

Child Psychological Functioning During the COVID-19 Lockdown: An Ecological, Family-Centered Approach

Karine Dubois-Comtois, PhD,*† Sabrina Suffren, PhD,*†‡ Diane St-Laurent, PhD,*‡ Tristan Milot, PhD,‡§ Jean-Pascal Lemelin, PhD‡||

ABSTRACT: *Objective:* To evaluate how sociodemographic characteristics and various aspects of parent well-being, family functioning, parent-child relationship, and child characteristics are related to psychological functioning in children aged 9 to 12 years during the COVID-19 lockdown. *Method:* Participants included 144 children aged 9 to 12 years and their parents who lived in the province of Quebec, Canada, during the COVID-19 mandatory lockdown. Parents and children were administered a phone-based survey in which various child, parent, parent-child, and family characteristics were assessed. *Results:* Results showed that higher internalizing problems in children were related to greater depressive symptoms in parents, lower attachment security to parents, and greater aversion to aloneness in children. Results on externalizing behavior problems showed that more problems were associated with more family dysfunction and chaos and lower attachment security to parents. Finally, results on children's anxiety toward COVID-19 showed that more anxiety was associated with greater parental anxiety toward COVID-19 and more child aversion to aloneness. *Conclusion:* Our findings showed that even during an unusual and stressful context such as a pandemic, proximal variables such as the attachment relationship that have been known to be closely associated with adaptation are significantly related to child psychological functioning. Such observations are important because they highlight factors that may accentuate child vulnerability in times of a pandemic and shed light on potential intervention targets.

(*J Dev Behav Pediatr* 42:532–539, 2021) **Index terms:** children, anxiety, loneliness, family functioning, parent-child relationship, COVID-19, parent well-being.

Although there have been a great number of studies on the medical aspects of COVID-19, little research has examined the psychological effects of the pandemic.¹ A review of the literature on child and adolescent mental health in the context of COVID-19 shows the lack of documentation on this issue, with only 6 published studies between March and July 2020.² This review highlights a higher prevalence of anxiety and depressive disorders in young people compared with those in the pre-COVID-19 period. Factors that have been related to

child psychopathology in the context of COVID-19 include child sex and age, although studies obtained mixed results. Being older and a girl was related to more symptoms in some studies,^{3–6} but other studies failed to observe significant associations or obtained mixed results.^{7,8} Despite having assessed the links between some demographic characteristics and mental illness, these studies did not consider other important individual and family factors that may account for child adjustment. Therefore, documentation on the association between child psychological functioning and various family, parental, and child characteristics during COVID-19 is still limited, and more research is urgently needed to have a better knowledge of these associations during this crisis period. For instance, studies have assessed child anxiety during the COVID-19 pandemic,^{9,10} but anxiety toward COVID-19 has not received scientific attention thus far.

According to Prime et al.,¹¹ difficulties in handling the COVID-19 pandemic and the mandatory lockdown, as well as preexisting family vulnerabilities, are all factors that can negatively affect child adjustment. In line with various developmental models, they suggest considering a number of factors that are either distal to the child, such as parent well-being and family functioning, or proximal to the child, such as the parent-child relationship or child characteristics. According to the transactional model, child functioning and adaptation is a product of the continuous dynamic interactions between characteristics of the child and the family environment in

From the *Département de Psychologie, Université du Québec à Trois-Rivières, Trois-Rivières, QC, Canada; †Centre de Recherche, Centre Intégré Universitaire de Santé et de Services Sociaux du Nord-de-l'Île-de-Montréal (CIUSSS-NIM), Montreal, QC, Canada; ‡Centre de Recherche Universitaire sur les Jeunes et les Familles (CRUJeF), Québec, QC, Canada; §Département de Psychoéducation, Université du Québec à Trois-Rivières, Trois-Rivières, QC, Canada; ||Département de Psychoéducation, Université de Sherbrooke, Sherbrooke, QC, Canada.

Received September 2020; accepted January 2021.

Fonds de recherche du Québec—Santé (FRQS); Fonds de recherche du Québec—Société et culture (FRQSC).

Disclosure: The authors declare no conflict of interest.

Address for reprints: Karine Dubois-Comtois, PhD, Department of Psychology, Université du Québec à Trois-Rivières, C.P. 500, Trois-Rivières, Québec, Canada G9A 5H7; e-mail: karine.dubois-comtois@uqtr.ca.

This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

Copyright © 2021 The Author(s). Published by Wolters Kluwer Health, Inc.

which he or she develops.¹² The family environment is a setting that includes various levels of family, parent, and parent-child factors that are interrelated with child characteristics. At the family level, household chaos and poor family functioning have been related to child behavior problems.¹³ At the parent level, parents struggling with mental health problems are more likely to have children who also have poor psychological functioning.¹⁴ At the parent-child level, a supportive and warm relationship and attachment security with the parent have been related to greater child adaptation.^{15,16} Prime et al.¹¹ suggested that these environmental factors, which have been associated with child adjustment before the COVID-19 pandemic, are likely to be affected by the COVID-19 lockdown and, in turn, predict child psychological functioning during the pandemic.

