

Original Article

A cohort study examining the association between children's symptoms of inattention and hyperactivity, internalizing symptoms, and mindful parenting during the COVID-19 pandemic

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ABSTRACT

Objectives: Increased mental health difficulties have been reported in Canadian children as a result of the COVID-19 pandemic, and emerging research suggests that children with high levels of symptoms of inattention and hyperactivity have been disproportionately impacted. Accordingly, the pandemic has impacted families as well. The purpose of this study was the following: (1) to examine whether children's symptoms of inattention and hyperactivity at the beginning of the 2020 and 2021 academic year were associated with mindful parenting at the end of the academic year and (2) to examine whether children's depressive and anxiety symptoms at the end of the year moderated this relationship.

Methods: Parents of 114 young children in a large Canadian city participated in this study in the Winter of 2020 and the Spring of 2021. Parents completed several self-report scales used to measure children's mental health symptomatology and mindfulness in parenting.

Results: Children's symptoms of inattention and hyperactivity were significantly, negatively associated with mindful parenting across the pandemic year, and children's depressive symptoms moderated this relationship. Specifically, when children's depressive symptoms were low or average it was found that higher symptoms of inattention and hyperactivity were associated with lower levels of mindful parenting. However, when children's depressive symptoms were high their symptoms of inattention and hyperactivity were not predictive of mindful parenting.

Conclusions: Children's mental health, namely symptoms of inattention/hyperactivity and depression, are related to challenges in mindful parenting during COVID-19. These results may inform practitioners about which families require additional support during the pandemic.

Keywords: Anxiety; Attention-deficit disorder with hyperactivity; Coronavirus; Depression; Parenting.

The Coronavirus Disease 2019 (COVID-19) has had profound impacts on families and young children throughout the world (1,2). Preventive health and safety measures resulted in repeated school closures across Canada, leading to unprecedented challenges in various domains in the lives of children and their families (3). Children's mental health has been impacted by the pandemic and its associated consequences (e.g., school closures, prolonged isolation), which has resulted in several Canadian organizations recently declaring a #codePINK (i.e., a national paediatric mental health crisis) (4).

Between 46.5% and 53.6% of Canadian children and youth experienced an increase in anxiety, depressive, irritable, inattentive, and hyperactive symptoms following the emergence of the pandemic (5). While few studies focused on young children in the primary grades, one study found that young boys (mean age of 5.69 years) exhibited worsened mental health at the commencement of the pandemic whereas there were no significant changes in the mental health of young girls (6). It was also found that children aged 3 to 6 years, in contrast to older children, exhibited additional clingy behaviours and fearful attitudes that

their loved ones would contract COVID-19 (7). Young children with high levels of symptoms of inattention and hyperactivity have been disproportionately affected by the pandemic, as evidenced by their difficulties transitioning to virtual learning and increases in anxiety and depressive symptoms (8). A Japanese study using a community sample found a slight increase in the percentage of children who displayed subclinical levels of attention-deficit hyperactivity disorder (ADHD) in May 2020 versus March 2020, and higher symptoms of inattention and hyperactivity in March 2020 predicted increased clinical levels of conduct behaviours in May 2020 (9). These findings indicate that children with symptoms of inattention and hyperactivity, even at sub-clinical levels, may experience disproportionate risk during the pandemic. Moreover, these emerging studies indicate that the mental health of young children has been impacted by the pandemic and examining the long-term effects warrants further investigation.

When considering the mental health of youth during the pandemic, it is important to consider the family context. Youth's adjustment to the pandemic is linked to family processes and caregiver well-being (10). Specific parenting practices are one way that family processes may influence child adjustment to the pandemic. Mindful parenting is a specific parental approach/practice that entails attending carefully, nonjudgmentally, and compassionately to one's child and one's parenting practices (11). Mindful parenting is associated with a range of positive outcomes, such as parenting in a consistent/calm manner in alignment with one's values, fostering positive parent-child relations, and reducing parental stress while bolstering children's well-being (11). Because children's mental health symptoms may influence parenting practices, such as mindful parenting, it is important to understand how such associations have been affected by the COVID-19 pandemic.

