



## Article

# Characterising the Educational Experiences and Mental Health of Children with Pre-Existing Learning Difficulty or Specific Learning Disorder (SLD) during the COVID-19 Pandemic

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**Citation:** Catroppa, C.; Morrison, E.; Ryan, N.P.; Khan, N.; Botchway-Commey, E.N.; Moe, S.; Piazza, C.; Corso, K.; Rae, G.; Bull, C.; et al. Characterising the Educational Experiences and Mental Health of Children with Pre-Existing Learning Difficulty or Specific Learning Disorder (SLD) during the COVID-19 Pandemic. *COVID* **2023**, *3*, 1233–1243. <https://doi.org/10.3390/covid3090087>

Academic Editor: Andrea Fiorillo

Received: 10 July 2023

Revised: 21 August 2023

Accepted: 23 August 2023

Published: 25 August 2023



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**Abstract:** This prospective study sought to characterise the educational experiences, mental health, and behavioural functioning of Australian children with a pre-existing learning difficulty or specific learning disorder (SLD) during the COVID-19 pandemic. The study also evaluated the potential role of parent psychological distress as a risk factor for poorer child functioning in this high-risk population. Using a prospective longitudinal design, the study involved 58 parents of children and adolescents with a pre-existing learning difficulty or specific learning disorder (*M* age = 11.9 years; range 7–17 years) who were initially referred to a state-wide diagnostic centre for specific learning disorders in Melbourne, Victoria, Australia. Child outcomes were assessed using the COVID-19 Wellbeing and Mental Health Survey (a modified version of the CoRoNaVirus Health Impact Survey [CRISIS] tool), the Strengths and Difficulties Questionnaire (SDQ), and the Emotional Distress Scale from the Patient-Reported Outcomes Measurement Information System (PROMIS). Parents' mental health was assessed using the CRISIS tool and the Kessler Psychological Distress Scale (K10). In keeping with initial predictions, a large proportion of parents expressed significant disruption to child educational experience and routines, including challenges related to child engagement in remote learning platforms during COVID-19. Compared to pre-pandemic mental health symptom ratings, children experienced significantly higher symptoms of worry, negative thoughts, loneliness, agitation, and aggression during the pandemic period (all  $p < 0.05$ ). As expected, higher levels of parent distress predicted greater child worry symptoms ( $p = 0.003$ ) and more frequent child behavioural difficulties ( $p = 0.004$ ). These results help elucidate the specific psychological and educational challenges faced by children with pre-existing learning difficulty or SLD during the COVID-19 pandemic. Family-centred intervention and/or supports may help to address the unique educational and psychological needs of young people with pre-existing learning differences and their families during future global pandemics.

**Keywords:** COVID-19 pandemic; children; adolescents; learning difficulties; educational; mental health

## 1. Introduction

COVID-19 has significantly affected the lives of children and families globally [1]. The widespread health, economic, social, and mental health consequences of the COVID-19 pandemic are particularly pronounced in Melbourne, Australia, which is often referred to as the ‘world’s most locked down city.’ The city was subjected to 262 days of hard lockdown [2], which involved strict curfews, travel restrictions, extended closures of schools and playgrounds, social distancing, and significant restrictions to physical activity outside the home. Not surprisingly, population-based Australian studies show that initial COVID-19 lockdown measures were associated with significant increases in child anxiety and depression symptoms [1,3], as well as higher rates of parent depression, anxiety, and stress [3].

Despite increasing recognition of how COVID-19 restrictions impact child and parent mental health at a population-level [1,3], very few studies have examined the impacts of the COVID-19 pandemic on vulnerable, high-risk subgroups of Australian children, including those with special educational needs (e.g., specific learning disorders or learning difficulty). According to the DSM-5 [4], a specific learning disorder (SLD) is a neurodevelopmental disorder that is biological in origin and is characterized by deficits in one or more areas of academic skill development (e.g., reading, written expression, and/or mathematics). By definition, these academic deficits must persist over time, despite provision of targeted evidence-based intervention [4]. Children who do not fulfil the DSM-5 diagnostic criteria for SLD will often receive a diagnosis of sub-threshold ‘learning difficulty’ (LD), which typically requires ongoing individualised support and educational modifications. In the context of prolonged school closures and extended periods of remote learning during the COVID-19 lockdowns, it is likely that children with pre-existing SLD or learning difficulty are disproportionately vulnerable to educational and mental health challenges [5]. Despite this hypothesis of heightened vulnerability in this high-risk group of children during COVID-19 [5], no study to date has delineated the mental health challenges and associated risk factors in Australian young people with pre-existing SLD or learning difficulty.