To date, studies testing the associations between these factors and child psychological functioning during the pandemic are scarce. Two studies have shown that higher parental distress and anxiety and parenting stress during the COVID-19 pandemic were associated with greater child distress, emotional symptoms, hyperactivity, and conduct problems.^{5,17} Three studies have assessed more proximal variables related to child well-being, such as parenting style and the parent-child relationship. In a study conducted in Spain, parents of children aged 3 to 12 years were asked to evaluate their child's behaviors during the COVID-19 lockdown and their own level of distress and parenting style.¹⁸ Results showed that negative and positive child behaviors during the lockdown were related to parent distress and parenting practices. A study from the United States with parents of children aged 0 to 18 years found that parents' caregiver burden and mental health were related to parental perceptions of children's stress and that parents' and children's distress was significantly linked to a negative parent-child relationship.¹⁹ Another study conducted in the United States with parents of children aged 5 to 18 years showed that COVID-19 stressors are related to greater family discord and use of caustic parenting, which, in turn, predict greater child and parent distress.²⁰ These studies highlight the need to consider the quality of the parent-child relationship in the assessment of child and parent adaptation during the pandemic. However, they included children from a large age range who have different developmental needs and are likely to experience the COVID-19 pandemic differently. They also considered only the parents' perspective and did not assess children's characteristics that could be related to child psychological functioning. Finally, they did not assess child anxiety toward COVID-19.

Considering the lack of social interactions during the COVID-19 lockdown, 1 child characteristic that is likely to be related to psychological functioning is aversion to aloneness. A recent systematic review of studies conducted before the COVID-19 lockdown revealed that social isolation and loneliness increase the risk of depression in children and adolescents up to 9 years later,

raising concerns on the impact of social isolation and loneliness on child mental health in the context of COVID-19.²¹ No study has yet tested the association between child aversion to aloneness and psychological functioning during the COVID-19 lockdown.

To fill the current gap in the literature and assess how multiple factors from different ecological levels (socio-demographic, family, parent, parent-child, and child) relate to child adaptation during the COVID-19 lockdown, we conducted a study that considers both parents' and children's perspectives.¹⁶ The first objective of this study is to evaluate, through parent and child reports, how sociodemographic characteristics and various aspects of parent well-being, family functioning, parent-child relationship, and child characteristics are related to internalizing and externalizing behavior problems in children aged 9 to 12 years during the COVID-19 lockdown in the province of Quebec, Canada. We expected that proximal factors, such as the parent-child relationship and child characteristics, would be more strongly related to externalizing and internalizing behavior problems than more distal factors, such as sociodemographic characteristics, parent well-being, or family functioning. Because child anxiety toward COVID-19 and factors specifically related to it have not been studied thus far, a second objective of this study is to assess whether sociodemographic, family, parent, parent-child, and child characteristics are related to child anxiety toward COVID-19.

METHODS

Participants and Procedure

We conducted a cross-sectional study through a phone-based survey during the COVID-19 lockdown with 144 families including at least 1 child aged between 9 and 12 years. Participants responded to invitations posted on social networks and across school e-mail lists in Quebec, between April 18, 2020, and May 18, 2020, in various areas where the lockdown was mandatory. This study was approved by Université du Québec à Trois-Rivières' research ethics committee. Online informed consent was obtained from all participating parents (mother or father) and children before completing the survey on the phone with a trained research assistant. Research assistants received a 3-hour training conducted by the first 2 authors of this study before recruitment, and they were in contact with the researchers during data collection to answer any remaining questions. Parents and children completed the survey separately, and families were compensated with a \$10 gift card for their participation. Parents were first interviewed and were then invited to lend the phone to their child and make sure the latter had privacy to complete the interview without being disturbed. Research assistants were not able to verify whether families complied with this request. Parents were asked questions on their own depressive symptoms, general family functioning, household

disorder, quality of the parent-child relationship, and child externalizing behavior problems. Children answered questions on their security of attachment to parents, aversion to aloneness, and internalizing behavior problems. Parents and children also independently reported on their own anxiety toward COVID-19.

