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Associations between household educational attainment and adolescent positive mental health in Canada

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ABSTRACT

Investigating the determinants of positive mental *health*, as opposed to focusing on mental *illness*, is a new research direction with important implications for population health promotion. Past research suggests that mental health develops in early childhood and that social factors including highest household educational attainment may play an important role. The current study examined the association between household educational attainment and adolescent self-reported positive mental health in a nationally representative Canadian sample using data from the 2011-12 Canadian Community Health Survey. The sample included 10,091 adolescents aged 12 to19 living at home with at least one parent. Household educational attainment was obtained from a Statistics Canada derived variable documenting the highest level of education in the household. Adolescent positive mental health was assessed using the Mental Health Continuum scale. Multivariable logistic regression analyses showed that after adjusting for household income, single parent status, and household size, adolescents had lower odds of experiencing positive mental health in households in which attempted but not completed post-secondary was the highest education level compared to completed post-secondary education (OR = 0.64, 95% CI = 0.44, 0.95). This association was strongest in adolescents aged 12 to14 (OR = 0.43, 95% CI = 0.21, 0.84) and females (OR = 0.50, 95% CI = 0.29, 0.88). Contrary to expectations, we did not find an incremental increasing association between adolescent positive mental health and household educational attainment. Instead, results suggested that common underlying factors may have contributed both to uncompleted post-secondary education in the household and adolescents' diminished positive mental health.

1. Introduction

Positive mental health is a key component of overall health that profoundly affects individuals' functioning in life and subjective well-being (Keyes, 2009a). Distinct from merely the absence of mental disorder, the World Health Organization characterizes mental health as the ability to realize one's full potential, cope effectively with stress, work productively, and contribute to community (World Health Organization, 2016). Yet despite this distinction, the promotion of positive mental health is not well understood, particularly during early life. Studies of mental health problems suggest that the foundations of mental health are established from a young age, as it is estimated that half of all lifetime mental health disorders emerge before age 14 and that 14–20% of children under age 17 are affected by a current mental health disorder (Kessler, Berglund, Demler, Jin, Merikangas & Walters, 2005). Within Canada, mental illness is estimated to affect 10–20% of youth aged 12 to 19, with females being disproportionately affected by depressive episodes (Canadian Mental Health Association, 2016; Statistics Canada, 2013). In order to improve upon these outcomes, a recent review of children's mental health in Canada called for a national public health strategy that addresses underlying socio-economic determinants of mental health (e.g., household income, educational attainment, and available social support) in order to reduce the development of current and future mental health problems in children (Reiss, 2013; Waddell, McEwan, Shepherd, Offord, & Hua, 2005).

Low household income and educational attainment are associated with material deprivation and reduced opportunities for children that in turn predict the onset and severity of childhood mental health problems (Evans, 2004; McLaughlin et al., 2011; Reiss, 2013). However beyond material disadvantage, lower educational attainment within the home environment has been identified as a social disadvantage that can limit opportunities for children's own educational attainment, career

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prospects, and hopes for upward social mobility (Elffers, 2012; Reiss, 2013; Sheikh, Abelsen, & Olsen, 2016). Furthermore, low educational attainment of parents has been shown to be independently associated with reduced utilization of child mental health resources, and relatedly, increased severity and duration of child mental health problems (McLaughlin et al., 2011; Reiss, 2013). As such, identifying and understanding how early social inequalities affect the development of children's *positive* mental health is an important research question. And while past research has often examined education as a parent-level variable (Goldfeld, Kvalsvig, Incledon, O'Connor, & Mensah, 2014; Park, Fuhrer, & Quesnel-Vallée, 2013), other research suggests that educational attainment is often similar within families, with social and economic resources shared at a household level (Schwartz, 2013). Drawing from a national population-based data source, we sought to examine how household educational attainment was related to adolescent positive mental health, recognizing that in the majority of cases the highest education level would belong to a parent/caregiver or another adult in the household.

