



Research Paper

Parental loneliness, parental stress and child mental health during the COVID-19 pandemic: Variations by cumulative socioeconomic risk

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ABSTRACT

Background: The COVID-19 pandemic has raised concerns about parent and child mental health, especially within disadvantaged families. However, little is known about how parental stress and loneliness during the pandemic influenced their children and no studies have investigated if these associations could vary by socioeconomic status.

Methods: In July to September 2021, a large representative sample of parents ($N = 4,524$) in Québec (Canada) reported on aspects of their own mental health and that of their 9–10 year old child. Outcome variables were child externalizing and internalizing symptoms. Exposure variables were changes in parental loneliness and parental stress since the onset of the pandemic. The moderator variable was cumulative socioeconomic risk. Multiple linear regression analyses were executed and adjusted for confounding factors.

Results: Child internalizing symptoms were associated with higher levels of parental stress ($\beta = 0.14, p < .001$) and loneliness ($\beta = 0.23, p < .001$). Child externalizing symptoms were also associated with parental stress ($\beta = 0.13, p < .001$) and loneliness ($\beta = 0.18, p < .001$). Most of these associations were stronger within the most disadvantaged households.

Limitations: The cross-sectional design does not allow interpretations about causality.

Conclusions: Increases in parental stress and loneliness since the onset of the COVID-19 pandemic would be detrimental to parent and child mental health. As these issues were amplified within families experiencing more socioeconomic adversities, our results can inform public policy to support families in times of crisis and direct resources to those most in need.

1. Introduction

The ongoing COVID-19 pandemic and resulting mitigation measures have affected the wellbeing of children and families across the globe (Coller and Webber, 2020; Gassman-Pines et al., 2020). Families had to adapt without notice to a myriad of general and family-specific adversities including school closures, children's distance learning, disruptions to daily routines, social distancing, difficulties in access to services and caregiving burdens. These abrupt changes negatively influenced aspects of parental and child mental health (Adams et al., 2021; Calvano et al., 2021), especially in socioeconomically disadvantaged families (Gadermann et al., 2021; Gibson et al., 2021). Less is known however about how aspects of parental mental health during the pandemic, namely

stress and loneliness, could have influenced child mental health and how these associations could vary across socioeconomic status. In this study, we investigated whether parental stress, parental loneliness, child internalizing symptoms and child externalizing symptoms in 2021 during COVID-19 varied according to household socioeconomic status. Next, in our main analysis, we explored whether parental loneliness and parental stress during COVID-19 influenced child internalizing and externalizing symptoms, and whether these associations were conditioned by levels of socioeconomic risk experienced by families.

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1.1. The mental health of children and parents during the COVID-19 pandemic

Longitudinal evidence suggests that internalizing and externalizing symptoms among youth increased from before to during the pandemic (Chadi et al., 2022). Findings suggest that children were at greater risk of mental health problems than other age groups (Abramson, 2022). This is concerning in both the short and long-term. As such, identifying risk factors associated with child mental health within the pandemic context should be a focus in research and public policy (Chadi et al., 2022). Research shows that parental mental health struggles were associated with that of their children (Wolicki et al., 2021) and that the COVID-19 context has been especially difficult for parents. For instance, in Canada, parents with children living at home reported higher levels of alcohol consumption, suicidal thoughts, anxiety and depression in comparison to those without children under their care (Gadermann et al., 2021).

Upsurges in stress and loneliness have stand out as two core psychosocial features of the COVID-19 pandemic (Buecker and Horstmann, 2021; Cooke et al., 2020). Stress and loneliness are among the most potent risk factors for physical and mental health problems. For instance, a meta-analysis shows that loneliness had large effects on mental health outcomes (Park et al., 2020). Researchers estimate that suffering from loneliness has the equivalent health risk of smoking 15 cigarettes a day (Tiwari, 2013). Stress is another core risk factor for health problems. For instance, stressful life events escalate health problems and often precede the onset of mental health disorders (Schneiderman et al., 2005).

Further, the added strain on parents who experienced increases in loneliness and stress during the pandemic can be detrimental to the mental health of their children. For instance, in Italy, researchers found that increases in parenting stress during the pandemic had a moderate correlation with children's emotional deregulation (Spinelli et al., 2020). In the United States, a study conducted prior to the pandemic found associations between parental feelings of loneliness and the general health of parents and their adolescents (Thompson et al., 2020). The influence of parental loneliness and stress on child mental health warrants more attention, especially within the pandemic context. No research to our knowledge has documented how associations between parental and child well-being could be influenced by the socioeconomic status of households.