In total, 180 children participated in this study (families with 2 children aged 9–12 years: $n = 28$ and families with 3 children aged 9–12 years: $n = 4$). To avoid shared variance for a portion of the sample, we retained the first child who participated in this study for each family that included more than 1 child aged 9 to 12 years. The final sample thus consisted of 144 parents and their child (131 mothers and 13 fathers) with a mean age of 40.1 years ($SD = 5.11$; range: 27–59). The mean child age was 10.44 years ($SD = 1.09$; range = 9–12 years), and 51.4% ($n = 74$) were boys. Regarding parents' education, 12.5% had a high school degree, 34.7% a college or professional degree, and 52.8% a university degree. Family income before COVID-19 was as follows: 23.6% of families earned less than 50,000\$CAN, 13.9% had an income between 50,000\$CAN and 70,000\$CAN, 29.9% between 70,001\$CAN and 110,000\$CAN, and 31.3% earned more than 110,000\$CAN. Two families refused to disclose their annual income. Our sample is mainly composed of middle- to high-income families before the COVID-19 pandemic (mean income = 98,265\$CAN, $SD = 64,416$); however, there is a great variability in family income in the sample (range = 10,000\$CAN to 450,000\$CAN). Families came from 14 of the 17 administrative regions in the province of Quebec and lived in metropolitan, suburban, or rural areas, indicating sample diversity in geographic location.

Instruments

Sociodemographic Characteristics

Parents completed a sociodemographic questionnaire that provided information on family background (family income before COVID-19, parental education, and each family members' age and sex) and changes in family income because of COVID-19 (i.e., Has COVID-19 brought changes in your family? If yes, please describe the changes).

Parent Depressive Symptoms

Parents also completed the 6 depression items from the Brief Symptom Inventory-18 (BSI-18).²² These items, rated on a 5-point Likert scale, assess various depressive symptoms over the past 7 days. The depression T scores were used in this study. Cronbach's alpha for the depressive symptoms in this sample scale is 0.75. The BSI-18 is a widely used measure that has excellent psychometric properties.²³

Family Functioning

Family functioning was assessed through 2 questionnaires administered to the parent. The level of household disorder was evaluated using the Confusion, Hubbub, and Order Scale (CHAOS), a validated parent-reported scale.²⁴ The scale consists of 15 yes-no items that are

summed (e.g., There is often a fuss going on at our house). Cronbach's alpha for the sample was 0.61. The CHAOS has been widely used and has good psychometric properties.²⁵ General family functioning was assessed using the short version of the General Functioning subscale of the McMaster Family Assessment Device (GF6+).²⁶ GF6+ consists of 6 items related to family functioning (e.g., In times of crisis, we can turn to each other for support) rated on a 4-point Likert scale (1 = strongly agree to 4 = strongly disagree). A mean score greater than 2 indicates an unhealthy family functioning. Cronbach's alpha for the scale in this sample is 0.73. The psychometric properties of the GF6+ are comparable with those of the long version.²⁶

Parent-Child Relationship and Security of Attachment

Quality of the parent-child relationship was assessed by parents, whereas security of attachment was reported by children. Parents completed the Child-Parent Relationship Scale (CPRS)—Short Form. The CPRS is composed of 15 items rated on a 5-point scale (1 = definitely does not apply to 5 = definitely applies)²⁷ and covers 2 dimensions: the Closeness (e.g., I share an affectionate, warm relationship with my child) and Conflict scales (e.g., My child and I always seem to be struggling with each other). Considering the potentially high intercorrelation between the Conflict scale and child externalizing problems, only the Closeness scale was retained in this article. Internal consistency for the Closeness scale in this sample is 0.72. The CPRS has good psychometric properties.²⁸ Children completed the short version of the Inventory of Parent and Peer Attachment (IPPA-R)²⁹ validated for children aged 9 to 15 years.³⁰ This self-report measure includes 14 items assessing the security of attachment to parents (e.g., My parents help me to understand myself better) using a 3-point Likert scale (always true, sometimes true, and never true). The items were summed into a total security score. Cronbach's alpha for the scale in this sample is 0.73. The revised version of the IPPA showed good reliability and validity.^{29,30}

Child Aversion to Aloneness

Children completed the 12-item Negative Experienced Aloneness Scale of the Loneliness and Aloneness Scale for Children and Adolescents.³¹ The items, rated on a 4-point scale (often, sometimes, seldom, and never), assess child aversion to aloneness (e.g., When I am alone, I feel bad). The items were summed; a high score indicates high levels of negative views on aloneness. Cronbach's alpha for the scale in this study is 0.79. The instrument showed convergent and discriminant validity and good reliability.³¹

Parent and Child Anxiety Toward COVID-19

Parents' and children's anxiety toward COVID-19 was assessed with the 7-item Fear of COVID-19 Scale (FCV-19S), completed independently by both parents and children. This self-report measure, rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly

agree), evaluates thoughts, behaviors, and physiological symptoms related to fear of COVID-19.³² The items were summed into a total score. Cronbach's alpha for the scale in this study is 0.87 for parents and 0.84 for children. The FCV-19S was developed and validated with a sample of 717 Iranian adults.³² Since its initial validation, studies with participants from multiple countries including the United States have demonstrated that the instrument possesses good psychometric qualities.³³ It was also validated with a sample of adolescents (mean age of 12).³⁴