The objectives of this study were to examine whether children's symptoms of inattention and hyperactivity at the beginning of the 2020 to 2021 academic year were associated with mindful parenting later in the pandemic and to examine whether children's depressive and anxiety symptoms moderated this relationship. It was hypothesized that children's symptoms of inattention and hyperactivity would significantly, negatively predict mindful parenting due to previous research showing that parents who have children with ADHD tend to experience high parenting stress (12–14), challenges with parent-child exchanges (13), and more distress than parents with typically developing children (15)—all of which would likely result in less mindful parenting. Cross-sectional studies have shown that child behaviour problems are significantly associated with lower levels of mindful parenting (16,17) and a recent study found associations between lower levels of mindful parenting in families where a child has ADHD (18). It was also hypothesized that both children's depressive and anxiety symptoms would moderate this relationship, since it is well-established that symptoms of inattention and hyperactivity frequently co-occur with internalizing behaviours (19) and there is evidence that internalizing symptoms exacerbate difficulties in relationships between children with high levels of symptoms of inattention and hyperactivity and their parents (20).

METHOD

Sampling

Participants were included if they were English-speaking parents of children in senior kindergarten or the first grade during the 2020 to 2021 academic year. If the child had a diagnosis of autism spectrum disorder (ASD) or an intellectual disability (ID) they were not eligible.

Procedure

Institutional approval was provided by the *University of Ottawa Research Ethics Board* (H-08-18-1020). Parents gave informed consent on paper and completed the survey electronically, which consisted of a demographic questionnaire and rating scales. The survey was completed at two separate time points, once between November and December 2020 (i.e., Winter 2020) and again between May and June 2021 (i.e., Spring 2021). The average time between responses was 158.72 days (i.e., approximately 5 months). Follow-up emails were used to reduce attrition.

Measures

Children's symptoms of inattention and hyperactivity:

The ADHD Rating Scale-5 for Children and Adolescents, Home Version (ADHD RS-5) (21) was used to measure children's symptoms of inattention and hyperactivity in Winter 2020 as per the criteria outlined in the *Diagnostic and Statistical Manual of Mental Disorders 5* (DSM-5) (19). There were two nine-item subscales which represented children's inattentive (e.g., 'Fails to give close attention to details or makes careless mistakes in schoolwork or during other activities') and hyperactive/impulsive symptoms (e.g., 'Fidgets with or taps hands or feet or squirms in seat'). For this study, a composite score for symptoms of inattention and hyperactivity was used (i.e., the average of all 18 items). Response options ranged from 0 (*never or rarely*) to 3 (*very often*), and higher scores reflected more frequent symptoms of inattention and hyperactivity in the past 6 months. This scale demonstrated strong internal consistency in the current sample ($\alpha=0.93$).

Children's internalizing symptoms:

The Child and Adolescent Symptom Inventory-Progress Monitor Parent Checklist (CASI-PM-P) (22) is a 29-item scale used to measure various mental health symptoms among children and youth and was used in this study to measure children's internalizing symptoms in Spring 2021. This study used the four-item global depression subscale (e.g., 'Is depressed/sad for most of the day') and the seven-item global anxiety subscale designed for children ages 3 to 5 years (e.g., 'Has difficulty controlling worries'), both of which involved calculating mean scores. Response options range from 0 (*never*) to 3 (*very often*), with higher scores reflecting more severe symptoms in the past month. In the current sample, the CASI-PM-P showed adequate reliability for the global depression and anxiety subscales ($\alpha=0.81$ and $\alpha=0.80$, respectively).

Mindful parenting:

The Interpersonal Mindfulness in Parenting scale (IEM-P) (23) was used to measure participants' mindful parenting in Spring

2021 (e.g., 'I am aware of how my mood affects the way I treat my child'), whereby the 10 items were averaged together. Items from this scale pertained to: (1) parents' awareness/present-centered attention directed toward their own inner experiences and their children, (2) parents' ability to nonjudgmentally and openly receive the cognitions/feelings of their children, and (3) non-reactivity toward their children's actions. Response options ranged from 1 (*never true*) to 5 (*always true*), and higher scores reflected more mindful parenting in daily interactions with one's child. This scale was shown to have adequate internal consistency in the current sample ($\alpha=0.75$).