Mirroring evidence from Australian population-based samples [1,3], several large international studies have recorded significant increases in both child and parent psychological distress during the COVID-19 pandemic. In one seminal Italian study, Crescentini et al. [6] investigated the psychological impacts of nation-wide lockdowns on 721 parents of children under 18 years of age. The findings showed that compared to pre-pandemic estimates of psychological health and wellbeing, both parents and children experienced significant increases in depression, anxiety, and stress symptoms during the early phases of the pandemic. Similarly, a population-based study of 29,000 Chinese families revealed that the COVID-19 pandemic coincided with significant deterioration in psychosocial wellbeing among children aged 2–12 years. Interestingly, these same authors found that child psychosocial problems were linked to several independent risk factors, including single parent households, lower family socio-economic status, and maternal mental illness [7]. The report also found that psychosocial problems were significantly higher among children with special educational needs and/or acute or chronic illnesses [7]. Overall, these findings underscore the critical need for more comprehensive investigation of educational experiences, mental health problems, and associated risk factors in children with pre-existing SLD or learning difficulty during the COVID-19 pandemic.

Preliminary reports suggest that COVID-19 school closures and extended periods of remote learning pose unique challenges for children with pre-existing learning and developmental difficulties. For example, one international study revealed that 87% of children with neurodevelopmental conditions (including SLDs) were not receiving the minimum recommended levels of online instruction during COVID-19 [5]. For some of these children, pre-existing support services were discontinued during the pandemic, which may predispose these high-risk children to symptoms of social isolation, anxiety, irritability, and depression [8]. Although these preliminary data are not specific to Australian children, this pattern of findings underscores the importance of further research to characterise child

educational experiences, mental health challenges, and associated factors in Australian children with pre-existing SLD or learning difficulty during COVID-19.

Based on prior research findings [5], one possibility is that child mental health problems are significantly higher among children with pre-existing learning difficulty whose parents possess fewer adaptive coping resources to manage ongoing pandemic-related stressors. Consistent with this suggestion, recent population-level studies suggest that the impact of COVID-19 restrictions on children's behavioural and emotional functioning is at least partly explained by parental stress levels [9,10]. Although these potential links remain unexplored in children with pre-existing SLD, it is possible that the magnitude of the association between parent mental health and child functioning is stronger in families of children with pre-existing neurodevelopmental vulnerabilities, including SLD or learning difficulty [9,10]. For many of these families, it is likely that the effects of chronic, pandemic-related stressors (i.e., health, financial/economic, social) was compounded by the increased demands of supporting a child with special learning needs during extended periods of remote learning [11].

In summary, very few studies have prospectively characterised the educational experiences and mental health of Australian children with pre-existing SLD or learning difficulty during the COVID-19 pandemic. To address this substantial gap in knowledge, this prospective cohort study aimed to evaluate the educational experiences, mental health symptom burden, and behaviour of children with pre-existing SLD or learning difficulty during the COVID-19 pandemic in Melbourne, Australia. We also aimed to evaluate the role of parent psychological distress as a potential risk factor in predicting poorer child functioning during the COVID-19 pandemic.

## 2. Materials and Methods

### 2.1. Participants

This study forms part of a larger longitudinal prospective study investigating the mental health of children and adolescents with a chronic illness or neurodevelopmental condition during the COVID-19 pandemic [12].

The current study included 58 parents of children referred for assessment to a state-wide diagnostic centre for Specific Learning Disorders (SPELD, Victoria) from January–December 2019. Parents were eligible to participate in the study if their child was from 5 to 17 years of age at the time of the initial diagnostic assessment with SPELD, Victoria. Parents also needed sufficient English language proficiency to complete standardised questionnaires.

### 2.2. Study Measures

All surveys were administered to participating parents using REDCap Electronic Data Capture tools [13]. Immediately upon enrolment in the study, parents provided retrospective ratings of pre-COVID child and family functioning (denoted as Time 0 [T0]). At Time 1 (T1), parents completed questionnaires assessing child and family functioning during the first wave of the COVID-19 pandemic. At Time 2 (T2), parents completed follow-up questionnaires, which were administered 6 months following the initial wave of data collection (T1).

#### 2.2.1. Demographic Information

The study collected demographic information related to the children with pre-existing learning difficulty (i.e., child age, sex, and school grade level) and the participating parent/caregiver (i.e., country of birth, family structure, highest level of education, socio-economic status). Socio-economic status was measured by the *Australian Socioeconomic Index 2006 (AUSIE06)* [14]. The AUSIE06 is used to rank parental occupation using a score ranging from 0 to 100 using the official occupational classification of the Australian and New Zealand Standard Classification of Occupation (ANZSCO). Higher scores on AUSIE06 represent higher SES [14].