Child Behavior Problems

Child externalizing behavior problems were assessed by parents, whereas child internalizing problems were self-reported by children. This decision was supported by 3 rationales: (1) considering that parents may underestimate child internalizing problems,³⁵ using child reports of internalizing problems instead of parent reports can be relevant; (2) parents and children have similar perceptions of child externalizing problems in middle childhood³⁶; and (3) assessing internalizing problems through children and externalizing problems through parents limited the time children and parents spent answering questions on the phone and avoided participant fatigue. Parents completed the 42 items of the Externalizing Scale of the Child Behavior Checklist for Ages 6 to 18 (CBCL/6-18) and were instructed to report child behaviors since the beginning of the lockdown.³⁷ Items related to attention problems and aggressive behaviors were scored by the parent on a 3-point scale (not true, somewhat or sometimes true, very true, or often true). Child internalizing problems were self-reported using the Youth Self-Report (YSR),³⁷ which was originally designed to assess problems in youth aged 11 to 18 years but has been validated for children as young as 7 years.³⁸ The 32 items related to anxiety, depression, somatization, and withdrawal were scored by the child on a 3-point scale (not true, some-

what or sometimes true, very true, or often true). Raw scores were used in this study to account for the full range of variation. Internal consistency for the 2 scales in this study is satisfactory (respectively, Cronbach's $\alpha = 0.91$ and 0.87). The CBCL/6-18 and the YSR are widely used measures of psychological functioning in childhood and adolescence and have excellent psychometric properties.³⁷

Statistical Analysis

Descriptive statistics were computed for study variables, and Pearson correlations (or *t* tests) were used to examine bivariate associations between them. Analyses of variance were performed to verify whether differences in child behavior problems were accounted for by changes in family income because of the COVID-19 pandemic. Three multiple linear regression analyses were conducted to assess how the different individual and family variables (entered simultaneously in the model) were linked to child internalizing and externalizing behavior problems and to child anxiety toward COVID-19. Multiple regression analyses allow us to assess relations between variables of interest when the predictors are not independent because it accounts for shared variance. All statistical tests were 2-sided, and $p < 0.05$ was considered statistically significant. All data were analyzed using SPSS software, version 25.0 (IBM).

RESULTS

Descriptive Statistics and Preliminary Analyses

Descriptive statistics and correlations between study variables are presented in Table 1. Correlation analyses between sociodemographic variables and child adjustment revealed that child internalizing and externalizing problems were not related to child age or family income before the COVID-19 pandemic (Table 1). In our sample, 54.9% of families maintained the same income during the

Table 1. Correlations Between Study Variables and Descriptive Data

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	M	SD
1. Child age	—											10.44	1.09
2. Family income (CANS)	-0.02	—										98,265	64,416
3. Parental depressive symptoms	0.02	0.06	—									53.39	8.95
4. Parent anxiety toward COVID-19	-0.03	-0.23**	0.28**	—								14.60	5.71
5. General family functioning	0.05	-0.13	0.19*	0.13	—							1.35	0.32
6. Family chaos	-0.04	0.07	0.33***	0.05	0.17*	—						4.87	2.30
7. Attachment to parents	0.25**	0.09	-0.17*	-0.14	-0.08	-0.01	—					36.42	3.70
8. Closeness	-0.09	0.15	-0.26**	-0.05	-0.45***	-0.20*	0.18	—				31.13	3.22
9. Aversion to aloneness	-0.17*	-0.13	0.24**	0.18*	0.16	0.12	-0.19*	-0.03	—			33.65	6.88
10. Internalizing problems	0.08	-0.15	0.28**	0.13	0.08	0.02	-0.39***	-0.12	0.35***	—		10.82	7.08
11. Externalizing problems	-0.01	-0.06	0.37***	0.20*	0.39***	0.44***	-0.27**	-0.39***	0.17*	0.31***	—	10.42	7.72
12. Child anxiety toward COVID-19	-0.12	-0.14	0.02	0.28**	0.15	-0.01	-0.14	0.08	0.32***	0.43***	0.13	14.13	5.73

N = 144 except for analyses with family income, for which n = 142. * $p < 0.05$; ** $p < 0.01$; and *** $p < 0.001$.

Table 2. Multiple Regression Analysis Testing the Association Between Child Internalizing Behavior Problems and Parent, Child, and Family Characteristics

Predictor Variables	B	SE	β	<i>p</i>	95% CI
Parent well-being					
Parental depressive symptoms	0.15	0.07	0.19	0.02	0.02 to 0.29
Parent anxiety toward COVID-19	-0.01	0.10	-0.01	0.89	-0.20 to 0.18
Family functioning					
General family functioning	-0.48	1.87	-0.02	0.80	-4.17 to 3.21
Family chaos	-0.24	0.24	-0.08	0.33	-0.72 to 0.24
Parent-child relationship					
Security of attachment to parents	-0.59	0.15	-0.31	<0.001	-0.88 to -0.29
Closeness in the parent-child relationship	-0.07	0.19	-0.03	0.70	-0.45 to 0.30
Child aversion to aloneness	0.27	0.08	0.26	0.001	0.11 to 0.43

