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The Mental Health of Canadians With Self-Reported Learning Disabilities

Alexander M. Wilson
Mount Allison University
Catherine Deri Armstrong
University of Ottawa
Adele Furrie
Ottawa, Canada
Elizabeth Walcot
Université de Sherbrooke

There has been growing concern as to the mental health status of persons with learning disabilities (PWLD). This study examined rates of mental health problems among PWLD aged 15 to 44 years using a large, nationally representative data set. PWLD were more than twice as likely to report high levels of distress, depression, anxiety disorders, suicidal thoughts, visits to mental health professionals, and poorer overall mental health than were persons without disabilities (PWOD). Multivariate regression analyses determined that these significantly higher rates of mental health problems remained for all six measures after controlling for confounding factors including income, education, social support, and physical health. Differences found in the older adult sample (ages 30–44) were even larger than in the adolescent sample (ages 15–21) for suicidal thoughts, depression, and distress. Males with learning disabilities were more likely to report depressive episodes, anxiety disorders, and consultations with health professionals, whereas females with learning disabilities were more likely to report high distress, suicidal thoughts, and poor general mental health relative to PWOD. On balance, learning disabilities were not found to be more detrimental to mental health for one gender or the other.

Keywords: *mental health; adults; adolescents*

Increasing attention has been given to the social-emotional development of persons with learning disabilities (PWLD). In general, the literature on this topic finds that those with learning disabilities (LD) are at increased risk for mental health problems. Existing studies have focused on specific aspects of mental health, such as stress (Wenz-Gross & Siperstein, 1998), anxiety (Riddick, Sterling, Farmer, & Morgan, 1999), or depression (Heath & Ross, 2000). Generally, such studies have used small sample sizes and narrow age ranges.

Studies have reported elevated stress and anxiety levels for PWLD. Higher rates of school-related stress were found in samples of school-identified junior high (Geisthardt & Munsch, 1996) and high school students (Wenz-Gross & Siperstein, 1998). Because the school years represent one of the most significant major life stressors for PWLD, stress may be lessened once schooling has ended (Raskind, Goldberg, Higgins, & Herman, 1999). Fisher, Allen, and Kose (1996) found higher rates of state and trait anxiety among boys with LD. Among post secondary students with LD, Heiman and Precel (2003) produced evidence of high rates of anxiety. Raised levels of anxiety and apprehension and reduced levels of self-confidence and stability have been reported among adults with LD (Hales, 2001), prompting Gregg, Hoy, King, Moreland, and Jagota (1992) to argue that long-term stress resulted in low self-confidence.

Depression and its links to LD have been studied more extensively in both school and clinical samples. Higher scores on inventories measuring depression have been found in children with LD as young as 8 years of age (Heath, 1995; Wright-Strawderman & Watson, 1992), in younger adolescents (Maag & Behrens, 1989), and in older adolescents (Dalley, Bolocofsky, Alcorn, & Baker,

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1992). Among high school students, higher depression rates have been reported for PWLD in resource-room settings (Dalley et al., 1992; Maag & Behrens, 1989) but not in self-contained LD classrooms (Howard & Tryon, 2002). The highest rates were associated with the least successful students with LD (Dalley et al., 1992). Both teacher (Newcomer, Barenbaum, & Pearson, 1995) and parent ratings (Wright-Strawderman & Watson, 1992) have produced higher depression rates for students with LD. In addition, clinical samples of children with major depressive disorders have reported unexpectedly higher rates of LD (e.g., Fristad, Topolosky, Weller, & Weller, 1992). Although fewer studies of adults have been reported, a qualitative study of 14 adults (aged 26–60) found that 11 related their depression to the presence of LD (Shesell & Reiff, 1999). Furthermore, one follow-up study of children with LD into their 30s (Raskind et al., 1999) found that 42% had psychological difficulties classifiable under the *Diagnostic and Statistical Manual of Mental Disorders–Fourth Edition* (*DSM-IV*; American Psychiatric Association, 2000), but those difficulties did not present until adulthood. A second study found that 30% of adults with LD served by rehabilitation services had associated psychiatric (adjustment and depression) problems (Dunham, Multon, & Koller, 1999). Although the relationship between adults with LD and depression has not been well studied, the evidence for such a relationship among students at all levels is strong.

As well as higher levels of stress and depression, some studies have suggested an increased risk of suicide. Using data on high school students from the National Longitudinal Study of Adolescent Health, researchers reported that 5.7% of adolescents with school-identified LD had attempted suicide within the prior 12 months (Svetaz, Ireland, & Blum, 2000). When compared with adolescents without LD, the rates for these PWLD were almost twice as high for both males (4% vs. 2%) and females (9% vs. 5%). For high school students with LD in resource settings, 1 in 10 agreed with the statement, "I want to kill myself" (Dalley et al., 1992). For persons who committed suicide and left notes, 89% produced spelling patterns and handwriting errors similar to a school sample of adolescents with LD (McBride & Siegel, 1997). In the Shesell and Reiff (1999) qualitative study, 4 of the 14 adults with LD had considered suicide. Both personal characteristics (e.g., impulsivity) and depression have been cited as risk factors for suicide in students with LD (Bender, Rosenkrans, & Crane, 1999).

Finally, females with LD may be at greater risk for mental health problems. Higher rates and symptoms of depression have been reported for females with LD than for females without disabilities (Heath & Ross, 2000). Female high school students with LD have been found to have a higher likelihood of suicide attempts than males with LD (9% vs. 4%) and higher than females without LD (9% vs. 5%; Svetaz et al., 2000). Gender differences in psychiatric disorders for adults with LD were found with females reporting higher rates than males (Hoy et al., 1997). However, it should be noted that there is a higher incidence for most mental health problems for females in the general population (Hankin et al., 1998).

In summary, based on studies largely involving questionnaire-based scores in the clinical range or using clinic-referred (preidentified) samples of persons with LD, having LD has been found to increase the risk for mental health disorders including stress, anxiety, depression, and suicide, primarily among adolescents but also among adults. However, it is important to note that scores in the clinical range on mental health questionnaires do not necessarily equate with meeting the standards of the *DSM-IV* (American Psychiatric Association, 2000; Maag & Reid, 2006).

The current study sought to address some key issues in the relationship between mental health in adolescents with self-reported LD and adults with self-reported LD using a large nationally representative Canadian data set and six carefully selected measures of mental health. Specifically, this study sought to answer the following research questions:

1. Do Canadians with self-reported LD differ significantly from Canadians without disabilities in the rates of mental health problems?
2. If so, can the observed differences be explained by confounding factors such as income and education?
3. If not, do these differences persist over the life span?
4. Do these differences exist for both males and females and to the same extent?

