

ASSOCIATIONS BETWEEN RECEIPT OF THE CANADA RECOVERY BENEFIT AND
MENTAL HEALTH IN CANADIAN PARENTS AND THEIR CHILDREN

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MENTAL HEALTH IN CANADIAN PARENTS AND THEIR CHILDREN

By

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A Thesis Submitted to the School of Graduate Studies in Partial Fulfilment of the
Requirements for the Degree Master of Science

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MASTER OF SCIENCE (2025)

Health Research Methodology, Department of Health Research Methods, Evidence, and
Impact

McMaster University, Hamilton, Ontario

TITLE: Associations Between Receipt of the Canada Recovery Benefit and Mental Health in
Canadian Parents and Their Children

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Number of Pages: vii, 62

Lay Abstract:

The COVID-19 pandemic had large negative economic impacts on Canadians. Previous economic recessions have been associated with poorer mental health. The Canada Recovery Benefit (CRB), a benefit meant to support Canadians who lost employment or income due to COVID-19, may offset these declines in mental health. The longitudinal Canadian Health Survey on Children and Youth which surveyed the same Canadian parents and their children in 2019 and 2023 was used to examine this. Those who reported losing employment or income during the pandemic experienced worse mental health outcomes across time. The analyses did not definitively demonstrate that the CRB offset declines in mental health, although there is some limited evidence suggesting that it may be beneficial. More research is needed to conclusively determine whether the CRB was beneficial. Future research could also investigate the impacts of other COVID-19 related benefits.

Abstract:

Background: The COVID-19 pandemic was associated with a large economic downturn in Canada. Past economic recessions and unemployment have been associated with poorer mental health. Therefore, the Canada Recovery Benefit (CRB), a benefit meant to support Canadians who lost employment or income due to COVID-19, may attenuate declines in mental health.

Objectives: 1) Examine if the CRB is associated with an attenuation in declines of mental health and functioning in Canadian parents and their children. 2) Determine whether this association differs for those in low-income versus non-low-income households.

Methods: This was a secondary data analysis using the longitudinal Canadian Health Survey on Children and Youth which collected data in 2019 and 2023. Multi-level logistic regression was conducted to examine whether receipt of the CRB was associated with attenuation of within-person declines in parent self-reported mental health, and parent-reported child cognitive-behavioural, and emotional functioning.

Results: There was a significant increase in the odds of reporting poor parental mental health from 2019 to 2023. Findings for main objectives are generally non-significant and inconclusive, although there is some small evidence showing that the CRB may be associated with an attenuation of mental health decline. A sensitivity analysis of households with single parents resulted in stronger trends suggesting an attenuation of mental health decline, though still non-significant. No significant differences in the

association of the CRB with changes in mental health or functioning were observed between low-income and non-low-income households.

Conclusion: Associations between the CRB and attenuation of mental health and functioning declines are unclear, though a single-parent sensitivity analysis gave a limited indication that the CRB could be associated with a non-significant attenuation of mental health decline. Future research should address methodological limitations and consider broadening its scope to other pandemic-era economic supports.

Acknowledgements:

To my thesis supervisor, Dr. Kathy Georgiades, and thesis committee members, Dr. Arthur Sweetman, Dr. Julia Abelson, and Dr. Eric Duku, thank you very much for your support, feedback, and guidance. I also thank the staff at the McMaster Research Data Centre for supporting my thesis, as well as Statistics Canada and the Canadian Research Data Centre Network who enable myself and researchers across Canada to access datasets such as the Canadian Health Survey on Children and Youth. Finally, thank you to my family who has supported me every step of the way.

Table of Contents

Chapter 1 - Background	1
Chapter 2 - Methods	11
Chapter 3 - Results.....	25
Chapter 4 - Discussion	52
References	64

BACKGROUND

ECONOMIC IMPACTS OF COVID-19 IN CANADA

The Coronavirus disease 2019 (COVID-19) pandemic had a profound impact on the lives of Canadians that extended beyond the direct effects of the virus itself. The pandemic was associated with a large global economic downturn and Canada was no exception (Mishrif, 2024). Prior to the COVID-19 pandemic, unemployment in Canada was approximately 6%, whereas during the first wave of the pandemic in Spring 2020, unemployment rose to approximately 14% (Statistics Canada, 2025a). Unemployment remained elevated above pre-pandemic levels between 8 to 9% throughout much of the pandemic period, with the unemployment rate not returning to pre-pandemic levels until the Spring of 2022 (Statistics Canada, 2025a). In addition to the impact of the pandemic on employment, it was also associated with elevated increases to the cost of living compared to pre-pandemic. Pre-pandemic, inflation in Canada was approximately 2% annually, however, during the COVID-19 pandemic, following a brief deflationary period in Spring 2020, annualized inflation (as measured by the consumer price index) was elevated throughout 2021 and 2022, peaking at 8.1% in June 2022 (Statistics Canada, 2025b). Inflation did not return to pre-pandemic levels until Spring 2023 (Statistics Canada, 2025b). When compared to peer countries, Canada's recovery from this economic shock was the worst among G10 countries in terms of GDP per capita (Razak *et al.* 2022). Canada experienced a 1.6% reduction in GDP per capita from pre-pandemic to Q4 2021 while, for example, the United States of America's GDP per capita grew by 2.7% (Razak *et al.* 2022). Therefore, with spikes in unemployment, increases to the cost of living far above normal,

and a relatively slow economic recovery, many Canadians likely experienced financial difficulties during the pandemic, as a result of these broader economic trends.

DIFFERENTIAL ECONOMIC IMPACTS

Although the economic impacts of the pandemic were likely felt by everyone to some extent - whether that be the loss of a job or increases to the cost of living - these impacts were not felt equally across the Canadian population. For example, workers in lower income deciles were more likely to lose their job or have fewer working hours when compared to those in higher income deciles (Statistics Canada, 2021). In addition, the extent to which lower income deciles were disproportionately impacted was far greater during the COVID-19 pandemic, than during the 2008 financial crisis (Statistics Canada, 2021). This suggests that the economic downturn associated with the COVID-19 pandemic was relatively more harmful for lower income Canadians compared to the financial crisis. Economic impacts varied greatly by sector, with workers within the food services and accommodation, and wholesale and retail trades being impacted the most compared to other sectors. Forty-one percent of all employment losses during the initial wave of the pandemic occurred within these sectors (Public Health Agency of Canada, 2020). Finally, based on pre-pandemic characteristics, certain groups were more vulnerable to work interruptions. One group to note is single parent households, especially single mothers, where more than 50% were considered to be financially vulnerable pre-pandemic (Messacar & Morissette, 2020). Therefore, this group may have been particularly vulnerable to the economic impact of the COVID-19 pandemic. Despite the pandemic impacting all Canadians to some degree, the economic fallout of the

pandemic disproportionately fell onto those with lower incomes, those in the service sector, and single-parent households, alongside other financially vulnerable groups who may have been more susceptible to disruptions in employment caused by the COVID-19 pandemic.

MENTAL HEALTH IMPACTS OF RECESSION

With many Canadians experiencing worse economic prospects due to the COVID-19 pandemic, this may have had downstream effects on the health of Canadians, and mental health, more specifically. Prior research into the impact of economic recessions on mental health suggests that recessions have a negative impact. For example, a systematic review of 101 studies on mental health outcomes during times of recession found consistent evidence that economic recessions and mediators such as unemployment, income decline, and unmanageable debts are significantly associated with poor mental well-being, increased rates of common mental disorders, substance related disorders, and suicidal behaviours (Frasquilho *et al.*, 2015). However, most studies included in the review were cross-sectional limiting the ability to make causal inferences. (Frasquilho *et al.*, 2015). Further, most studies from the review were focused on the 2008 financial crisis which may limit generalizability to other recessionary periods (Frasquilho *et al.*, 2015). In addition to broader economic trends being associated with poorer mental health, job loss is known to be associated with poorer mental health (Hergenrather, *et al.*, 2015), and this was observed during the COVID-19 pandemic as well (McDowell *et al.*, 2021). Given that recessionary periods and unemployment are both associated with poorer mental health, and that the COVID-19 pandemic was associated with both a large economic

downturn and high levels of unemployment in Canada, it can be hypothesized that the economic impacts of the COVID-19 pandemic may have had negative downstream effects on Canadians mental health.

THE CANADA RECOVERY BENEFIT

In response to the pandemic, and its associated economic impacts, the Canadian government implemented a number of economic supports to help Canadians and Canadian businesses to weather COVID-19. Among G20 countries Canada ranked fourth in terms of pandemic-relief spending as a percentage of gross domestic product in 2020 at 12.3% (270 billion dollars; Statistics Canada, 2022). In 2020, approximately 68% of Canadians benefitted from at least one pandemic-relief program (Statistics Canada, 2022). One example of such a program is the Canada Recovery Benefit (CRB). The CRB was implemented from September 2020 – October 2021 and evolved out of the Canada Emergency Response Benefit (another economic support implemented by the Canadian government). However, if one was eligible for the CRB but did not claim it at the time, benefits could be received after October 2021 (Government of Canada, 2022a). Canadians who experienced a 50% or more decrease in their average weekly income from pre-pandemic levels and did not otherwise qualify for employment insurance were eligible for the CRB (Government of Canada, 2022a). Those eligible for CRB could receive \$1000 for each two-week period in which they applied for up to 42 weeks, after which one could receive \$600 for each two-week period for an additional 12 weeks. This means that the maximum amount one could have received from the CRB was \$24,600 (Government of Canada, 2022a). The CRB was received by approximately 2.3 million

Canadians for a total gross value of 28.4 billion dollars (Government of Canada, 2022b).

To the extent that changes in mental health due to recessions and unemployment are driven by losses of income, one could hypothesize that the CRB may have served to attenuate some of these effects.

DIFFERENTIAL RECEPTION OF PANDEMIC-RELIEF

Given that the CRB and other pandemic-related economic supports were implemented to help those impacted by the pandemic, and that the pandemic did not impact all Canadians equally, it is no surprise that receipt of the CRB and other pandemic supports was not equal within the Canadian population. For instance, according to the 2021 census, 77.7% to 93.0% of Canadians in the second to seventh decile of income received at least one pandemic related economic benefit, while only 27.0% of those within the top income decile did (Statistics Canada, 2022). In addition, approximately 74.8% of women received at least one pandemic related benefit, while only 61.6% of men did, with this difference largely reflecting top-ups to the Canada Child Benefit (Statistics Canada, 2022). Those identifying as racialized or Indigenous were also more likely to receive pandemic related benefits as these groups were more likely to experience losses of employment due to the COVID-19 pandemic (Public Health Agency of Canada, 2020). In addition to the actual receipt of benefits varying between groups in the Canadian population, the relative contribution of pandemic-related benefits as a proportion of income varied between groups. An example of this is that younger Canadians had large proportions of their income made up of these benefits, including 42.5% for those aged 15-19 and 29.4% for those aged 20-24 (Statistics Canada, 2022). Therefore, with the probability and relative

importance of receiving pandemic-related benefits varying considerably among different groups in the Canadian population, it is important to account for these potential confounding factors when examining impacts of pandemic-related benefits. Additionally, one should consider whether this may result in certain sub-groups benefiting more strongly from the receipt of economic supports due to the supports comprising a larger proportion of their income.

