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Heterogeneity in maternal and child mental health responses to the COVID-19 pandemic

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A B S T R A C T

We used latent profile analysis on a longitudinal dataset to examine changes in maternal and child mental health during COVID-19 and factors that may protect against declines in mental health. Participants were 183 low-income mothers (M = 36 years) with young children (M = 5.31 years) in the City of Toronto with data collected prior to and during the pandemic in 2020. Mothers reported on their own stress, anxiety and depression and their children’s emotional, conduct, hyperactivity, peer, and prosocial problems at both timepoints. We found heterogeneity in mental health changes, with 5 distinct patterns of change for mothers, and 4 distinct patterns of change for children during COVID-19. The majority (83%) of mothers experienced significant declines in at least one aspect of mental health. In contrast, the majority of children (65%) experienced either no change or improvements in mental health. Interestingly, patterns of change across these groups were not differentiated by demographic characteristics such as income, education, and family composition. However, for mothers, a higher degree of satisfaction with social support was associated with membership in a profile with better mental health both prior to, and during the pandemic. For children, having a stable history of early childhood education, and care was associated with membership in a profile that showed improvements in mental health during the pandemic. We discuss how our results support the need for proactive and global interventions for at-risk families with raised mental health concerns, and the benefits that stable early childhood education and care may provide for young children.

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1. Introduction

The highly contagious COVID-19 virus caused by SARS-CoV-2 saw a rapid rise in infections by the end of 2019. The virus was first detected in Canada in February 2020, and shortly afterward, on March 11, 2020, was assigned “pandemic” status by the World Health Organization. In an effort to prevent the spread of the virus, the government of Ontario, where the current study took place, implemented social distancing as a public health initiative which resulted in the closures of all schools, childcare services, and non-essential services. These initiatives caused a large-scale disruption in the lives of the majority of families living in the province.

Preliminary research on the effects of COVID-19 has shown that mothers and young children have experienced a deterioration in mental health since the onset of the pandemic, with at-risk families being disproportionately affected (Brown et al., 2020; Davenport et al., 2020; Cassman-Pines et al., 2020; Prime et al., 2020). Furthermore, social distancing requirements have created a unique situation in which families’ access to their regular sources of social support have also been curbed.

Prior to the pandemic, a majority of Canadian pre-school aged children attended some form of early childhood education and care (ECEC) arrangement (Statistics Canada, 2020a). The pandemic-related closures however, resulted in most of these children being withdrawn from childcare and being cared for by their parents at home (Statistics Canada, 2020a). Many studies have found that having a history of stable ECEC arrangements is associated with positive social, emotional, and academic outcomes for young children (Adams et al., 2010; Kershaw et al., 2005; Loeb et al., 2004; Thompson, 2000).

The effects of access to ECEC and social support in reducing the impact of stress on children and mothers are generally studied using correlational designs restricting our ability to make causal inferences. Crises that arise during ongoing longitudinal data collection, provide a unique opportunity to investigate causal relationships (Chermoh et al., 2010). Using data from an ongoing longitudinal study in Toronto, Ontario, Canada, in this study we examined patterns of reactions to the pandemic in terms of mental health of children and mothers and the factors (e.g., demographics, ma-
ternal perceptions of social support) that are associated with those changes.

1.1. Effects of COVID-19 on Mental Health

1.1.1. COVID-19 and maternal mental health

The pandemic and resulting public health measures have resulted in additional stressors for families such as loss of income and employment (Witteveen & Velthorst, 2020), fear of infection and lack of access to information and resources (Park et al., 2020). These stressors are associated with higher levels of stress, anxiety, and depression in parents (Brown et al., 2020; Lee et al., 2020). Mothers of young children, in particular, reported an increase in depression, anxiety and poor sleep patterns following the onset of the pandemic (Brown et al., 2020; Davenport et al., 2020; Thapa et al., 2020). Patrick et al. (2020) found that in the United States, 25% of mothers reported decreases in their own mental health and 14% reported deterioration in their children (Patrick et al., 2020). Lee et al. (2020) reported more widespread effects, finding that 40% of parents in the United States met criteria for major depression and anxiety, rates that were double those prior to the pandemic (S. J. Lee et al., 2020).

It is well established that sociodemographic characteristics (for example, race, parental education, and marital status) are important to maternal and child mental health, such that families from better resourced environments have better mental health outcomes (Algeria et al., 2010; Hannigofer et al., 2017; Meyrose et al., 2018; Satcher, 2001; Watson et al., 2019). There is now increasing evidence suggesting that there is socioeconomic inequality in the adverse effects of the pandemic on mothers and children. The negative effects of the pandemic are exacerbated by poverty, low levels of parental education, belonging to a single-parent family, and identifying as a visible minority (Bhogal et al., 2021; Li et al., 2021; Patrick et al., 2020). Therefore, it is imperative that research on changes in familial mental health considers the influence of sociodemographic factors.

In a survey on parenting during COVID-19, Statistics Canada (2020) found that most Canadian parents with young children were concerned about balancing childcare and work demands (Statistics Canada, 2020b). Parents also reported concerns about their children's mental health, in particular managing their child's stress, anxiety, and over-exposure to electronic devices (Statistics Canada, 2020b).

Not all research, however, has found that the pandemic has had deleterious effects on families. A large proportion of Canadian parents in a study on family well-being reported excellent (46%) or good (31%) mental health during COVID-19, and almost half of the respondents (48%) reported stable or better mental health than before (Spinks et al., 2020). Respondents also reported improved family connections, with 60% of parents talking to their children more, and 77% reporting satisfaction with their partner’s support (Spinks et al., 2020).

1.1.2. COVID-19 and Child Mental Health

Young children constitute a group that is particularly vulnerable to the effects of social isolation, however there is limited research on the long-term effects of large-scale outbreaks on children (Araújo et al., 2020; S. J. Lee, 2020). Prior research on the effects of quarantines has shown that one-third of children who experienced extended periods of quarantine met the threshold for PTSD diagnoses (Sprang & Silman, 2013). Similarly, during COVID-19, parents reported that their children experienced higher levels of frustration, sadness, and fear (S. Lee et al., 2020; Wang et al., 2020). Research on children in China during COVID-19 found that children between the ages of 3 and 6 demonstrated high levels of clinginess, inattention, and irritability (Jiao et al., 2020).