Data analytic approach

To address the first study objectives, bivariate correlations were conducted in SPSS 26 to determine how children's symptoms of inattention and hyperactivity in Winter 2020 were associated with mindful parenting in Spring 2021. To address the second objective, two separate moderation analyses were conducted using PROCESS macro for SPSS (v 3.5) (24). Children's symptoms of inattention and hyperactivity were the predictor variable, mindful parenting was the outcome variable, and children's depression or anxiety symptoms functioned as separate moderating variables. Significant interactions were probed by examining simple slopes of symptoms of inattention and hyperactivity on mindful parenting at the mean, one SD above the mean, and one SD below the mean for the moderator.

RESULTS

Descriptive data of sample

A sample of 114 parents completed all measures, a size which was deemed adequate for the proposed analyses (power analyses suggested a minimum sample of 84 for correlational analyses and 77 for moderated regressions). The mean age of the participating parents was 39.18 years ($SD=4.14$) and 94 (82.5%) were female. Sixty participants (52.6%) reported that their children were girls, whereby the mean age of the children

was 5.57 years ($SD=0.57$). Bivariate correlations showed no significant correlations between child age and any study variables. There were no significant differences across the two time points (i.e., Winter 2020 and Spring 2021) along sociodemographic characteristics (e.g., annual family income). Furthermore, no significant differences were found along sociodemographic characteristics between those who participated in the study at both time points and those who only participated at one time point. The average level of inattentive and hyperactive symptoms in our sample was 0.74 (on the 0 to 3 item scaling), which is consistent with the means reported for the standardization sample for boys (0.70) and for girls (0.53) (21). T-tests revealed that boys in the sample had higher levels of inattention and hyperactivity, $t(112)=2.07$, $P=0.041$ and depressive symptoms, $t(112)=2.01$, $P=0.046$. However, due to sample size constraints, child sex was not included in the primary analyses. Additional descriptive data can be found in the [Supplementary Appendix](#).

Children's symptoms of inattention and hyperactivity and mindful parenting

Children's symptoms of inattention and hyperactivity significantly, negatively predicted mindful parenting, $r(112)=-0.25$, $P<0.01$ (Table 1). That is, parents who reported higher symptoms of inattention and hyperactivity in their children in the Winter reported lower levels of mindful parenting practices in the Spring.

Children's internalizing symptoms as moderators

Children's anxiety symptoms did not significantly moderate the relationship between symptoms of inattention and hyperactivity and parenting, $b=0.078$, 95% CI $[-0.184, 0.340]$, $t=0.59$, $P=0.56$ (Table 2); however, children's depressive symptoms did significantly moderate this relationship, $b=0.354$, 95% CI $[0.022, 0.686]$, $t=2.11$, $P<0.05$ (Table 3). Specifically, there was a significant, negative relationship between children's symptoms

Table 1. Descriptive statistics and correlation matrix for study variables

Variable	M	SD	1	2	3	4
1. Children's symptoms of inattention and hyperactivity (Winter)	0.74	0.55	-			
2. Children's anxiety symptoms (Spring)	0.40	0.43	0.40*			
3. Children's depressive symptoms (Spring)	0.18	0.35	0.48*	0.50*		
4. Mindful parenting (Spring)	3.69	0.43	-0.25*	0.01	-0.09	

* $P<0.01$.

Table 2. Model of predictors of mindful parenting with anxiety as moderator

	b	SE B	T	P
Constant	3.69 [3.61, 3.77]	0.04	90.19	<0.001
Children's symptoms of inattention and hyperactivity (Winter)	-0.25 [-0.41, -0.09]	0.08	-3.03	<0.01
Children's anxiety symptoms (Spring)	0.10 [-0.12, 0.31]	0.11	0.88	0.38
Children's symptoms of inattention and hyperactivity \times children's anxiety symptoms	0.08 [-0.18, 0.34]	0.13	0.59	0.56

$R^2=0.08$.

of inattention and hyperactivity and mindful parenting when children’s depressive symptoms are either low, $b = -0.299$, 95% CI $[-0.480, -0.119]$, $t = -3.29$, $P < 0.01$ or average, $b = -0.237$, 95% CI $[-0.397, -0.076]$, $t = -2.92$, $P < 0.01$, but not when depressive symptoms are high, $b = -0.114$, 95% CI $[-0.295, 0.066]$, $t = -1.26$, $P > 0.05$; [Figure 1](#).