Past studies have identified linear associations between household educational attainment and negative mental health outcomes for young children. For example, two studies which measured parents' highest level of completed schooling found that household educational attainment and income were independently associated with young children's social, emotional, conduct, and hyperactivity problems (Davis, Sawyer, Lo, Priest, & Wake, 2010; Sonego, Llácer, Galán, & Simón, 2013). Similarly, research by Park et al. (2013) identified the educational attainment of mothers, in particular, to be a strong predictor of depression among adolescent offspring (aged 12 to 24) even after adjusting for household income, single parent status, maternal age, adverse life events, and parents' depression. Related research on psychological resources suggests that adolescents living within lower education households perceive higher stress and that this is at least partially explained by lower dispositional optimism (Finkelstein, Kubzansky, Capitman, & Goodman, 2007). Other research investigating the association of childhood socioeconomic status (parents' education and financial conditions) on adult mental health has found that a lack of instrumental support (i.e., someone able to help in times of need) explained most of the variation in offspring mental health outcomes, more than emotional support or offspring health behaviours (Sheikh et al., 2016).

In comparison, associations between household educational attainment and offspring *positive* mental health remain relatively underresearched (McLaughlin et al., 2011; Sonego et al., 2013). One recent Australian study found that children at school-entry were rated to have higher positive mental health if their mother had completed high school (Goldfeld et al., 2014). However, we know of no studies that have empirically assessed the association between household educational attainment and positive mental health outcomes amongst adolescent offspring. Furthermore, existing studies on child and adolescent mental health outcomes have generally relied on teacher and parent reports of mental health, rather than measuring experiences of mental health directly from adolescents themselves (e.g., Davis et al., 2010; Goldfeld et al., 2014; Sonego et al., 2013).

Hone et al. (Hone, Jarden, Schofield, & Duncan, 2014) contend that policy-makers are increasingly interested in assessments of health that include measures of positive mental health and well-being, with an emphasis on strengths-based approaches as opposed to an illness-focus. Positive mental health typically includes "hedonic" components, such as enjoying life, but also commonly measures components such as level of engagement in society and positive functioning, which benefit productivity and population health outcomes (Hone et al., 2014). In this way, well-being and ill-being are no longer regarded as opposite ends of the same spectrum; population level data on positive mental health are valued in their ability to provide distinct information from rates of mental illness. The addition of a positive mental health measure in the Canadian Community Health Survey (CCHS) in 2011 reflects this shift in perspective and presents unique opportunities to investigate underlying determinants of positive mental health at a national level. The current study aimed to address an important knowledge gap by investigating the association between household educational attainment and adolescent self-reported positive mental health in a representative national sample.

2. Methods

2.1. Data source

This study was conducted using data collected in the 2011–2012 CCHS. The CCHS is an annual cross-sectional survey that collects data using a multi-stage cluster sampling procedure described in detail by Statistics Canada (Statistics Canada, 2014a). Each year, participants aged 12 and older are selected across Canada's ten provinces and three territories. Responses are weighted by participants' demographic and geographic information to obtain population-based estimates. The CCHS excludes persons living on First Nations reserves, full-time members of the Canadian Forces, persons living in institutions, and persons living in remote Northern areas. Interviews are conducted by telephone by highly trained interviewers employed by Statistics Canada; one member within each selected household is interviewed. In 2011–2012, the overall household response rate was 78.4%. The person-level response rate within participating households was 87.3% (Statistics Canada, 2014b).

2.2. Study sample

A total of 13,753 adolescent respondents (aged 12 to 19 years) participated in the 2011–2012 survey. For the purposes of the current analysis, we restricted the sample to adolescents currently living at home with at least one parent (including a stepparent or adoptive parent). This resulted in excluding 1,735 adolescents (12%) who did not fit the inclusion criteria. An additional 1,915 participants (16%) were excluded for having missing or 'don't know' responses for any of the explanatory variables (highest level of education of a household member, household income, single parent status, and household size). The final analytical sample included 10,091 participants, representing 73% of adolescents who completed the CCHS.

2.3. Study variables

2.3.1. Primary outcome: adolescent positive mental health

Adolescents' positive mental health status was assessed using the Mental Health Continuum Short-Form (MHC-SF) component of the CCHS (Keyes, 2009b). The scale consisted of 14 items measuring emotional well-being (3 items) and positive functioning (11 items). Questions included, "In the past month, how often did you feel satisfied with your life?" and "…how often did you feel good at managing the responsibilities of your daily life?" Response options ranged from 1 (every day) to 6 (never). As has been done in previous research (Keyes & Simoes, 2012), dichotomous response categories were then created by collapsing three categories of mental health status defined by Keyes (2009b) and derived by Statistics Canada (Statistics Canada, 2014c). Participants were considered to be "flourishing" if they reported frequent positive experiences ("every day" or "almost every day") on at least one of the three measures of emotional well-being and at least six of the eleven measures of positive functioning. Scores in the lower two sub-categories (languishing and moderate positive mental health) were collapsed into a new category, "moderate to low mental health," to attain adequate statistical power and provide easier interpretation. The resulting dichotomous variable ("flourishing" and "moderate to low" positive mental health) was then used as the outcome variable in a logistic regression analysis.