In a study on children in lockdown in Spain during COVID-19, Ezplezeta, Navarro, de la Osa, Trepat, & Penelo, 2020 similarly found a significant increase in conduct and peer problems, however, they also showed an increase in prosocial behavior (Ezplezeta, Navarro, de la Osa, Trepat, & Penelo, 2020). Increases in children’s mental health problems were associated with how the adults around them were coping with the lockdown (Ezplezeta, Navarro, de la Osa, Trepat, & Penelo, 2020). These findings are supported by research showing that parental stress negatively impacts the parent-child relationship and is associated with negative mental health outcomes in children (Conger et al., 2010). Furthermore, disruptions to ECEC may exacerbate children’s behavioral problems and such disruptions are associated with harsher parenting practices and maternal stress (Bratsch-Hines et al., 2015; Claessens & Chen, 2013).

1.1.3. Heterogenous Changes to Mental Health during COVID-19

Research on maternal and child mental health during COVID-19, shows different patterns of change in mental health, with some studies finding declines in different proportions of their sample, and some showing improvements in functioning (S. Lee et al., 2020; Patrick et al., 2020; Spinks et al., 2002). A meta-analysis of research on the impact of COVID-19 found small but significant increases in depression and anxiety but no reductions in life satisfaction or well-being (Prati & Mancini, 2021).

A longitudinal study on the effects of COVID-19 on university students found that students with pre-existing mental health concerns experienced little change and in fact, showed improvements in mental health (Hamza et al., 2020). Another study in the Netherlands similarly found that as rates of infection were rising, students reported decreases in anxiety, stable levels of stress and increases in depression et al. (Fried et al., 2020). In a commentary on the potentially heterogenous long-term effects of COVID-19 on mental health, Mancini (2020) refers to improvement in social and mental functioning following prior crises such as the SARS epidemic in Hong Kong and Virginia Tech Campus shootings (Mancini, 2020). Consistent with these past findings, some people may experience improvements in social functioning and mental health following the COVID-19 pandemic, with quality of social relationships being a critical component that may determine the direction of these effects (Mancini, 2020).

Research on predictors of the psychological impact of pandemics in the general population has shown mixed results, with one study finding that younger age, low levels of education, and having children were associated with poor psychological outcomes (Taylor et al., 2008), while other studies found that the same factors had no associations with outcomes (Hawryluck et al., 2004; Prati & Mancini, 2021). To date, however, there is no research on the factors that may contribute to the heterogenous mental health impact of COVID-19 on mothers, and children. Therefore, it is important to determine the protective factors that may contribute to mental health responses in families in light of the disruptions that they have faced. Based on the literature on mental health in families, we have identified 2 such protective factors: social support for mothers, and a history of stable ECEC for children.

1.2. Protective Factors

1.2.1. Social Support and maternal mental health

In times of uncertainty, mothers with low levels of social support report higher levels of perceived stress (Ajduković et al., 2018). Conversely, supportive environments may mitigate the effects of external stressors on parental stress, and are associated with more positive parenting (McConnell et al., 2011; Sanders et al., 2014). Perceived social support from families and
peers has also been associated with lower rates of anxiety, particularly in mothers of young children (Chavis, 2016). The size of mothers’ social support network is also associated with lower levels of maternal stress, post-partum depression and anxiety in new and expectant mothers (Flowers et al., 1996; Kivijärvi et al., 2004).

A recent study on protective factors for parental stress during COVID-19 found that social and ECEC support were associated with lower levels of perceived stress in mothers (Brown et al., 2020). COVID-19, however, has created a distinct set of conditions as a result of social distancing guidelines which may constrain mother’s access to her social support networks. For many families, when available, access to social support may be limited to digital communication (Prime et al., 2020).

1.2.2. ECEC stability and child development

ECEC instability is defined as sequential changes in ECEC settings and arrangements over time (Adams et al., 2010; Bratsch-Hines et al., 2015; Shlay et al., 2005). Research has shown that stable ECEC is an important aspect of children’s early experiences (Thompson, 2000). For example, children in stable ECEC arrangements are more likely to form secure attachments, experience sensitive interactions from educators, and show higher levels of school readiness compared to children who experience unstable care (Kershaw et al., 2005; Loeb et al., 2004). These effects can be particularly strong for infants, with findings that infants who spent at least 1 year with an educator demonstrated more secure attachments than those who experienced interruptions in care (Raikes, 1993). Effects of child-care stability before entering the school system are long-lasting and tend to persist even beyond 3 years of elementary school (Howes, 1988).

The negative effects of instability have also been noted in the ECEC literature, with children who experienced unstable care arrangements displaying more conduct problems, hyperactivity, and poorer social adjustment in formal schooling (Bratsch-Hines et al., 2015; Howes, 1988; Huston et al., 2002). Instability of ECEC has been found to be especially detrimental to the outcomes of children who come from low-income families or have faced instability in other aspects of their life (Adams et al., 2010; Bratsch-Hines et al., 2015). It is important to note that there is limited research investigating causal links between ECEC and child mental health. Such research, which would involve random assignment to different patterns of exposure to ECEC would be very difficult to conduct. Our naturalistic experiment provides a unique opportunity to gather more conclusive evidence around the directionality of ECEC and mental health.

Researchers have suggested that child mental health may influence the relationship between unstable ECEC and child outcomes. To investigate this relationship, Morrissey (2009) used within-child fixed effects models to control for children’s prior behavior and suggested that child temperament did not mitigate the negative effects of multiple concurrent ECEC arrangements (Morrissey, 2009). Pilarz and Hill (2014) similarly found that long-term instability (changes in caregivers over time) was associated with externalizing problems, even when controlling for child temperament (Pilarz & Hill, 2014). [Reference removed for review] also found that when asked, parents rarely mentioned child temperament or mental health as a reason for changing providers while language and number of siblings in the family had significant associations with ECEC instability and children’s mental health did not. Though causal inferences cannot be made due to the research designs of these studies, this literature suggests that ECEC instability may have an impact on child outcomes over, and above the contribution of the child’s own characteristics including mental health.

Even though having a history of unstable ECEC arrangements has been consistently linked to negative child outcomes, it is important to note that changes in care arrangements may not always be harmful for children. For example, transitions may be associated with positive outcomes for children when they are planned in advance, result in an improvement in the quality of care or occur after the age of 3, as many children move from informal to formal care (Sandstrom & Huerta, 2013). Thus, ECEC instability can be either positive or negative, depending on the context.

Closures of ECEC arrangements resulting from COVID-19 were unexpected, sudden, and led to lack of access to ECEC for most children in Canada. Thus, they likely fall into what can be thought of as negative instability. Prior to the pandemic, approximately 60% of Canadian pre-school aged children attended some form of ECEC arrangement. Following the closure, this rate dropped to 14% after March 2020, with licensed childcare spaces being reserved for children of essential workers. Furthermore, within the 14% of the Canadian families who utilized ECEC services during the pandemic, more than half of these families (57%) had to move their child in to a different arrangement, and paid higher prices (Statistics Canada, 2020a).