DISCUSSION

The findings from this study indicated that children’s symptoms of inattention and hyperactivity in Winter 2020 were significantly, negatively associated with mindful parenting in Spring 2021. Moreover, children’s depressive symptoms in Spring 2021 negatively moderated this relationship when the depressive symptoms were either low or average.

The significant, negative relationship between children’s symptoms of inattention and hyperactivity and mindful parenting is in alignment with a study that found parents of children with ADHD engaged in less mindful parenting than parents of children without ADHD (18). It was noted that high parental

distress among those who have children with ADHD likely accounted for this finding (18). Thus, while parental distress was not measured in this study, it is well established that parents of children with ADHD experience more distress (15,18,25), which is likely exacerbated during a pandemic. Given that parental well-being has been found to be positively correlated with mindful parenting (23), higher levels of parental distress might partly explain the negative relationship between children’s symptoms of inattention and hyperactivity and mindful parenting.

Compared to parents of neurotypical children, many parents of children with ADHD are more reactive, critical, and less responsive (25), all of which are contrary to the core aspects of mindful parenting. Furthermore, it has been noted that individuals with ADHD have experienced elevated behavioural concerns during COVID-19 (26). Together with the government-mandated lockdowns, which included school closures, parents may have become more reactive to their children with symptoms of inattention and hyperactivity, even at subclinical levels, due to the increased amount of time spent together. Nonetheless, it is important to note that the present study only measured mindful parenting at

Table 3. Model of predictors of mindful parenting with depression as moderator

	b	SE B	T	P
Constant	3.66 [3.58, 3.74]	0.04	88.78	<0.001
Children’s symptoms of inattention and hyperactivity (Winter)	-0.24 [-0.40, -0.08]	0.08	-2.92	<0.01
Children’s depressive symptoms (Spring)	-0.15 [-0.47, 0.16]	0.16	-0.98	0.33
Children’s symptoms of inattention and hyperactivity × children’s depressive symptoms	0.35 [0.02, 0.69]	0.17	2.11	<0.05

$R^2 = 0.10$.

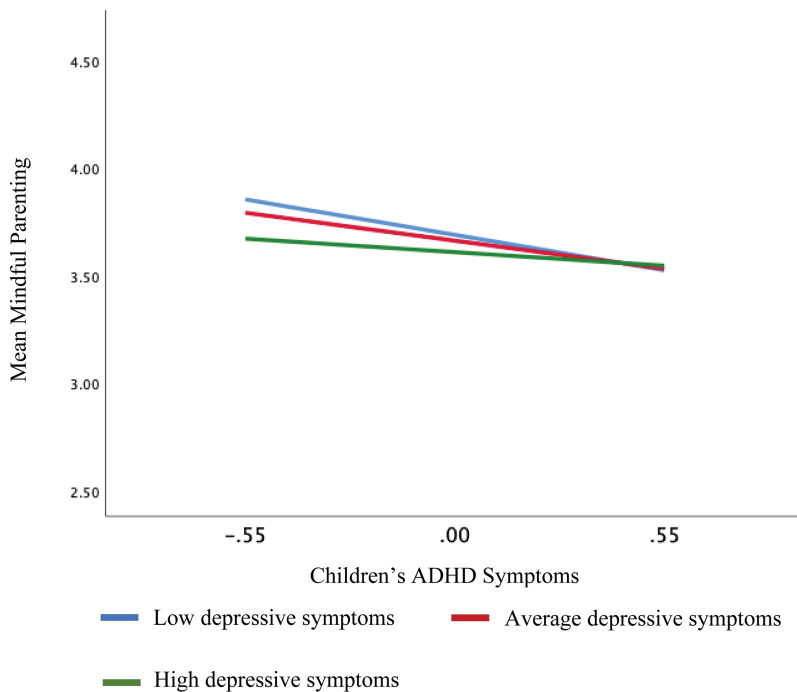


Figure 1. Simple slopes of the regression of mindful parenting on children’s symptoms of inattention and hyperactivity at three levels of children’s depression symptoms. When children’s depressive symptoms were low or average it was found that higher symptoms of inattention and hyperactivity were associated with lower levels of mindful parenting. However, when children’s depressive symptoms were high their symptoms of inattention and hyperactivity symptoms were not predictive of mindful parenting.