2.3.2. Explanatory variables

2.3.2.1. Household educational attainment. Household educational attainment was obtained from a Statistics Canada derived variable measuring the highest level of education in the household (Statistics Canada, 2014c). On the CCHS, adolescent survey respondents are asked to identify the *person most knowledgeable* who then answers the survey questions on educational attainment for each household member. In the public data, responses from all household members are aggregated and presented as a single household educational attainment variable. Responses to the household educational attainment variable are then grouped into four categories: Less than secondary school education, secondary school education, some post-secondary (referred to as "incomplete post-secondary" within the current study for ease of interpretation), and post-secondary graduation. Unfortunately further specificity on this variable, including the individual within the household to whom the highest education level belonged (i.e., parent or adolescent, age, gender), was not available in the data source. As such, we treated household educational attainment as a structural condition of adolescents' home environments. That said, by cross-referencing the household education variable with the highest education of adolescent respondents, we were able to ascertain that in the vast majority of cases the highest household education level belonged to a parent or another household adult. This was particularly evident among 12 to 14 year-olds, for whom 0% were reported to have an educational attainment beyond "less than secondary school" (Table 1).

2.3.2.2. Covariates. We included the following covariates in our model: total annual household income (five categories from < $20,000 to > $80,000 Canadian Dollars), single parent status (two categories, from one to two parents including stepparents), and household size (four categories from two to five or more people). Two further covariates were included in a sensitivity analysis: Immigrant status (born in Canada: "no" or "yes") and ethnic minority status ("no" or "yes" if participants self-identified as an ethnicity other than white/Caucasian).

2.4. Analysis plan

We conducted multivariable logistic regression analyses to estimate the strength of association between household educational attainment and adolescents' positive mental health. We ran an initial unadjusted model to examine the bivariate association between our primary explanatory and outcome variable. We then introduced covariates previously identified within the literature to be associated with positive mental health outcomes (household income, single parent status, and household size). Income has frequently been identified as a mediator in the association between education and mental health (Davis et al., 2010; Goldfeld et al., 2014; Park et al., 2013; Sheikh et al., 2016; Sonego et al., 2013) whereas single parent status and household size may be independently related to positive mental health through instrumental and emotional support (Goldfeld et al., 2014; Sheikh et al., 2016). Covariates were introduced incrementally to examine the statistical effect on the primary association of interest. To observe age and gender differences, we also conducted logistic regression analyses on stratified subpopulations based on adolescents' age group (12 to 14, 15 to 17, and 18 to 19 years) and gender (female, male). Following Statistics Canada's guidelines, a weighted sample was used to improve the representativeness and precision of estimates of positive mental health across the Canadian population (Statistics Canada, 2014a). The study was conducted in compliance with the Statistics Act (Government of Canada, 2005) and the University of British Columbia Research Ethics policy. Data were analyzed using SAS version 9.4 (SAS Institute, 2013).

Table 1
Highest educational attainment of adolescent respondents (n = 10,091).

	Less than Secondary	Secondary School Graduation	Some Post-Secondary	Post-Secondary Certification	Not Stated
Ages 12–14	4054 (96.4%)[a]	0 (0%)	0 (0%)	0 (0%)	97 (3.6%)
Ages 15–17	3347 (84.5%)	180 (4.6%)	316 (9.9%)	36 (1.0%)	2 (0.1%)
Ages 18–19	342 (14.7%)	956 (44.7%)	509 (28.5%)	251 (12.2%)	1 (0.01%)
Total	7743 (74.3%)	1136 (11.3%)	825 (10.0%)	287 (3.0%)	100 (1.4%)

[a] Frequencies based on population weights.

2.5. Sensitivity analyses

As a final step, we conducted sensitivity analyses to examine changes in the outcome (1) using adolescent positive mental health as a continuous score, (2) including immigrant status and ethnic minority status as covariates, and (3) expanding the sample to include adolescents not currently living at home.