1.2. Socioeconomic risks and mental health

Children and youth from disadvantaged families are at greater risk for experiencing mental health problems (Reiss, 2013). A systematic review showed that the COVID-19 context widened these disparities in mental health (Gibson et al., 2021). For instance, a study found that mental health worsened among children at large during COVID-19 and that children whose parents had lower education were even more affected (Li et al., 2021). Though exposure to any risk factor can be detrimental to child development, exposure to increasing numbers of risk factors is associated with increasingly worse developmental outcomes (Evans et al., 2013; Rutter, 1979; Sameroff, 2000). Since the seminal work of Rutter (1979) on the cumulative risk hypothesis, the influence of exposure to cumulative risks on various outcomes has drawn widespread interest from researchers. In such studies, cumulative risk scores were typically created by adding 1 point for exposure to each risk (see Evans et al., 2013 for a review). In creating cumulative risk indexes, researchers create scores for a specific category of risk (e.g., socioeconomic) or sum together risk factors from multiple categories within a single index (e.g., demographic, psychological, biological risk factors). Some studies found that exposure to a singular risk was not related to outcomes but that associations only appeared once a certain number of risks accumulated (e.g. > 2 risks) (e.g. Rutter, 1979). Others found linear associations beginning at the exposure to a singular risk (e.

g. Appleyard et al., 2005). Most often cumulative risk indexes have been used as a parsimonious exposure variable leading to various behavioral outcomes. A new and interesting line of research has been investigating cumulative risk as a moderator between various exposures and outcomes (Evans et al., 2013). For instance, a notable recent study conducted in five European countries showed that various cumulative risks associated with the COVID-19 pandemic (e.g., social isolation, caregiver overload) were associated with mental health outcomes of children and caregivers. These associations were moderated by another cumulative risk index containing pre-existing psychosocial risk factors (e.g. caregiver education level, mono-parental households, psychiatric diagnoses within the family) (Pereira et al., 2021).

Building on these findings, we investigated how the mental health of children and parents during the COVID-19 pandemic could vary according to cumulative socioeconomic risk factors. We use low income, low education and single parent household in our cumulative socioeconomic risk index because (a) the 3 indicators have been consistently associated with child maladjustment (e.g. Family Stress Model) (Conger et al., 2010; Masarik and Conger, 2017) and (b) are classic indicators of socioeconomic status in child development studies (Evans et al., 2013) and (c) make a coherent SES index in terms psychometric properties (e.g. factorial validity). We focused on the intensity of parental stress and loneliness rather than including them in our cumulative risk index because they (a) are core psychological features associated with the COVID-19 pandemic, (b) have strong associations with outcomes in and of themselves and (c) are malleable and a good target for public policy. We hypothesized that the influence of parental loneliness and stress on child mental health would be even stronger within households faced with higher levels of cumulative socioeconomic risk. As such, we investigated this question using a large population-based sample of families with a 9–10 year-old child living in the Canadian province of Québec.

2. Methods

2.1. Participants and procedure

Participants were mothers (77%, $n = 3486$), fathers (22%, $n = 1014$) or other legal guardians (<1%, $n = 24$) (in this paper referred to as “parents”) of a 9–10 year-old child enrolled in 4th grade during the 2020–2021 school year completed questionnaires about themselves and their child. Sampling methodology for the current study is detailed in Fig. 1. In brief, the Institut de la Statistique du Québec (ISQ) randomly selected 8760 children who participated in the Quebec Survey of Child Development in Kindergarten (QSCDK) ($N = 83,335$) when they were enrolled in Kindergarten (2016–17 school year). Eligible parents were invited to participate in the current study and 4524 provided consent (55% response rate). Demographic characteristics of the sample are presented in Table 1.

Data were collected from July 14th to September 14th 2021 three months after a provincial wide lockdown in Québec and 15 months after the onset of the pandemic. In March 2020 in Québec, a public health emergency was declared, borders were closed and lockdowns were instated. Schools were closed for most children for the remainder of the school year. On average 70 school days were lost. When data was collected in July to September 2021, severe restrictions had eased, but several other measures were still in place (e.g. mask mandate, restrictions on gatherings, vaccine passport etc.). During the 2020–2021 school year, cases of COVID-19 in the school led to classroom closure 0.65 times ($SD=1.21$), cases of COVID-19 in the family led to child absenteeism 1.23 times ($SD=2.36$) and 6% of children tested positive for COVID-19.