Method

Data Source

Data were obtained from the *Canadian Community Health Survey: Mental Health and Well-being, Cycle 1.2* (CCHS 1.2; Statistics Canada, 2003), a nationally representative sample of individuals residing in private dwellings in the 10 provinces. Conducted in 2002, the sample excluded households on Indian reserves, full-time members of the Canadian armed forces, and households in selected remote regions. Residents of the three territories and residents of institutions were also not represented in the sample. The sampling design was a multistage stratified cluster design in which the dwelling was the final

sampling unit. One respondent was randomly selected from within each selected dwelling with an oversampling of adolescents and young adults (aged 15–24) and seniors (aged 65+). Approximately 98% of the population aged 15 or older in the 10 provinces were represented in the sample of 36,984 individuals. The CCHS is considered representative at both national and provincial levels.

The theme of the survey was mental health and well-being. As such, the mental health content was developed through extensive consultation that encompassed representatives from the World Health Organization (WHO); academic, federal, and provincial departments; and consumer groups and professional associations (see Note 1). The primary tool used to establish the content was the *World Mental Health Composite Diagnostic Interview Schedule* (WMH-CIDI; World Health Organization, 1990) that was developed to be administered by lay interviewers in a survey environment. Evidence collected in the WMH-CIDI field trials and later clinical calibration studies showed that the disorders considered by the WMH-CIDI measured, with acceptable reliability and validity, the results that would have been obtained during a clinical interview by a psychiatric professional (see Gravel & Beland, 2005).

Participants

The CCHS 1.2 asked respondents about 34 long-term physical and mental health conditions that were "diagnosed by a health professional." One of the conditions was "learning disability." Those who responded "yes" to having a learning disability were then asked to identify the type, including attentional disorders, which were either Attention-Deficit Disorder (ADD), no hyperactivity, or Attention-Deficit Hyperactivity Disorder (ADHD); Dyslexia; or other type of learning disability. Respondents could indicate more than one type of LD.

For the study herein, two populations of interest were identified. The PWLD sample was composed of those respondents who answered "yes" to having LD as diagnosed by a health professional, irrespective of how they responded to the follow-up question about type of LD. This provided a sample of 670 individuals with LD (400 male and 270 female).

Although the authors were aware of limitations associated with self-reported LD, it was argued that this sample provided a unique opportunity to examine a nationally representative sample of PWLD, across ages and circumstances. Several arguments supported the use of self-reported LD in this project. First, the definition used here, *as diagnosed by a health professional*, was stronger than a simple question asking only whether the respondents had an LD. Second, the results herein are comparable to existing smaller studies on the relationship between mental health and LD, which use clinical or school-based definitions for LD. Last, the main analysis was replicated with the subgroup of LD who self-identified as Dyslexic (118 male and 85 female). We reasoned that although some individuals may self-identify as LD who, in fact, would not meet acceptable criteria, those who also identify as Dyslexic would more likely typify those who meet the narrow criteria of reading difficulties within the more heterogeneous category of LD. Furthermore, the terminology of Dyslexia would be more consistent with that used by a health professional, particularly for those with LD in the aged 30-to-44 sample whose diagnosis would more likely be through a clinic than a school setting in Canada. Further arguments for the use of self-identified LD will be provided in the discussion section.

The PWOD sample comprised those individuals who answered "no" to a set of general disability questions and answered "no" to having LD. The general disability questions are those used in the census of 2001 to identify Canadians with disabilities. Specifically, PWOD answered "no" to the following questions: "Do you have difficulty hearing, seeing, communicating, walking, climbing stairs, bending, learning or doing any similar activities?" and "Does a long-term physical condition or mental condition or health problem, reduce the amount or the kind of activity you can do: at home, at school or at work?" The PWOD sample consists of 14,265 individuals, 6,756 males and 7,509 females.

The choice of PWOD as the reference group, as opposed to, say, the sample of persons with other disabilities, was made for two reasons. First, there is a larger literature regarding the determinants of mental health for the general population, and second, the population with other disabilities is very heterogeneous, and comparisons would not necessarily be as meaningful.

In this analysis, three age groups were distinguished: (a) persons aged 15 to 21 years, representing adolescents and young adults who would likely be attending school (244 PWLD, 3,096 PWOD); (b) transitioning adults aged 22 to 29 years, representing those moving into employment and independence (161 PWLD, 3,394 PWOD); and (c) older adults aged 30 to 44 years (265 PWLD, 7,775 PWOD). The upper age limit of 44 years was chosen because persons older than 44 years at the time of data collection (2002) would have been unlikely to receive a diagnosis of LD. That is, because the average age at which a diagnosis of LD is usually made is between 11 and 12 years, and the likelihood of receiving a diagnosis of LD before 1970 was unlikely, it would mean that those older than 44 in 2002 would not be likely labeled as LD.

Measures of Mental Health

Of the many measures of mental health available in the CCHS 1.2, six variables were selected for this study: (a) the respondent's level of distress during the past month; (b) the presence or absence of lifetime consultation with any professional for problems with emotions, mental health, or alcohol or drug use; (c) the presence of a major depressive disorder; (d) the presence or absence of major anxiety disorder; (e) the self-assertion of whether the respondent ever thought seriously about committing suicide; and (f) the respondent's self-perception of overall mental health. Recall that these measures were developed in consultation with representatives from the WHO; academic, federal, and provincial departments; and consumer groups and professional associations. In addition, the tools used were developed to be administered by lay interviewers in a survey environment, and calibration studies have found that the measures considered by the WMH-CIDI were reliable and valid when compared with results obtained from clinical interviews by psychiatric professionals. A detailed description of these variables appears in the appendix.

Data Analysis

Descriptive analysis. The initial analysis involved descriptive statistics using population estimates produced from weighted frequencies. Statistics Canada's guidelines concerning reliability were applied. The first stage examined the six selected mental health variables to determine the nature and extent of any differences between the two populations, PWOD and PWLD. These data were analyzed for differences by gender and by age (15–21 years, 22–29 years, 30–44 years). The second stage compared various sociodemographic characteristics known to affect mental health between PWOD and PWLD. The variables chosen were as follows: availability to the respondent of tangible social support, availability of emotional or informational support, self-assessment of general physical health, presence of at least one chronic physical health condition, educational attainment, marital status, employment status, and level of household income. A detailed description of these variables appears in the appendix.

Regression analysis. To identify differences in the mental health between PWLD and PWOD, a set of multivariate regressions was run for each of the six measures of mental health. The use of regression analysis as opposed to a simple comparison of means was undertaken as the two populations of interest vary along many dimensions, some of which have been shown to be important predictors of mental health.

These regressions provided the difference in the probability of reporting a negative mental health outcome (e.g., the difference in the probability of self-reporting an anxiety disorder) for a PWLD as compared with a PWOD with the same characteristics as defined by demographic status (gender, age group, income level, educational attainment, marital status, and province of residence), personal support (level of social and emotional support), health (presence of a chronic condition and poor self-reported physical health), and employment (employment and student status) characteristics.

Due to the limited sample of PWLD in the data set, the main specification was run with both genders and all age groups combined. Specification checks were run for each age group separately and for males and females separately. Similar specification checks can be found in Svetaz et al. (2000).