3. Results

The study sample included 10,091 adolescents aged 12 to 19 years. As shown in Table 2, males and females were equally represented (49.3% female), and 26.6% of participants identified as an ethnic minority (i.e., did not identify as white/Caucasian). Most adolescents were represented in the younger age categories, 12 to 14 years (38.5%) and 15 to 17 years (40.3%), than the age category 18 to 19 years (21.2%). The majority of adolescents reported experiencing flourishing mental health (83.2%). Within participating households, post-secondary graduation was the most frequently reported highest level of educational attainment (82.8%), followed by secondary school graduation (10.0%), incomplete post-secondary (4.7%), and incomplete secondary school education (2.5%).

Overall, a higher proportion of adolescents reported flourishing in the 12 to 14 age group compared to the 15 to 17, or 18 to19 age groups. Flourishing was more prevalent among males compared to females. In bivariate analyses, a greater proportion of adolescents reported to be flourishing in households where completed post-secondary or completed secondary education was the highest education level attained (83.7% and 83.5%, respectively). The lowest proportion of flourishing (74.4%) was reported among adolescents living in households where incomplete post-secondary was the highest education level (all results shown in Table 2).

Table 3 shows the results of the logistic regression analyses. After adjusting for household income, single parent status, and household size, adolescents had 36% lower odds of flourishing in homes where the highest education level was incomplete post-secondary compared to completed post-secondary (OR = 0.64, 95% CI = 0.44, 0.95). No other education categories were associated with statistically significant differences in adolescent positive mental health when compared to completed post-secondary. Higher household income was associated with significantly higher odds of flourishing (income > $80,000 compared to < $20,000) before and after adjusting for covariates. In unadjusted analyses, two-parent status was associated with higher odds of flourishing, but this association was not significant after adjusting for education, income, and household size. Households containing 3 or more persons were also associated with higher odds of flourishing, but not at statistically significant levels.

When stratified by age group and gender, the association between household educational attainment and adolescents' self-reported positive mental health was strongest for younger adolescents and females (Table 4). When stratified by age, after adjusting for covariates, non-

Table 2
Descriptive characteristics of the 2011-12 Canadian community health survey sample comparing household educational attainment and adolescent positive mental health.

	Overall Study Sample		Study Sample by Positive Mental Health Status	
	n = 10,091	100%[a]	Flourishing (%)	Moderate to low (%)
Adolescent Characteristics				
Age				
12–14 years	4,151	38.5	87.4	12.6
15–17 years	3,881	40.3	81.7	18.3
18–19 years	2,059	21.2	78.4	21.6
Gender				
Male	5,141	50.7	84.0	16.0
Female	4,950	49.3	82.3	17.7
Born in Canada[b]				
Yes	9,275	87.7	83.3	16.7
No	772	11.7	82.0	18.0
Ethnic minority[b]				
Yes	2,115	26.6	82.9	17.1
No	7,794	72.0	83.3	16.7
Positive mental health				
Flourishing	8,460	83.2	–	–
Moderate to low	1,631	16.8	–	–
Household Characteristics				
Household educational attainment				
Post-secondary graduation	8,320	82.8	83.7	16.3
Incomplete post-secondary	429	4.7	74.4	25.6
Secondary graduation	1,068	10.0	83.5	16.5
Less than secondary	274	2.5	80.9	19.1
Household income				
< $20,000	517	5.3	77.4	22.6
$20,000-$39,999	1,325	13.4	79.1	20.9
$40,000-$59,999	1,639	16.4	82.6	17.4
$60,000-$79,999	1,640	15.8	84.0	16.0
> $80,000	4,970	49.2	84.8	15.2
Single parent status				
Single parent/ guardian[c]	2,186	21.7	80.0	20.0
2+ parents/ guardians	7,905	78.3	84.1	15.9
Household size				
2 persons	869	6.6	77.2	22.8
3 persons	2,823	22.2	83.2	16.8
4 persons	4,297	41.3	83.8	16.2
5+ persons	2,102	29.8	83.6	16.4

[a] Frequencies based on population weights.
[b] < 1.5% not stated.
[c] Includes adoptive parents and stepparents.

completion of post-secondary school was associated with significantly lower odds of positive mental health among adolescents aged 12 to 14 (OR: 0.43; 95% CI = 0.21, 0.84). Although incomplete post-secondary remained the most vulnerable education category at all ages, odds ratios were not statistically significant for adolescents aged 15 to 17 (OR = 0.91, 95% CI = 0.47, 1.75) or 18 to 19 (OR = 0.68, 95% CI = 0.37, 1.27). When stratified by gender, incomplete post-secondary was associated with lower positive mental health among both males and females, but was only statistically significant among females ($OR_{females}$ = 0.50, 95% CI = 0.29, 0.88 compared to OR_{males} = 0.84, 95% CI = 0.49, 1.43). Age by gender interactions were not observed.