IMPACTS OF INCOME SUPPLEMENTS ON MENTAL HEALTH

While typical recessions have been shown to be associated with poorer mental health, it may be that the large-scale economic supports introduced during the COVID-19 pandemic helped to attenuate some of these effects. Previous research has shown that income supplements provided to households are generally associated with improved mental health, albeit the effect sizes are small. For instance, a systematic review of 136 studies including working-age adults found that increased incomes probably have a positive impact on mental health, particularly when individuals moved out of poverty, but the effects were modest (Thomson *et al.*, 2022). Another systematic review of 16 studies focusing on children found that there may be small improvements to mental health when their families receive income supports (Boccia *et al.*, 2023). Finally, in Canada, by analyzing past increases in the Canada Child Benefit (CCB), and leveraging inter-provincial differences, a longitudinal study found that increases to the CCB was associated with improved mental health, among other positive outcomes (Milligan & Stabile, 2011). Therefore, based on this previous evidence one could hypothesize that the CRB would be associated with small beneficial effects with respect to mental health.

SELF-REPORTED GENERAL MENTAL HEALTH

Self-reported general mental health is an important outcome to consider when assessing the mental health impacts of economic supports implemented during the COVID-19 pandemic. A self-report measure such as this is beneficial compared, for example, to using diagnosis of a mental disorder, because formal diagnosis of a mental disorder requires contact with a health provider of some kind. This can be an issue during normal times due to longstanding issues with access to mental health care, but it is particularly problematic during the COVID-19 pandemic when access to healthcare may have been especially limited (Moynihan *et al.* 2021). While not as robust from a measurement standpoint as other valid and reliable mental health measures, self-reported general health, and mental health has shown to be a valid measure with respect to one's general health status. For example, those with mental health morbidities have higher odds of reporting fair or poor mental health than those without (Mahwani & Gilmour, 2010). Additionally, the use of this measure allows more easily for comparisons to other studies given how common this measure is in other general health surveys both within Canada and globally. Therefore, self-reported parent mental health is an important outcome to assess when examining the impact of economic supports implemented during the COVID-19 pandemic on the mental health of Canadians.

CHILD FUNCTIONING

Another important outcome to consider in terms of measuring mental health impacts of the pandemic is functioning. According to the Diagnostic and Statistical Manual of Mental Health Disorders (5th edition), most mental disorders must present with “clinically significant distress or impairment in social, occupational, or other important areas of functioning” alongside the disorder specific symptoms (American Psychiatric Association, 2013). Thus, a key component of assessing mental disorder is measuring its impact on functioning, thereby solidifying functioning as an important concept to measure. While there are many ways that functioning can be defined, for this study functioning is examined through the lens of disability as conceptualized by the Washington Group on Disability.

The Washington Group created an internationally comparable high-quality measure of disability in order to address the problem of poor measurement being used to measure disability globally, especially in low- and middle-income countries (Loeb *et al.*, 2017). The measure considers a variety of domains with respect to disability, but the current study focuses on a subset of these by assessing the cognitive, communicative, and psychosocial functioning domains within the measure. The UNICEF/Washington measure is the version used in these analyses, and is well-validated, showing good reliability and validity both globally (Zia *et al.*, 2020), and in Canada using the 2019 Canadian Health Survey on Children and Youth (CHSCY; Nolan *et al.*, 2025). Previous work examining this measure in 2019 CHSCY has identified the measure is composed of two factors, a cognitive-behavioural functioning factor and an emotional functioning factor (Nolan *et*

al., 2025). Therefore, given the importance of functioning with respect to the diagnosis of mental disorder and the availability of an internationally comparable valid and reliable scale, child functioning is an important outcome to consider when assessing impacts of the CRB during the COVID-19 pandemic.

RATIONALE

Given previous work which has identified associations between economic recessions and detrimental effects on mental health, the economic turmoil caused by the COVID-19 pandemic may have resulted in poorer mental health mediated by its economic impacts (Frasquilho *et al.*, 2015; Hergenrather, *et al.*, 2015; McDowell *et al.*, 2021). The Canadian government implemented large-scale economic supports to combat the economic impacts of the COVID-19 pandemic (Statistics Canada, 2022). One such support was the Canada Recovery Benefit, received by 2.3 million Canadians for a total value of 28.4 billion dollars (Government of Canada, 2022b). Based on previous work which has found benefits, albeit small, to mental health from income supplements one could hypothesize that receiving CRB may serve to attenuate some of the negative impacts to mental health associated with the economic recession during the COVID-19 pandemic (Thomson *et al.*, 2022; Boccia *et al.*, 2023; Milligan & Stabile, 2011). Self-reported parental mental health and child functioning are important outcomes to consider when assessing changes in mental health during COVID-19 (Mahwani & Gilmour, 2010; Loeb *et al.*, 2017). Therefore, it is important to identify whether receipt of the CRB is associated with attenuation of declines in parent mental health and child functioning over time, when compared to those who did not receive the CRB, after adjusting for various

covariates. In addition, the relative impact of the CRB could be larger for low-income households due to the benefit comprising a larger share of their income. Therefore, it is important to test whether the hypothesized association differs for low-income versus non-low-income households. Finally, the potential impacts of the CRB on single-parent households is of particular interest because they are more likely to be financially vulnerable (Messacar & Morissette, 2020) and single-parent households allow for more complete adjustment for parent employment loss during the pandemic in the analysis (as this measure is only reported for the person completing the survey).

STUDY OBJECTIVES

The objectives of the thesis were to:

1. Examine whether receipt of the Canada Recovery Benefit was associated with attenuation of mental health declines among Canadian parents and their children from pre- to post-COVID-19 compared to those who did not receive the Canada Recovery Benefit, after adjusting for measured covariates.
2. Determine whether the associations of the Canada Recovery Benefit with respect to attenuating declines in parental and child mental health vary in low-income versus non-low-income households, after adjusting for measured covariates.
3. A secondary objective is to examine receipt of the Canada Recovery Benefit in single-parent households due to their financial vulnerability and the ability for parent income loss to be better controlled for in the analysis.

METHODS

Study Design

This study is a secondary data analysis utilizing data from the 2019 and 2023 longitudinal Child Health Survey on Children and Youth (CHSCY). This was a national longitudinal study conducted by Statistics Canada in partnership with Health Canada, the Public Health Agency of Canada, and a Canadian Institutes of Health Research funded research team at McMaster University's Offord Centre for Child Studies. The target population for the 2019 CHSCY was the Canadian population aged 1-17 as of January 2019. The sampling frame of the 2019 CHSCY was the Canada Child Benefit (CCB) file, which covered approximately 98% of Canadian children and youth residing within the provinces. Children and youth living on First Nation's reserves, and other Aboriginal settlements in the provinces, those living in foster homes, and the institutionalized population were excluded. Sampling was stratified by province (except for Ontario which was stratified by Local Health Integration Network subregions). In addition, sampling was stratified into three age groups, children aged 1-4, children aged 5-11, and youth aged 12-17. Data were exclusively collected through a proxy report from a person-most-knowledgeable (PMK) for children aged <12, most often a parent. For youth aged ≥12 they could also self-report data, in addition to a PMK report. PMK's also reported on some of their own as well as family characteristics.

Data were collected by phone or online survey in either English or French. Data for the 2019 CHSCY were collected from February 2019 to June 2019. Survey weights were

generated by Statistics Canada to improve the representativeness of the sample with respect to the target population. The 2023 longitudinal CHSCY was collected from March to June 2023 and was similar in terms of methodology except for exclusions in sampling described below, and respondents aged 18+ only reporting data for themselves, i.e. no PMK proxy.

Response and Retention Rates

In 2019 the CHSCY sampled 92,170 households, of which 47,871 responded, resulting in a 52.1% response rate (Statistics Canada, 2025c). For the longitudinal follow-up in 2023, those living in the three territories, those who moved to Indigenous reserves, those participating in other Statistics Canada Surveys, and a random selection from the Ontario oversample conducted in 2019, were excluded from the sampling in 2023 (Statistics Canada, 2025c). The number of sampling units in 2023 was 41,934, of which 22,739 responded for a retention rate of 54.2% (Statistics Canada, 2025c).

Ethical Considerations

This study made use of secondary data; therefore, institutional research ethics approval was not required. Participation was voluntary and parents and children consented to participation. Data were stored and accessed at the McMaster University Research Data Centre. An RDC analyst vetted all outputs to ensure that it met vetting requirements in terms of participant identification and statistical considerations.

Study Measures

Outcomes

Primary outcome: PMK mental health:

PMK mental health was assessed through a self-report of the PMK using the following question: “In general, how is your mental health?”. Respondents could answer “Excellent”, “Very Good”, “Good”, “Fair”, or “Poor”. By convention, this variable was dichotomized, such that “Excellent”, “Very Good”, and “Good” were indicative of good mental health (coded 0), while “Fair”, or “Poor” were indicative of poor mental health (coded 1; Statistics Canada, 2025d).

Secondary outcomes: child cognitive-behavioural and emotional functional difficulty

Child functional difficulties were assessed by a PMK proxy report using a modification of the UNICEF/Washington Group Module. This module assesses functional difficulty across various domains. However, for the purposes of analysis, domains regarding physical health indicators were excluded from consideration, as the focus of this study is mental health. Therefore, functional difficulties with respect to seeing, hearing, walking, fine-motor control, or self-care were not included. Among the remaining domains, psychometric analysis conducted on the 2019 CHSCY suggests that the measure is composed of two factors which have been termed cognitive-behavioural, and emotional functional difficulty (Georgiades *et al.*, in prep; Nolan *et al.*, 2025). Thus, each factor was examined separately during analyses.

The domains which comprise the cognitive-behavioural factor are communication, learning, remembering, concentrating, accepting change, behaviour, and making friends. Each of these items were measured by asking the following with respect to the child being reported on (with some additional explanation for each item): “Does [he/she] have difficulty with [*domain + example or explanation*]? Would you say...” with the following responses being available: “no difficulty”, “some difficulty”, “a lot of difficulty”, or “cannot do at all”. According to the Washington group’s recommendation “A lot of difficulty” or “cannot do at all” signifies a functional difficulty in that domain (UNICEF, 2017). For analytical purposes, a functional difficulty in at least one domain within a factor represented a functional difficulty in that factor overall. Therefore, a child with a functional difficulty in any of the domains within the cognitive-behavioural factor will be considered to have a functional difficulty for that factor (coded 1), if the child has no functional difficulties in any of the domains they were considered to not have a functional difficulty in the factor (coded 0).

The emotional factor has only two domains, anxiety, and depression. Each of these items were assessed using this general question: “How often does [child name] seem [*anxiety/depressive symptomology*]? Would you say...”. Possible response options were “daily”, “weekly”, “monthly”, “a few times a year”, or “never”. According to the Washington group’s recommendation, only a response of “daily” should be considered a functional difficulty in that domain (UNICEF, 2017). Similarly to the other factor, if a functional difficulty was observed in either domain, then this was considered to represent a functional difficulty for the emotional factor overall (coded 1), whereas no functional

difficulties being observed in either domain would represent no functional difficulties in the factor (coded 0).

Exposure

Receipt of Canada Recovery Benefit – time invariant

Receipt of the Canada Recovery Benefit was assessed through a linkage to the T1 Family File (T1FF) in 2021 and 2022. The T1FF recorded the dollar amount of CRB received by a census family (generally a household). This was converted to be dichotomous such that if a household received the CRB in either 2021 or 2022 (value listed greater than zero) they were considered as having received the CRB (coded 1). Whereas, if the amount received through the CRB was listed as zero in both 2021 and 2022 then the household was considered to not have received the CRB (coded 0).

Covariates

Time

If an observation was recorded in the 2019 CHSCY then time was coded as 0. If an observation was recorded in the 2023 CHSCY then time was coded as 1.

Employment or income loss during the COVID-19 pandemic – time invariant

A key confounder associated with the CRB is employment or income loss during the COVID-19 pandemic. This was assessed through the following question: “Since March 2020, have you experienced any of the following life events or situations in your life? – Loss of job or income”. Respondents could answer “Yes” (coded 1) or “No” (coded 0).