1.3. Current Study

The study took place in the City of Toronto, which is the most populous city in Canada with approximately 136,000 pre-school aged children (Statistics Canada, 2016). The number of licensed childcare spaces, however, is limited to only approximately 80,000 (City of Toronto, 2019). Due to the high cost of licensed care, the City of Toronto provides a childcare subsidy to enable low-income families to access licensed ECEC services.

Given low-income families’ susceptibility to poor psychological health as a result of the pandemic, in this study we seek to investigate whether prior ECEC stability and social support may be protective factors for the adverse mental health effects that the pandemic may have on mothers and children from low-income families in Toronto. We also test whether different patterns of mental health responses are associated with family demographic characteristics.

1.4. Research Questions and Hypotheses

1) What are the effects of the COVID-19 pandemic on the mental health of low-income mothers and children in Toronto? We hypothesized that the effects of COVID-19 on the mental health of low-income mothers and children would vary and include groups of mothers and children who saw improvements, declines and stability in mental health responses to COVID-19. We expected that the predominant pattern will be a decline in maternal and child mental health, with small sub-groups of individuals who remain stable or improve.

2) Is there a relationship between social support and changes in maternal mental health during COVID-19? We hypothesize that mothers with higher level of social support availability and satisfaction will experience lower declines in mental health.

3) Is there a relationship between history of ECEC stability and changes in child mental health during COVID-19? We hypothesize that children with histories of stable ECEC will experience lower declines in mental health.

4) Is there a relationship between sociodemographic characteristics and changes in child and maternal mental health during COVID-19? We hypothesize that lower levels of maternal education and household income, younger maternal age, belonging to a single-parent household and identifying as visible minorities will be associated with greater declines in child and maternal mental health as a result of COVID-19.
2. Material and Methods

2.1. Participants

This study uses data from a larger longitudinal research project, conducted in collaboration with the City of Toronto. As part of this study 895 participants (a 70% consent rate) were recruited from the City of Toronto subsidy waitlist from 2014 to 2016 and have been followed since. The timing of the first 2 waves of data collection was determined by children’s ages. Wave 1 was conducted when the child was 12–24 months-old and Wave 2 was conducted when the child was 30–42 months-old. These waves of data collection had been completed for all children prior to the onset of COVID-19. Wave 3 was conducted when the child entered Junior Kindergarten. This wave was completed for children recruited to this study in 2014 and 2015, but not for the youngest children in our study who were recruited in 2016. For these children Wave 3 data were collected alongside the COVID-19 data.

Since the beginning of the study, approximately 130 families dropped out, leaving the sample at 765 by the onset of the pandemic. Response rates for this low-income sample for each wave of our data collection were approximately 50%. A total of 355 participants completed a phone survey during COVID-19. Of these participants, 242 responded to both the COVID-19 and previous wave of data collection within 2.5 years prior to the onset of the pandemic (the mean difference between the prior time-point and the onset of the pandemic was 21 months, SD = 8 months). Of the 242 participants who responded to both waves of data collection, 59 families were missing more than 30% of data on our variables of interest, and were removed from the analysis. Missing values on maternal mental health outcomes were computed based on available data if participants responded to 50% or more of the items in each measure. This was the case for 20 respondents.

Therefore, the sample in this study consisted of mothers (M = 36.39 years, SD = 5.39 years) with young children (M = 5.31 years, SD = 0.6 years) who: 1) responded to the COVID-19 wave and an earlier wave of data collection at least 6 months prior to the pandemic, 2) provided complete data for all of the key variables of interest examined in this study (see measures below) and 3) had complete ECEC history data up until the start of Junior Kindergarten at the time in which the COVID-19 data collection took place. This sample consisted of 183 mothers and 179 children (the smaller number of children is due to the fact that 4 mothers completed all the relevant survey questions for themselves but did not answer mental health questions about their children).

A series of chi-squared tests of independence were conducted to investigate whether the sample used in this study was representative of the originally recruited sample. Our sample study was comparable to the original sample on maternal education, marital status, and language spoken at home. However, this study sub-sample had a higher proportion of respondents who identified as Caucasian, and reported an annual household income higher than $50,000 (CAD).

The respondents in this study have substantially lower household income (median $60,000–79,000; CAD) than the average population in Toronto which earns approximately $104,378 (CAD; City of Toronto, 2018). The sample in this study also had a substantially higher proportion of single-parent households (40%) compared to the population of Toronto (21%; City of Toronto, 2016). A total of 49% of the children in the sample were girls. Approximately half (48%) of the mothers had at least a college diploma. The sample was ethnically diverse (Caucasian, 37%, Black, 29%, Asian, 24%, with 10% identifying with another ethnic group). Fifty-one percent of households had at least 1 family member for whom English was their first language.

2.2. Procedure

Mothers who applied for a childcare subsidy when their children were between the ages of 3–8 months were recruited to participate in the larger study. Mothers were initially contacted for Wave 1 when their child was 12–months old, Wave 2 data were collected when the child was approximately 30–months old, Wave 3 data was collected when the children entered Junior Kindergarten. The COVID-19 wave of data collection included in this study took place between May and November of 2020.

For the purposes of this paper, we used standardized measurements, described below, collected at 2 time points. Data for the ‘Prior to COVID-19’ timepoint was taken from the most recent, pre-COVID-19 wave of data collected from the family. Data utilized in this study from the COVID-19 Wave was collected from May to November 2020. ECEC instability data were compiled from data collected across all waves from this study. The study received approval from the University of Toronto’s Research Ethics Board.

2.3. Measures

2.3.1. Child and Family Demographics

In prior waves, mothers were asked to report on child characteristics such as age and gender and their own characteristics such as their age, annual household income, highest level of education, marital status, home language, and ethnic group identification. Annual household income was reported in increments of $10,000 (CAD) up from “less than $10,000” to “$100,000+” and was dichotomized to above and below $50,000 for analyses.

Highest level of maternal education was reported as: “None,” “Some High School,” “Secondary (high) school graduation certificate or equivalent,” “Some College,” “College Certificate or Diploma,” “Trade Certificate,” “Some University,” “Bachelor’s Degree (e.g., B.A., B.Sc, LL.B.),” and “Master’s Degree (e.g., M.A., M.Sc, M.Ed) or ‘Above’” and was dichotomized to above and below Bachelor’s Degree for analyses. Marital status was reported as “Married,” “Living with partner (Common Law),” “Divorced,” “Widowed,” “Separated,” “Single, never married” and “In a relationship, never married and not living together” and was dichotomized to single and married/common law for analyses. Ethnic group was reported as “White,” “Chinese,” “South Asian (e.g., East Indian, Pakistani, Punjabi, Sri Lankan),” “Black (e.g., African, Haitian, Jamaican, Somali),” “Native/Aboriginal People (e.g., North American Indian, Metis),” “Arab/West Asian (e.g., Armenian, Egyptian, Iranian, Lebanese),” “Filipino,” “South East Asian (e.g., Cambodian, Indonesian, Laotian, Vietnamese),” “Latin-American,” “Japanese,” “Korean,” and “Other.” It was recoded as “White,” “Black,” “Asian,” or “Other” for analyses.