the second time point. Thus, the directionality of effects cannot be definitely determined using these data. Future studies using cross-lagged designs will be important to fully understand how mindful parenting and ADHD are related.

At low and average levels of children's depressive symptoms, higher symptoms of inattention and hyperactivity were associated with lower mindful parenting whereas at high levels of children's depressive symptoms, their symptoms of inattention and hyperactivity were not associated with mindful parenting. While these findings are interesting, it is important to note that the average level of depressive symptoms was relatively low in this community sample and the effect size was small. Future research should examine associations between these variables in a sample of children with clinically elevated symptoms.

Interestingly, children's anxiety symptoms did not moderate the relationship between children's symptoms of inattention and hyperactivity and mindful parenting. In this study children's depressive symptoms were reflective of slightly more observable behaviours (e.g., 'has low energy, is tired for no apparent reason') than children's anxiety symptoms (e.g., 'has difficulty controlling worries'). Thus, it is possible that children's depressive symptoms were more visible to parents compared to children's anxiety symptoms, particularly since young children are sometimes unable to identify their own anxiety cognitions and/or their anxiety manifests as somatic symptoms (e.g., stomach complaints) (27).

Findings from this study highlight how parental perceptions of children's behaviours are associated with mindful parenting, in which case the pandemic might create additional challenges. Given that mindful parenting is associated with many positive outcomes (e.g., lower parental stress, improved parent-child relations) (11), it is important to find ways to foster these skills. Additional research may help clinicians better understand the role they can play in helping families.

A strength of this study was that data were collected at two different time points; thus, it was possible to see how children's symptoms of inattention and hyperactivity during Winter 2020 were associated with mindful parenting later that year. However, the sample size was relatively small. While attempts were made to limit sample selection bias by attempting to include any primary caregiver across different schools with very limited exclusion criteria, future research should use larger sample sizes and continue to monitor children's mental health and parenting variables throughout the pandemic. It is possible that this could shed light on bidirectional relationships among these variables (i.e., mindful parenting may also influence children's symptoms of inattention and hyperactivity). Other limitations were that we could not examine the contribution of child sex due to sample size limitations, and that data were gathered solely through parent self-report. Future research should examine how mindful parenting and child mental health may be differentially affected during the pandemic, as well as investigating the perspectives of other adults (e.g., teachers). These limitations, along with the relatively high annual family incomes reported by participants, may have resulted in a slight inflation of the mindful parenting variable. Finally, it is important to measure parental distress in future studies to see how this variable affects the mental health of children and parenting practices.

In conclusion, children's symptoms of inattention and hyperactivity are significantly, negatively associated with mindful parenting during the pandemic and children's low and moderate levels of depressive symptoms moderated this relationship. These findings provide new insight about how children's mental health is associated with parenting during a pandemic and informs clinicians about which families might require additional support during this time.

SUPPLEMENTARY DATA

Supplementary data are available at *Paediatrics & Child Health* Online by searching for pxab109.

ETHICS APPROVAL

This study was approved by the University of Ottawa Research Ethics Board (H-08-18-1020).

FUNDING

Social Sciences and Humanities Research Council Insight Program, Grant #435-2018-1487.

POTENTIAL CONFLICTS OF INTEREST

HO received complementary registration to present this research at CADDRA ADHD Research Day in October 2021. There are no other disclosures. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

SUPPLEMENT FUNDING

This article is part of a special supplement on the impact of the COVID-19 pandemic on children and youth. Production of this supplement was made possible through a financial contribution from the Public Health Agency of Canada. The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.

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