N = 144, $F(7,136) = 6.97$, $p < 0.001$, $R^2 = 0.26$. CI, confidence interval; SE, standard error.

first months of the pandemic, 43.2% experienced a decrease in income, and 4.9% experienced an increase. Analyses of variance showed no differences in study variables according to changes in family income because of COVID-19. *t* tests on study variables revealed no significant differences between mother and father reports (*t* between 0.85 and 1.71), and no differences were found as a function of child sex (*t* between 0.32 and 1.69). Considering the absence of significant associations between child psychological functioning and sociodemographic variables, the latter were not included in the main analyses.

Analyses on Child Behavior Problems

A multiple regression was conducted to assess whether study variables were related to child internalizing behavior problems. The model explained 26% of the variance of internalizing behavior problems (Table 2). Specifically, standardized beta coefficients showed that more parental depressive symptoms ($\beta = 0.19$), lower attachment security to parents ($\beta = -0.31$), and greater child aversion to aloneness ($\beta = 0.26$) were all predictive of internalizing problems in the context of the

COVID-19 lockdown. A larger effect size was obtained with child attachment security than with parent depressive symptoms.

A multiple regression was also conducted on child externalizing behavior problems. The model explained 40% of the variance of externalizing problems (Table 3). Specifically, standardized beta coefficients showed that greater family dysfunction ($\beta = 0.21$) and chaos ($\beta = 0.32$) and lower attachment security to parents ($\beta = -0.19$) were related to more child externalizing problems in the context of the COVID-19 lockdown. All variables showed similar effect sizes. Although parents' depressive symptoms and anxiety toward COVID-19, closeness in the parent-child relationship, and aversion to aloneness were significantly correlated with externalizing problems (Table 1), these associations became nonsignificant when included in the model with the other individual and family variables.

Analyses on Child Anxiety Toward COVID-19

A multiple regression was performed on child anxiety toward COVID-19. The model explained 20% of the

Table 3. Multiple Regression Analysis Testing the Association Between Child Externalizing Behavior Problems and Parent, Child, and Family Characteristics

Predictor Variables	B	SE	β	<i>p</i>	95% CI
Parent well-being					
Parental depressive symptoms	0.11	0.07	0.12	0.10	-0.02 to 0.24
Parent anxiety toward COVID-19	0.11	0.10	0.08	0.25	-0.08 to 0.30
Family functioning					
General family functioning	5.18	1.84	0.21	0.01	1.54 to 8.81
Family chaos	1.08	0.24	0.32	<0.000	0.61 to 1.56
Parent-child relationship					
Security of attachment to parents	-0.40	0.15	-0.19	0.01	-0.69 to 0.11
Closeness in the parent-child relationship	-0.36	0.19	-0.15	0.06	-0.73 to 0.01
Child aversion to aloneness	0.02	0.08	0.002	0.82	-0.14 to 0.18

N = 144, $F(7,136) = 12.93$, $p < 0.001$, $R^2 = 0.40$. CI, confidence interval; SE, standard error.

variance in anxiety toward COVID-19 (Table 4). Specifically, standardized beta coefficients showed that greater parent anxiety toward COVID-19 ($\beta = 0.26$) and more child aversion to aloneness were related to more anxiety toward COVID-19 ($\beta = 0.27$). Both variables showed similar effect sizes.

DISCUSSION

The purpose of this study was to assess how multiple factors stemming from different ecological levels are related to child psychological functioning during the COVID-19 lockdown. Our findings generally confirmed theoretical assumptions from several familial and developmental models that proximal variables (at the parent-child or child levels) are important factors related to child adaptation, but other, more distal factors (at the parent or family levels) were also significantly associated with child psychological functioning.¹¹ These results also echo those found in studies with children living in low-income or maltreating families or having experienced mass trauma, suggesting that under various stressors, the parent-child relationship is an important factor related to child psychological functioning.³⁹ Such observations are relevant because they highlight factors that may accentuate child vulnerabilities in times of pandemic and also shed light on potential intervention targets.