2.3.2. COVID-19 Disruptions and Living Arrangements

During the COVID-19 wave of data collection, mothers were asked questions about disruptions to their family such as changes in employment, school status and income as a result of the pandemic and their household composition during the pandemic. Changes in employment and school status were reported as “Yes” or “No.” Changes in income were reported as “Hours were cut back,” “Hours increased,” “Rate of pay reduced,” “Rate of pay increased” and “Other” and were dichotomized as reduction or no reduction in income for analyses. Household composition was reported relative to the child, with the options “Lives with 2 parents in the same household,” “Lives with 1 parent only,” “Alternates between 2 parents in different households,” and “Living with extended family.”

2.3.3. ECEC Instability

Across all waves of the survey, including the COVID-19 wave, parents were asked to provide a chronological list of all of the tran-
sitions that their child experienced across various forms of ECEC since the previous survey. This information provided us with a comprehensive ECEC history timeline for each child. Questions included the type of care arrangement, start and end dates of care, and reasons for changes in care. Respondents were also asked to indicate whether their child has been in multiple care arrangements simultaneously.

In this study ECEC instability was operationalized as the number of transitions experienced by the child from birth until the start of formal schooling. Transitions were counted as moves between parental care and non-parental care and across different providers of non-parental care. Movement between classrooms within the same ECEC provider were not counted as transitions. History of multiple simultaneous care arrangements were coded as a binary indicator (yes/no) across the child's ECEC history. To ascertain whether child problem behaviors may have prompted a change in provider, parent-stated reasons for change in ECEC were examined before we conducted the analyses presented in this paper. Only a negligible number of respondents (0.007%) stated child-related problems as a reason for changing care. Thus, ECEC instability does not appear to be a proxy for issues related to child mental health.

2.3.4. The Cohen Perceived Stress Scale (PSS-4)

The PSS-4 is a brief, 4-item assessment for identifying and monitoring stress (Lee, 2012). Participants rate the frequency with which they felt stressed over the last month on a Likert-type scale ranging from 0 (never) to 4 (fairly often). Total scores range from 0 to 16, with higher scores indicating higher stress (Lee, 2012). A large-scale study on stress in Canadian families in 2010 found that the average score on the PSS-4 for Canadian mothers was 3.06 (Muhammad & Gagnon, 2010). The PSS-4 has high internal consistency (Cronbach’s α = 0.7) and is useful in situations in which a short stress questionnaire is required (Cohen et al., 1983; Lee, 2012).

2.3.5. The Generalized Anxiety Disorder Scale (GAD-2)

The GAD-2 is a 2-item assessment for identifying and monitoring anxiety (Donker et al., 2011). Scores are based on a rating of the frequency with which participants report feeling anxious over the last 2 weeks on a Likert-type scale ranging from 0 (not at all) to 3 (nearly every day). Total scores range from 0 to 6, with scores of 3 or higher indicating a probable anxiety disorder (Donker et al., 2011). The GAD-2 has a sensitivity of 0.86 and a specificity of 0.83 for identifying major anxiety. The GAD-2 also has excellent reliability (Cronbach’s α = 0.92) and validity (AUC = 0.91). Thus, the GAD-2 is a well validated way to assess anxiety (Donker et al., 2011).

2.3.6. The Patient Health Questionnaire (PHQ-2)

The PHQ-2 is a 2-item assessment for identifying and monitoring depression (Löwe et al., 2005). Scores encompass a rating of the frequency with which participants report feeling depressed over the last 2 weeks on a Likert-type scale ranging from 0 (not at all) to 3 (nearly every day). Total scores range from 0 to 6, with scores of 3 or higher indicating a higher probability of major depressive disorder (Löwe et al., 2005). PHQ-2 also has high internal consistency (α = 0.83) and has demonstrated convergent validity, as indicated by high correlations with other depression measures (r ranging from 0.67 to 0.87). Thus, the PHQ-2 is a well validated tool for assessing depression (Löwe et al., 2005).

2.3.7. Strengths and Difficulties Questionnaire (SDQ)

The SDQ is a standardized 25-item instrument used to screen for psychopathology in children aged 4 – 17 (Goodman, 1997). For children between the ages of 2–4, a slightly modified version was used. Parents rate items on a 3-point Likert scale as either 0 (not true), 1 (somewhat true) or 2 (certainly true). The SDQ consists of 4 difficulties subscales measuring emotional problems (for example, “Many worries or often seems worried”), conduct problems (for example, “Often loses temper”), hyperactivity (for example, “restless, overactive, cannot stay still for long”) and peer problems (for example, “rather solitary, prefers to play alone”), and one prosocial behavior subscale (for example, “considerate of other people’s feelings”). Each subscale contains 5 items, with scores ranging from 0 to 10 for each scale. Cut-off scores for emotional problems are 0–3 (average), 4 (slightly raised) and 5–10 (high); conduct problems 0–2 (average), 3 (slightly raised) and 4–10 (high); hyperactivity 0–5 (average), 6 (slightly raised), 7–10 (high); peer problems 0–2 (average), 3 (slightly raised), 4–10 (high); and prosocial behavior 6–10 (high), 5 (average), 0–4 (low; Goodman, 1997). The preschool version of the SDQ demonstrates satisfactory internal consistency (α > 0.70) for all subscales except peer problems (D’Souza et al., 2017). The SDQ demonstrates high discriminant validity across all subscales and there is some evidence for predictive validity (Croft et al., 2015).

2.3.8. Social Support Questionnaire-Short Form (SSQ-6)

The SSQ-6 (Sarason et al., 1987) is a 6-item instrument assessing an individual’s sources of social support and their satisfaction with that support. Individuals are first asked to list the people in their life from whom they receive social support from across 6 items (e.g., “Whom can you really count on to distract you from your worries when you feel under stress?”). For each item they are then asked to rate their satisfaction with the support on a Likert-scale ranging from 1 (Very satisfied) to 6 (Very dissatisfied). In this study, ratings of satisfaction were reverse-coded from 1 (Very dissatisfied) to 6 (Very satisfied) to improve interpretation. The questionnaire results in a support score computed as the mean number of people listed across all items, and a satisfaction score computed as the mean of all satisfaction scores (Sarason et al., 1987). The SSQ-6 has excellent internal consistency (Cronbach’s α = 0.97) and good discriminant validity as indicated by significant correlations with other measures of global social support and relationship quality (Brock et al., 1996; Sarason et al., 1987).