Results of all sensitivity analyses are provided in an Appendix. A linear regression model using Positive Mental Health as a continuous score replicated this pattern of results, except that the positive association between larger household size and higher positive mental health scores was in this case statistically significant (Table A1). Including adolescent immigrant status or ethnic minority status did not change the previously observed logistic regression results (Table A2). Expanding the sample to include the 12% of adolescents not currently living at home also did not change the results (Table A3).

4. Discussion

Using a nationally representative cross-sectional survey, the current study found that *attempted, but not completed* post-secondary educational attainment was associated with the lowest levels of positive mental health among adolescents in Canada, after adjusting for household income, single parent status, and household size. This finding differs from past research that has observed incremental decreases in child mental health problems with every higher level of parent educational attainment (Davis et al., 2010; Reiss, 2013; Sonego et al., 2013). In comparison, in the current study adolescents' self-reported positive mental health did not increase with every higher level of household educational attainment. The finding that incomplete post-secondary was associated with the poorest outcomes for adolescents was surprising, given that attempted post-secondary was the second highest educational attainment category overall, requiring prerequisite completion of secondary school. The results indicate that there is something unique about attempting and not completing higher education that is also associated with lower adolescent positive mental health outcomes.

When stratified by age and gender, the association between incomplete post-secondary education and lower adolescent positive mental health was more pronounced for younger adolescents (aged 12 to 14) and females. The stronger association among 12 to 14 year olds is consistent with the literature that suggests younger children may be more sensitive to their home environments because they tend to spend more time at home (Sonego et al., 2013). That said, this same pattern was observed for the overall adolescent sample, pointing to the relevance of household educational attainment for offspring positive mental health throughout adolescence (McLaughlin et al., 2011). The observed gender difference in positive mental health may have in part reflected higher reported prevalence of depressive symptoms among females (Nolen-Hoeksema, 2006). Other research suggests that social relationships may be a greater source of stress for females, which may account for why household factors related to social disadvantage may be more closely associated with mental health outcomes for females compared to males (Landman-Peeters, Hartman, van der Pompe, den Boer, Minderaa & Ormel, 2005).

We cannot determine a causal association from the current data, yet these results suggest directions for future investigations examining social and structural factors associated with adolescent positive functioning and well-being. For example, educational trajectories can be disrupted by numerous life events (e.g., as a result of child-bearing, unexpected loss of financial support, or experiences of mental or physical illness; Elffers, 2012; Milesi, 2010), that could subsequently affect offspring positive mental health through lack of instrumental support or caregiver strain. There appears to be some evidence for this hypothesis as Sheikh et al. (2016) found that lower instrumental support was the largest mediator explaining the association between lower household socioeconomic status and adult offspring's self-reported mental health problems. Similarly, future research could

Table 3
Unadjusted and adjusted logistic regression analyses investigating the association between household educational attainment and adolescent positive mental health (n = 10,091).

	Unadjusted Model				With Income				With Single Parent Status				With Household Size			
	b	SE	OR	95% CI	b	SE	OR	95% CI	b	SE	OR	95% CI	b	SE	OR	95% CI
Household educational attainment																
Incomplete post-secondary	-0.57	0.19	0.57	0.39, 0.83	-0.47	0.20	0.63	0.43, 0.93	-0.45	0.20	0.64	0.43, 0.94	-0.44	0.20	0.64	0.44, 0.95
Secondary graduation	-0.01	0.16	0.99	0.72, 1.36	0.09	0.17	1.09	0.79, 1.52	0.10	0.17	1.10	0.79, 1.54	0.10	0.17	1.10	0.79, 1.54
Less than secondary	-0.19	0.21	0.82	0.55, 1.25	0.03	0.23	1.03	0.66, 1.61	0.04	0.23	1.04	0.67, 1.63	0.05	0.23	1.05	0.67, 1.64
Household income																
$20-$39,999					0.10	0.20	1.11	0.75, 1.63	0.08	0.20	1.09	0.74, 1.60	0.78	0.20	1.08	0.73, 1.60
$40-$59,999					0.31	0.20	1.36	0.92, 2.02	0.27	0.20	1.31	0.89, 1.94	0.26	0.20	1.30	0.88, 1.93
$60-$79,999					0.41	0.20	1.50	1.02, 2.21	0.35	0.21	1.43	0.95, 2.14	0.35	0.21	1.42	0.95, 2.13
> $80,000					0.47	0.18	1.59	1.13, 2.25	0.40	0.19	1.49	1.03, 2.16	0.40	0.19	1.48	1.02, 2.16
Single parent status																
2+ parents									0.13	0.12	1.14	0.90, 1.43	0.08	0.14	1.09	0.83, 1.42
Household size																
3 persons													0.26	0.19	1.28	0.89, 1.86
4 persons													0.19	0.20	1.21	0.81, 1.81
5+ persons													0.20	0.22	1.22	0.79, 1.87