Low-income measure – time invariant

Low-income status was assessed using a linkage of the 2019 CHSCY to the 2018 T1FF and used pre-tax low-income measure thresholds from Statistics Canada (Statistics Canada, 2025e). The thresholds are determined by taking half of the median pre-tax household income in Canada and then adjusting for household size by multiplying by the square root of the size of the household (Statistics Canada, 2025e). Thus, these thresholds adjust for household size while taking economies of scale into account.

Median Provincial COVID-19 Stringency – time invariant

Provincial COVID-19 stringency is a measure of the extent to which public health restrictions were implemented to contain the spread of COVID-19 over the course of the pandemic within a province. An index of stringency was measured daily by the Oxford COVID-19 Government Response Tracker (Hale *et al.*, 2021). The stringency index is composed of a series of ordinal items and geographic flags to indicate whether measures were province-wide or regionally targeted. The stringency index items include school closures, workplace closures, cancellation of public events, limits on gathering size, closure of public transportation, stay-at-home requirements, restrictions on domestic travel, restrictions on international travel, and public health information campaigns. As an example of how the items are coded, school closures were coded to be “0” representing no measures, “1” meant recommending closures or significant alteration compared to pre-COVID-19, “2” represented requiring closing in at least some school levels, and “3” meant required closure of all schools. If the school closure policy was province-wide then

it was coded a “1” for the geographic flag variable, and coded “0” if the policy was only applied regionally.

Based on these ordinal items a stringency index ranging from 0-100 was created, with zero representing no restrictions and 100 representing the maximum amount of restrictiveness for each item (including being applied across the whole province). Details on the measures and stringency index calculation are described in Hale *et al.*, 2021. The stringency index for each province on a daily basis from March 2020 to December 2022 was used to calculate the median daily stringency value for each province. This stringency value was then linked to participants using their province of residence in 2023 and treated as a continuous variable in analyses. This variable was then mean centred in regression models, meaning that a zero on this variable represents the mean median stringency across the provinces.

PMK/child age in 2019 – time invariant

The age of the PMK and child being reported on were assessed using a standard Statistics Canada Household Composition module which measures age in years based on PMK report. Age was treated as a continuous variable in analyses.

PMK/child gender+ – time invariant

The gender of the PMK was assessed by asking the PMK “What is your gender?” possible answers were “Male”, “Female”, or “Please Specify”. The gender of the child being reported on was assessed by asking the PMK “What is [child name’s] gender?” or self-report for children aged 12+ (“What is your gender?”). In either case, possible

answers were “Male”, “Female”, or “Please Specify”. As answers other than male or female make up too few responses for vetting purposes, Statistics Canada created a gender+ variable which randomly allocates these responses to either the “Male” or “Female” category. This gender+ variable was used in analyses with “Male+” coded as 0 and “Female+” coded as 1.

PMK/child Indigenous identity – time invariant

Indigenous identity was assessed by asking “Are you/[child name] First Nations, Métis, or Inuk (Inuit)?” with possible answers being “No, not First Nations, Métis, or Inuk (Inuit)”, “Yes, First Nations (North American Indian)”, “Yes, Métis”, or “Yes, Inuk (Inuit)”. Due to statistical and vetting considerations if any of the Indigenous identities were endorsed, then an individual was coded as endorsing Indigenous identity (coded 1), with the reference group being non-racialized, non-Indigenous (coded 0). If any of the Indigenous identities were endorsed, then the racialized identity question was skipped.

PMK/child racialized identity – time invariant

The racialized identity of the PMK/child was assessed by asking “Are you/[child name]:” with response options of “White” (coded 0), “South Asian” (coded 1), “Chinese” (coded 2), “Black” (coded 3), “Filipino” (coded 4), “Arab” (coded 5), “Latin American” (coded 6), “Southeast Asian” (coded 7), “West Asian” (coded 8), “Korean” (coded 9), “Japanese” (coded 10), or “Other: Please Specify”. A multi-racial category was created for those who endorsed multiple groups (coded 11). Due to vetting and statistical considerations, the “Other” category was not presented in results.

Family structure – time varying

Family structure was assessed using the household composition module within the CHSCY. A household with two biological parents was coded as 0, and a household with fewer than two biological parents was coded as 1.

Parental mental health – time varying

Parental mental health was included as a covariate for child functioning models and was coded the same as when it was considered an outcome as described above.

Number of parents in household – time invariant

Number of parents was assessed using the household composition module within the CHSCY. A household with two parents in 2019 was coded as 0, and a household with fewer than two was coded as 1. This variable was not used in analyses but instead used for determining the sample for the single-parent household sensitivity analysis.

STATISTICAL ANALYSIS

All analyses were conducted at the McMaster University Research Data Centre using STATA 18 (StataCorp, 2025).

Weighting

Longitudinal sampling weights (inverse probability) generated by Statistics Canada were applied for all analyses. Initial weights in 2019 were calculated based on the CCB sampling frame, then these were adjusted based on non-response, and then calibrated to ensure the weights correspond to sex-age group population estimates at a sub local health

integration network level (where possible), for both males and females aged 1-4, 5-11, and 12-17. The longitudinal weights were derived from these initial weights from 2019 after adjusting for non-response in 2023 and the shift in sampling frame (i.e. no Ontario oversample, no territories in 2023 etc.). All analyses presented are weighted.

Analytical Methods

Simple descriptive statistics were generated to describe the sample, stratified by whether a household received the CRB. Percentages were rounded to the nearest tenth of a percent, and sample numbers were rounded to the nearest 100.

To describe any differences in terms of the odds of receiving CRB based on sample characteristics, a multivariable logistic regression was conducted with the dependent variable being receipt of CRB (yes/no). All PMK and household variables (for time varying and outcome variables the 2019 values were used) and child functioning outcomes used in the main analyses were included in this model to explore the extent to which these variables may be associated with the receipt of the CRB. Therefore, independent variables included in the model were: pre-tax household low-income status, employment loss during the COVID-19 pandemic, PMK gender+, PMK age, PMK Indigenous identity, PMK racialized identity, family structure, PMK general mental health, and child cognitive-behavioural and emotional functioning. Odds ratios and 95% confidence intervals (using robust standard errors) were estimated. Model fit was assessed through calculation of the area under the receiver-operator curve (ROC).

To address the first objective of this thesis, examining if receipt of the CRB was associated with an attenuation of mental health and functioning declines, multilevel multivariable logistic regressions were conducted, with observations nested within individuals with a random intercept. The main effect of time represents changes in the odds of the outcome from 2019 to 2023. Then, to estimate this association of the CRB on the outcomes, an interaction between CRB and time was the parameter of interest. This approach follows one of the recommendations of O’Connell *et al.*, 2017 for pre-post studies. The receipt of CRB occurred in-between the time points of the L-CHSCY thereby making this effectively a pre-post study. The multilevel logistic regression approach allows estimation for within-person changes in the outcome of interest while accounting for the correlation between observations within an individual. This is required because the assumption of independent observations present within standard logistic regression is not fulfilled.

To address the second objective of the thesis, whether the hypothesized attenuation of the CRB with respect to mental health declines differed in low-income households compared to non-low-income households, a three-way interaction term of time by CRB by low-income (alongside the other possible two-way interaction terms of these three variables) was estimated.

Measured confounders were included in all models. For the model to estimate associations between receipt of the CRB and PMK general mental health the independent variables were receipt of CRB, household low-income status, employment loss during COVID-19, provincial median COVID-19 stringency, PMK gender+, PMK age, PMK

Indigenous identity, PMK racialized identity, and family structure. Interactions within this model included: time by CRB receipt, time by household low-income status, CRB receipt by household low-income status, time by CRB receipt by household low-income status, employment loss during COVID-19 by time, and provincial median stringency index by time. The employment loss during COVID-19 by time, and stringency index by time interactions are included because, like with the receipt of the CRB, these factors were assessed between 2019 and 2023, meaning that the interaction term is the true association of interest, while the main effects represent purely confounding occurring in 2019. Models for child functioning were similar, except using child age, child gender, and child racialized identity as opposed to their PMK counterparts, and PMK general mental health was also added as a covariate to account for possible informant effects.

Odds ratios and 95% confidence intervals (using robust standard errors) were estimated. Unconditional intra-class correlations (ICC) were estimated to determine the extent to which variance was explained by individual level versus observation level factors. The area under the ROC was estimated to assess model fit. Marginal effects for receipt of the CRB and receipt of the CRB by low-income status were estimated to aid in interpretation of results. Model results in the absence of the three-way interaction are presented, both because the three-way interaction terms were not significant in any of the models, and to allow for easier interpretation of the associations of the CRB with outcomes overall (time by CRB interaction). As a sensitivity analysis, due to a lack of information regarding spousal employment loss during COVID-19, the analysis was also conducted for single-

parent households in 2019 to reduce the extent to which this unaccounted-for confounding may influence results.

To better contextualize the practical implications of odds ratios generated in models, the following guidelines for effect sizes, as recommended by Rosenthal (1996), were used for interpretation purposes: unimportant effect = $0.66 < OR < 1.5$; small effect = $OR < 0.66 / OR > 1.5$; moderate effect = $OR < 0.4 / OR > 2.5$; large effect = $OR < 0.25 / OR > 4$.

Although, these should only be taken to be general guidelines as the actual practical effect of an odds ratio depends heavily on the prevalence of the outcome in question, model specifications due to the nature of maximum-likelihood estimation (Norton & Dowd, 2018), and that small population level effects can be as impactful as large effects on an individual level (Rose, 1985).

Sample for Analysis

The total eligible sample which responded in both 2019 and 2023 was composed of 22,800 participants. The PMK changed from 2019 to 2023 in 7,600 cases including both those older youth who became their own PMK in 2023, and changes in the PMK within a household for younger children and youth. As this analysis is concerned with within-person changes in mental health and functioning, those cases where the PMK changed were excluded from analyses, resulting in a sample of 15,200. As youth aged 14-17 at baseline are their own PMK in 2023, this means that only the sample of children aged 1-13 is used. This sample was used for descriptive statistics shown in Table 1, with pairwise deletion being used for missing data in each variable. For models which use child

functioning outcomes, only those with children aged 5–13-years (and the same PMK) were used to allow for common measurement from 2019 to 2023. Using this age group is required for common measurement because those younger or older were asked a different set of functioning questions in 2019 versus 2023. The total eligible sample for this group is 9,400. This includes Table 2, where limiting the sample to 5–13-year-old children and list-wise deletion of missing data resulted in a sample of 8,700. For Table 3 the eligible sample was the L-CHSCY sample (children aged 1-13 at baseline) with the same PMK (15,200) though due to pair-wise deletion of missing data the final sample for analysis was 14,400. For Tables 4 and 5 the eligible sample was those children aged 5-13 (9,400) and due to pair-wise deletion of missing data the final sample was 8,900. Models listed in Table 6 have the same sample for analysis as their respective counterparts in Tables 3-5. The PMK mental health model in Table 7 includes only single-parent households for a total eligible sample of 2,700, though the final sample for analysis was 2,500 due to pair-wise deletion of missing data. For the child functional difficulty models the sample was those children aged 5–13 who lived in a single-parent household, the total eligible sample was 1,800, while only 1,700 were present in the sample for analysis due to pair-wise deletion of missing data.