Three additional specification checks were run to address concerns specific to our data set. First, in Canada, education is a provincial rather than a federal right. Therefore, each province has developed its own educational policies. This has resulted in varying policies of definition, identification, and classification procedures for serving students with LD. As such, it is possible that the self-identified LD groups were not homogeneous across provinces. To address this concern, a specification was run to interact the LD indicator with the set of provincial indicators. In this way, it was possible to identify the effect of LD on the mental health indicators for a reference province (Ontario was chosen, as it is the most populous) and the incremental impact of LD on mental health from living in each other province.

Second, the possibility that ADD may be confounding the main results was addressed. This concern reflects the growing evidence as to the coexistence of LD and attentional disorders (Semrud-Clikeman et al., 1992) and the findings that those with ADD have higher than expected rates of mental health problems (e.g., Connor et al., 2003; Kessler et al., 2006). To examine this possibility, a specification was run in which it was possible to separately identify the effect of LD for those who also reported ADD (both with hyperactivity and without) and the effect of ADD separately. Furthermore, the analysis was repeated by age group as the effects of attentional disorders on mental health may vary by age. For example, Biederman et al. (2006) found significantly higher rates of psychopathology in a 10-year follow-up of children and adolescents with ADHD.

Last, the main analysis was rerun separately for those who report Dyslexia as their type of LD to verify the earlier results using an arguably "cleaner" subsample of respondents with self-reported LD.

Table 1
Percentage Reporting the Selected Mental Health Variables by Sex and Age Group for the Two Populations

		15–44 Years		15–21 Years		22–29 Years		30–44 Years	
Sex	Mental Health Variables	PWOD (n = 14,278)	PWLD (n = 670)	PWOD (n = 3,100)	PWLD (n = 244)	PWOD (n = 3,394)	PWLD (n = 161)	PWOD (n = 7,784)	PWLD (n = 265)
Both sexes									
	Distress	22.6	54.8***	31.3	53.6***	22.9	57.0***	18.8	54.6***
	Depression	10.2	24.1***	7.4	14.6***	11.2	20.7***	10.9	36.3***
	Anxiety disorders	10.1	25.8***	9.7	20.4***	10.2	27.0***	10.3	31.0***
	Professional consultation	19.5	43.6***	14.4	35.0***	19.4	46.0***	21.6	51.3***
	Suicidal thoughts	11.7	33.4***	12.0	24.7***	13.6	37.6***	10.7	40.2***
	Self-assessed poor or fair mental health	4.5	20.7***	4.6	15.1***	3.7	22.0***	4.8	25.9***
Males									
	Distress	21.9	51.2***	31.0	46.4***	22.9	54.6***	17.6	54.0***
	Depression	6.9	19.4***	4.8	11.3***	7.3	14.2***	7.6	31.4***
	Anxiety disorders	8.3	24.6***	8.0	19.8***	8.4	26.8***	8.5	28.2***
	Professional consultation	13.4	39.6***	9.9	33.2***	12.8	41.8***	15.1	44.9***
	Suicidal thoughts	10.4	29.0***	8.6	21.7***	12.8	32.3***	10.2	34.6***
	Self-assessed poor or fair mental health	3.7	18.4***	3.6	9.9***	3.1	19.6***	4.0	26.7***
Females									
	Distress	23.2	60.7***	31.7	64.7***	23.0	61.6***	20.1	55.7***
	Depression	13.6	31.8***	10.4	19.7***	14.9	33.0***	14.2	44.1***
	Anxiety disorders	12.0	27.8***	11.6	21.4***	11.9	27.5***	12.2	35.3***
	Professional consultation	25.8	50.1***	19.5	37.8***	25.9	54.0***	28.1	61.4***
	Suicidal thoughts	13.0	40.6***	15.9	29.4***	14.5	47.7***	11.2	48.9***
	Self-assessed poor or fair mental health	5.3	24.5***	5.7	23.2***	4.3	26.6***	5.6	24.7***

Note: Sample sizes refer to samples with both sexes combined. PWOD = persons without disabilities. PWLD = persons with learning disabilities.
*** $p < .001$.

All regressions were weighted using survey sampling weights. Logistic modeling was used in all cases, and odds ratios are reported in the tables.

Results

Descriptive Results

Statistically significant differences in mental health were found between the two populations when both genders and age groups were considered together (Table 1). PWLD were found to be 2 to 5 times more likely to report all of the six mental health problems than were PWOD. Although females were more likely to report mental health problems than were males in the PWOD population, the differences between the genders were even larger for the PWLD population for all six mental health indicators. When genders and age groups were considered separately, a pattern of increasing difference in mental health problems with age emerged. That is, the percentage of reported mental health problems for the PWLD sample increased from adolescence and young adulthood (15–21 years) to older adulthood (30–44 years) across the six mental health variables, whereas the results from the PWOD sample were more varied, sometimes decreasing (distress), increasing (professional consultation), leveling off (depression and anxiety), or irregularly decreasing and then increasing (suicidal thoughts).

Table 2 reports the sociodemographic characteristics of the two populations of interest. PWOD reported more tangible social support (44.5% vs. 38.9%) and more emotional or informational support (38.6% vs. 30.6%) than did PWLD. These differences may be due in part to differences in marital status. Whereas 54% of PWOD reported being married or living common law, only 28.4% of PWLD reported this.

With respect to physical health, the results were not as clear. Although more PWLD reported the presence of a selected chronic physical condition than did PWOD (75.6% vs. 53.0%), the opposite results were recorded for self-perceived physical health: 43.3% of PWLD reported poor or fair physical health, and 63.6% of PWOD reported these same levels of health.

PWLD were more likely to report having less than a secondary school certificate or diploma and less likely to

Table 2
Percentage Reporting the Selected Control Variables

Control Variables	PWOD	PWLD
Tangible social support—% reporting maximum tangible social support	44.5	38.9***
Emotional or informational support—% reporting maximum emotional or informational support	38.6	30.6***
Self-perceived physical health—% reporting poor or fair physical health	63.6	43.3***
Chronic physical conditions—% reporting at least one of the selected chronic conditions	53.0	75.6***
Highest level of schooling—% reporting having less than a secondary school certificate or diploma	20.0	43.7***
Marital status—% reporting married or living common law	54.0	28.4***
Labor-force status—% reporting working or absent from their job in the week preceding the interview	78.6	63.1***
At school—% reporting currently attending school	25.3	29.9***
Household income adequacy—% falling into the lowest or lower-middle income quartile	8.9	18.8***

Note: PWOD = persons without disabilities. PWLD = persons with learning disabilities.
*** $p < .001$.

report having a job than were their PWOD peers. More PWLD were reported to be still attending school (29.9% of PWLD vs. 25.3% of PWOD). More PWLD were living in households where the household income adequacy fell within the lowest or lower-middle quartile (18.8% of PWLD vs. 8.9% of PWOD). All these differences were statistically significant at the .01 level of significance.

Regression Results

Table 3 reports the odds ratios for the logistic regressions for each of the six measures of mental health separately. A number greater than (or less than) 1.00 indicates that the odds of self-reporting the given mental health outcome is greater than (or less than) that of the reference category. For example, if in the regression for anxiety disorders the coefficient of PWLD is 1.43 (or 0.43), this would indicate that the odds of a PWLD reporting an anxiety disorder is 143% (or 43%) of the odds of an otherwise identical PWOD reporting the same.