Post-secondary graduation was selected as the reference category to produce the most stable model; the majority of participants were included in this category. Odds ratios can be interpreted as the odds of experiencing flourishing positive mental health for each household educational attainment level compared to post-secondary graduation.

Table 4
Adjusted logistic regression analysis investigating the association between household educational attainment and adolescent positive mental health, stratified by adolescent age and gender.

	Age 12–14 (n = 4151)		Age 15–17 (n = 3881)		Age 18–19 (n = 2059)		Males (n = 5141)		Females (n = 4950)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Household educational attainment										
Incomplete post-secondary	0.42	0.21, 0.84	0.91	0.47, 1.75	0.68	0.37, 1.27	0.84	0.49, 1.43	0.50	0.29, 0.88
Secondary graduation	1.00	0.46, 2.19	1.06	0.68, 1.63	1.61	0.94, 2.76	1.45	0.92, 2.29	0.88	0.55, 1.40
Less than secondary	0.76	0.36, 1.60	1.09	0.54, 2.20	1.25	0.47, 3.31	1.06	0.54, 2.07	1.02	0.56, 1.85
Household income										
$20-$39,999	1.14	0.57, 2.30	0.84	0.48, 1.47	1.41	0.65, 3.05	1.02	0.55, 1.91	1.14	0.69, 1.88
$40-$59,999	0.84	0.41, 1.73	1.05	0.59, 1.88	2.95	1.44, 6.03	1.06	0.59, 1.91	1.56	0.92, 2.65
$60-$79,999	1.43	0.63, 3.21	0.98	0.55, 1.76	2.12	0.99, 4.56	1.12	0.61, 2.07	1.70	0.98, 2.95
> $80,000	1.20	0.59, 2.43	1.14	0.66, 2.00	2.52	1.26, 5.05	1.15	0.65, 2.03	1.85	1.12, 3.07
Single parent status										
2+ parents	1.31	0.83, 2.07	1.08	0.73, 1.60	0.97	0.56, 1.68	1.20	0.82, 1.75	0.96	0.66, 1.39
Household size										
3 persons	1.45	0.65, 3.27	1.16	0.67, 2.03	1.40	0.73, 2.67	1.17	0.68, 2.04	1.40	0.85, 2.30
4 persons	1.38	0.58, 3.25	1.12	0.62, 2.02	1.15	0.57, 2.29	1.09	0.60, 1.97	1.36	0.79, 2.33
5 persons	1.42	0.58, 3.49	0.96	0.50, 1.85	1.33	0.61, 2.93	0.99	0.53, 1.86	1.51	0.84, 2.73

Post-secondary graduation was selected as the reference category to produce the most stable model; the majority of participants were included in this category. Odds ratios can be interpreted as the odds of experiencing flourishing positive mental health for each household educational attainment level compared to post-secondary graduation.

unpack what Elffers (2012) calls a "double drawback" of having both lower social capital (including limited financial resources as well as lower parent involvement and support) and lower school engagement, which may be associated with both lower positive mental health outcomes for adolescents (i.e., lower emotional well-being, life satisfaction, and positive functioning) as well as lower likelihood of adolescents completing post-secondary education themselves. Although a limitation in the current study was the lack of specificity regarding to whom the highest educational attainment belonged, many of the factors associated with low household educational attainment including limited instrumental support, social connections, or relatable experience, would be likely to affect offspring positive mental health regardless of whether parents or adolescents themselves had higher educational status.

In summary, numerous stressors, life events, and social inequalities may precede or coincide with household educational attainment and adolescent positive mental health outcomes. Although we could not measure these factors in the current study, future research could investigate mediators of this association to help inform new policy and program interventions to mitigate the risk of reduced support and opportunities for young people based on the educational attainment of their parents. For example, tailoring supports to enhance completion of post-secondary education and targeting interventions at particular transitions in the life course could be areas to examine.