Missing Data

Overall, the level of missing data was low. Receipt of the CRB, child cognitive functional difficulty in 2019 or 2023, low-income status, child age in 2019, PMK gender+, child gender+, and provincial stringency had no missing data in the samples used for analyses. Less than 1% of data were missing for both PMK mental health and child emotional

functional difficulty in 2019 and 2023, and PMK age in 2019. Less than 2% of data were missing for family structure. Less than 5% of PMK employment loss during the pandemic, PMK and child Indigenous identity, and PMK and child racialized identity data were missing. Pair-wise or list-wise deletion was used to address missing data. While multiple imputation would be a better approach to address missing data, given the small amount of missing data overall and no significant systematic patterns in missing data for outcome variables being observed, list-wise or pair-wise deletion is an acceptable approach for these analyses, though it may still create some bias (Newman, 2014).

RESULTS

Descriptive Statistics

Weighted sample characteristics stratified by receipt of the Canada Recovery Benefit (CRB) are presented in Table 1.

Table 1. Weighted sample characteristics stratified by receipt of the CRB, $n=15,200$.

Variable	No CRB Received	CRB Received	Total
n (%)	13,400 (87.9)	1,800 (12.1)	15,200 (100)
CRB Amount Received (2025 CAD), M (SD)	-	14,900 (11,700)	-
Low-income Status in 2019			
Non-low-income	11,400 (84.9)	1,200 (66.8)	12,600 (82.7)
Low-income	1,900 (15.1)	600 (33.2)	2,500 (17.3)
Employment or Income Loss Due to COVID-19			
No Employment/Income Loss	10,800 (83.9)	1,200 (65.5)	12,000 (81.7)
Employment/Income Loss	2,100 (16.1)	600 (34.5)	2,700 (18.3)
Provincial Stringency Median, M (SD)	50.10 (2.56)	50.34 (2.31)	50.13 (2.53)
PMK Age in 2019, M (SD)	38.91 (6.55)	39.67 (6.87)	39.00 (6.59)
PMK Gender+			
Man+	1,600 (11.7)	300 (14.2)	1600 (12.0)
Woman+	11,800 (88.3)	1500 (85.8)	13,600 (88.0)
PMK Indigenous Identity	400 (3.2)	100 (2.8)	500 (3.1)
PMK Racialized Identity			
Non racialized, non-Indigenous	8,900 (70.2)	1,000 (55.9)	9,900 (68.5)
South Asian	900 (7.1)	200 (12.9)	1,100 (7.8)
Chinese	600 (5.0)	200 (9.6)	800 (5.6)
Black	500 (4.2)	100 (5.7)	600 (4.4)
Filipino	500(3.6)	100 (2.9)	600 (3.5)
Arab	300 (2.3)	100 (3.4)	400 (2.4)
Latin American	200 (1.6)	0 ^a (1.7)	200 (1.6)
Southeast Asian	100 (0.9)	0 ^a (1.5)	100 (1.0)
West Asian	100 (0.8)	0 ^a (1.4)	100 (0.9)
Korean	100 (0.4)	0 ^a (1.3)	100 (0.5)
Japanese	0 ^a (0.2)	0 ^a (0.2)	0 ^a (0.2)
Multiple Groups	100 (0.5)	0 ^a (0.5)	100 (0.5)
Family Structure in 2019			
Two biological parents	10,400 (79.1)	1,400 (77.4)	11,800 (78.9)
One or no biological parents	2,800 (20.9)	400 (22.6)	3,200 (21.1)

PMK Self-reported General Mental Health in 2019			
Good/Very Good/ Excellent	12,800 (95.2)	1,700 (94.8)	14,500 (95.2)
Fair/Poor	600 (4.8)	100 (5.2)	700 (4.8)
Child Cognitive Functional Difficulty in 2019			
No Difficulty	5,000 (60.7)	800 (68.4)	5,800 (61.7)
Difficulty	3,200 (39.3)	400 (31.6)	3,600 (38.3)
Child Emotional Functional Difficulty in 2019			
No Difficulty	6,800 (82.1)	900 (82.3)	7,700 (82.2)
Difficulty	1,500 (17.9)	200 (17.7)	1,700 (17.8)

^a = rounded to zero.

Some descriptive statistics to note are, first, that approximately 12.1% of the sample received the CRB, and that among those households who received the CRB, the mean (2025 CAD) amount received was \$14,900 (SD = \$11,700). Second, low-income households appear more likely to have received the CRB as 33.2% of households who received the CRB were low-income, compared to the non-CRB sample being 15.1% low-income households. Third, those who reported experiencing a loss of employment or income due to the COVID-19 pandemic were seemingly more likely to belong to a household which received the CRB, with 34.5% of those in households receiving the CRB reporting a loss of employment or income, compared to the non-CRB sample where 16.1% reported a loss of employment or income. Fourth, non-Indigenous, non-racialized respondents were seemingly less likely to belong to a household which received the CRB with 55.9% of the respondents receiving the CRB belonging to this group, compared to 70.2% in the non-CRB sample. Besides these highlighted statistics the measured

characteristics of those who received versus not receiving the CRB appeared broadly similar.

Receipt of CRB

To more formally examine whether certain time invariant or baseline characteristics were associated with receipt versus non-receipt of the CRB and to account for potential confounding between these characteristics a multivariable logistic regression was conducted with receipt of CRB as the outcome. The results of this regression are presented in Table 2.

Table 2. Logistic regression results depicting association between baseline (2019) sample characteristics and odds of receiving the CRB. $n = 8,700$.

Variable	Odds Ratio (95% CI)	p-value
Low-income Status		
Non-low-income	<i>ref</i>	
Low-income	2.59 (2.04 – 3.28)	<0.001
Employment or Income Loss Due to COVID-19		
No Employment/Income Loss	<i>ref</i>	
Employment/Income Loss	2.59 (2.09 – 3.21)	<0.001
PMK Age, M (SD)	1.02 (1.00 – 1.03)	0.02
PMK Gender+		
Man+	<i>ref</i>	
Woman+	1.02 (0.76 – 1.37)	0.89
PMK Indigenous Identity		
Non racialized, non-Indigenous	<i>ref</i>	
Indigenous	1.38 (0.80 – 2.39)	0.25
PMK Racialized Identity		
Non racialized, non-Indigenous	<i>ref</i>	
South Asian	1.74 (1.25 – 2.42)	<0.001
Chinese	1.75 (1.25 – 2.46)	<0.001
Black	1.42 (0.85 – 2.39)	0.19
Filipino	0.85 (0.52 – 1.40)	0.52
Arab	0.98 (0.49 – 1.96)	0.95
Latin American	0.92 (0.32 – 2.66)	0.88
Southeast Asian	1.33 (0.63 – 2.82)	0.46
West Asian	1.20 (0.48 – 3.01)	0.69
Korean	2.46 (0.87 – 6.94)	0.09
Japanese	0.77 (0.09 – 6.90)	0.82
Multiple Groups	1.59 (0.41 – 6.09)	0.50
Family Structure		
Two biological parents	<i>ref</i>	
One or no biological parents	0.74 (0.57 – 0.97)	0.03
PMK Self-reported General Mental Health		
Good/Very Good/Excellent	<i>ref</i>	
Fair/Poor	0.89 (0.57 – 1.39)	0.61
Child Cognitive Functional Difficulty		
No Difficulty	<i>ref</i>	
Difficulty	0.75 (0.54 – 1.03)	0.08
Child Emotional Functional Difficulty		

No Difficulty	<i>ref</i>	
Difficulty	1.16 (0.88 – 1.52)	0.30

ROC Area = 0.68 (0.66 – 0.70).

Being in a low-income household in 2019 was associated with a significant 2.59 (95%CI: 2.04 – 3.28) times increase in the odds of receiving the CRB compared to being in a non-low-income household. Reporting a loss of employment or income during the COVID-19 pandemic was associated with a significant 2.59 (95%CI: 2.09 – 3.21) times increase in the odds of receiving the CRB compared to those who did not report a loss of employment or income due to the COVID-19 pandemic. Each increase of one year in the PMK age in 2019 was associated with a significant 1.02 (95%CI: 1.00 – 1.03) times increase in the odds of receiving the CRB. The gender of the PMK was not observed to be associated with a significant difference in the odds of receiving the CRB. No significant differences were observed for those identifying as Indigenous as compared to non-racialized, non-Indigenous respondents. Respondents who identified as South Asian, or Chinese, had significantly increased odds of receiving the CRB, compared to those who identified as neither Indigenous nor a racialized group. No significant differences were observed, as compared to non-Indigenous, non-racialized respondents, for those identifying as Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean, Japanese, or multiple groups. Those who were living in a household with fewer than two biological parents in 2019 had 0.74 (95%CI: 0.57 – 0.97) times the odds of receiving the CRB compared to those in a household with two biological parents. No significant differences in the odds of receiving the CRB were observed based on 2019 PMK self-reported mental health, 2019 child cognitive behavioural functional difficulty,

or 2019 child emotional functional difficulty. The area under the receiver-operator curve for this model was 0.68 (95%CI: 0.66 – 0.70).

Associations between receipt of the CRB and within-person PMK Mental Health

To assess whether receipt of the CRB was associated with an attenuation of within-person declines in PMK self-reported general mental health, a multilevel (observations nested within individuals) multivariable logistic regression was conducted. The results from this regression are displayed in Table 3.

Table 3. Multilevel logistic regression results showing associations between receipt of the CRB (plus covariates) and odds of PMK self-report of general mental health being fair or poor. $n = 14,400$.

Variable	OR (95%CI)	p-value
Time		
2019	<i>ref</i>	
2023	2.55 (2.09 – 3.12)	<0.001
Receipt of CRB		
CRB not received	<i>ref</i>	
CRB received	1.39 (0.80 – 2.44)	0.25
CRB X Time	0.76 (0.40 – 1.46)	0.41
Household Low-income Status		
Non-low-income	<i>ref</i>	
Low-income	1.80 (1.20 – 2.70)	0.01
LIM X Time	0.83 (0.53 – 1.30)	0.42
CRB X LIM	0.36 (0.13 – 1.00)	0.05
CRB X Time X LIM	2.22 (0.72 – 6.87)	0.17
Employment or Income Loss Due to COVID-19		
No Employment/Income Loss	<i>ref</i>	
Employment/Income Loss	2.06 (1.43 – 2.96)	<0.001
Employment/Income Loss X Time	1.71 (1.15 – 2.53)	0.01
Median Stringency in Province	0.94 (0.90 – 0.99)	0.01
Stringency X Time	1.08 (1.02 – 1.15)	0.01
PMK Age in 2019	0.98 (0.97 – 1.00)	0.06
PMK Gender		
Man+	<i>ref</i>	
Woman+	1.95 (1.22 – 3.11)	0.01
Family Structure		
Two biological parents	<i>ref</i>	
One or no biological parents	2.20 (1.75 – 2.77)	<0.001
PMK Indigenous Identity		
Non racialized, non-Indigenous	<i>ref</i>	
Indigenous	2.76 (1.70 – 4.50)	<0.001
PMK Racialized Identity		
Non racialized, non-Indigenous	<i>ref</i>	
South Asian	0.21 (0.12 – 0.39)	<0.001
Chinese	0.62 (0.36 – 1.07)	0.08
Black	0.33 (0.18 – 0.60)	<0.001
Filipino	0.28 (0.10 – 0.79)	0.02
Arab	0.09 (0.03 – 0.25)	<0.001
Latin American	0.24 (0.07 – 0.80)	0.02

Southeast Asian	0.73 (0.24 – 2.23)	0.58
West Asian	0.09 (0.02 – 0.50)	0.01
Korean	0.77 (0.17 – 3.41)	0.17
Japanese	0.51 (0.04 – 6.84)	0.61
Multiple	0.39 (0.04 – 4.21)	0.44

ICC = 0.61 (0.55 – 0.67). ROC Area = 0.99 (0.99 – 0.99)

The main parameters of interest, in terms of the association between receipt of the CRB and attenuation of a decline in PMK mental health, is the CRB by time interaction, and the CRB by time by low-income interaction. First the main effect of time was significantly associated with increased odds (OR: 2.55, 95%CI: 2.09 – 3.12, $p < 0.001$) of poor PMK mental health, bearing in mind this parameter represents the associations with time given all the terms which have a time interaction are zero (CRB, employment loss, LIM, CRB X LIM, and COVID-19 stringency). The marginal effects plots (e.g. Figures 1 & 2) provide a better representation of the average association of time with outcomes. The main effect of CRB indicated that in 2019 among those living in non-low-income households (the reference group due to the three-way interaction term) going on to receive the CRB in the future was not observed to be significantly associated with the odds of reporting poor mental health compared to those who would not go on to receive the CRB. The odds ratio of the CRB by time interaction was not observed to be significant (OR: 0.76, 95%CI: 0.40 – 1.46, $p = 0.41$). This parameter represents the ratio by which the 2019 and 2023 odds ratios estimating the associations of the CRB with poor mental health differ. This relationship is illustrated in Figure 1, which plots the marginal effects of this model over time by receipt of CRB in non-low-income households. The CRB by time parameter represents the difference in the slopes depicted in Figure 1.