Across these six measures, PWLD were found to have 2.8 times greater odds of reporting high distress, 2.4 greater odds of reporting having had depressive episodes, 2.4 greater odds of reporting anxiety disorders, 3.3 greater odds of reporting having seen a health professional regarding mental health problems, 2.9 times greater odds of having had suicidal thoughts, and 2.6 times greater odds of being in poor mental health. In all six cases, the estimates were statistically significant, even after controlling for confounding factors.

The interpretation of the control variables provided the relationship between the variable itself and the mental health outcome for the *average* respondent, not one that was either a PWLD or a PWOD specifically. In general, the results were as expected. In all regressions except that of high distress, being male was associated with lower risks of self-reported mental health problems. The age-group variables suggested that aging was associated with decreased odds of reporting high levels of distress but increased odds of reporting depressive episodes or having seen a professional about mental health problems. Income was not found to play a consistently significant role in predicting mental health problems. High levels of income adequacy were associated with lower odds of reporting high distress, having suicidal thoughts, and reporting poor mental health only. Schooling also did not appear to play consistently significant roles. Relative to not having finished high school, having a postsecondary degree was associated with lower odds of reporting high distress and poor mental health but with higher odds of having seen a professional for mental health problems.

Being married was usually associated with better self-reported mental health outcomes. Higher levels of both social and emotional support appeared to be protective of mental health as both of them were strong predictors of better mental health outcomes. Being employed was not found to be associated with lower odds of mental health problems. However, being a student was associated with lower odds of having had suicidal thoughts and reporting poor mental health. The one remarkable finding in the controls for province of residence was that Quebec residents were more likely to report all mental health problems than were Ontario residents with the exception of reporting poor mental health.

Measures of physical health were also strong predictors of mental health in all regressions. Those in better physical condition and those without chronic conditions were less likely to report poor mental health outcomes.

Specification Checks

Reported in Table 4 are the results for the regressions estimated separately for each age group (only the coefficients for PWLD are reported). The results suggest that

Table 3
Main Regressions

Variable	Distress	Depression	Anxiety Disorders	Professional Consultation	Suicidal Thoughts	General Mental Health
PWOD	1.00	1.00	1.00	1.00	1.00	1.00
PWLD	2.78***	2.37***	2.38***	3.27***	2.89***	2.57***
Female	1.00	1.00	1.00	1.00	1.00	1.00
Male	0.90	0.48***	0.67***	0.45***	0.77***	0.69**
Age 15–19	1.00	1.00	1.00	1.00	1.00	1.00
Age 20–29	0.81*	1.43*	1.07	1.21	1.11	1.06
Age 30–44	0.60***	1.52**	1.10	1.49***	0.82	1.32
Income Adequacy 1	1.00	1.00	1.00	1.00	1.00	1.00
Income Adequacy 2	0.88	0.81	0.91	0.85	0.81	0.82
Income Adequacy 3	0.79**	0.92	0.89	0.96	0.79*	0.83
Income Adequacy 4	0.68**	0.98	0.94	1.06	0.64**	0.61*
Less than high school	1.00	1.00	1.00	1.00	1.00	1.00
High school	0.84	1.14	1.02	1.04	1.03	0.72
Some postsecondary	0.95	1.46**	1.09	1.71***	1.07	0.96
Postsecondary degree	0.74***	1.26	0.92	1.35**	0.99	0.62**
Not married	1.00	1.00	1.00	1.00	1.00	1.00
Married	0.88	0.70***	0.75**	0.70***	0.86	0.64**
Social Support 1	1.00	1.00	1.00	1.00	1.00	1.00
Social Support 2	0.82*	0.81	0.90	0.92	0.93	0.90
Social Support 3	0.73**	0.74	0.81	0.67**	0.79	0.56*
Social Support 4	0.64***	0.68**	0.70**	0.80*	0.77*	0.94
Emotional Support 1	1.00	1.00	1.00	1.00	1.00	1.00
Emotional Support 2	0.55***	0.75*	0.72**	0.83*	0.65***	0.52***
Emotional Support 3	0.43***	0.60***	0.55***	0.75*	0.50***	0.37***
Emotional Support 4	0.39***	0.70*	0.60***	0.71**	0.53***	0.31***
No chronic condition	1.00	1.00	1.00	1.00	1.00	1.00
Chronic condition	1.39***	2.23***	1.69***	1.97***	1.85***	1.90***
Good physical condition	1.00	1.00	1.00	1.00	1.00	1.00
Poor physical	2.82***	2.11***	1.67***	1.83***	1.65***	9.08***
Currently not working	1.00	1.00	1.00	1.00	1.00	1.00
Currently working	0.93	1.00	1.11	1.05	1.12	0.97
Currently not a student	1.00	1.00	1.00	1.00	1.00	1.00
Currently student	0.96	0.84	0.90	0.85	0.79*	0.59**
Newfoundland	0.88	0.70	1.24	0.74*	0.60**	0.66
Prince Edward Island	0.71*	0.78	0.89	0.85	0.75	0.75
Nova Scotia	0.90	1.14	1.40*	1.43**	0.93	1.31
New Brunswick	0.90	1.01	1.12	1.14	1.13	0.97
Quebec	1.34*	1.48***	1.28*	1.51***	1.42**	0.94
Ontario	1.00	1.00	1.00	1.00	1.00	1.00
Manitoba	0.94	1.01	1.13	1.24	1.11	1.15
Saskatchewan	0.79	0.76	0.80	1.11	1.33**	0.87
Alberta	0.93	0.95	0.94	1.10	1.43**	1.09
British Columbia	0.92	1.21	1.19	1.29**	1.33**	1.34
n	14,903	14,889	14,935	14,893	14,916	14,927

Note: Odds ratios reported for logistic regressions. PWOD = persons without disabilities. PWLD = persons with learning disabilities.
*$p < .05$. **$p < .01$. ***$p < .001$.

LD was associated with poorer mental health across all measures of mental health and all age groups, except reporting depressive episodes for the adolescent and young adult age group. Comparing the estimated coefficients from the adolescent and older adult age groups using an *Adjusted Wald Test*, LD was found to be associated with significantly poorer mental health outcomes in the older adult age group for suicidal thoughts ($p < .05$) and marginally significant for depression ($p = .06$) and distress ($p = .06$). As this is not a longitudinal study, we cannot distinguish between the following hypotheses: the mental health problems of PWLD, at least for some

Table 4
Robustness Checks for Age

	PWLD		
Mental Health Variable	Age 15–19	Age 20–29	Age 30–44
Distress	2.04***	3.54***	3.47***
Depression	1.65	1.59	3.33***
Anxiety disorders	2.09**	2.46**	2.48***
Professional consultation	3.12***	3.02***	3.54***
Suicidal thoughts	1.99**	2.87***	4.21***
General mental health	2.21**	4.85***	2.13*

Note: PWLD = persons with learning disabilities.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 5
Robustness Checks by Sex

	PWLD	
Mental Health Variable	Males	Females
Distress	2.48***	3.37***
Depression	2.40***	2.26***
Anxiety disorders	2.98***	1.90**
Professional consultation	3.76***	2.61***
Suicidal thoughts	2.70***	3.18***
General mental health	2.75**	3.26***

Note: PWLD = persons with learning disabilities.
**$p < .01$. ***$p < .001$.

measures, that appeared in adolescence and young adulthood tend to persist and may in fact deteriorate over time relative to their peers without LD; and 30- to 44-year-old individuals with LD have poorer mental health outcomes than do younger individuals with LD perhaps due to earlier diagnosis or to improved interventions in more recent years that have benefited the younger cohort.