2.4. Data Analysis

Initial data exploration revealed a considerable heterogeneity of change patterns in the sample. Therefore, we proceeded with conducting the Latent Profile Analyses (LPA) to isolate homogeneous groups with similar patterns of change in mental health. LPA is a statistical technique that allows classification of participants into groups based on a set of continuous variables. Since the measures of child and maternal mental health were continuous and positively skewed (except SDQ prosocial behavior scores that were negatively skewed and, therefore, reverse coded for analyses), LPA were conducted with gamma distribution and log link function. This choice of the distribution and link function accounts for the skewed nature of the variables. Separate LPA analyses were conducted for mothers and children in the sample. LPA models with 1–8 classes were tested. The best fitting models for mothers and children were chosen using the information criterion model fit indices (AIC and BIC), comparison of model fit based on the log-likelihood test, marginal probabilities across the classes, and interpretability of the classes. LPA analyses were conducted using Stata v.15 software.

Based on the results of the LPA analyses, class membership variables were created for mothers and children in the sample. These variables were used to examine whether social support is related to the type of COVID-19-related maternal mental health profiles and whether ECEC instability is related to the type of COVID-19-related child mental health profiles.
Table 1 Model fit indices for latent profile analyses.

| Model | LL (model) | df | LL change | P-value | AIC | BIC |
|-------|------------|----|-----------|---------|-----|-----|
| Maternal Mental Health Profiles | 1 | -2021.60 | 12 | 4067.21 | 4105.72 |
| 2 | -1900.95 | 19 | 120.66 | 0.000 | 3839.89 | 3900.87 |
| 3 | -1869.47 | 26 | 31.48 | 0.000 | 3790.93 | 3874.38 |
| 4 | -1851.80 | 33 | 17.67 | 0.014 | 3769.60 | 3857.51 |
| 5 | -1785.61 | 40 | 66.19 | 0.000 | 3651.22 | 3779.60 |
| 6 | -1809.21 | 47 | 23.60 | 0.001 | 3712.42 | 3863.27 |
| 7 | -1742.53 | 54 | 66.69 | 0.000 | 3593.05 | 3766.37 |
| 8 | -1737.66 | 61 | 4.86 | 0.000 | 3597.33 | 3793.11 |

Note: The preferred models have been bolded. Significance values are provided in the 5th column of the table (P-value). As noted just below the table the bolded rows refers to the selected model.

Sociodemographic characteristics of mothers and children were examined in relation to latent profile memberships. To investigate which child and mother characteristics are related to the class membership, a series of 1-way ANOVAs were conducted for continuous explanatory variables. A series of chi-square tests of independence were used for categorical explanatory variables. To account for the fact that multiple analyses were conducted, the alpha level was adjusted using Bonferroni correction for each family of tests. All statistical analyses were conducted using SPSS v.26 and used bootstrapping to obtain robust estimates of standard errors.

Finally, as noted above, the COVID-19 data were collected between May, and November of 2020. To test for the possibility of an effect of time since the onset of the pandemic on participant reactions we compared responses on mental health, social support, ECEC instability, and demographics for each month. As responses were comparable across months subsequent analyses were conducted across this period.

3. Results

3.1. Latent Profile Analysis of Changes in Maternal Mental Health

LPA with 1–8 latent profiles were performed on 6 variables related to maternal mental health prior and during COVID-19 pandemic. All models converged and were identified. The model fit indices and model comparison results based on log-likelihood tests are presented in Table 1. As can be seen from this table, models with 5 and 7 profiles had the best combination of the AIC and BIC model fit indices. Both models were significantly better compared to adjacent models with a smaller number of profiles (Table 1). Examination of the latent profile proportions and the latent profile probabilities, together with the principle of parsimony resulted in a 5-profile model of maternal mental health.

The profile means for each of the maternal mental health measures used in the LPA analyses are presented in Table 2. The first and the last profiles had the smallest probabilities of the latent profile membership (at 7.10% and 9.28%), while profile 3 had the largest probability (more than 35%).

3.1.1. Trends in Maternal Mental Health Profiles

Patterns of maternal mental health across profiles prior to and during COVID-19 are presented in Fig. 1. Paired-samples t-tests were conducted for prior and COVID-19 scores on all 3 measures of maternal mental health. An adjusted P-value of 0.017 (0.05/3) was used to account for the fact that the same respondents were compared on 3 measures. Mean values are reported in the subsequent section on all measures for each profile.

Profile 1: Sailing Along. A small proportion (7.10%) of our sample were in this profile. Mothers in this profile had the low scores at the earlier time point on stress (1.31) and anxiety (0.46) and reported no depression (0.00). Their anxiety and depression remained low and stable during COVID-19 (0.08 and 0.15 respectively) however they experienced a significant decline in stress from 1.31 to 0.08 (P = 0.009).

Profile 2: Typical Moms Feeling a Little Blue. This profile made up 19.12% of our sample. Mothers in this profile demonstrated similar levels of perceived stress (3.91) to average Canadian mothers (3.06; Muhammad & Gagnon, 2010), and remained stable (3.49) during COVID-19. Their prior anxiety was low (0.34) and remained stable during COVID-19 (0.09). They did, however, experience a significant increase in depression. Specifically, they reported no depression prior to the pandemic and somewhat higher levels during the pandemic (0.00–0.54 [P = 0.000]). Anxiety and depression in this profile both before and during the pandemic were below the clinical cut-offs.

Profile 3: Typical Moms Heading for a Crash. This was the largest profile and comprised of 36.06% of our sample. Mothers in this profile experienced significant declines in all measures of mental health. They had prior levels of stress (2.92) similar to the average Canadian mother (3.06; Muhammad & Gagnon, 2010) but experienced a significant increase in stress during COVID-19 (5.36, P = 0.000). They saw an even larger increase in anxiety from the prior timepoint (0.76) to COVID-19 (2.24, P = 0.000). These mothers reported no depression (0.00) at the prior timepoint but experienced an increase with the pandemic (1.42, P = 0.000). Anxiety and depression in this profile both before and during the pandemic were below the clinical cut-offs.