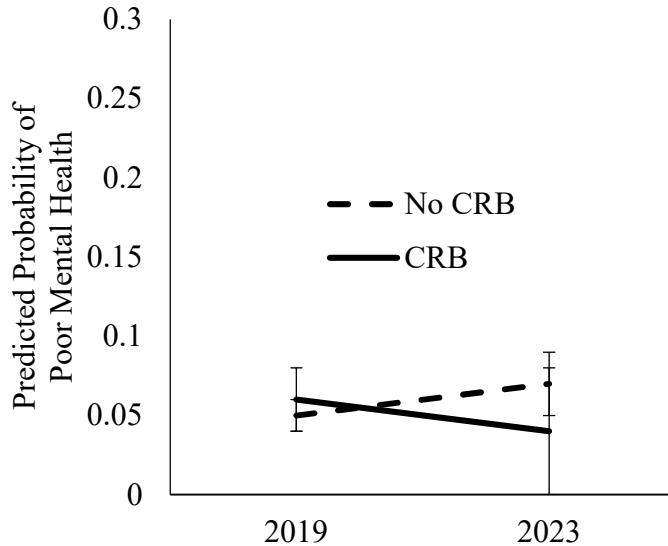


Figure 1. Marginal effects plot from Table 3 model depicting predicted probability of PMK reporting fair or poor mental health over time by receipt of the CRB (CRB X Time interaction is difference in slopes) in non-low-income households.

As the CRB by time parameter is not significant, this suggests that receipt of the CRB was not observed to be associated with differences in the probability of reporting fair/poor mental health across time compared to those who did not receive the CRB, among non-low-income households. While the slopes may appear different large confidence intervals preclude definitive conclusions with respect to a difference in the probability of poor mental health over time based on receipt of CRB.

It was hypothesized that the impacts of the CRB may differ by household low-income status, therefore a 3-way CRB by time by low-income status interaction was tested alongside the other possible two-way interactions, these results are shown in Table 3. The low-income status by time interaction was not significant (OR: 0.83, 95%CI: 0.53 – 1.30, $p = 0.42$). The marginally significant ($p = 0.05$) CRB by low-income interaction may

suggest that in 2019, the extent to which those who would go on to receive the CRB were associated with poorer mental health was lessened for those in low-income households (OR: 0.36, 95%CI: 0.13 – 1.00). Finally, the three-way interaction was not significant, (OR: 2.22, 95%CI: 0.72 – 6.87, $p = 0.17$), though the trend suggests that the association observed for the non-low-income households in Figure 1 above may be lessened for the low-income group. Figure 2 illustrates these findings visually.

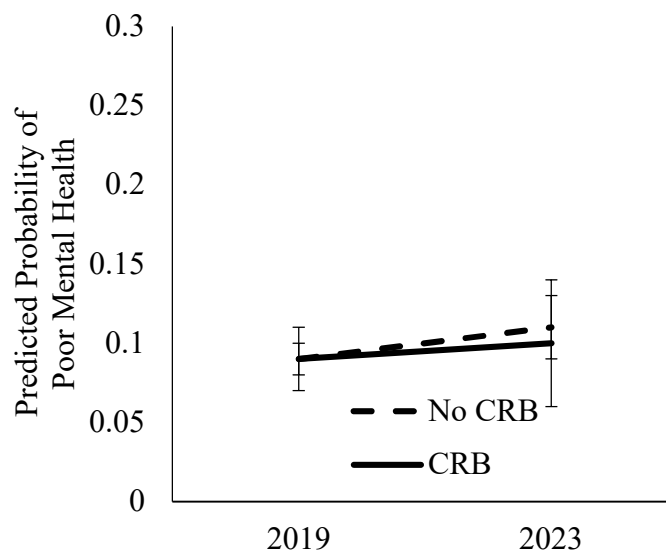


Figure 2. Marginal effects plot from Table 3 model depicting predicted probability of PMK reporting fair or poor mental health over time by receipt of the CRB (CRB X Time interaction, plus CRB X Time X LIM is difference in slopes) in low-income households.

The slopes for the CRB and no CRB groups are similar, which is a result of the three-way interaction offsetting the potential association of the CRB with an attenuation of the mental health decline observed in the non-low-income households in Figure 1. Thus, in low-income households, it seems no meaningful association of the CRB with attenuation of mental health declines was observed.

Another finding to highlight in this model is associations of a loss of employment or income during the COVID-19 pandemic with poorer mental health. In 2019, the association of employment or income loss with poor mental health was significant (OR: 2.06, 95%CI: 1.43 – 2.96, $p < 0.001$) suggesting that those who would go on to experience employment or income loss had poorer mental health at baseline. However, the employment loss by time interaction was also significant (OR: 1.71, 95%CI: 1.15 – 2.53, $p = 0.01$) suggesting that these individuals experienced poorer mental health outcomes across time as well, compared to those who did not experience a loss of employment or income.

Another finding of note is associations of provincial COVID-19 stringency and time. A 1-unit increase of median provincial COVID-19 stringency was associated with a small reduction in odds of PMK poor mental health in 2019 (OR: 0.94, 95%CI: 0.90 – 0.99, $p = 0.01$), suggesting that living in provinces with a higher stringency index during the pandemic was associated with lower odds of reporting poor mental health pre-pandemic. As stringency cannot have effects on the past, this represents confounding. The stringency by time interaction was significant as well (OR: 1.08, 95%CI: 1.02 – 1.15, $p = 0.01$) suggesting that living in provinces with higher levels of stringency were associated with more negative changes in the odds of poor mental health across time compared to living in provinces with lower median stringency.

The unconditional intra-class correlation calculated for the multilevel logistic regression was 0.67 (95%CI: 0.59 – 0.74), suggesting that the estimated proportion of variance explained at the individual level is 67%, while 33% is explained at the observation level.

The intra-class correlation for the final model was 0.61 (95%CI: 0.55 – 0.67). The area under the receiver-operator curve was 0.99 (95%CI: 0.99 – 0.99).

Associations between the CRB and Child Cognitive-Behavioural Functioning

To assess whether receipt of the CRB was associated with an attenuation of within-person declines in PMK reported child cognitive-behavioural functioning, a multilevel (observations nested within individuals) multivariable logistic regression was conducted. The results from this regression are shown in Table 4.

Table 4. Multilevel logistic regression results showing associations between receipt of the CRB (plus covariates) and PMK reported odds of child cognitive-behavioural functional difficulty. $n = 8,900$.

Variable	OR (95%CI)	p-value
Time		
2019	<i>ref</i>	
2023	1.07 (0.87 – 1.33)	0.50
Receipt of CRB		
CRB not received	<i>ref</i>	
CRB received	0.60 (0.37 – 1.00)	0.05
CRB X Time	1.16 (0.62 – 2.15)	0.65
Household Low-income Status		
Non-low-income	<i>ref</i>	
Low-income	1.29 (0.79 – 2.08)	0.31
LIM X Time	1.15 (0.71 – 1.86)	0.58
CRB X LIM	1.18 (0.50 – 3.48)	0.76
CRB X Time X LIM	0.68 (0.20 – 2.34)	0.54
Employment/Income Loss Due to COVID-19		
No Employment/Income Loss	<i>ref</i>	
Employment/Income Loss	1.63 (1.12 – 2.39)	0.01
Employment/Income Loss X Time	1.25 (0.81 – 1.93)	0.32
Median Stringency in Province	0.99 (0.94 – 1.04)	0.59
Stringency X Time	1.00 (0.95 – 1.06)	0.93
Child Age in 2019	1.01 (0.97 – 1.05)	0.63
Child Gender		
Boy+	<i>ref</i>	
Girl+	0.54 (0.43 – 0.68)	<0.001
Family Structure		
Two biological parents	<i>ref</i>	
One or no biological parents	2.09 (1.63 – 2.70)	<0.001
Child Indigenous Identity		
Non racialized, non-Indigenous	<i>ref</i>	
Indigenous	1.39 (0.89 – 2.19)	0.89
Child Racialized Group		
Non racialized, non-Indigenous	<i>ref</i>	
South Asian	0.23 (0.14 – 0.39)	<0.001
Chinese	0.36 (0.20 – 0.68)	<0.001
Black	0.26 (0.14 – 0.49)	<0.001
Filipino	0.47 (0.24 – 0.93)	0.03
Arab	0.42 (0.16 – 1.09)	0.08
Latin American	1.58 (0.41 – 6.13)	0.51

Southeast Asian	0.69 (0.24 – 1.97)	0.48
West Asian	0.59 (0.17 – 2.09)	0.41
Korean	0.52 (0.05 – 5.03)	0.58
Japanese	0.65 (0.16 – 2.67)	0.55
Multiple	0.46 (0.17 – 1.25)	0.13
PMK Self-reported Mental Health		
Good/Very Good/Excellent	<i>ref</i>	
Fair/Poor	4.40 (3.29 – 5.88)	<0.001

ICC = 0.63 (0.56 – 0.69). ROC Area = 0.98 (0.98 – 0.98).

Again, the main parameters of interest are the CRB by time and CRB by time by low-income interactions. First, the main effect of the CRB was marginally significantly associated with cognitive-behavioural functional difficulty (OR: 0.60, 95%CI: 0.37 – 1.00, $p = 0.05$) meaning the odds of reporting child cognitive-behavioural functional difficulty in 2019 may be lower for those households who would go on to receive the CRB versus those who did not. The main effect of time was not significant (OR: 1.07, 95%CI: 0.87 – 1.33, $p = 0.50$), but this should not be interpreted in isolation, as it represents the association of time with outcomes given all terms which have an interaction with time have a value of zero. The CRB by time interaction was not significant ($p = 0.65$) and close to the null (OR: 1.16, 95%CI: 0.62 – 2.15) thus, no meaningful association of the CRB with changes in cognitive-behavioural functioning was observed for those living in non-low-income households.

For those living in low-income households the findings are similar, as the three-way interaction of CRB by time by low-income status was not significant (OR: 0.68, 95%CI: 0.20 – 2.34, $p = 0.54$). In addition, the low-income by time (OR: 1.15, 95%CI: 0.71 – 1.86), and CRB by low-income interactions (OR: 1.18, 95%CI: 0.50 – 3.48) were both

not observed to be significant ($p = 0.58$, and $p = 0.76$, respectively), with point estimates close to the null.