The questionnaire administered to parents was developed by the Observatory for Children's Education and Health (OPES) in collaboration with the ISQ. Data were collected via an online questionnaire or telephone interview in English or in French (35 min duration). Parents

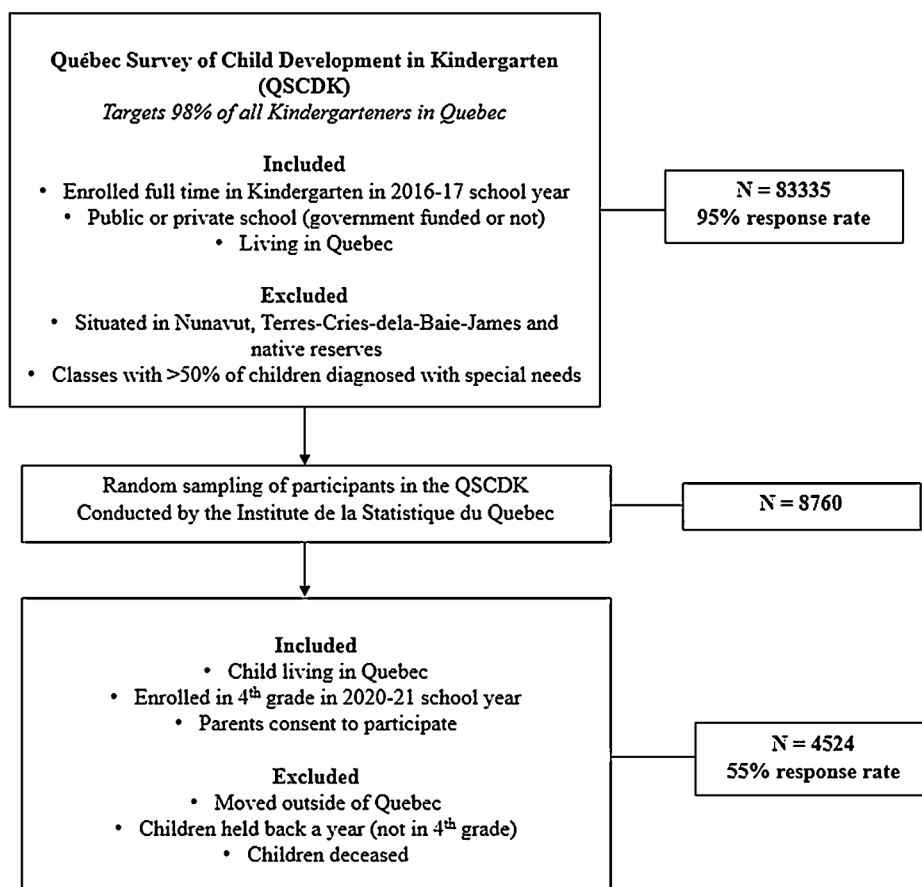


Fig. 1. Sampling methods for the current study.

reported on their current experience and that of their child, well as on changes that they and their child underwent since the onset of the pandemic in March 2020. Ethics approval for data collection was obtained from the ISQ and Sainte-Justine Hospital's ethics committee.

2.2. Measures

2.2.1. Parental loneliness

Parents were asked "to what extent have you suffered from isolation or solitude because of the COVID-19 pandemic?" using a response scale ranging from 1 (not at all) to 5 (a lot).

2.2.2. Parental stress

Parents were asked "Because of the COVID-19 pandemic, would you say that your stress level..." (1=strongly decreased; 4=stayed stable; 7=strongly increased).

2.2.3. Child mental health

Parents reported on children's internalizing (3 items: anxiety, depression, social withdrawal; $\alpha=0.62$) and externalizing symptoms (5 items: hyperactivity, impulsivity, attention, aggression, opposition; $\alpha=0.77$) over the last 6 months (1=never; 3=often) using an abbreviated parental version of the *Social Behavior Questionnaire* (SBQ). Scales were analyzed as continuous variables ranging from 1 to 3. The SBQ has adequate psychometric properties including convergent, divergent and structural validity and internal coherency (Collet et al., 2022).