Profile 4: Stressed Moms Losing Ground. This profile comprised of 28.41% of our sample. Mothers in this profile reported higher levels of stress than average Canadian mothers (3.06; Muhammad & Gagnon, 2010) that remained stable both prior to (4.62) and during (5.69) the pandemic. They did, however, experience significant increases in anxiety (from 1.27 to 2.04, P = 0.002) and depression (from 1.40 to 2.02, P = 0.013) with COVID-19. Anxiety and depression in this profile both before and during the pandemic were below the clinical cut-offs.

Profile 5: Stressed Moms Lose the Blues. This profile comprised of a small proportion (9.28%) of our sample. Mothers in this profile reported the highest levels of stress across all profiles, that remained stable both before (7.53), and during (7.47) the pandemic. They reported moderate and stable levels of anxiety before (2.76) and during (2.35) the pandemic. These mothers did, however, experience significant reductions in depression from above the clinical cut-off prior to the pandemic (3.82) to below the cut-off during the pandemic (1.88, P = 0.000).

3.1.2. Maternal Mental Health Profiles and Maternal Characteristics

Chi-square tests of independence and 1-way ANOVAs were conducted between maternal mental health profiles and 1) demographic characteristics such as respondent age, household income, education, ethnic status, marital status and language spoken and 2) pandemic-related disruptions such as changes in work, income, and household composition.

Ethnic status was the only variable with a statistically significant association with maternal mental health profile $\chi^2(4) = 15.01$, $P < 0.05$. The association was moderately strong (Cohen, 2013).
Cramer’s V = 0.286. Post hoc comparisons revealed that the Typical Moms Heading for a Crash profile had a higher proportion of Caucasian respondents and lower proportion of visible minorities. In contrast, the Stressed Moms Losing Ground profile had a higher proportion of visible minorities and a lower proportion of Caucasians.

3.1.3. Maternal Mental Health Profiles and Social Support

Two 1-way ANOVAs were conducted to determine if the mean 1) number of people identified as sources of social support and 2) satisfaction with social support were different across the 5 profiles. Differences between profiles on mean number of people identified as social supports were not statistically significant. Differences in social support satisfaction, however, were significant across the profiles F(4,165) = 2.602, P < 0.05, η² = 0.059. Tukey post hoc analysis revealed that the mean social support satisfaction of mothers in the Typical Moms Feeling a Little Blue (5.79, 95% CI (5.64–5.93)) was significantly (P = 0.04) higher than the mean social support satisfaction of mothers in the Stressed Moms Lose the Blues profile (5.15, 95% CI [4.67–5.64]).

3.2. Latent Profile Analysis for Changes in Child Mental Health

LPA with 1–8 latent profiles were performed on 10 variables related to child mental health prior and during COVID-19 pandemic. All models converged and were identified. The model fit indices and model comparison results based on log-likelihood tests are presented in Table 1. As can be seen from this table, the model with 4 profiles had the best combination of the AIC and BIC model fit indices. It was significantly better compared to the 3-profile model and not significantly different from the 5-profile model. This model also had a balanced distribution of the sample across the

| Table 2 | Marginal means for observed variables across latent profiles for mothers and children. |
|---------|-------------------------------|-------------------|----------------|----------------|-------------------|
| Maternal Mental Health Profiles | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 |
| During COVID-19 | | | | | |
| Stress  | 0.20 | 3.59 | 5.35 | 5.69 | 7.47 |
| Anxiety  | 0.08 | 0.25 | 2.20 | 2.64 | 2.36 |
| Depression  | 0.23 | 0.58 | 1.41 | 2.02 | 1.89 |

Prior
| Stress  | 1.44 | 3.79 | 2.97 | 4.61 | 7.53 |
| Anxiety  | 0.44 | 0.42 | 0.72 | 1.26 | 2.77 |
| Depression  | 0.00 | 0.00 | 0.00 | 1.40 | 3.81 |

Proportion of respondents | 7.10% | 19.12% | 36.06% | 28.41% | 9.28%

Child Mental Health Profiles

| During COVID-19 | Emotional problems | Conduct problems | Hyperactivity | Peer Problems | Prosocial behavior* |
|----------------|-------------------|-----------------|---------------|--------------|---------------------|
| Emotional problems  | 1.03  | 1.64  | 0.94  | 2.33  | -      |
| Conduct problems  | 0.89  | 1.23  | 2.85  | 2.38  | -      |
| Hyperactivity  | 2.95  | 3.76  | 5.99  | 4.40  | -      |
| Peer Problems   | 1.24  | 1.37  | 1.24  | 2.29  | -      |
| Prosocial behavior* | 0.63  | 0.19  | 1.18  | 2.78  | -      |

Prior
| Emotional problems | 0.24  | 1.44  | 0.16  | 1.78  | -      |
| Conduct problems  | 0.53  | 2.08  | 2.88  | 2.54  | -      |
| Hyperactivity  | 1.63  | 4.30  | 5.55  | 4.28  | -      |
| Peer Problems   | 0.67  | 1.71  | 0.73  | 2.63  | -      |
| Prosocial behavior* | 0.96  | 1.10  | 1.45  | 2.95  | -      |

Proportion of respondents | 16.76% | 37.99% | 17.88% | 27.37% | 9.28%

* This scale was reverse-coded; therefore, higher values reflect more problems with prosocial behavior.

Fig. 1. Profiles based on changes in maternal stress, anxiety and depression from Prior wave to COVID-19.
profiles. Therefore, a 4-profile LPA solution was selected as a parsimonious model of homogeneous groups of changes in child mental health prior, and during the COVID-19 pandemic.

The profile means for each of the child mental health measures used in LPA analyses are presented in Table 2. The probabilities of the latent profile memberships for each group were 16.76%, 37.99%, 17.88%, and 27.37%.

### 3.2.1. Trends in Child Mental Health Profiles

Patterns of child mental health across profiles prior to and during COVID-19 are presented in Fig. 2. Scores on the prosocial subscale were reverse coded to prosocial problems for comparability, with higher scores reflecting less prosocial behavior. Paired samples t-tests were conducted for prior and COVID-19 scores on all SDQ sub-scales. An adjusted P-value of 0.01 (0.05/5) was used to account for the same respondents being compared on 5 sub-scales. Mean values are reported in the subsequent section on for all subscales for each profile.

**Profile 1.**: Superkids Slip a Little. This profile comprised of 16.76% of our sample. Children in this profile had low and average levels of problem behaviors on all subscales and had low scores at the earlier time point on all SDQ subscales (emotional problems, 0.20; conduct problems, 0.43; hyperactivity, 1.47; peer problems, 0.57 prosocial problems, 1.00). During COVID-19, these children experienced significant increases in emotional problems (0.97, \( P = 0.009 \)), hyperactivity (3.03, \( P = 0.000 \)), and peer problems (1.40, \( P = 0.005 \)). However, their scores across all subscales remained in the average range.