Similar to the PMK mental health findings, loss of employment or income during the COVID-19 pandemic was associated with an increased odds of cognitive-behavioural functional difficulty (OR: 1.63, 95%CI: 1.12 – 2.39, $p = 0.01$) in 2019, meaning that those who would go on to lose employment or income during the COVID-19 pandemic had an increased odds of reporting child cognitive-behavioural functional difficulty in 2019. However, the employment loss by time interaction was not significant (OR: 1.25, 95%CI: 0.81 – 1.93, $p = 0.32$), meaning that no significant association between cognitive-behavioural functional difficulty and employment or income loss was observed.

With respect to cognitive-behavioural functional difficulty, no significant association was observed with the median provincial stringency in 2019 (OR: 0.99, 95%CI: 0.94 – 1.04, $p = 0.59$). The stringency by time interaction was also not significant (OR: 1.00, 95%CI: 0.95 – 1.06, $p = 0.93$).

The unconditional intra-class correlation calculated for the multilevel logistic regression was 0.70 (95%CI: 0.62 – 0.77), suggesting that the estimated proportion of variance explained at the individual level is 70%, while 30% is explained at the observation level. The intra-class correlation for the final model was 0.63 (95%CI: 0.56 – 0.69). The area under the receiver-operator curve was 0.98 (95%CI: 0.98 – 0.98).

Associations between the CRB and Child Emotional Functioning

To assess whether receipt of the CRB was associated with an attenuation of declines in within-person PMK reported child emotional functioning, a multilevel (observations nested within individuals) multivariable logistic regression was conducted. The results from this regression are reported in Table 5.

Table 5. Multilevel logistic regression results showing associations between receipt of the CRB (plus covariates) and PMK reported odds of child emotional functional difficulty. $n = 8,900$.

Variable	OR (95%CI)	p-value
Time		
2019	<i>ref</i>	
2023	1.93 (1.65 – 2.25)	<0.001
Receipt of CRB		
CRB not received	<i>ref</i>	
CRB received	1.16 (0.76 – 1.79)	0.49
CRB X Time	1.02 (0.61 – 1.69)	0.95
Household Low-income Status		
Non-low-income	<i>ref</i>	
Low-income	1.01 (0.72 – 1.43)	0.95
LIM X Time	1.14 (0.78 – 1.65)	0.50
CRB X LIM	0.70 (0.31 – 1.58)	0.39
CRB X Time X LIM	1.22 (0.46 – 3.23)	0.70
Employment/Income Loss Due to COVID-19		
No Employment/Income Loss	<i>ref</i>	
Employment/Income Loss	1.60 (1.19 – 2.16)	<0.001
Employment/Income Loss X Time	0.92 (0.65 – 1.31)	0.65
Median Stringency in Province	0.95 (0.92 – 0.99)	0.01
Stringency X Time	1.06 (1.01 – 1.10)	0.02
Child Age at Baseline	1.03 (1.00 – 1.06)	0.08
Child Gender		
Boy+	<i>ref</i>	
Girl+	1.51 (1.28 – 1.78)	<0.001
Family Structure		
Two biological parents	<i>ref</i>	
One or no biological parents	1.36 (1.12 – 1.65)	<0.001
Child Indigenous Identity		
Non racialized, non-Indigenous	<i>ref</i>	
Indigenous	1.14 (0.80 – 1.63)	0.47
Child Racialized Group		
Non racialized, non-Indigenous	<i>ref</i>	
South Asian	0.22 (0.15 – 0.32)	<0.001
Chinese	0.35 (0.24 – 0.51)	<0.001
Black	0.18 (0.11 – 0.28)	<0.001
Filipino	0.15 (0.09 – 0.25)	<0.001
Arab	0.22 (0.12 – 0.43)	<0.001

Latin American	0.29 (0.11 – 0.75)	0.01
Southeast Asian	0.45 (0.18 – 1.15)	0.1
West Asian	1.03 (0.45 – 2.37)	0.94
Korean	0.76 (0.23 – 2.51)	0.65
Japanese	0.61 (0.23 – 1.63)	0.32
Multiple	0.52 (0.27 – 1.00)	0.05
PMK Self-reported Mental Health		
Good/Very Good/Excellent	<i>ref</i>	
Fair/Poor	3.92 (3.07 – 5.02)	<0.001

ICC = 0.46 (0.41 – 0.51). ROC Area = 0.97 (0.97 – 0.97).

As before, the main parameters of interest are the CRB by time, and CRB by time by low-income status interactions. First, the main effect for time was significant (OR: 1.93, 95%CI: 1.65 – 2.25, $p < 0.001$) suggesting increased odds of emotional functional difficulty in 2023 compared to 2019. The main effect of the CRB was not significant (OR: 1.16, 95%CI: 0.76 – 1.79, $p = 0.49$). Also, for those in non-low-income households, the association of the CRB with an attenuation to emotional functioning declines was non-significant (OR: 1.02, 95%CI: 0.61 – 1.69, $p = 0.95$) with a point estimate close to the null.

For those living in low-income households, the findings were largely similar as the three-way interaction was not significant (OR: 1.22, 95%CI: 0.46 – 3.23, $p = 0.70$). The low-income by time, and CRB by low-income interactions were similarly not significant ($p = 0.50$, and $p = 0.39$, respectively) with point estimates relatively close to the null.

Similarly to cognitive-behavioural functional difficulties, there was a significant association between employment or income loss during the COVID-19 pandemic and emotional functional difficulties in 2019 (OR: 1.60, 95%CI: 1.19 – 2.16, $p < 0.001$). In

addition, as with cognitive-behavioural functional difficulties, there was no significant employment loss by time interaction (OR: 0.92, 95%CI: 0.65 – 1.31, $p = 0.65$).

Unlike with cognitive-behavioural functional difficulties, a 1-unit increase in median provincial COVID-19 stringency was associated with a small reduction in the odds of emotional functional difficulty in 2019 (OR: 0.95, 95%CI: 0.92 – 0.99, $p = 0.01$), suggesting that those living in provinces with a higher stringency index during the pandemic had lower odds of reporting emotional functional difficulties pre-pandemic due to confounding factors. However, the stringency by time interaction was small but significant as well (OR: 1.06, 95%CI: 1.01 – 1.10, $p = 0.02$) suggesting that living in provinces with higher levels of stringency was associated with increased odds of emotional functional difficulty over time compared to those provinces with lower levels of median stringency.

The unconditional intra-class correlation calculated for the multilevel logistic regression was 0.53 (95%CI: 0.48 – 0.57), which means that the estimated proportion of variance explained at the individual level is 53%, while 47% is explained at the observation level. The intra-class correlation for the final model was 0.46 (95%CI: 0.41 – 0.51). The area under the receiver-operator curve was 0.97 (95%CI: 0.97 – 0.97).

CRB by Time Interaction without CRB by Time by Low-income Interaction

It is difficult to interpret the overall associations of the CRB with outcomes when including the CRB by time by low-income interaction, because the inclusion of this term in the models means that the CRB by time parameter shown in output only applies to

those who are non-low income. In addition, though some possible trends were observed in the three-way interactions, none were statistically significant, meaning that there is not sufficient evidence to conclude that the association of the CRB with changes in outcomes varies by low-income status. Therefore, to allow for easier interpretation of the association of the CRB with outcomes and in light of the three-way interactions not being observed to be significant, the models discussed previously were run without the three-way interactions (or additional two-way interactions added alongside the three-way interaction i.e. low-income by time, and CRB by low-income). The results of these models are compiled in Table 6.

Table 6. Multilevel logistic regression results showing associations between receipt of the CRB (plus covariates) and PMK reported odds of fair/poor mental health and odds of child functional difficulties in cognitive-behavioural or emotional domains excluding CRB X Time X LIM interaction and associated two-way interactions (except CRB X Time).

Variable	PMK MH, n = 14,400	Child Cog-Func., n = 8,900	Child Emo-Func., n = 8,900
Time			
2019	<i>ref</i>	<i>ref</i>	<i>ref</i>
2023	2.45 (2.03 – 2.95)	1.10 (0.90 – 1.34)	1.96 (1.69 – 2.27)
Receipt of CRB			
CRB not received	<i>ref</i>	<i>ref</i>	<i>ref</i>
CRB received	1.04 (0.64 – 1.68)	0.63 (0.40 – 1.00)	1.05 (0.73 – 1.51)
CRB X Time	0.96 (0.56 – 1.64)	1.04 (0.60 – 1.81)	1.09 (0.71 – 1.68)
Household Low-income Status			
Non-low-income	<i>ref</i>	<i>ref</i>	<i>ref</i>
Low-income	1.47 (1.10 – 1.96)	1.37 (0.98 – 1.93)	1.03 (0.81 – 1.32)
Employment or Income Loss Due to COVID-19			
No Employment/ Income Loss	<i>ref</i>	<i>ref</i>	<i>ref</i>
Employment/ Income Loss	2.04 (1.42 – 2.94)	1.63 (1.12 – 2.39)	1.59 (1.18 – 2.14)
Employment/ Income Loss X Time	1.72 (1.16 – 2.54)	1.25 (0.81 – 1.93)	0.93 (0.66 – 1.32)
Median Stringency in Province	0.95 (0.90 – 1.00)	0.99 (0.94 – 1.04)	0.95 (0.92 – 0.99)
Stringency X Time	1.08 (1.02 – 1.14)	1.00 (0.95 – 1.06)	1.06 (1.01 – 1.10)
PMK/Child Age at Baseline	0.98 (0.97 – 1.00)	1.01 (0.97 – 1.05)	1.03 (1.00 – 1.06)
PMK/Child Gender			
Man+/Boy+	<i>ref</i>	<i>ref</i>	<i>ref</i>
Woman+/Girl+	1.95 (1.23 – 3.11)	0.54 (0.43 – 0.68)	1.51 (1.28 – 1.78)
Family Structure			
Two biological parents	<i>ref</i>	<i>ref</i>	<i>ref</i>
One or no biological parents	2.22 (1.77 – 2.79)	2.09 (1.62 – 2.69)	1.36 (1.12 – 1.65)
PMK/Child Indigenous Identity			

Non racialized, non-Indigenous	<i>ref</i>	<i>ref</i>	<i>ref</i>
Indigenous	2.79 (1.72 – 4.53)	1.39 (0.89 – 2.19)	1.15 (0.80 – 1.64)
PMK/Child Racialized Identity			
Non racialized, non-Indigenous	<i>ref</i>	<i>ref</i>	<i>ref</i>
South Asian	0.21 (0.12 – 0.38)	0.23 (0.14 – 0.39)	0.22 (0.15 – 0.32)
Chinese	0.61 (0.35 – 1.06)	0.36 (0.20 – 0.68)	0.35 (0.24 – 0.51)
Black	0.33 (0.18 – 0.60)	0.26 (0.14 – 0.49)	0.17 (0.11 – 0.28)
Filipino	0.28 (0.10 – 0.78)	0.47 (0.24 – 0.93)	0.15 (0.09 – 0.25)
Arab	0.09 (0.03 – 0.25)	0.42 (0.16 – 1.09)	0.22 (0.12 – 0.43)
Latin American	0.24 (0.07 – 0.80)	1.58 (0.41 – 6.15)	0.29 (0.11 – 0.76)
Southeast Asian	0.76 (0.25 – 2.34)	0.69 (0.24 – 1.97)	0.46 (0.18 – 1.17)
West Asian	0.09 (0.02 – 0.50)	0.59 (0.17 – 2.09)	1.03 (0.45 – 2.36)
Korean	0.76 (0.17 – 3.37)	0.52 (0.05 – 5.03)	0.75 (0.23 – 2.47)
Japanese	0.52 (0.04 – 4.21)	0.65 (0.16 – 2.67)	0.61 (0.23 – 1.64)
Multiple	0.39 (0.04 – 4.53)	0.46 (0.17 – 1.25)	0.51 (0.27 – 1.00)
PMK Self-Reported Mental Health			
Good/Very Good/Excellent	-	<i>ref</i>	<i>ref</i>
Fair/Poor	-	4.50 (3.29 – 5.88)	3.94 (3.08 – 5.04)

PMK MH: ICC = 0.61 (0.55 – 0.67). ROC Area = 0.99 (0.99 – 0.99).