The results showed that higher internalizing problems in children were related to greater depressive symptoms in parents, lower child attachment security to parents, and greater aversion to aloneness in children, with a larger effect size with attachment security than with parent depressive symptoms. The results on externalizing behavior problems indicated that more problems were associated with more family dysfunction and chaos and lower attachment security to parents, all of these variables showing similar effect sizes. Finally, the results on child anxiety toward COVID-19 showed that more anxiety was associated with greater parent anxiety toward COVID-19 and more child aversion to aloneness, both of these variables showing similar effect sizes. These results highlight the idea that various characteris-

tics of the parent, the family, the parent-child relationship, and the child are related to different dimensions of child psychosocial functioning during the COVID-19 lockdown. Interestingly, attachment security toward the parent was related to both internalizing and externalizing problems, emphasizing the importance of the attachment relationship in the context of the COVID-19 pandemic. Considering the potential bidirectional effects, these results suggest that an insecure attachment relationship could accentuate child psychopathology, but the latter could also worsen the attachment relationship.⁴⁰

At the parent level, parental depressive symptoms were associated with internalizing behavior problems, as well as with family functioning and the parent-child relationship. Such results suggest that parental depressive symptoms may set the stage for a more negative family environment that, in turn, affects parent-child relationships and child adjustment.^{19,41} Parent anxiety and child anxiety toward COVID-19 were both related. This result is important because it shows how anxiety about the pandemic runs in the family, especially considering the fact that parent and child each reported independently on their own level of anxiety. The more the parent expresses fear of COVID-19, the more the child also experiences fear, and vice versa.

At the child level, aversion to aloneness was related to internalizing problems and anxiety toward COVID-19. In the context of social isolation because of the lockdown, children who were reluctant to stay alone may have experienced more distress. It is also possible that children who were already experiencing distress before the lockdown were more likely to negatively evaluate aloneness. Nevertheless, this result is in line with studies conducted before the pandemic showing that social isolation predicts internalizing problems in children and adolescents.²¹

In our study, changes in family income because of COVID-19 were not related to child behavior problems. Perhaps these changes were too recent at the time to exert a significant impact on children and families or

Table 4. Multiple Regression Analysis Testing the Association Between Child Anxiety Toward COVID-19 and Parent, Child, and Family Characteristics

Predictor Variables	B	SE	β	p	95% CI
Parent well-being					
Parental depressive symptoms	-0.07	0.06	-0.11	0.21	-0.18 to 0.04
Parent anxiety toward COVID-19	0.24	0.08	0.24	0.004	0.08 to 0.40
Family functioning					
General family functioning	2.94	1.58	0.16	0.07	-0.18 to 6.06
Family chaos	-0.02	0.21	-0.01	0.91	-0.43 to 0.38
Parent-child relationship					
Security of attachment to parents	-0.14	0.13	-0.09	0.26	-0.39 to 0.10
Closeness in the parent-child relationship	0.28	0.16	0.16	0.08	-0.04 to 0.60
Child aversion to aloneness	0.22	0.07	0.26	0.002	0.08 to 0.35

N = 144, $F(7,136) = 4.74$, $p < 0.001$, $R^2 = 0.20$. CI, confidence interval; SE, standard error.

they were less likely to affect children, considering that families in our sample are mostly from middle-class to upper-income households.

Implications for Clinicians and Policymakers

This study has multiple implications for clinical practice. A significant number of commentaries and infographics have been published to inform those who work closely with families on the best practices to adopt in times of a pandemic. Although such publications are key for clinicians and policymakers, for the most part, they are not based on evidence collected during the COVID-19 pandemic. Our study offers evidence on factors that are associated with child psychological functioning assessed during the early phase of the COVID-19 pandemic in the context of a mandatory lockdown. Our findings demonstrated that child externalizing and internalizing problems and anxiety toward COVID-19 were associated with different individual and family factors, which should be taken into account by clinicians. Considering that child aversion to aloneness was related to internalizing problems and anxiety toward COVID-19, clinicians should emphasize to parents the importance of helping their children cope with anxiety toward COVID-19 and developing strategies that maintain social contact despite the lockdown such as performing activities that respect social distancing. Child attachment to parents was related to internalizing and externalizing behavior problems. Considering this factor is proximal to the child, interventions that target the parent-child relationship by increasing attachment security to parents could improve child psychological functioning despite the stress associated with the pandemic context. Parent mental health issues, and more specifically anxiety toward COVID-19 and depressive symptoms, which are likely to increase in the context of the COVID-19 pandemic,⁴² are also important in the identification of vulnerable groups of children and parents and to implement effective prevention and intervention strategies.

Strengths and Limitations

This study is one of the first to report on the associations between child psychological functioning and a number of factors related to parent and child characteristics and the family environment, including the parent-child relationship, in the context of the COVID-19 lockdown. Constructs were assessed using multiple questions from psychometrically sound inventories and a multiinformant approach. Boys and girls were almost equally represented in the sample, and the child age range was relatively narrow, which allowed the assessment of children with similar developmental needs. Sample diversity in geographic location is relevant to generalizability of findings in North America.