2.2.4. Socioeconomic position

2.2.4.1. Singular socioeconomic risks. Education: Parents reported their highest level of education using 8 response options that corresponded to

the education system in Quebec ranging from no high school diploma to Master's degree or above.

Mono-parental households: Parents reported on their relationship status including if they were living with a partner (biological parent of the child or other) or not living with a partner (mono-parental).

Poverty line: Parents reported the total income of their household before taxes and deductions over the previous year in numerical format. If they did not provide an answer, they were asked to indicate the category of their household income using intervals of 25,000\$CA. In cases where parents declined to provide a specific numeric value of their household income but did provide the category, we imputed the missing value with the mid-point of the categorical response. Parents also reported the number of occupants in the household. We derived if the family was living under the poverty line according to 2020 thresholds from Statistics Canada on the basis of income and number of occupants. For instance, in 2020, a household with three occupants with less than 42,111 \$CA before taxes and deductions was under the poverty line threshold; a household with five occupants required a minimum of 57,989 \$CA (Statistics Canada, 2022).

2.2.4.2. Cumulative socioeconomic risk index. Using these singular risks, we created cumulative socioeconomic risk index by summing together three binary indicators of socioeconomic status including (a) parent education level (1 = a short professional diploma/certificate or lower), (b) single parent household (1=parents not living with a partner) and (c) household income (1=below the poverty line).

2.2.5. Covariates

Covariates included child's sex (male, female), parents' relationship with the child (mother, father, caregiver, host family, or extended family), parents' birthplace (Québec, Canada outside of Québec, outside

Table 1
Characteristics of participants.

	N	%
Relationship with child		
Mother	3486	77.05
Father	1014	22.42
Other legal guardian	24	0.52
Child custody		
Full time	3869	85.53
60% to less than 100%	237	5.24
40% to 60%	413	9.12
14% to less than 40%	5	0.11
Number of children living in household		
1	590	13.05
2	2293	50.69
3	1151	25.45
4	390	8.62
5	64	1.42
6	22	0.48
>7	13	0.28
Parent age group (years)		
Less than 29	25	0.56
30–34	364	8.05
35–39	1278	28.26
40–44	1687	37.28
45–49	837	18.51
50–54	253	5.59
55–59	52	1.16
60 years and above	27	0.60
Place of birth of participant		
Quebec	3316	73.30
In Canada, not Québec	162	3.59
Outside of Canada	1046	23.12
Language questionnaire was administered		
English	460	10.16
French	4064	89.84
Child's sex		
Male	2290	50.62
Female	2234	49.38
Poverty line		
Above poverty line	3734	82.53
Below poverty line	790	17.47
Education level		
Higher education	3332	73.65
Less than a professional diploma	1192	26.35
Mono-parental households		
Parent with partner	3780	83.56
Single parent	744	16.44
Number of cumulative socioeconomic risks		
0	2609	57.67
1	1287	28.45
2	481	10.63
3	147	3.26
Parents loneliness item		
Not at all	1074	23.75
A little	1673	36.97
Somewhat	870	19.24
Moderately	576	12.74
A lot	330	7.30
Parents stress item		
Strongly decreased	90	1.98
Considerably decreased	147	3.24
Somewhat decreased	195	4.31
Stayed stable	1065	23.55
Somewhat increased	1544	34.13
Considerably increased	910	20.11
Strongly increased	574	12.68

Note. Source: Data compiled from the preliminary file of *Résilience Familiale* (2022), © Gouvernement du Québec, Institut de la statistique du Québec.

of Canada), parents' age, percentage of time that the child resided with the parent, number of people living in household and the language in which the questionnaire was administered (English, French). [Table 1](#) shows the specific response choices for all covariates and the percentage of participants endorsing each response.

2.3. Statistical analyses

We provided descriptive statistics for exposure and outcome variables for the full sample and for each level of cumulative risk. In our main analyses, we used multiple linear regressions to test the influence of three exposures (cumulative socioeconomic risk, parental stress and parental loneliness) on two outcomes (child internalizing and externalizing symptoms). To test our moderation hypotheses, the interaction terms loneliness \times cumulative socioeconomic risk and stress \times cumulative socioeconomic risk were included in these models. A visual representation is provided for significant interactions. These included a regression line representing effects of the exposure at each level of cumulative risk. In addition, we showed the strength of the association at each level of cumulative risk with the R^2 statistic. Stress, loneliness and cumulative risk were mean-centered in regression analyses. We executed regression analyses with and without adjusting for covariates. Covariates with three or more categories were dummy coded. To ensure the representativeness of the sample, all results shown use weights provided by the ISQ that adjust for non-response rates, geographic locations and administrative regions. All analyses are two-tailed, used $p < 0.01$ for statistical significance and were conducted with SPSS version 27. Missing values were minimal ($< 3\%$) and excluded from analyses.