Child Cog-Func.: ICC = 0.63 (0.56 – 0.69). ROC Area = 0.98 (0.98 – 0.98).

Child Emo-Func.: ICC = 0.46 (0.41 – 0.51). ROC Area = 0.97 (0.97 – 0.97).

As previously, the main parameter of interest is the CRB by time interaction. The

interaction terms were not significant for any of the models, with point estimates close to

the null.

Family Structure Sensitivity Analysis

Due to measurement limitations, only employment or income loss during the COVID-19 pandemic for the person most knowledgeable is known. Therefore, it is not known whether, for example, a spouse lost employment or income during COVID-19. To address this, the main analyses were repeated for those living in single-parent households at baseline. The intent for this sensitivity analysis is that within this group, in principle, employment or income losses during the pandemic in a household would be fully accounted for, thereby eliminating confounding from unmeasured spousal employment or income loss. The results of this sensitivity analysis are reported in Table 7.

Table 7. Multilevel logistic regression results showing associations between receipt of the CRB (plus covariates) and PMK reported odds of fair/poor mental health and odds of child functional difficulties in cognitive-behavioural or emotional domains in only single-parent households.

Variable	PMK MH, n = 2,500	Child Cog-Func., n = 1,700	Child Emo-Func., n = 1,700
Time			
2019	<i>ref</i>	<i>ref</i>	<i>ref</i>
2023	2.90 (2.03 – 4.13)	1.22 (0.83 – 1.79)	1.82 (1.30 – 2.55)
Receipt of CRB			
CRB not received	<i>ref</i>	<i>ref</i>	<i>ref</i>
CRB received	1.95 (0.93 – 4.1)	1.00 (0.44 – 2.30)	0.89 (0.42 – 1.87)
CRB X Time	0.52 (0.23 – 1.20)	0.72 (0.28 – 1.83)	1.35 (0.58 – 3.14)
Household Low-income Status			
Non-low-income	<i>ref</i>	<i>ref</i>	<i>ref</i>
Low-income	1.17 (0.79 – 1.74)	1.71 (1.03 – 2.83)	1.03 (0.70 – 1.53)
Employment or Income Loss Due to COVID-19			
No Employment/ Income Loss	<i>ref</i>	<i>ref</i>	<i>ref</i>
Employment/ Income Loss	1.70 (0.98 – 2.97)	1.17 (0.58 – 2.34)	2.27 (1.30 – 3.97)
Employment/ Income Loss X Time	1.85 (1.00 – 3.45)	2.44 (1.20 – 4.97)	1.27 (0.67 – 2.40)
Median Stringency in Province	0.88 (0.80 – 0.96)	1.01 (0.91 – 1.13)	0.95 (0.88 – 1.04)
Stringency X Time	1.14 (1.02 – 1.26)	0.98 (0.87 – 1.10)	1.05 (0.95 – 1.16)
PMK/Child Age at Baseline	0.97 (0.94 – 0.99)	0.95 (0.88 – 1.02)	1.02 (0.96 – 1.09)
PMK/Child Gender			
Man+/Boy+	<i>ref</i>	<i>ref</i>	<i>ref</i>
Woman+/Girl+	3.10 (1.27 – 7.56)	0.55(0.34 – 0.90)	1.23 (0.86 – 1.75)
PMK/Child Indigenous Identity			
Non racialized, non-Indigenous	<i>ref</i>	<i>ref</i>	<i>ref</i>
Indigenous	3.53 (1.40 – 8.92)	1.31 (0.57 – 3.02)	1.32 (0.68 – 2.55)
PMK/Child Racialized Identity			
Non racialized, non-Indigenous	<i>ref</i>	<i>ref</i>	<i>ref</i>

South Asian	0.35 (0.12 – 1.06)	0.12 (0.03 – 0.49)	0.06 (0.02 – 0.19)
Chinese	0.57 (0.33 – 1.46)	0.10 (0.02 – 0.40)	0.25 (0.11 – 0.56)
Black	0.37 (0.18 – 0.76)	0.24 (0.10 – 0.58)	0.13 (0.07 – 0.26)
Filipino	0.15 (0.04 – 0.61)	0.48 (0.14 – 1.58)	0.33 (0.12 – 0.94)
Arab	0.18 (0.03 – 1.11)	0.27 (0.03 – 2.32)	0.18 (0.04 – 0.75)
Latin American	0.05 (0.01 – 0.35)	1.54 (0.16 – 14.6)	0.19 (0.03 – 1.17)
Southeast Asian	1.46 (0.19 – 11.1)	1.29 (0.10 – 16.1)	1.19 (0.07 – 20.4)
West Asian	0.10 (0.01 – 1.33)	0.53 (0.10 – 2.91)	0.20 (0.04 – 0.99)
Korean	2.99 (0.28 – 31.8)	0.22 (0.01 – 5.41)	0.15 (0.02 – 1.31)
Japanese	3.48 (0.11 – 113)	1.24 (0.16 – 9.34)	2.15 (0.38 – 12.2)
Multiple	0.12 (0.01 – 1.69)	0.61 (0.12 – 3.25)	0.12 (0.03 – 0.55)
PMK Self-Reported Mental Health			
Good/Very Good/Excellent	-	<i>ref</i>	<i>ref</i>
Fair/Poor	-	3.25 (1.91 – 5.51)	3.44 (2.14 – 5.53)

PMK MH: ICC = 0.50 (0.39 – 0.61). ROC Area = 0.97 (0.97 – 0.98).

Child Cog-Func.: ICC = 0.64 (0.53 – 0.75). ROC Area = 0.98 (0.98 – 0.98).

Child Emo-Func.: ICC = 0.47 (0.37 – 0.57). ROC Area = 0.96 (0.96 – 0.97).

As before, the main parameter of interest is the CRB by time interaction. For PMK self-reported mental health the CRB by time interaction not associated with a significant attenuation of the mental health decline ($p = 0.13$) with an odds ratio of 0.52 (95%CI: 0.23 – 1.20). However, there is a pattern of results which may suggest the CRB as beneficial. This finding is illustrated by Figure 3.

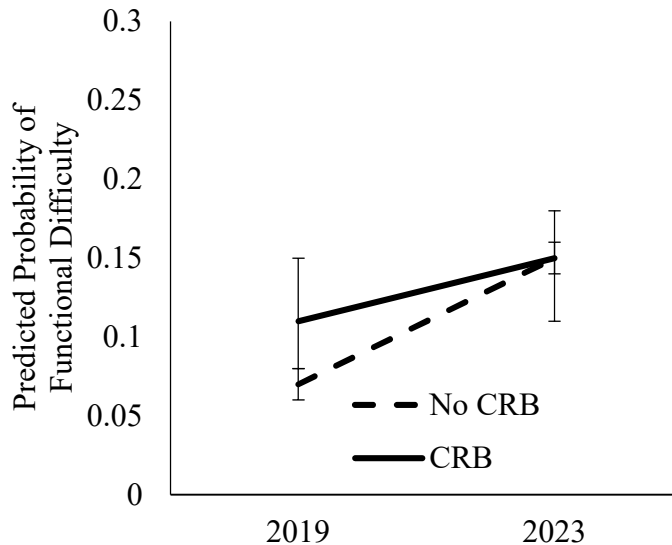


Figure 3. Marginal effects plot from Table 7 PMK MH model depicting predicted probability of PMK reporting fair or poor mental health over time by receipt of the CRB (CRB X Time interaction is difference in slopes) in single-parent households.

Bearing in mind that the CRB by time interaction was not significant, Figure 3 suggests that the increased probability of reporting fair or poor mental health from 2019 to 2023 may have been attenuated in the group that received the CRB, compared to those that did not.

For both cognitive-behavioural (OR: 0.72, 95%CI: 0.28 – 1.83, $p = 0.49$) and emotional functional difficulties (OR: 1.35, 95%CI: 0.58 – 3.14, $p = 0.49$) in single-parent households the CRB by time interactions were not significant and with wide confidence intervals making any definitive conclusions impossible to make.

DISCUSSION

This work sought to examine whether receipt of the Canada Recovery Benefit (CRB) was associated with an attenuation of PMK mental health, and child functional outcome declines over time, compared to those who did not receive the CRB, after adjusting for measured covariates, and whether these associations differed based on low-income status. No significant results at the $\alpha = 0.05$ level were observed to support these hypotheses. Point estimates generally supported the CRB being associated with small to unimportant attenuation of mental health and functional declines, though given their non-significant nature they are plausibly due to sampling error. The three-way CRB by time by low-income status interactions tested were also not significant at the $\alpha = 0.05$ level, and the trends suggested by point estimates were inconsistent. Therefore, there is insufficient evidence to show that the associations of the CRB with mental health and functioning, supposing they exist, vary by low-income status.

Regarding the associations of the CRB with PMK self-reported general mental health, the findings were not significant (OR: 0.76, 95%CI: 0.40 – 1.46, $p = 0.41$). This may be because, as previous research has suggested, the impacts of economic supplements on mental health are small (Thomson *et al.*, 2022; Boccia *et al.*, 2023; Milligan & Stabile, 2011), potentially too small to be detected in the current study. Although, despite their small size, supposing they exist, these effect sizes may still be relevant when applied on the population level (Rose, 1985). The CRB by time by low-income status interaction was also not significant ($p = 0.17$). This means that significant differences in the association of the CRB with an attenuation of mental health declines between low-income and non-low-

income households were not observed. For the sensitivity analysis using only single-parent households to, in principle, completely account for household unemployment or income loss as a confounding factor, the CRB was still not significantly (OR: 0.52, 95%CI: 0.23 – 1.20, $p = 0.13$) associated with attenuating a decline in mental health. However, the confidence intervals generally supported a beneficial effect with them ranging from large beneficial to unimportant effect sizes. Despite this, the general pattern of results does not allow for definitive conclusions as to whether receipt of the CRB is associated with an attenuation of mental health decline during the COVID-19 pandemic. Though, the single-parent sensitivity analysis does provide some, albeit limited, indication that the CRB could possibly be protective.

For the association between the CRB and PMK reported child cognitive-behavioural functional difficulty the CRB was observed to have no significant association with cognitive-behavioural functioning. For non-low-income households the association was not significant ($p = 0.65$). Additionally, the CRB by time by LIM interaction was not significant ($p = 0.54$). Therefore, differences in the association of the CRB with cognitive-behavioural functional difficulty for low-income and non-low-income households were not observed. Finally, for the single-parent sensitivity analysis, the CRB by time interaction was not significant ($p = 0.49$). These non-significant results could reflect the findings of previous research where the impact of financial supplements on child mental health is relatively small (Boccia *et al.*, 2023), though confidence intervals are too large to make any real determination of effect size or direction for this outcome.

Similar to cognitive-behavioural functional difficulty, the CRB was observed to have non-significant associations with respect to attenuating declines in emotional functional difficulty. For those in non-low-income households the association of the CRB with emotional functional difficulties was non-significant ($p = 0.95$) with a point estimate close to the null. In low-income households compared to non-low-income households no significant difference ($p = 0.70$) in the associations of the CRB with emotional functional difficulties was observed. For the single-parent sensitivity analysis, the association of the CRB with attenuation of emotional functional difficulty decline was not significant ($p = 0.49$). As above, it may be the case that the small effect sizes of income supplements observed in previous research (Boccia *et al.*, 2023) were too small to be detected by this analysis. However, confidence intervals are too large to conclusively determine effect size or direction based on these data.