**Profile 2.**: Typical Kids Doing Better. This was the largest profile and comprised of 37.99% of our sample. Prior scores of children in this profile were at the mid-point of scores across all other profiles on conduct problems (2.03), hyperactivity (4.29) and peer problems (1.72; Supplement 1). On the prosocial problems subscale, they had the lowest scores across all profiles (1.12; Supplement 1). During COVID-19, these children saw a significant reduction in conduct problems (1.22, \( P = 0.000 \)) and prosocial problems (0.19, \( P = 0.000 \)). Their scores on the other subscales remained stable and within the average range.

**Profile 3.**: Challenging Kids Feeling the Strain. This profile comprised of 17.88% of our sample. Children in this profile had low prior scores on emotional (0.13), peer (0.75) and prosocial (1.44) problems but had higher scores on conduct problems (3.09) than the first 2 profiles and the highest scores across all profiles on hyperactivity (5.88; Supplement 1). These children experienced a significant increase in emotional problems with COVID-19 (1.00, \( P = 0.001 \)). Their scores on conduct problems (3.06) and hyperactivity (6.29) remained raised and stable and their peer (1.19) and prosocial (1.16) problems remained low.

**Profile 4.**: Concerning and Unaffected. This profile comprised of 27.37% of our sample. At the prior timepoint children in this profile were on the higher end of scores on all subscales. They had the highest scores on peer problems (2.67) and prosocial problems (3.06) and were “raised” and similar to Profile 3 on conduct problems (2.96) and similar to profile 2 on hyperactivity (4.14; Supplement 1). Their scores were stable across timepoints.

### 3.2.2. Child Mental Health Profiles and Family Characteristics

Chi-square tests of independence and 1-way ANOVAs were conducted between child mental health profiles and 1) child characteristics such as age and gender, 2) family characteristics such as household income, mother’s education, mother’s ethnic status, parents’ marital status and language spoken at home and 3) pandemic-related disruptions to the family such as changes in household income, changes in mothers’ work status.

Child gender had a statistically significant association with child mental health profile \( \chi^2 (3) = 7.83, P < 0.05 \). The association was moderately strong Cramer’s \( V = 0.209 \) (Cohen, 2013). Post hoc comparisons revealed that the Challenging Kids Feeling the Strain...
profile had a higher proportion of males than other profiles. Maternal Education also had a statistically significant association with child mental health profile $\chi^2(3) = 8.01, P < 0.05$. The association was moderately strong, Cramer’s $V = 0.213$ (Cohen, 2013). Post hoc comparisons revealed that the Superkids Slipping a Little Profile had a higher proportion of mothers with a bachelor’s degree or above and the Typical Kids Doing Better Profile had a higher proportion of mothers without a Bachelor’s degree.

### 3.2.3. Child Mental Health Profiles and ECEC Instability

A 1-way ANOVA was conducted to determine if the number of ECEC transitions was different for the 4 profiles. Differences in mean number of transitions was statistically significant across the profiles $F(3,175) = 2.875, P < 0.05, \eta^2 = 0.047$. Tukey post hoc analysis revealed that the mean number of transitions in the Concerning and Unaffected profile (2.92, 95% CI [2.49–3.33]) was significantly ($P = 0.008$) higher than the Typical Kids Doing Better profile (2.29, 95% CI [2.09–2.53]). A chi-square test of independence was conducted to determine if the child mental health profiles differed across history of multiple care arrangements. Findings were not statistically significant.

### 4. Discussion

By capitalizing on data from ongoing longitudinal study, we set out to study the effects of the COVID-19 pandemic on child, and maternal mental health. We did this using a highly diverse, low-income sample with a high proportion of single parent households in Toronto, Canada. Overall, we saw declines in mental health for both children, and mothers. However, consistent with findings from the burgeoning body of research on the effects of exposure to the COVID-19 pandemic, our results show that responses to the pandemic are heterogeneous. Interestingly, as described below, a non-trivial portion of mothers, and a substantial proportion of children experienced improvements in mental health following the onset of the COVID-19 pandemic.

#### 4.1. Maternal mental health responses to the COVID-19 pandemic and what might explain their responses

Consistent with our hypothesis, the majority of mothers in our sample (83%) belonged to groups that experienced significant increases in at least one indicator of mental health problems. These patterns of change are consistent with preliminary findings on the effects of COVID-19 on maternal mental health (Brown et al., 2020; Davenport et al., 2020; Lee et al., 2020; Patrick et al., 2020; Thapa et al., 2020). The Somewhat Stressed Moms Losing Ground profile differed from the Typical Moms Heading for a Crash profile in that it had a higher proportion of mothers who identified as visible minorities and had elevated levels of depression prior to the pandemic.

These findings are supported by literature on mental health in visible minorities, which suggests that they experience higher variability in depression than non-visible minorities (Stafford et al., 2011), and are less likely to seek treatment for depression (Mojtabai & Olsson, 2006).

Two of our maternal profiles, the Sailing Along, and Stressed Moms Lose the Blues Profiles together comprised of 16% of our sample. Both of these groups experienced significant reductions in at least one indicator of mental health problems. However, since each of these groups had quite a small sample size, interpretation of these categories is preliminary, and exploratory in nature. Neither of these profiles differ from any of the other profiles on demographic characteristics. The Sailing Along profile had the lowest rates on most of our indicators of mental health both prior to and during the pandemic. The Stressed Moms Lose the Blues Profiles profile had the highest rates of stress in our sample prior to COVID, and for these mothers, stress levels remained unaffected, but depression levels decreased significantly. This pattern may be explained by findings that developing new coping strategies such as setting a routine, engaging in self-care, increased outdoor activities, and avoiding news about the pandemic are associated with lower depression symptoms during COVID-19 (Fullana et al., 2020). Interestingly, the 5 profiles identified in this study were not substantially different in terms of demographic characteristics.

Our hypothesis that mothers with higher level of social support availability and satisfaction will experience lower declines in mental health was not supported by our findings. In contrast to findings that social support network size is associated with lower levels of maternal mental health (Flowers et al., 1996; Kivijärvi et al., 2004), we found no significant relationships between number of people listed as supportive, and maternal mental health.

With respect to social support satisfaction, mothers in the Typical Moms Feeling a Little Blues profile reported significantly higher satisfaction with social support than mothers in the Stressed Moms Lose the Blues profile. Consistent with this finding, mothers in the former profile had significantly lower ratings on all measures of mental health at both timepoints than mothers in the latter, who faced the most challenges overall (Supplement 1). Differences in mental health across these profiles appear to be unrelated to the pandemic but highlight an important need for high quality social support for mothers with elevated levels of mental health concerns.