3. Results

As detailed in [Table 1](#), 67% of parents reported that their stress increased at least somewhat since the onset of the pandemic and 76% reported that they were suffering from loneliness at least a little more. [Table 2](#) presents the means and standard deviations for parental loneliness, parental stress and child internalizing and externalizing symptoms calculated in the full sample and at each level of risk. Overall, levels of parental stress, parental loneliness, child externalizing symptoms and child internalizing symptoms were higher at each added level of risk.

[Tables 3](#) and [4](#) present regression analyses without and with adjustment for covariates, respectively. Child externalizing symptoms were associated with parental loneliness ($\beta = 0.17$), parental stress ($\beta = 0.12$), and with cumulative socioeconomic risk ($\beta = 0.03$). The interaction between parental stress and cumulative socioeconomic risk was not significant. The interaction between parental loneliness and cumulative socioeconomic risk was significant ($p < .01$) such that the association was stronger within more disadvantaged families. The model accounted for 15% of variance once having adjusted for covariates. The association between parental loneliness and child externalizing symptoms is shown in [Fig. 2a](#), which shows that 5% of variance was explained for those with zero risks, 6% for those with one, 7% for those with two and 11% for those with three risks.

Child internalizing symptoms were associated with parental loneliness ($\beta = 0.21$), parental stress ($\beta = 0.13$), and with cumulative socioeconomic risk ($\beta = 0.02$). The interactions terms stress \times cumulative socioeconomic risk and loneliness \times cumulative socioeconomic risk were significant ($p < .001$) such that associations were stronger within disadvantaged families. The model accounted for 17% of variance once having adjusted for covariates. [Fig. 2b](#) shows the association between parental loneliness and child externalizing symptoms at each level of cumulative risk. Parental loneliness explained 8% of variance in child internalizing symptoms for those with zero risks as well as those with one risk, 12% for those with two risks and 18% for those with three risks. [Fig. 2c](#) shows the association between parental stress and child internalizing symptoms at each level of risk. Parental stress explained 6% of variance for those with zero risks, 5% for those with one or two risks and 13% for those with three risks.

4. Discussion

Drawing on a large and representative sample of families in the

Table 2
Mean levels of parental and child mental health in the full sample and at levels of cumulative socioeconomic risk.

	Full sample		Number of cumulative risks							
			0 Risk		1 Risk		2 Risks		3 Risks	
	M	SD	M	SD	M	SD	M	SD	M	SD
Loneliness (parent)	2.43	1.19	2.34	1.12	2.49	1.23	2.56	1.31	2.92	1.37
Stress (parent)	4.96	1.31	4.93	1.29	4.99	1.32	4.97	1.43	5.31	1.13
Externalizing symptoms (child)	1.66	0.47	1.64	0.45	1.68	0.48	1.71	0.51	1.78	0.55
Internalizing symptoms (child)	1.78	0.49	1.76	0.48	1.79	0.51	1.81	0.51	1.98	0.54

Note. Source: Data compiled from the preliminary file of *Résilience Famil* (2022), © Gouvernement du Québec, Institut de la statistique du Québec.

Table 3
Parental stress, parental loneliness, cumulative socioeconomic risks and interactions as predictors of child mental health outcomes: Regression analyses without controls.

	Children's mental health outcomes											
	Externalizing symptoms						Internalizing symptoms					
	B	SE	β	p	99% CI		B	SE	β	p	99% CI	
					Lower	Upper					Lower	Upper
Constant	1.66	0.00		<0.001	1.65	1.66	1.78	0.00		<0.001	1.78	1.79
Loneliness	0.07	0.00	0.18	<0.001	0.07	0.07	0.09	0.00	0.23	<0.001	0.09	0.10
Stress	0.05	0.00	0.13	<0.001	0.04	0.05	0.05	0.00	0.14	<0.001	0.05	0.06
Cumulative socioeconomic risk	0.03	0.00	0.04	<0.001	0.02	0.03	0.02	0.00	0.03	<0.001	0.02	0.03
Loneliness × Cumulative socioeconomic risk	0.01	0.00	0.02	<0.001	0.01	0.01	0.02	0.00	0.03	<0.001	0.01	0.02
Stress × Cumulative socioeconomic risk	0.00	0.00	0.00	0.47	0.00	0.01	-0.01	0.00	-0.01	<0.001	-0.01	0.00
R ²	0.07						0.11					

Note: SE=standard error; CI=confidence interval. Source: Data compiled from the preliminary file of *Résilience Famil* (2022), © Gouvernement du Québec, Institut de la statistique du Québec.

