 1.36 =)$  2.41 for high and low challenge respectively.

Similar effects are observed at the high school level, although the effects are not as strong. Students with low skills are more likely to experience depression. This effect is stronger for boys than for girls.

	Anxiety		Depression	
	Middle school	High school	Middle school	High school
<b>Student-level</b>				
Socioeconomic status	<b>0.79</b>	<b>0.78</b>	<b>0.76</b>	<b>0.79</b>
Expectations for success	<b>0.87</b>	<b>0.86</b>	<b>0.80</b>	<b>0.82</b>
Advocacy at school	<b>1.03</b>	<b>1.03</b>	<b>1.02</b>	1.01
<b>School-level</b>				
Quality of teaching	1.14	1.21	1.04	<b>1.25</b>
Classroom disciplinary climate	0.92	1.07	0.88	1.06
Teacher-student relations	0.86	<b>0.80</b>	0.95	<b>0.82</b>

Note. Results in bold text are statistically significant ( $p < 0.05$ ).

Table 6. Odds-Ratios for experiencing anxiety and depression associated with school processes and socioeconomic status

The last table examines the relationship between anxiety and depression with socioeconomic status and the measures of classroom and school context. The results were derived from a multilevel analysis with SES at the child level and the classroom and school context factors measured as the school level. It was not possible to identify students' classroom membership with the TTFM data. Students with higher SES are less prone to experiencing anxiety and depression at both the middle and high school levels. The odds-ratios are very close, approximately 0.75, for both anxiety and depression at both levels of schooling. This indicates that a student with an SES that is 0.5 standard deviations above the mean (i.e., about the 69th percentile) is only three-quarters as likely to experience anxiety or depression as a student with an SES that is 0.5 standard deviations below the mean (i.e., at the 31st percentile).

Advocacy at school and expectations for success were also entered as student-level variables in the model. The argument is that it is students' own experience of teachers' expectations of them and their own sense that they have an advocate at school that is important to their well-being. Teachers' expectations for success appear as a protective factor. In middle schools, each one-point increase on the ten-point scale is associated with a decrease in the odds of a student experiencing anxiety or depression. This relationship is stronger in high schools than in middle schools. A student's report of having an advocate at school has a very weak relationship with anxiety and depression; the odds-ratios are very close to one at both levels of schooling.

Two school process variables, classroom disciplinary climate and teacher-student relations, which were measured at the school level, also appear as protective factors. A one-point increase on the ten-point classroom disciplinary climate scale is associated with a decrease in the odds of anxiety of about 14% at the middle school level and by about 6% at the high school level. However, these results were not statistically significant. Slightly stronger effects were observed for depression, but in this case also the results were not statistically significant. Similar findings were evident for teacher-student relations, although in this case the protective effect was significant for both anxiety and depression at the secondary level. The odds-ratios for quality of teaching were greater than 1.0 for anxiety, indicating that it is a risk factor for anxiety and depression. However, these estimates were not statistically significant. For depression, the odds-ratio was 1.22 and statistically significant at the high school level. This counter-veiling effect is comparable to the protective effect of teacher-student relations.

#### 4. Discussion

This paper examined the prevalence of anxiety and depression between males and females for a large sample of students that completed the *Tell Them From Me* student survey in the fall of 2011. *Tell Them From Me* is Canada's largest school survey, covering a wide range of student outcomes as well as school and classroom processes. Four key findings emerged from the analysis.

First, girls have a higher prevalence of anxiety and depression than boys in middle school and in the early stages of high school. The gap is largest at the time when students make the transition from middle to high school. The gender gap at the end of grade 8 is slightly smaller for depression than it is for anxiety. Another key finding is that the prevalence of depression does not decline during the high school years for boys as it does for girls; rather it increases linearly through to the end of grade 12, when it reaches about 10%.

The results of this study show clearly why the prevalence of depression, in absolute terms, can vary substantially across studies. One source of variability is sampling error, which is largely ruled out in this study due to the large sample size. However, many studies reported in the literature are based on samples with less than 1000 students. Another source is the age range considered. These findings show clearly that the results can range considerably depending on the grade or age level considered; this is especially the case for depression. A third source of variation is measurement error. This is affected not only by the nature and quality of the items in the scales but also by the cut-point on the scale used to denote psychopathology. We developed separate continuous measures for each scale, anxiety and depression, using a variant of Item Response Theory for graded responses (Samejima, 1997). The approach takes into account the 'difficulty' of each item as well as the response categories for each item. For example, an anxiety item about whether students are concerned about what other students think of them is 'easier' than an item about feeling fearful and nervous, and thus has a lower value on the IRT scale. Also, each item has four separate IRT scores, corresponding to the frequency reported by a student (e.g., "Never or hardly ever", "About once a week", "About 2 or 3 times a week", or "Every day or almost every day"). Therefore, each pattern of scores yields a different score on the IRT scale. We set the cut-point at an IRT corresponding to a pattern in which a student answered "Every day or

almost every day" to the three easiest items and answered "About 2 or 3 times a week" to the three most difficult items.

Thus, the absolute prevalence is arbitrary, as we would have reported a different prevalence if we had set the cut-point corresponding to a different pattern, such as a student that answered "Every day or almost every day" to all six items. The prevalence would also change if we added an easier or more difficult item to the scale. Quite often, researchers hold up clinical diagnosis as the 'gold standard'. However, clinicians also have their own internal 'cut-points' for discerning whether or not a child is anxious or depressed, and there is considerable variation among clinicians (Roberts et al., 1998). In school-based studies in which the prevalence of mental health issues is derived from reported cases, the prevalence can also vary because of the availability of clinicians in certain geographic areas.