#### 4.2. Child mental health responses to the COVID-19 pandemic and what might explain their responses

The majority of children in our sample (65%) belonged to the Typical Kids Doing Better and Concerning and Unaffected profiles. These children either experienced no change or they experienced improvements in mental health. Children in the Typical Kids Doing Better profile were within the average range on all subscales and compared to the other profiles, were at the mid-point on all problem subscales, and demonstrated the least prosocial problems (Supplement 1). For these children, COVID-19 was associated improvements in conduct, and prosocial problems. Conduct problems have been found to be associated with peer rejection (Gooren et al., 2011; van Lier & Koot, 2010). For these children, staying at home during the pandemic may have alleviated behavioral problems that are caused by exposure to peer rejection. Overall, findings of improvements in mental health for a substantial proportion of children during the COVID-19 pandemic raises questions about how to improve children′s ongoing circumstances.

Children in the Concerning and Unaffected profile had elevated scores on most measures and the highest scores on peer problems than all other profiles (Supplement 1) that remained stable after the onset of the pandemic. These results support findings from a study of university students that found that students with pre-existing mental health concerns retained stable levels during the pandemic (Hamza et al., 2020).

In keeping with our hypothesis, one-third of the children in our sample belonged to the Superkids Slip a Little and Typical Kids Doing Better profiles, in which they experienced a decline in at least one aspect of mental health. The Superkids Slip a Little profile had the lowest conduct and hyperactivity problems at the earlier time-point and lower scores than other profiles on most measures both before and during the pandemic (Supplement 1). However, these children experienced significant deterioration. These findings, too, are consistent with findings that university students without mental health concerns experienced a decline in mental health during the pandemic (Hamza et al., 2020).
The Challenging Kids Feeling the Strain profile had children with the highest scores on hyperactivity at both timepoints (Supplement 1) and also had the highest proportion of male children. These findings are consistent with a large volume of literature on gender-differences and hyperactivity (Gershon & Gershon, 2002; Hasson & Fine, 2012; Levy et al., 2005). These children experienced significant increases in emotional problems, consistent with findings that children with externalizing problems are at high risk for developing internalizing symptoms when exposed to stressful life experiences (Nobile et al., 2013; Willner et al., 2016). Similar to our results for mothers, demographic characteristics do not appear to be a primary differentiating factor among our different profiles of mental health responses to the COVID-19 pandemic.

Given the sudden disruption in ECEC experienced by the children in this study, we expected that consistent with past findings (Kershaw et al., 2005; Loeb et al., 2004), a history of stable ECEC would serve as a protective factor for children’s mental health. We found that the number of transitions was higher for the Concerning and Unaffected profile than the Typical Kids Doing Better, which had the most favorable outcomes. These findings provide some support for our hypothesis that having a history of stable ECEC served as a protective factor against the negative mental health effects of the pandemic. Children in the Concerning and Unaffected profile experienced more transitions and also had higher problems both before and after the pandemic on most measures compared to other profiles (Supplement 1). It is worth noting that data about changes in ECEC arrangements were collected at multiple timepoints in this study. At each point parents were asked about the reason for any reported changes. Very few parents reported that changes were made as a result of children’s behavioral problems (e.g., virtually no parent reported that their child was asked to leave their provider). This suggests that the children’s behavioral problems did not directly drive ongoing instability in ECEC. Thus, it appears that having a history of instability was not associated with deterioration in mental health during the pandemic but having a history of stability served as a protective factor.

An important limitation of this study was the substantial rates of attrition from the larger study that this sample was drawn from. The issue of attrition was compounded by low response rates to different pieces of the data used in the current study. These rates of attrition and non-response rates likely reflect the very low-income nature, high rate of single parent households, and high ethnic diversity of the original sample. The hard-to-reach nature of the original sample also make it less stable. While the subsample used in this study had somewhat higher incomes than the original sample, they were still substantially lower income than the general population in Toronto. Despite this high rate of attrition, their lower incomes, and high rates of single parent households make this sample worth studying in and of itself. Another limitation is the small sample size for certain profiles, that requires the results to be interpreted with caution. Future research should be conducted using larger, representative samples to obtain generalizable findings of patterns of mental health using latent profile analysis. Another limitation is the use of self-reported data. While there is evidence to support the validity of the measures used in the study, a shortcoming of the self-report methodology is that respondents may not be able to assess themselves accurately on measures of mental health. We recommend that future research on the mental health effects of the pandemic utilize multiple informants or researcher administered measures of mental health. Finally, while we did not find differences in our variables of interest across the period of data collection (May to November of 2020), it seems very possible that responses to the pandemic will vary across time. Thus, future research that tracks ongoing responses is needed.

5. Conclusion

COVID-19 has resulted in a large-scale disruption in the lives of families across the world. However, we have found that the pandemic has not affected everyone in the same way. A non–trivial proportion of mothers and children saw improvements in mental health amidst a public health crisis. This raises questions about the aspects of their earlier environment that did not meet their needs. Our findings that some mothers and children with elevated mental patterns remain stable and elevated highlight the need for these groups to be attended to, even in the absence of a major disaster. A substantial proportion of mothers and children experienced declines in their mental health. Prompt policy solutions to support these individuals are badly needed. We saw declines in mental health for individuals who had higher and lower levels of mental health problems prior to the pandemic. This suggests that mental health intervention aimed at supporting individuals during the COVID-19 pandemic should target a wide range of individuals, not just those with a history of mental health concerns. We found that the direction of changes in mental health is not dependent on demographic factors like income and education but do seem to be somewhat influenced by earlier experiences. Mothers with the poorest mental health outcomes report lower satisfaction with social support than mothers with typical patterns of mental health. Similarly, having a history of stable ECEC differentiated the children who were improving during the pandemic from those who had the most problems overall, that remained elevated, and stable. The complexity of child and maternal mental health response to the COVID-19 pandemic highlight the need to additional research on this topic.

Credit author statement

Sumayya Saleem: Conceptualization, Formal Analysis, Investigation, Data Curation, Writing – Original Draft, Visualization. Samantha Burns: Conceptualization, Methodology, Formal Analysis, Investigation, Writing – Original Draft. Olesya Falenchuk: Methodology, Software, Formal Analysis, Data Curation, Writing – Original Draft. Petr Varmuzza: Investigation, Writing – Review, and Editing. Michal Perelman: Conceptualization, Methodology, Resources, Writing – Review and Editing, Supervision, Project Administration.

Declaration of Competing Interest

None.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.ecresq.2021.12.004.

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