Table 4
Parental stress, parental loneliness, cumulative socioeconomic risks and interactions as predictors of child mental health outcomes: Regression analyses with controls (second step shown).

	Children's mental health outcomes											
	Externalizing symptoms						Internalizing symptoms					
	B	SE	β	p	99% CI		B	SE	β	p	99% CI	
					Lower	Upper					Lower	Upper
Constant	1.69	0.01		<0.001	1.66	1.73	1.79	0.01		<0.001	1.76	1.83
Loneliness	0.07	0.00	0.17	<0.001	0.06	0.07	0.09	0.00	0.21	<0.001	0.08	0.09
Stress	0.04	0.00	0.12	<0.001	0.04	0.05	0.05	0.00	0.13	<0.001	0.05	0.05
Cumulative socioeconomic risk	0.02	0.00	0.03	<0.001	0.01	0.02	0.01	0.00	0.02	<0.001	0.01	0.02
Loneliness × Cumulative socioeconomic risk	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.02	<0.001	0.00	0.01
Stress × Cumulative socioeconomic risk	0.00	0.00	-0.01	0.02	-0.01	0.00	-0.01	0.00	-0.02	<0.001	-0.01	-0.01
R ²	0.15						0.17					

Note: SE=standard error; CI=confidence interval. Source: Data compiled from the preliminary file of *Résilience Famil* (2022), © Gouvernement du Québec, Institut de la statistique du Québec.

Canadian province of Québec, we found that COVID-19 pandemic in 2021 affected the mental health of children and parents, and that families exposed to the higher levels of socioeconomic risk experienced more pronounced mental health struggles. Importantly, we found that parental stress and loneliness were associated with child internalizing and externalizing symptoms, and these associations were most often stronger among families with higher levels of cumulative socioeconomic risks. Given these results, policy should focus on improving the mental health of parents and children, especially those in greater socioeconomic disadvantage, during times of crisis and disruptions.

4.1. Family mental health and socioeconomic risks

In our study 67% of parents reported at least some increase in their levels of stress since the onset of the pandemic and 76% reported at least some increase in feelings of loneliness. These are alarmingly high proportions, especially given the well-known adverse effects of stress and loneliness on health outcomes (Park et al., 2020; Schneiderman et al.,

2005). We also found that the mental health struggles of children and parents were greater in underprivileged households. Though studies have evidenced that parents and children with lower socioeconomic status were at greater risk for mental health struggles during the pandemic (Gibson et al., 2021; Li et al., 2021), our study highlighted the important role of cumulative socioeconomic risks on mental health. This converges with a large body of findings outside of the pandemic context showing that exposure to cumulative risk factors influences mental health to a greater extent than exposure to any singular risk (Evans et al., 2013; Wickrama et al., 2016).

4.2. Associations between parent and child mental health

We found that parental stress and loneliness during the pandemic were associated with higher levels of child externalizing and internalizing symptoms. The added burden of increased stress would put more strain on parents which can negatively influence their ability to engage in positive parenting practices (Borre and Kliewer, 2014). Outside of the