Other important findings include, first, that employment or income loss during the pandemic was consistently associated with significantly worsened PMK mental health from 2019 to 2023 with confidence intervals suggesting unimportant to moderate effect sizes. This matches with previous literature surrounding employment losses (Hergenrather *et al.*, 2015; McDowell *et al.* 2021). Significant associations were not consistently observed for child functional difficulty outcomes. A second finding to highlight is that higher levels of median COVID-19 stringency within a province was consistently associated with poorer PMK mental health outcomes across time, aligning somewhat with previous research on the stringency index in Canada (Cameron-Blake *et al.*, 2023).

Another important set of findings is the characteristics of households which were associated with higher odds of receiving the CRB (Table 2), implying these households were more likely to have been impacted by the pandemic on an economic level. Being a low-income household prior to the pandemic were associated with a significant ($p < 0.001$), moderately sized increase in the odds of receiving the CRB. While identifying with certain racialized groups was generally associated with a significant ($p < 0.001$), small increase in the odds of receiving the CRB. Thus, both low-income and racialized groups appear to have been more strongly impacted on an economic level by the pandemic compared to their non-low-income, and non-racialized counterparts. In addition to these findings, households with fewer than two biological parents were associated with significantly ($p = 0.03$) lower odds of receiving the CRB. Finally, though likely unimportant in size, there was a significant ($p = 0.02$) association between a 1-year increase in PMK age and receipt of CRB.

When it comes to the odds of receiving the CRB, the findings of this study are similar to those which have been observed previously (Statistics Canada, 2022). First, low-income households have previously been observed to have been more likely to receive pandemic related benefits (Statistics Canada 2022). With respect to Indigenous identity and racialized identity the findings also generally follow previous research where those identifying as non-Indigenous and non-racialized were less likely to receive CRB compared to racialized or Indigenous groups, with this mainly being due to racialized and Indigenous Canadians being more likely to have experience unemployment during the pandemic (Public Health Agency of Canada, 2020).

Previous research had not found that older adults were more likely to receive the CRB, rather, the opposite was found where younger adults were more likely to receive pandemic-related benefits (Statistics Canada, 2022). However, this may be explained by the sample for analysis only including parents with a child aged 5-13. For the general population of adults, those who are retired would not be eligible for the CRB and most retirees would likely not have children within this age range, therefore, this difference in the odds of receiving the CRB compared to previous research may be a product of the sampled population being different than the general population of adults examined in previous research.

With respect to households with fewer than two biological parents being less likely to receive CRB, this may be an artefact of the CRB being measured on a household level, rather than the individual level. Pre-pandemic economic risk factors would lead one to expect single-parent households (which are a subset of this category) to be more vulnerable to economic impacts of the pandemic (Messacar *et al.*, 2020) and hence more likely to receive the CRB. However, assuming some large proportion of the fewer than two biological parent group is single-parent households, that group would only have one opportunity, so to speak, to receive the CRB, whereas a two-parent household would have two. Therefore, all else being equal, one may expect that the probability of a single-parent household receiving the CRB would be half that of a two-parent household simply on that basis. Of course, in reality, these groups differ in other respects but one may still expect that households with fewer than two biological parents would be less likely to receive the CRB on this basis.

The analysis which examined the odds of receiving the CRB based on certain characteristics generally is in agreement with previous research (Messacar *et al.*, 2020; Public Health Agency of Canada, 2020; Statistics Canada, 2022). Any differences can be plausibly explained by differences between the CHSCY sample and the general adult population and the fact that receipt of CRB was measured on a household rather than individual level.

While the main objectives of this study are generally inconclusive, this should not be thought of as evidence for the CRB not being effective overall. This work should primarily be viewed as hypothesis generating, especially given the methodological issues which will be discussed further, so the limited indications that the CRB may be beneficial which do exist should be the impetus to conduct further research in this domain that is able to address some of the issues that exist with the current study. Other aspects of this work support the idea that economic supports could potentially be promising, for instance the significant worsening of PMK mental health that was associated with employment loss could be partially due to losses in income. Therefore, an income supplement is a strong candidate to offset such income-related mental health declines. Finally, even if the mental health impacts of the CRB are truly null, there are many other aspects that one should consider when evaluating the overall impact of the CRB, such as societal or economic outcomes. Thus, this work should not be seen as an overall evaluation of the CRB, rather it examines the CRB purely through a mental health lens. In that sense, when considering potential effects of similar programs in future pandemics or severe recessions, potential beneficial impacts on mental health from these programs could be

taken into consideration, though more research is required to solidify this finding for the purposes of policy especially with respect to examining important outcome beyond mental health and functioning.

Strengths of Study

The primary strengths of the study come from the attributes of the L-CHSCY itself. First, the sampling methodology of the L-CHSCY is excellent. The sampling frame making use of the Canada Child Benefit file ensures 98% coverage of children across Canada, while the robust stratified sampling approach and sampling weights make the L-CHSCY effectively the gold-standard for population-based representative surveys, as is the case with many other Statistics Canada surveys. Consequently, the findings from this study should be generalizable and applicable to the general population of Canadian children and their parents in 2019 with the exception of the territories and those living on reserve plus those falling under other exclusion criteria. However, the response rate (52.1%) and retention rate (54.2%) are relatively low (Statistics Canada 2025c) which could limit generalizability somewhat.

A second major strength of the study is the tax linkage to the T1 family file. This allows for much more accurate measurement with respect to the financial status of households in the study than can be done with self-reported measures alone. This is particularly important for the receipt of the CRB which is the primary exposure of interest in the analysis but is also important for ensuring accurate ascertainment of household low-income status. Therefore, at least with respect to income related variables there should be

little measurement error (for the years in which they are available). However, one limitation of this approach is that it can only capture those who file taxes.

A final strength to highlight is the geographic linkage to COVID-19 stringency data from the Oxford Government Response Tracker. While a provincial level linkage can only control for so much, accounting at least to some extent for differences across Canada with respect to non-pharmaceutical public health interventions to control COVID-19 is important. This is because COVID-19 stringency could represent a potential confounder as it may be associated with employment or income loss and hence receipt of CRB, as well as changes to mental health while not necessarily being on the causal pathway. Therefore, this geographic linkage of COVID-19 stringency adds value to the L-CHSCY survey, and this study.

Limitations of Study

As with all non-randomized study designs a major limitation of this study is the fact that those who are exposed and not exposed to the exposure of interest may differ systematically from each other. In the case of this study, it is clear that those who received the CRB versus not would differ, as in order to be eligible for the CRB, one needed to have a loss of income or employment during the COVID-19 pandemic. Thus, inherent in the receipt of CRB is the harmful confounder of having lost employment or income. This is clearly shown in Table 2 as well, where, for example, low-income, and racialized groups were both associated with an increased odds of receiving the CRB and these characteristics are also associated with mental health and functioning outcomes, as can be

seen in other results tables. In order to address this, employment or income loss during the pandemic and other measured confounders were included as a covariate in regression models. However, the employment or income loss variable was only available for the person answering the survey. This means that, as observed in Table 1, only 34.5% of those who lived in households which received the CRB reported employment loss during the COVID-19 pandemic. A substantial portion of the group which received the CRB but did not report an employment or income loss (65.5%) are likely respondents in households where another member besides the respondent experienced employment loss. One could hypothesize that spousal income or employment loss may be as important with respect to controlling for confounding, but this information was not available in the survey. While the single-parent sensitivity analysis that was conducted addressed this issue somewhat, single-parent households are likely to differ from those with two parents in other ways, making this an imperfect solution. Therefore, the uncontrolled confounding associated with spousal income or employment loss during the pandemic is still a major issue and likely results in the CRB appearing to have weaker attenuating effects within the analysis than it may have in truth.

Another limitation to this study is that the tax-linked data associated with the 2023 L-CHSCY is only available for 2021 and 2022, while the CRB was introduced in September 2020. Therefore, if a household only received the CRB in 2020, and not at any subsequent time, then they would be misclassified as not having received the CRB in this study. Consequently, this misclassification would result in results being biased towards to null. Conducting a tax linkage to the 2020 T1 family file and taking that information into

account when coding receipt of the CRB could be done to alleviate this issue. Treating receipt of the CRB as binary is also a limitation as the association with changes in mental health and functioning may differ depending on the total amount received. However, in the absence of 2020 tax data the total amount received would likely be inaccurate for many households should the dollar amount have been used.

Another limitation to highlight is the fact that the measurement of the outcome in 2023 may be too far removed from the exposure to detect meaningful effect sizes. As most CRB recipients received the CRB in 2021, there would be approximately two years from the receipt of the CRB until the measurement of mental health or functional difficulty in the 2023 L-CHSCY. Therefore, whatever effects the CRB may have had on mental health or functional difficulty could have diminished considerably by the time that these outcomes were measured, and this may contribute to why significant associations of the CRB with attenuation of declines in outcomes were not observed. This issue cannot reasonably be addressed in the L-CHSCY, but perhaps tax linkages to ascertain CRB receipt could be conducted for other longitudinal surveys which were conducted more frequently during the pandemic. This would then enable outcomes to be measured more proximally to the receipt of the CRB.

A final limitation to discuss is the measurement used to evaluate changes in mental health and functional difficulty. While these measures have been validated, given the small changes in mental health which have been observed in previous studies regarding income supplementation, having more sensitive measures would likely be more suitable in order to detect these small changes in mental health. Mental health scales would be helpful in

this regard both because they are typically more sensitive to change due to their dimensional nature, but also because being able to evaluate continuous outcomes would generate more statistical power for the same sample size as compared to the binary outcomes used in this study. Thus, the binary measures used in this study may not have been able to detect the small changes that are expected based on literature, and therefore using mental health scales in future research would be warranted.

Directions for future research

Future research could involve addressing some of the limitations of the current study by making use of other peri-pandemic surveys which could be linked to tax data for the purposes of investigating the associations of the CRB with attenuating mental health decline. In addition to this, other pandemic-era income supplements such as the Canada Emergency Response Benefit (CERB) could be investigated, as this benefit was received by more Canadians than the CRB and was for a larger dollar amount. Therefore, it could potentially have a larger, more easily detected, impact on mental health.

Ascertaining a tax linkage to the 2020 T1 family file would allow investigating the CERB in the L-CHSCY, but other surveys could be used as well to address other methodological issues. Having the 2020 tax linkage could also allow for further investigation into income related factors such as changes in household income throughout the pandemic period, and exact amounts of specific pandemic benefits received.

A final possible direction for future research could be to evaluate associations between pandemic supplements and mental health within the L-CHSCY but cross-sectionally,

using just the 2023 L-CHSCY data as it does have better measures for mental health than the measures which are present in 2019 and 2023 and would still have the tax linkage during the pandemic. Unfortunately, this would trade better measurement for a poorer ability to make causal inferences due to weaknesses inherent to cross-sectional study designs i.e. reverse causation, inability to control for baseline outcome measures etc.

Despite the non-significant results observed in this thesis, there are some small indications that examining the associations of the CRB or other pandemic-related benefits may yield results, should some methodological issues from this work be addressed. It is important to determine whether the CRB and related benefits are associated with an attenuation of mental health and functioning outcomes so that these potential beneficial effects can be taken into consideration when creating such policies. This work could not only be used to inform policy for future pandemics but also responses to other economic crises causing large-scale unemployment and raised costs of living. With the continuing threat of American tariffs on Canada having the potential of causing such a crisis, now is the time to generate the evidence that policy makers need to make informed decisions regarding economic supports for Canadians.

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