The results for the second specification checks are reported in Table 5 where the regressions were estimated separately for each gender (only the coefficients for PWLD are reported). In all cases (for both genders and all six measures of mental health), having LD was associated with significantly poorer mental health outcomes. *Adjusted Wald Test* comparison of the estimated coefficients for males and females did not indicate any statistically significant difference between the estimated effects of LD for males and females for any of the six mental health problems.

The third specification check considered whether the effect of LD on mental health varies by province of residence—for example, due to differences across provinces in the definitions of LD as described above. Table 6 reports the results for a set of regressions, again one for each measure of mental health, where LD is interacted with each province of residence. As the excluded or reference province is Ontario, the estimated effect of having self-reported LD on mental health for individuals from Ontario is given by the coefficient of LD and is reported in the first row. In all cases, having LD is associated with significantly poorer mental health outcomes. In the rows that follow, the estimated additional impact of LD relative to Ontario is estimated for each province. To understand how to interpret the coefficients, suppose the estimated coefficient for anxiety disorders for Ontario were found to be 2.50. An estimated odds ratio for an interacted province, say, Quebec, of 1.43 (0.43) would indicate that the odds of a PWLD reporting an anxiety disorder in Quebec is $2.50 \times 1.43 = 3.58$ ($2.50 \times 0.43 = 1.075$) of the odds of an otherwise identical PWOD reporting the same from Quebec.

The results in Table 6 indicate that in general, the interaction terms are not significantly different from zero, suggesting that there are no systematic differences in the estimated effect of self-reported LD on mental health by province of residence. In only two cases are the interacted coefficients significantly different from zero: Nova Scotians with LD were less likely to report having seen a health professional regarding mental health problems than were Ontarians with LD (but still 161% more likely to report having seen a health professional for mental health problems than was an otherwise identical PWOD), and persons from Saskatchewan with LD were less likely to report having poor mental health than were Ontarians with LD (79% as likely to report poor mental health than was an otherwise identical PWOD).

The fourth specification check addressed the possibility that ADD/ADHD is driving the negative relationship between LD and mental health. In Table 7a, the estimated effect of LD without coexisting ADD/ADHD and the estimated effect of LD coexisting with ADD/ADHD are reported. In all cases, the estimated effect of having LD was still associated with significantly poorer mental health outcomes as was the estimated effect of having both LD and ADD/ADHD. Although the estimated effects of the latter were larger than predicted from the literature, the key points of this specification were that self-reported LD had a negative impact on mental health and that the coexistence of ADD/ADHD was not driving the main results of the study.

To further examine the effect of coreported ADD/ADHD, the above analysis was rerun by age group. The results are presented in Table 7b. Here, the results were more varied but still highly indicative of the fact that coexisting ADD/ADHD was not the main driver of the positive relationship between LD and mental health problems. In the younger age group (15–19 years), LD

Table 6
Robustness Check: Interactions by Province

	Distress	Depression	Anxiety Disorders	Professional Consultation	Suicidal Thoughts	General Mental Health
Ontario	2.90***	2.43***	2.50***	4.19***	2.74***	3.17***
Additional impact of learning disabilities on mental health for other provinces						
Newfoundland	0.77	1.06	1.71	1.47	1.18	0.58
Prince Edward Island	0.66	1.56	0.74	0.92	0.53	2.30
Nova Scotia	0.86	0.95	0.81	0.39*	0.46	1.17
New Brunswick	0.71	1.12	0.78	0.68	1.93	0.30
Quebec	1.21	0.40	0.75	0.41	0.69	0.65
Manitoba	1.42	1.74	1.26	1.18	2.22	1.05
Saskatchewan	0.58	0.34	0.35	0.57	0.63	0.25*
Alberta	0.92	1.66	1.06	0.86	1.38	0.67
British Columbia	0.84	1.25	1.07	0.75	1.36	0.74

*$p < .05$. ***$p < .001$.

Table 7a
Robustness Check: Comorbid ADD/ADHD

	Distress	Depression	Anxiety Disorders	Professional Consultation	Suicidal Thoughts	General Mental Health
LD, No ADD	2.72***	2.26***	2.12***	2.28***	2.43***	1.99**
ADD	2.88***	2.57***	2.85***	5.68***	3.70***	3.85***

Note: LD = learning disabilities; ADD = Attention-Deficit Disorder.

Table 7b
Robustness Check: Comorbid ADD/ADHD (by Age Group)

	Age 15–19		Age 20–29		Age 30–44	
Mental Health Variable	LD no ADD/ ADHD	ADD/ ADHD	LD no ADD/ ADHD	ADD/ ADHD	LD no ADD/ ADHD	ADD/ ADHD
Distress	2.38***	1.72*	2.79**	4.64***	3.07***	8.55***
Depression	1.05	2.61*	2.62**	0.71	2.79***	5.47***
Anxiety disorders	1.85	2.35**	2.32*	2.63*	2.28**	3.15***
Professional consultation	1.96*	4.99***	1.85*	5.02***	2.83***	7.26***
Suicidal thoughts	1.17	3.33***	2.72**	3.04**	3.39***	7.97***
General mental health	1.95	2.57*	2.38*	9.03***	1.82	3.37**

Note: ADD = Attention-Deficit Disorder; ADHD = Attention-Deficit Hyperactivity Disorder; LD = learning disabilities.
*$p < .05$. **$p < .01$. ***$p < .001$.

without ADD/ADHD was associated with greater odds of reporting high distress, reporting anxiety disorders ($p < .10$), having seen a health professional for mental health problems, and reporting poorer mental health ($p < .10$). As in Table 7a, the impact of ADD/ADHD was larger for the most part than the impact of LD without ADD/ADHD. For the two older age groups, the impact of ADD/ADHD appeared to be more strongly related to mental health outcomes. For example, individuals aged 20 to 29 reporting ADD/ADHD were more than 9 times more likely to report poor mental health than was an otherwise identical PWOD, whereas an individual of the same age with self-reported LD but no ADD/ADHD was 2.4 times more likely to report the same.