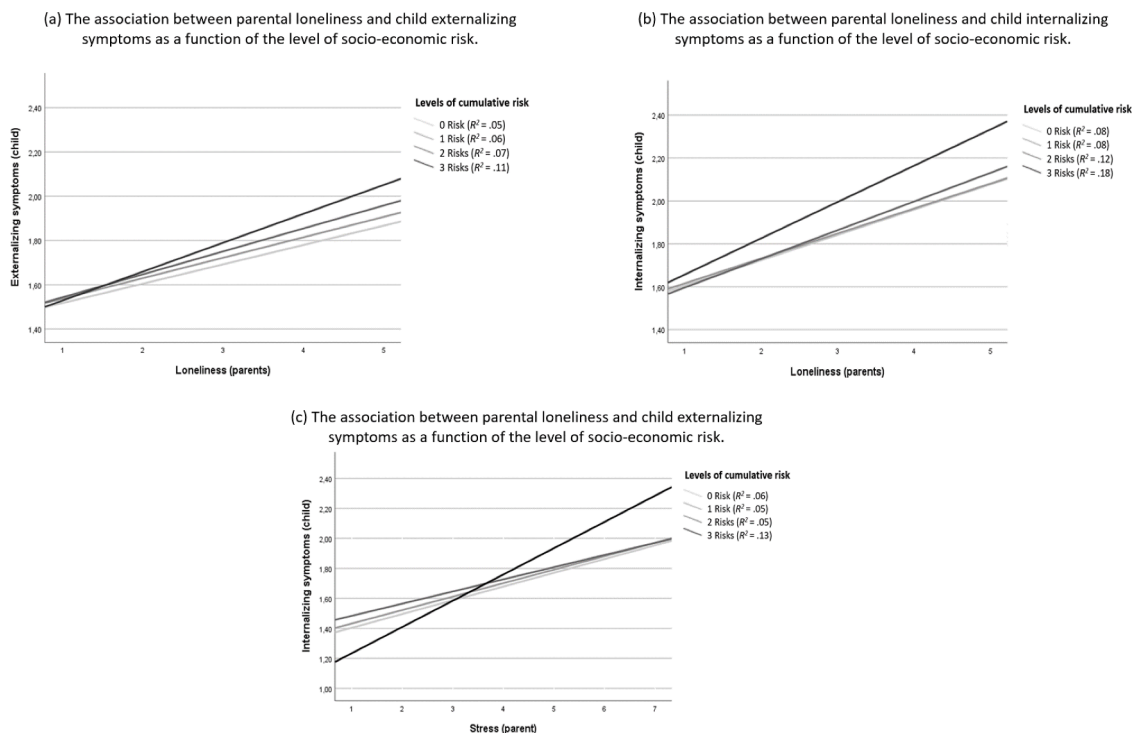


Fig. 2. Associations between parental and child mental health as a function of the level of socioeconomic risk.

Note: Source: Data compiled from the preliminary file of [Résilience Famil \(2022\)](#), © Gouvernement du Québec, Institut de la statistique du Québec.

pandemic context, a meta-analysis showed that parenting stress had a strong association with child externalizing symptoms and a moderate association with child internalizing symptoms ([Barroso et al., 2018](#)). Others found that the effect of aspects of the pandemic on child mental health would be influenced by parental stress levels. For instance, a study found that COVID-19 quarantines negatively influenced child mental health in part because their parents were under increased stress ([Spinelli et al., 2020](#)). Also, we found that associations between parental loneliness and child mental health appeared even larger than those observed with parental stress. Researchers have colloquially dubbed COVID-19 as a “loneliness pandemic” because of its central importance relative to other psychosocial factors ([Palgi et al., 2020](#)). Outside of the pandemic, parents’ feelings of loneliness, and of mothers especially, were related to child mental health across studies ([Nowland et al., 2021](#)). Within the pandemic context, a study also found that parental social isolation was correlated with both parent and child mental health outcomes with similar effect sizes to those found in our study ([Pereira et al., 2021](#)). Collectively, our findings and those of others highlight that increases in parental stress and loneliness during the COVID-19 pandemic are concerning, particularly given their link with worse child mental health.

Our moderation analyses showed that associations between parental loneliness and stress, and child mental health were generally stronger at higher levels of cumulative socioeconomic risk. Interestingly, we found that variations between no risks and three risks were always clear, whereas differences between zero, one or two risks were less stark. This converges with the hypothesis that children can sometimes cope with one or few risks, but begin to develop problems when larger numbers of risks accumulate ([Rutter, 1979](#)). For instance, in the model including child internalizing symptoms and parental loneliness, the variance explained at each level of cumulative risk was 7% (no risk), 7% (one risk), 12% (two risks) and 18% (three risks). In the model including children’s internalizing symptoms and parental stress, the variances were, respectively, 6%, 5%, 5%, 13%. In the model entailing parental loneliness and child externalizing symptoms, these variances were 5%, 6%, 7% and 11%. Overall, there appeared to be inflection points starting

at two or three cumulative risks. As such, when considering the associations between of parental stress and loneliness, and child mental health, our results highlight the importance of considering the accumulation of multiple socioeconomic risks rather than the absence/presence of any singular socioeconomic risk factor.