4.1. Strengths and limitations

The inclusion of a positive mental health measure in the CCHS provides a unique opportunity to explore whether social gradients can be observed for mental wellness in a nationally representative popula-

tion dataset. Furthermore, the measurement of both completed and uncompleted educational attainment allows for the examination of non-linear associations between household educational attainment and adolescent positive mental health. This is an important nuance that might otherwise have been missed without the sufficiently fine-grained response options and large sample size available in the CCHS.

The use of adolescent self-report data was also a strength of the study, however a trade-off of using this adolescent sample was the lack of available data on adolescents' parents/caregivers. For example, although we theorized that parents' educational attainment would be related to offspring positive mental health, within the available dataset we could not distinguish in all cases whether the highest household education level belonged to the parent or another member of the household. To avoid misclassification, we restricted the sample to adolescents living at home with at least one parent. We also replicated our analysis across age strata and observed a robust association between incomplete post-secondary education and lower adolescent positive mental health among 12 to 14 year-olds, none of whom had attempted post-secondary or graduated secondary school (Table 1). Given the younger age distribution of our sample and the consistency of response patterns across age strata, it seems unlikely that misclassification significantly affected the results. Furthermore, even in households where adolescents may have had the same or higher educational attainment than their parents/caregivers, the social disadvantages associated with low household educational attainment (reduced instrumental support, low involvement) would still apply.

Relatedly, the household education variable did not allow us to determine at what stage of life the household member attained their highest level of education, nor the gender of the individual to whom the highest education level belonged. Several studies, for example, suggest that maternal educational attainment is more predictive of offspring outcomes than paternal education (Goldfeld et al., 2014; Park et al., 2013). It could be that household educational attainment is differentially associated with adolescent mental health depending on the timing of attainment in relation to the child's life, the gender of the most-highly educated parent, or the potential interaction of these factors. Concurrently attending post-secondary while child-raising could increase stress, time and cost pressures for parents that could also potentially explain the observed association between incomplete post-secondary and adolescent positive mental health. These nuances warrant further examination in future studies.

Further limitations of this study included the absence of a measure of parent mental health, sample restrictions, and cross-sectional design. There is strong evidence that some forms of mental illness may be intergenerational (e.g., Goodman, 2007) and that parents' mental health can affect their own educational attainment (Breslau, Lane, Sampson, & Kessler, 2008). However, other research has found a robust association between parental educational attainment and offspring mental health outcomes even after controlling for parents' depression (Park et al., 2013). Future research should investigate the comparability of these associations with positive mental health. Restricting the sample to adolescents living at home with one or more parents may have also introduced selection bias. There may be important differences in the positive mental health of adolescents who live with their parent(s) versus away from their parent(s). That said, in a sensitivity analysis we found that the main associations persisted, even when the sample was not restricted to adolescents living at home (Table A3). Finally, the cross-sectional study design limits the inference of any directional associations. Although it can be argued that household educational attainment would likely precede offspring's mental health, it is also possible that a child's health or behaviour might affect parents' ability to pursue or complete further education.

4.2. Conclusions

Investigating the social factors associated with adolescents' positive mental health contributes to the growing body of research bringing focus to mental wellness as an outcome distinct from mental illness (Barry, 2009). The majority of Canadian adolescents in this study reported to have flourishing mental health. However, we also observed important age and gender differences such that a lower proportion of females and older adolescents reported flourishing mental health compared to males and younger adolescents. Establishing solid foundations for positive mental health during early adolescence and enhancing supports during the transition into adulthood may therefore be a key opportunity to maintain flourishing trajectories across the life course. Future research is needed to identify factors that have the ability to mediate and modify trajectories of lifetime positive mental health.

Based on our findings, we also suggest that future studies heed greater attention to how "educational attainment" is conceptualized, measured and interpreted. In the literature, studies commonly operationalize education categories in such a way that *some* post-secondary education is assigned a higher (and considered a more beneficial) category than *no* post-secondary education (e.g., Davis et al., 2010; McLaughlin et al., 2011; Sonego et al., 2013). The findings from our study demonstrate that there may be situations in which having obtained *some* post-secondary education may not confer advantages that are commonly associated with obtaining higher education. It could be that having obtained *some* post-secondary education reflects a set of life circumstances that actually precludes the completion of post-secondary degrees/programs. Future research investigating the intergenerational associations of household educational attainment and offspring mental wellness may be particularly important for informing inter-sectoral efforts (e.g., initiatives that include education, health and social support systems) to promote positive mental health and reduce population health inequalities.