Table 8
Robustness Check: Dyslexic Subsample

	Distress	Depression	Anxiety Disorders	Professional Consultation	Suicidal Thoughts	General Mental Health
Dyslexia	2.88***	3.28***	2.20**	3.13***	3.82***	2.42*
n	14,440	14,428	14,468	14,429	14,452	14,461

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

Finally, the main analysis was rerun for the subset of the self-identified LD respondents who reported their type of LD as Dyslexia. This was used as a verification of self-reported definition of LD as individuals may be less likely to self-report Dyslexia without some form of professional diagnosis. As such, if the same association between mental health and Dyslexia was found as was found for mental health and LD, the case for the use of self-reported LD would be strengthened. The results of these regressions are provided in Table 8. Again, only the coefficients of Dyslexia are reported, and in all six cases, strong evidence of the negative relationship between LD (measured here by self-reported Dyslexia) and mental health was found.

Discussion

The coexistence of LD with specific mental health disorders has been addressed in the literature. This study contributes to the field by exploring a range of mental health indicators associated with self-reported LD using a large nationally representative data set. The presence of these indicators throughout the life span was explored, and gender differences were articulated.

LD and the Incidence of Mental Health Difficulties

Increased levels of distress for PWLD compared with PWOD were found. The elevated levels, particularly among persons aged 15 to 21 years (46% for males with LD and 65% for females), may have been due to specific stressors identified in the LD literature such as academic or school-related stressors and peer-related stressors (e.g., Geisthardt & Munsch, 1996; Raskind et al., 1999; Wenz-Gross & Siperstein, 1998). That the stresses continue beyond the school years may reflect the fact that the same problems related to school learning are reported as still problematic as adults (Gerber et al., 1990). In non-LD studies, high levels of distress and stressful events among adolescents have been shown not only to trigger the onset of depression but also to potentially worsen its course after an initial episode (Lewinsohn, Rohde, & Seeley, 1993). In addition, these high levels of stress and stressful events have been associated with recurrence of depression 1 year later (Cohen, Hammen, Henry, & Daley, 2004).

Anxiety disorders are the most common childhood and adolescent mental health disorders (Bosquet & Egeland, 2006) with a median onset age of 11 years (Kessler et al., 2005). Social phobia is a facet of anxiety in that social incompetence and social isolation are often, though not always, associated with having LD (Tur-Kaspa, Weisel, & Segev, 1998; Wiener & Sunohara, 1998). In the current study, those with LD had more than 2 times the odds of reporting an anxiety disorder with a prevalence rate ranging between a low of 20.4% for 15- to 21-year-olds to a high of 31.0% for 30- to 44-year-olds (unadjusted data). For PWOD, the rate remained fairly stable, at around 10%. It should be noted further that the CCHS 1.2 anxiety indicator was restricted to three types of anxiety disorders (agoraphobia, panic disorder, and social phobia; see appendix). What was not included in the indicator was a measure of Generalized Anxiety Disorder (GAD), which is associated with excessive anxiety and worry (apprehensive expectation) and chronic tension (see *DSM-IV-TR*, 300.02; American Psychiatric Association, 2000). As these symptoms of GAD appear to be frequently reported among persons with LD, the rates of anxiety disorders in the present study may be an underestimate of anxiety disorders among PWLD.

Although there was a statistically significant difference in the rates of depression between PWLD and PWOD for persons ages 15 to 44 in the unadjusted analysis (Table 1), that difference disappeared after controlling for certain confounding factors (age and gender; Table 4). This highlights the importance of controlling for confounding factors because the results for the older PWLD (ages 30–44) were not consistent with the existing literature where higher rates of depression have been reported only in younger adolescents with LD (Maag & Behrens, 1989) and older adolescents with LD (Dalley et al., 1992).

Higher reports of suicidal thoughts among PWLD may reflect more frequently co-occurring depression originating from earlier academic distress or anxiety. For both the PWLD and the PWOD samples, the trajectories for suicidal thoughts and depression increased between ages 15 to 21 and ages 22 to 29. However, for PWLD, the rates for both continued to increase into older adulthood (30–44 years), whereas for PWOD, the rates peak in transitioning adults (22–29 years) and declined in older adulthood (30–44 years). This latter finding for PWOD was consistent with other studies (Petersen et al., 1993; Tremblay, Dahintin, & Kohen, 2003).

Not surprisingly, the rates of professional consultation and self-assessed poor health reflected the poorer mental health of PWLD. In the unadjusted data, PWLD were found to be 2 times more likely to have consulted a health or medical professional and 4 times more likely to report themselves in poor or fair mental health. After controlling for confounding factors, these significant differences remained.

LD, Mental Health, and the Life Span

LD has been shown to affect quality of life across the life span (Goldberg, Higgins, Raskind, & Herman, 2003). The present study expanded this theme into the mental health field. Adolescent and young adult males with LD demonstrated lower rates of distress than did 22- to 29-year-olds, unlike the more typical relationship of higher levels of distress among adolescents and young adults with decreased levels at higher ages as seen in females with LD and the PWOD sample. Thoughts of suicide rose with age in the male PWLD sample but not in the PWOD sample. Reasons for this increase in distress, depression, and suicidal thoughts are complex but may relate to the lower rates of marriage and higher incidence of not finishing secondary school. However, as this is not a longitudinal study, it is not possible to distinguish between the following two scenarios. First, the increased levels of distress, depression, and suicidal thought of PWLD that appeared in adolescence persisted or deteriorated over time. Second, older individuals with LD have poorer mental health outcomes than younger individuals with LD perhaps due to earlier diagnosis or improved interventions in more recent years that have benefited the younger cohort.

Depression alone in adolescence has been associated with poorer psychosocial functioning in adulthood, including overall well-being, internalizing behavior problems, interpersonal problems, and greater need for social support (Giaconia, Reinhertz, Paradis, Hauf, & Stashwick, 2001). Lewinshohn, Rohde, Seeley, Klein, and Gotlib (2003) followed young adults (aged 24) who had previously been diagnosed with major depression disorder before age 18. They had poorer family relationships, smaller social networks, greater major and minor adversity, and lower life satisfaction. The literature indicates that all of these factors have been associated with LD in adolescents and adults. Furthermore, recurrences of depression have been associated with lower levels of social support (Cohen et al., 2004), a factor associated with success of adults with LD (e.g., Raskind et al., 1999). These studies underline the complexity of the effects of depression and the difficulty of drawing clear cause and effect among LD, depression, and social functioning in adults with LD.

Anxiety disorder rates for males and females with LD increased significantly from 19.8% and 21.4% in the adolescent and young adult population to 28.2% and 35.3% in the older adult population, respectively. The PWLD rates for anxiety disorders displayed a very different trajectory from the PWOD population where the rates remained relatively steady around 8% for males and 12% for females. The trend in the PWOD population corresponded to what one would expect given that the majority of anxiety disorders are diagnosed between 6 and 22 years of age (Kessler et al., 2005). Interestingly, factors associated with anxiety disorders in childhood closely paralleled factors attributed to PWLD including developmental incompetence (Tur-Kaspa, 2004), social incompetence (including poor peer relationships and friendships; Vaughn & Hogan, 1994), and lower performance levels and growth in reading (Speece, Case, & Molloy, 2003). To date, no studies have investigated specific types of anxiety disorders (e.g., generalized, social, and phobic) in adults with LD.