Despite these important strengths, a number of limitations need to be mentioned. First, the design was cross-sectional, and causal inferences or direction of effects could not be made. Moreover, we unfortunately do not

have a baseline measure of how these variables related to one another or whether children had psychological problems before the lockdown. It is therefore unclear whether these findings represent a change in associations or outcomes related to COVID-19. Second, although adequate to test study hypotheses, the number of participants was limited when compared with cohort studies, and the racial/ethnic breakdown in our sample is unknown. Third, having the same informant for some predictors and outcomes could have inflated the magnitude of the observed associations. However, these results cannot only be explained by the informant considering that the self-reported characteristics of parent well-being were significantly related to child reports of internalizing problems and anxiety toward COVID-19, whereas child-reported attachment was associated with parent-reported child externalizing problems. It is noteworthy that this is one of the first published studies to include both parent-report and child-report measures during the first weeks of the COVID-19 pandemic. Fourth, research assistants could not verify whether children were able to answer questions without any family members present. It is therefore possible that full privacy was not respected for all children. Fifth, although there was heterogeneity in family income before COVID-19, on average, it is a middle- to high-income sample, limiting the possibility of generalizing results. Finally, our findings may not be generalizable to other populations, for example, children in another age range or populations outside North America. COVID-19 may indeed have very different impacts on families with different socioeconomic backgrounds and from different countries. Considering that the study was conducted in the relatively early days of the COVID-19 pandemic, the findings might differ as the pandemic goes on.

CONCLUSIONS

This study highlights the importance of considering multiple individual and family factors that can be associated with child psychological functioning in the context of a pandemic. The results indicate the importance of considering the parent-child relationship, child loneliness and social isolation, and parental depressive and anxiety symptoms as intervention targets to improve child psychological functioning in highly stressful and atypical contexts.

ACKNOWLEDGMENTS

The authors thank all the students involved in the data collection and the families for their generous participation.

REFERENCES

1. Ho CSH, Chee CY, Ho RC. Mental health strategies to combat the psychological impact of COVID-19 beyond paranoia and panic. *Ann Acad Med Singapore*. 2020;49:1-3.
2. Racine N, Cooke JL, Eirich R, et al. Child and adolescent mental illness during COVID-19: a rapid review. *Psychiatry Res*. 2020;292:113307.
3. Jiao WY, Wang LN, Liu J, et al. Behavioral and emotional disorders in children during the COVID-19 epidemic. *J Pediatr*. 2020;221:264-266.