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Appendix: Sensitivity analyses

See Tables A1, A2, and A3.

Table A1
Adjusted linear regression analysis investigating the association between household educational attainment and adolescent positive mental health as a continuous score[a] (n = 10,091).

	b	SE	t value	*p* value
Household educational attainment				
Incomplete post-secondary	-2.61	0.46	-5.72	< .001
Secondary graduation	-0.11	0.32	-0.36	0.72
Less than secondary	0.32	0.63	0.51	0.61
Household income				
$20-$39,999	0.46	0.49	0.95	0.34
$40-$59,999	1.43	0.48	2.95	< .01
$60-$79,999	1.33	0.49	2.70	< .01
> $80,000	1.87	0.46	4.04	< .001
Single parent status				
2+ parents	0.51	0.32	1.63	0.10
Household size				
3 persons	2.20	0.44	4.97	< .001
4 persons	2.34	0.47	4.93	< .001
5+ persons	2.20	0.49	4.47	< .001

[a] Positive Mental Health Continuous Score (range 0–70). Higher scores represent higher positive mental health. Post-secondary graduation was selected as the reference category to produce the most stable model; the majority of participants were included in this category.

Table A2
Adjusted logistic regression analysis investigating the association between household educational attainment and adolescent positive mental health including immigrant status and ethnic minority status.

	Adjusted Model with Immigrant Status (n = 10,091)		Adjusted Model with Ethnic Minority Status (n = 10,091)	
	OR	95% CI	OR	95% CI
Household educational attainment				
Incomplete post-secondary	0.64	0.43, 0.94	0.64	0.44, 0.95
Secondary graduation	1.10	0.79, 1.52	1.11	0.79, 1.54
Less than secondary	1.05	0.67, 1.65	1.05	0.67, 1.64
Household income				
$20-$39,999	1.08	0.73, 1.60	1.08	0.73, 1.59
$40-$59,999	1.30	0.88, 1.93	1.31	0.88, 1.94
$60-$79,999	1.41	0.94, 2.12	1.43	0.95, 2.14
> $80,000	1.47	1.01, 2.14	1.50	1.03, 2.18
Single parent status				
2+ parents	1.09	0.84, 1.42	1.08	0.83, 1.41
Household size				
3 persons	1.29	0.89, 1.86	1.28	0.89, 1.85
4 persons	1.22	0.82, 1.82	1.21	0.81, 1.81
5+ persons	1.22	0.79, 1.88	1.21	0.79, 1.86
Born in Canada				
No	1.06	0.78, 1.44	–	–
Ethnic Minority				
Yes	–	–	1.04	0.84, 1.29

Post-secondary graduation was selected as the reference category to produce the most stable model; the majority of participants were included in this category. Odds ratios can be interpreted as the odds of experiencing flourishing positive mental health for each household educational attainment level compared to post-secondary graduation.

Table A3
Adjusted logistic regression analysis investigating the association between household educational attainment and adolescent positive mental health unrestricted to adolescents living at home with parents.

	Adjusted model unrestricted by adolescents living at home (n = 11,334)	
	OR	95% CI
Household educational attainment		
Incomplete post-secondary	0.69	0.47, 0.99
Secondary graduation	0.98	0.73, 1.30

(continued on next page)

Table A3 *(continued)*

	Adjusted model unrestricted by adolescents living at home (n = 11,334)	
	OR	95% CI
Less than secondary	0.82	0.56, 1.22
Household income		
$20-$39,999	1.16	0.80, 1.70
$40-$59,999	1.27	0.85, 1.89
$60-$79,999	1.40	0.95, 2.08
> $80,000	1.50	1.03, 2.18
Single parent status		
2+ parents	1.09	0.84, 1.41
Household size		
With parent(s) (3 persons)	1.12	0.77, 1.62
With parent(s) (4 persons)	1.14	0.77, 1.70
With parent(s) (5+ persons)	1.11	0.71, 1.71
With spouse/partner	0.77	0.28, 2.13
Unattached/living with others	0.63	0.35, 1.13
Unattached/living alone	0.37	0.03, 4.23

Post-secondary graduation was selected as the reference category to produce the most stable model; the majority of participants were included in this category. Odds ratios can be interpreted as the odds of experiencing flourishing positive mental health for each household educational attainment level compared to post-secondary graduation.

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