The way that we modeled the intertwining of categories of risk factors in our study merits discussion, as it added novelty and distinguished our findings from others. A small number of studies have investigated cumulative risk as a moderator ([Evans et al., 2013](#)), but as shown in our study and that of [Pereira et al. \(2021\)](#), this could be a fruitful line of research. As previously mentioned, [Pereira et al. \(2021\)](#) found that various COVID-19 cumulative risk factors influenced parent and child mental health, and that these associations were moderated by pre-existing psychosocial cumulative risks. This is conceptually similar and convergent with our findings, but our design allowed us to highlight the major contribution of parental stress and loneliness to child mental health. Nevertheless, our study and that of [Pereira et al. \(2021\)](#) both highlighted the need to focus on families that accumulate socioeconomic hardships.

4.3. Strengths and limitations

Our study was timely and important because it was conducted among parents and children, segments of the population which have been notably affected by the COVID-19 pandemic and its mitigation measures. Our study benefited from using a large representative sample and validated measures of mental health outcomes among children. We were able to provide insight into how parental loneliness and stress during the COVID-19 pandemic were associated with the mental health of their children. Our study used multiple indicators of family socioeconomic strain and showed how their accumulation was intertwined with the mental health of parents and children. Our use of a cumulative risk index was parsimonious way to account for socioeconomic risk factors that makes intuitive sense for policy makers and laypeople ([Evans et al., 2013](#)). We were among the few to investigate how cumulative risk could moderate associations between psychological

factors and it would be interesting to expand this line of research.

Nevertheless, drawbacks of using cumulative risk scores include not accounting for the intensity of the adversity (e.g., food insecure versus just under the poverty line) nor the amount of time of exposure to risk factors (Evans et al., 2013). Other limitations of our measures included a) child mental health was informed exclusively by parents rather than a multi-informant approach, b) income was self-reported and did not account for income history and c) single items were used to assess loneliness and stress since the onset of the pandemic. We unfortunately did not have information on gender identification or ethnicity. The cross-sectional design of our study hindered any interpretations about the direction of causality. For instance, research suggested that improving children's behavior reduced parental stress, and that improving parental stress through training programs reduced children's behavioral problems (Barroso et al., 2018). Longitudinal designs would be important to implement in the future. These could include measures administered prior and during the pandemic or provide insight into the longer lasting effects of the pandemic on children's and parents' mental health.

5. Conclusions and implications for public policy

Our study evidenced that parents and children with multiple socioeconomic risks were struggling with mental health more than their more privileged counterparts. We brought to light the importance of parental stress and loneliness during the COVID-19 pandemic and its association with the mental health of their children. We found that the negative influence of these parental mental health struggles on child mental health were even stronger in underprivileged households. As such, public policy should make substantial efforts to support parents who have suffered from loneliness and stress during the pandemic, especially those in greater socioeconomic disadvantage. Though the mitigation measures of the pandemic have waned recently, unfortunately the pandemic has not vanished and some parents may still be suffering from prolonged loneliness and increased stressed. In a more general sense, our findings are relevant to parents who experience adverse events leading to higher levels of stress or loneliness, even if our study was framed specifically to COVID-19.

Group-based parenting interventions (e.g. training) are effective in reducing parental stress (Bennett et al., 2013; Ling et al., 2021). Research also shows that mindfulness based interventions were effective in reducing parental stress levels and in improving the mental health of their children (Burgdorf et al., 2019). Effective strategies to reduce feelings of loneliness and social isolation include cognitive behavioral techniques that address maladaptive social cognitions, social skills training, enhancing social support and increasing opportunities for social interactions such as getting involved with schools or volunteer groups (Jeste et al., 2020). Also, our findings suggested that if we take steps to help parents reduce their feelings of loneliness and stress levels it would not only be beneficial to their own well-being but also to that of their children. Lastly, all of these issues and solutions would be even more important to address among families faced with multiple socioeconomic risk factors and therefore would need to be publicly financed as to not place additional socioeconomic burdens on those who are most in need.

Author statement

Role of funding sources

Funding sources had no role in the design of this study and did not have any role during its execution, analyses, interpretation of the data, or decision to submit results.

Author contributions

TL and SC conceptualized the study and analyses. TL drafted the paper and performed analyses. SC provided supervision. All authors revised the paper, provided insight and approved the final version of the manuscript.

Declaration of Competing Interest

None.

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