4. Liu S, Liu Y, Liu Y. Somatic symptoms and concern regarding COVID-19 among Chinese college and primary school students: a cross-sectional survey. *Psychiatry Res.* 2020;289:113070.
5. Rosen Z, Weinberger-Litman SL, Rosenzweig C, et al. Anxiety and distress among the first community quarantined in the U.S. due to COVID-19: psychological implications for the unfolding crisis. *J Chem Inf Model.* 2020;53:1689-1699.
6. Zhou SJ, Zhang LG, Wang LL, et al. Prevalence and socio-demographic correlates of psychological health problems in Chinese adolescents during the outbreak of COVID-19. *Eur Child Adolesc Psychiatry.* 2020;29:749-758.
7. Oosterhoff B, Palmer CA, Wilson J, et al. Adolescents' motivations to engage in social distancing during the COVID-19 pandemic: associations with mental and social health. *J Adolesc Health.* 2020;69:179-185.
8. Xie X, Xue Q, Zhou Y, et al. Mental health status among children in home confinement during the coronavirus disease 2019 outbreak in Hubei Province, China. *JAMA Pediatr.* 2020;174:898-900.
9. Duan L, Shao X, Wang Y, et al. An investigation of mental health status of children and adolescents in China during the outbreak of COVID-19. *J Affect Disord.* 2020;275:112-118.
10. Garcia de Avila MA, Hamamoto Filho PT, Jacob FLDS, et al. Children's anxiety and factors related to the COVID-19 pandemic: an exploratory study using the children's anxiety questionnaire and the numerical rating scale. *Int J Environ Res Public Health.* 2020;17:5757.
11. Prime H, Wade M, Browne DT. Risk and resilience in family well-being during the COVID-19 pandemic. *Am Psychol.* 2020;75:631-643.
12. Sameroff AJ, MacKenzie MJ. A quarter-century of the transactional model: how have things changed? *Zero Three J.* 2003;24:14-22.
13. Marsh S, Dobson R, Maddison R. The relationship between household chaos and child, parent, and family outcomes: a systematic scoping review. *BMC Public Health.* 2020;20:1-27.
14. Connell AM, Goodman SH. The association between psychopathology in fathers versus mothers and children's internalizing and externalizing behavior problems: a meta-analysis. *Psychol Bull.* 2002;128:746.
15. Madigan S, Brumariu LE, Villani V, et al. Representational and questionnaire measures of attachment: a meta-analysis of relations to child internalizing and externalizing problems. *Psychol Bull.* 2016;142:367.
16. Pinquart M. Associations of parenting dimensions and styles with externalizing problems of children and adolescents: an updated meta-analysis. *Dev Psychol.* 2017;53:873.
17. Spinelli M, Lionetti F, Pastore M, et al. Parents' stress and children's psychological problems in families facing the COVID-19 outbreak in Italy. *Front Psychol.* 2020;11:1713.
18. Romero E, López-Romero L, Domínguez-Álvarez B, et al. Testing the effects of COVID-19 confinement in Spanish children: the role of parents' distress, emotional problems and specific parenting. *Int J Environ Res Public Health.* 2020;17:6975.
19. Russell BS, Hutchison M, Tambling R, et al. Initial challenges of caregiving during COVID-19: caregiver burden, mental health, and the parent-child relationship. *Child Psy Hum Dev.* 2020;51:671-682.
20. Daks JS, Peltz JS, Rogge RD. Psychological flexibility and inflexibility as sources of resiliency and risk during a pandemic: modeling the cascade of COVID-19 stress on family systems with a contextual behavioral science lens. *J Contextual Behav Sci.* 2020;18:16-27.
21. Loades ME, Chatburn E, Higson-Sweeney N, et al. Rapid systematic review: the impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *J Am Acad Child Adolesc Psychiatry.* 2020;59:1218-1239.
22. Derogatis LR. *BSI-18: Brief Symptom Inventory 18—Administration, Scoring, and Procedures Manual.* Minneapolis, MN: NCS Assessment; 2001.
23. Franke GH, Jaeger S, Glaesmer H, et al. Psychometric analysis of the Brief Symptom Inventory 18 (BSI-18) in a representative German sample. *BMC Med Res Methodol.* 2017;17:14.
24. Matheny AP, Wachs TD, Ludwig JL, et al. Bringing order out of chaos: psychometric characteristics of the confusion, hubbub, and order scale. *J Appl Dev Psychol.* 1995;16:429-444.
25. Dumas JE, Nissley J, Nordstrom A, et al. Home chaos: sociodemographic, parenting, interactional, and child correlates. *J Clin Child Adolesc Psychol.* 2005;34:93-104.
26. Boterhoven de Haan KL, Hafekost J, Lawrence D, et al. Reliability and validity of a short version of the general functioning subscale of the McMaster family assessment device. *Fam Process.* 2015;54:116-123.
27. Pianta RC. *Child-Parent Relationship Scale.* Charlottesville, VA: Unpublished Measure, University of Virginia; 1992.
28. Driscoll K, Pianta RC. Mothers' and fathers' perceptions of conflict and closeness in parent-child relationships during early childhood. *J Early Child Infant Psychol.* 2011;7:1-24.
29. Gullone E, Robinson K. The inventory of parent and peer attachment—revised (IPPA-R) for children: a psychometric investigation. *Clin Psychol Psychother.* 2005;12:67-79.
30. Vignoli E, Mallet P. Validation of a brief measure of adolescents' parent attachment based on Armsden and Greenberg's three-dimension model. *Eur Rev Appl Psychol.* 2004;54:251-260.
31. Marcoen A, Goossens L, Caes P. Loneliness in pre-through late adolescence: exploring the contributions of a multidimensional approach. *J Youth Adolesc.* 1987;16:561-577.
32. Ahorsu DK, Lin CY, Imani V, et al. The fear of COVID-19 Scale: development and initial validation. *Int J Ment Health Addict.* 2020;1-9.
33. Perz CA, Lang BA, Harrington R. Validation of the fear of COVID-19 scale in a US college sample. *Int J Ment Health Addict.* 2020:1-11.
34. Masuyama A, Shinkawa H, Kubo T. Validation and psychometric properties of the Japanese version of the fear of COVID-19 scale among adolescents. *Int J Ment Health Addict.* 2020:1-11.
35. Lagattuta KH, Sayfan L, Bamford C. Do you know how I feel? Parents underestimate worry and overestimate optimism compared to child self-report. *J Exp Child Psychol.* 2012;113:211-232.
36. Moss E, Smolla N, Cyr C, et al. Attachment and behavior problems in middle childhood as reported by adult and child informants. *Dev Psychopathol.* 2006;18:425-444.
37. Achenbach TM, Rescorla LA. *Manual for the ASEBA School-Age Forms & Profiles.* Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families; 2001.
38. Ebesutani C, Bernstein A, Martinez JI, et al. The youth self report: applicability and validity across younger and older youths. *J Clin Child Adolesc Psychol.* 2011;40:338-346.
39. Gewirtz A, Forgatch M, Wielin E. Parenting practices as potential mechanisms for child adjustment following mass trauma. *Jl Marital Fam Ther.* 2008;34:177-192.
40. Cortes-Garcia L, Wichstrøm L, Viddal KR, et al. Prospective bidirectional associations between attachment and depressive symptoms from middle childhood to adolescence. *J Youth Adolesc.* 2019;48:2099-2113.
41. Cummings ME, Keller PS, Davies PT. Towards a family process model of maternal and paternal depressive symptoms: exploring multiple relations with child and family functioning. *J Child Psychol Psychiatry.* 2005;46:479-489.
42. Salari N, Hosseini-Far A, Jalali R, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Glob Health.* 2020;16:1-11.