Thus, although the estimate of prevalence depends heavily on the cut-point set to define psychopathology, our scaled-based approach has several advantages. First, the meaning of the threshold is anchored to the response categories of the items. Second, it can be applied to any scale, regardless of whether there are three, four, or more response categories, and any number of items. Third, the approach can be applied across all children in the sample, regardless of age, sex, or other characteristics. One can also assess whether the set of items is 'measurement invariant' for age, sex, or other factors (Wu, Li, and Zumbo, 2007). An important aspect of measurement invariance is whether there are certain items that are 'easier' for girls than boys, or vice-versa, given their overall level of anxiety or depression. Fourth, which we see as a key advantage for this type of study, it provides a reliable method for making comparisons among sub-populations, across jurisdictions such as schools and school districts, and over time. For practical purposes, these are the kinds of comparisons that are relevant to schools and school districts that use TTFM.

The second key finding is that most middle and high schools have a prevalence of anxiety that is close to the national median. The inter-quartile range is only about 1% for both anxiety and depression. However, there are many notable outliers, with decidedly low or high levels of anxiety and depression. These are not simply due to measurement or sampling error, as TTFM assesses all children within schools and our HLM analysis provides "shrunk" estimates of each school's prevalence which takes into account measurement and sampling error. For educators, this means that most interventions need to focus on within-school strategies to reduce anxiety and depression, but there are some schools that warrant a whole-school, targeted approach. For researchers, these results raise questions about why some schools have markedly low levels of anxiety and depression while other have very high levels.

Third, about 35 to 45% of Canadian students were considered to be in "flow"; that is, have strong skills and feel they were challenged in their classes. This general finding was reported earlier by the Canadian Education Association as part of its project called, "What did you do in school today?" (Willms et al., 2009), which has spawned national interest in the extent to which children are intellectually engaged at school. This study shows that these students are less prone to experiencing anxiety or depression. However, students with high skills but lack challenge also have relatively low levels of anxiety and depression. While these students may lack intellectual engagement, it does not appear to increase anxiety or cause depression. Rather, our findings suggest that skills, not challenge, is the critical aspect in the Csikszentmihalyi schema. Moreover, there is a significant gender by skill interaction:

girls with low levels of skills tend to be more at risk than boys experiencing anxiety and depression.

An earlier study based on TTFM data used students' perceptions of their skills as the skill measure in the Csikszentmihalyi schema (Tramonte & Willms, 2010), while this study used a measure of skill derived from students' reports of grades. Analyses by The Learning Bar Inc. have shown that grades are a more reliable measure of skills than students' perceptions, but the findings from the earlier Tramonte and Willms (2010) are similar to those found in this study. As a factor that contributes to anxiety and depression, it seems that students' perceptions of their skills in relation to the peers in their context are equally important to students' achieved grades.

Our fourth key finding is also concerned with why schools vary in their levels of anxiety and depression. We approached this using a traditional multilevel analysis of school effects, using measures of schooling processes that have been found in many studies to be related to students' academic achievement. This strategy was only moderately successful. Students' SES and teachers' expectations for success proved to be strong student-level protective factors; however, students having an advocate at school had weak relationships with anxiety and depression. At the school level, classroom disciplinary climate and teacher-student relations had protective effects, as expected, but the analysis lacked statistical power and thus some of the estimates were not statistically significant. In hierarchical analyses, the statistical power of school-level factors depends more on the number of schools than the number of students in this type of study. The effects of quality of teaching were in the opposite direction as expected. This likely stems from collinearity at the school level in these factors; when quality of instruction is entered separately, without classroom disciplinary climate and teacher-student relations in the model, the results are weak but in the expected direction. As with many of the traditional 'school effects' analyses aimed at uncovering the effects of school processes on achievement, it is difficult to identify the key processes that make a difference. The results call for controlled intervention studies with longitudinal designs.

## 5. Conclusion

The findings of this study provide a compelling argument that the mental health of adolescents deserves equal or even greater attention than academic achievement in discussions about school effectiveness. Kessler et al. (2005) report that about one-half of all Americans will experience a mental health condition at some time during their lives, and in most cases the first onset is during childhood or adolescence. The *Tell Them From Me* evaluation system provides reliable data on the prevalence of anxiety and depression, enabling schools to track their progress on key outcomes. Students with low levels of skills are more prone to anxiety and depression, a relationship which is evident for most students when they begin middle school. Schools can make a difference, not only through staff efforts at helping students at the individual level, but also by establishing a positive school climate characterized by high expectations for success, a positive classroom disciplinary climate, and strong teacher-student relationships.

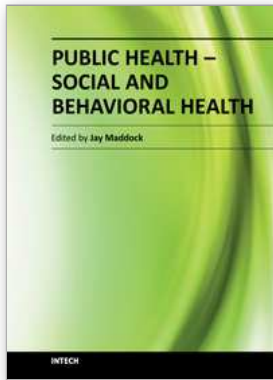
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Human behavior accounts for the majority of morbidity and premature mortality throughout the world. This book explores several areas of human behavior including physical activity, nutrition and food, addictive substances, gun violence, sexual transmitted diseases and more. Several cutting edge methods are also examined including empowering nurses, community based participatory research and nature therapy. Less well known public health topics including human trafficking, tuberculosis control in prisons and public health issues in the deaf community are also covered. The authors come from around the world to describe issues that are both of local and worldwide importance to protect and preserve the health of populations. This book demonstrates the scope and some of the solutions to addressing today's most pressing public health issues.

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