The multivariate analysis confirmed that significantly poorer mental health outcomes exist for all six measures of mental health for the three PWLD age groups than for the PWOD group. Furthermore, the gap in mental health between PWLD and PWOD in the 15- to 21-year-old sample was found to increase in the older adult sample for suicidal thoughts, depression, and distress.

A secondary finding from the current study was the enhanced negative impact on mental health for those PWLD who also self-reported ADD/ADHD. These effects were particularly evident among the two adult groups and consistent with studies of ADD/ADHD adults (e.g., Beiderman et al., 2006; Kessler et al., 2006) as well as children with reading disabilities (Willcutt & Pennington, 2000). However, the differential impact of LD versus ADD/ADHD in relation to mental health requires further study.

These findings of increased distress, depression, and anxiety disorders in adults with LD have implications for early treatment in childhood or adolescence. It is important that educational professionals, who diagnose LD in children and adolescents, collaborate with mental health professionals to better provide appropriate services for PWLD. Early and collaborative intervention is critical because the relationship of stress and distress to the onset of other mental health disorders has been well documented in the general population (Kessler, 1997). Despite the limitations of the cross-sectional design of this study, the differing trajectories of these mental health components in PWLD may be of crucial importance for designing services, particularly during adulthood (beginning at age 30 and beyond).

Gender Differences

Females more frequently reported mental health difficulties on all six measures studied in both the PWLD and the PWOD populations. However, both males and females with LD were found to report significantly higher rates than their peers without disabilities in both the unadjusted and the adjusted analyses. Furthermore, the multivariate analysis found that males with LD were more likely to have three of six mental health problems (depressive episodes, anxiety disorders, and consultations with a health professional for mental health problems) and that females with LD were more likely to have the other three mental health problems (high distress, suicidal thoughts, and poorer general mental health) relative to their peers without disabilities.

Consistent with the results from this study, other studies addressing gender differences in PWOD have shown higher rates of depression in girls than boys during later adolescence (Hankin et al., 1998). Petersen et al. (1993) concluded that gender differences reflect differences in the experience of depression by males and females and attribute these differences in part to females' having less effective coping styles and facing more challenges. Bennett, Ambrosini, Kudes, Metz, and Rabinovich (2005) attributed higher female rates to more guilt, self-blame, self-disappointment, and feelings of failure. Although these findings are interesting, a recent study on LD points to a prevalence rate that is similar for males and females (Siegel & Smythe, 2005). Experiencing greater difficulties and less coping strategies may reflect the underidentification of females with LD.

For adults with LD, gender differences of psychiatric disorders among female adults with LD have been reported (Hoy et al., 1997). Although Nolen-Hoeksema and Girgus (1999) have argued that adolescent girls without disabilities carry risk factors for depression from an early age, this has yet to be tested among younger girls with LD. Whether females with LD develop symptoms earlier to explain higher rates of later depression may be problematic, as they are identified as more likely to internalize symptoms, and their parents are less likely to report such symptoms (Willcutt & Pennington, 2000).

In recent years, there has been a movement toward identifying factors that act either to increase the risk of mental health problems or to protect (resilience) those from mental health problems among the population of persons with disabilities. In this study, higher levels of income, high school graduation, higher levels of social support, and intact marital relationships were associated with decreased risk of reporting mental health problems in both PWOD and PWLD. Raskind et al. (1999) identified social support systems as a key "success attribute" among successful adults with LD. Given that there were significant differences in these factors between PWLD and PWOD (Table 2), it is important to control for such differences when comparing mental health outcomes. The present analysis showed that even when removing the effects of these factors, significant differences in mental health remained between the PWLD and the PWOD groups.

Two characteristics in this analysis were of particular interest. First, there may have been some protective factors for depression in adolescents and young adults, which disappeared as the individual aged. One of the factors may be the prolongation of schooling for PWLD, as revealed in this study, so that distress and depression associated with the transition period between school and independence were delayed. This may point to the need for transitional planning and services for young adults and adults with LD, who are finishing vocational or academic programs later than PWOD.

Second, the finding that PWLD were more likely to report having at least one physical chronic condition has received little attention in the LD literature. This finding may be related to the presence of depression, as previous studies of depression in populations without LD have identified a link between depression and various chronic conditions (e.g., Rohde, Lewinsohn, & Seeley, 1994; Breslau, Lipton, Stewart, Schultz, & Welch, 2003; Lanteri-Minet, Radat, Chautard, & Lucas, 2005; Leino & Magni, 1993). The unexpectedly high rates of chronic conditions in PWLD (53% for PWOD and 75.6% for PWLD) may also be associated with significantly high stress over a prolonged length of time. Certainly, this finding warrants further investigation, particularly given the rates among adolescents and young adults with LD.

Limitations

Three potential limitations should be addressed. First, the use of self-reported LD may appear to be less reliable than professional diagnosis or standardized testing. However, self-identification was the method used in many large-scale surveys including the *2000 College Freshmen With Disabilities Biennial Statistical Profile* (Henderson, 2001) as well as the *International Adult Literacy Survey* (Vogel & Holt, 2003). Furthermore, self-report has been shown to be a valid measure of reading problems (Decker, Vogler, & Defries, 1989) as well as having a high concordance between standardized reading measures and subjective self-report of reading ability (Schulte-Korne, Deimel, & Remschmidt, 1997). And, in relation to the self-report of mental health conditions, the CCHS 1.2 was based on a modified version of the WMH-CIDI, which was designed to generate valid diagnoses based on the *International Classification of Diseases–10th Revision* and *DSM-IV* criteria. Although the WMH-CIDI has not been validated in a community sample, validation studies of the instrument have documented excellent reliability and adequate validity for *DSM* diagnoses in clinical samples (Kurdyak & Gnam, 2005; Andrews & Peters, 1998; Wittchen, 1994).

A second potential limitation was that the CCHS 1.2 did not permit the identification and then exclusion of those with global intellectual deficiencies. However, the CCHS 1.2 did allow for the identification of the Dyslexic subtype within PWLD. The main regression analyses were repeated for the self-identified Dyslexic subsample (Table 8), and the results were consistent with those for the larger sample of PWLD. This led the authors to conclude that the PWLD sample consisted largely of persons who would meet the criteria for current definitions of LD.

Third, the cross-sectional design of this study precludes making strong arguments in relation to age-group trends. To date, longitudinal studies have been limited to children and adolescents from school-identified samples (Raskind, Gerber, Goldberg, Higgins, & Herman, 1998).

Implications and Future Research

There are several implications arising from the present study. First, the high levels of distress among persons of all ages with LD clearly calls for more systematic efforts to identify the sources of that stress and to intervene early to reduce the likelihood of more serious mental health disorders. Second, the preponderance of mental health problems among women with LD at all ages indicates that more systematic attention needs to be paid to females with LD who may be particularly vulnerable to the effects of stress. This may be particularly problematic as females with LD tend not to be identified as early as males (Vogel, 1990) and because earlier identification of males is related to externalizing problems that are less likely to be exhibited by females with LD (Shaywitz, Shaywitz, Fletcher, & Escobar, 1990). Third, the current results indicate clearly that professionals in the field need to be more proactive in early identification of LD and that identification must include assessment of all aspects of the child, not simply academic achievement. The current movement toward academic intervention based less on clinical diagnosis and more on academic underachievement may postpone the recognition of potential mental health problems in younger children. In fact, for younger girls, initial screening for mental health problems may be more effective in identifying females with LD in the younger school years. Fourth, families play an integral role in mental health. The importance of social support as a protective factor was found in the current study. Further education of families surrounding issues of stress, coping, and the need for support particularly at younger ages and among females with LD needs to be undertaken. Fifth, and particularly for males, the aggravated and persistent mental health problems after age 30 speak to the need to continue to monitor adults well beyond the school years. Problems associated with LD not only persist into adulthood but also present potentially more and different challenges than previously known. Strategies for adults with LD of all ages need to be developed and support provided through collaboration among professionals from a number of disciplines including mental health, education, and medicine. With increased recognition that the effects of having LD are lifelong, more efforts need to be made in building awareness among medical, mental health, and educational professional of the coexistence of mental health disorders and LD in both children and adults. This could facilitate quicker identification and diagnosis of LD and provide families with early support, understanding, and resources to reduce the likelihood of developing more serious mental health disorders. Finally, an area of future study should be the relationship of chronic physical health conditions, mental health, and LD.

Note

1. http://www.statcan.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=5015&lang=en&db=IMDB&dbg=f&adm=8&dis=2.

Appendix
Variable Definitions

Variable Name[a]	Brief Description and Characteristics
Mental Health Variables	
Distress (DISBDK6)	Based on the following six questions dealing with self-reported feelings experienced in the past month. "During the past month, how many times did you feel nervous? Hopeless? Restless or fidgety? So depressed that nothing could cheer you up? That everything was an effort? Worthless?" This index is based on items from the CIDI, a structured diagnostic instrument designed to produce diagnoses according to definitions and criteria of the ICD-10. Coded to a dichotomous variable where 1 = *distress* (combined responses ≥ 5 that represent distress above the 80th percentile).[b]
Professional consultation (SERBFLAP)	Based on question concerning whether the respondent self-reported any consultations in his or her lifetime with any professionals for problems concerning emotions, mental health, or alcohol or illicit drug use. Professionals listed were psychiatrist, family doctor, other medical doctor, psychologist, nurse, social worker, religious or spiritual advisor, and other. Coded to a dichotomous variable where 1 = *consulted at least one professional.*[b]
Depression (DEPBDDPS)	Identifies the respondents who met the WMH-CIDI criteria for lifetime major episode. Respondents who met the criteria reported (a) 2 weeks or longer of depressed mood or loss of interest or pleasure and at least five symptoms associated with depression (depressed mood, loss of interest, significant weight loss/gain, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, feelings of worthlessness, diminished ability to think or concentrate, and recurrent thoughts of death), which represent a change in functioning; (b) symptoms that cause clinically significant distress or impairment in social, occupational, or other important areas of functioning; and (c) symptoms that are not better accounted for by bereavement, that last more than 2 months, or that are characterized by a marked functional impairment, preoccupation with worthlessness, suicidal ideation, or psychomotor retardation. Coded to a dichotomous variable where 1 = *met the WMH-CIDI criteria for a lifetime major depressive disorder*.[b]
Anxiety (MHPBFLA)	Identifies whether the respondent met the WMH-CIDI criteria for at least one of three measured anxiety disorders (agoraphobia, panic disorder, and social phobia) in the prior 12 months. Coded to a dichotomous variable where 1 = *met the required criteria for at least one of the three disorders*.[b]
Suicidal thoughts (DEPBFSLT)	Identifies whether the respondent had seriously considered taking his or her own life where 1= *considered taking one's life*.[b]
General mental health (SCRB_082)	Provides the respondent's assessment of his or her mental health. Coded to a dichotomous variable where 1 = *assessment of fair or poor*.[b]
Control Variables	
Social support (SSMBDTNG)	Based on questions that deal with the respondent's assessment of support available in four life situations assessed on a 4-point scale related to availability of support where lower scores indicate less social support. The sum of the responses was divided into quartiles.[b]
Emotional support (SSMBDEMO)	Based on questions that deal with the respondent's assessment of support available in eight life situations assessed on a 4-point scale related to availability of support where lower scores indicate less emotional support. The sum of the responses was divided into quartiles.[b]
General physical health (SCRB_081)	Provides the respondent's assessment of his or her physical health. Coded to a dichotomous variable where 1 = *assessment of fair or poor*.[b]
Chronic condition (CCCB_x)	Classifies the respondent based on whether he or she reports having at least 1 of 25 selected physical conditions. Coded to a dichotomous variable where 1 = *at least 1 of the 25 conditions*.[b]
Education (EDUBR04)	Classifies highest level of education attained by respondent into four categories—less than secondary school graduation, secondary school graduation, some postsecondary school, and postsecondary degree/diploma.[c]
Married (DHHB_MS)	Classifies marital status of respondent into two categories—married (including common law) and not married (all other marital statuses).
Working (LBFBDWSS)	Classifies labor force status into two categories—working (includes working the past week and absent from work the past week) and not working (all other labor-force statuses).
Income adequacy (INCBDIA4)	Classifies household income into four categories based on total household income and number of persons in household. Income Adequacy 1 refers to the lowest income, whereas Income Adequacy 4 refers to the highest income.[c]
At school (SDCB_8)	Coded to a dichotomous variable where 1 = *attending school at time of interview*.

Note: CIDI = *Composite International Diagnostic Interview*; ICD-10 = *Diagnostic Criteria for Research of the International Classification of Disease*; WMH-CIDI = *World Mental Health Composite Diagnostic Interview Schedule*.

a. As it appears in this article and in the *Canadian Community Health Survey: Mental Health and Well-being, Cycle 1.2*.

b. Those respondents who did not answer one or more of the six questions are treated as missing in the multiple regression analysis.

c. Respondents who did not answer are coded into a separate category in the multiple regression analysis.

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Alexander (Lex) M. Wilson, PhD, is associate professor of psychology and director of the Meighen Centre for Learning Assistance & Research at Mount Allison University, Canada. His current research interests are in young adults and adults with learning disabilities.

Adele Furrie, MA, is president of Adele Furrie Consulting Inc., Ottawa, Canada. Furrie Consulting provides research and analytical services to both governmental and nongovernmental organizations.

Catherine Deri Armstrong, PhD, is an assistant professor of economics at the University of Ottawa, Canada. Her current interests include applied health and labor economics.

Elizabeth Walcot, PhD, is a postdoctoral student at CERES, Université de Sherbrooke, Canada. Her current research interests are teacher learning and the use of technology to support the learning of students with learning disabilities.