### 2.2.2. Child Mental Health

The COVID-19 Wellbeing and Mental Health Survey for Children and Adolescents (Parent/Caregiver version) is a modified version of the CoRonavIruS Health Impact Survey (CRISIS) tool [15]. With evidence for high internal consistency and good test–retest reliability [16], the measure is designed to assess the psychosocial impact of the COVID-19 pandemic on child mental, behavioural, and physical health [15]. The measure captures pre-existing risk and protective factors (e.g., pre-existing mental health concerns or other health conditions, SES, family function), together with health outcomes and behaviours during the COVID-19 pandemic. The current study adapted the CRISIS tool to capture information related to child wellbeing and behavioural difficulties. Symptoms such as worry, restlessness, fatigue, anger, aggression, loneliness, negative thoughts, temper tantrums, yelling, injuring, and repetitive behaviours were rated on a 5-point Likert scale, which ranged from “not at all” (1) to “extremely often” (5). For analysis, symptoms were categorised into internalising behaviours (worry, happiness, anxiousness, fatigue, loneliness, negative thoughts, focus) and externalising behaviours (irritability, aggression, restlessness, temper tantrums, screaming, self-injury, repetitive behaviour).

The *Strengths and Difficulties Questionnaire—Parent Form (SDQ)* [17] is a well validated and widely used behavioural screening tool consisting of 25 items rated using a 3-point Likert scale. The 25 SDQ items are used to generate scores for five separate subscales, which assess emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behaviours. The SDQ has good test–retest reliability and internal consistency with Cronbach  $\alpha$  coefficients greater than 0.80 for the ‘total difficulties’ and ‘total impact’ scores [18].

The emotional distress scale from the *Patient-Reported Outcomes Measurement Information System (PROMIS)* [19] is a parent-report measure designed to assess child anxiety symptom severity. The emotional distress scale (anxiety) demonstrates excellent reliability [20–22] and is used to complement information obtained from the SDQ.

### 2.2.3. Parent Mental Health

The *Kessler Psychological Distress scale (K10)* [23] is a widely used and well-validated measure of psychological distress. This scale comprises 10 symptom-based items, which are rated using a Likert scale ranging from 1 (“not at all”) to 5 (“all of the time”). The K10 is designed to assess frequency and intensity of anxiety and depression-related symptoms over a 4-week period. The scores are summed to produce the total K10 score, with higher scores indicating greater levels of psychological distress [23].

## 2.3. Procedure

Ethical approval was granted by the RCH Human Research Ethics Committee (HREC 64840). The eligible families of children referred for psychoeducational assessment at SPELD Victoria throughout 2019 were initially contacted to obtain consent for their contact details to be shared with The Royal Children’s Hospital (RCH). The consenting families were subsequently emailed an invitation letter with study details. For those expressing interest, further information was provided by phone, including initial verbal consent to participate. Once initial verbal consent was obtained, parents completed online consent forms issued to their preferred email address.

All the parent-report surveys were administered using REDCap Electronic Data Capture tools (REDCap) [24]. Immediately upon enrolment in the study, parents provided retrospective ratings of pre-COVID child and family functioning (denoted as Time 0 [T0]). At Time 1 (T1), parents completed questionnaires assessing child and family functioning during the first wave of the COVID-19 pandemic. This initial data collection phase occurred from December 2020 to February 2021. At Time 2 (T2), parents completed 6-month follow-up questionnaires, which were administered 6 months following their T1 survey completion. This second phase of data collection concluded in September 2021.

## 2.4. Statistical Analysis

Data were analysed using descriptive statistics, including means, standard deviations, and proportional data (i.e., percentage of overall sample endorsing a given item). With 58 parent/caregiver respondents, 80% power, and alpha set to 0.05, the study was powered to find a correlation of 0.36 or a mean difference of 0.37 of a standard deviation. To determine whether children with pre-existing learning difficulty or SLD experienced significant increases in mental health symptom burden during the COVID-19 pandemic, paired samples *t*-tests and Cohen's *d* effect sizes were used to compare retrospective ratings of pre-COVID child mental health symptom severity (i.e., pre-pandemic estimates) against the level of mental health symptom burden exhibited during the COVID-19 pandemic. The preliminary bivariate Pearson *r* correlational analyses were used to explore potential associations between measures of parent mental health (K10, CRISIS assessment tool) and child functioning assessed using the SDQ and CRISIS assessment tool. Multivariable linear regression models were employed to evaluate the role of parent psychological distress as a potential risk factor in predicting child mental health and behavioural difficulties during COVID-19. All analyses were carried out using SPSS Version 28. Given the exploratory nature of the study and upon advice from the study statistician, our analyses did not involve correction for multiple comparisons.

## 3. Results

### 3.1. Demographic Characteristics of the Sample

Initial contact letters were issued to 340 eligible families. Of these families, 111 parents provided informed consent. The final study sample consisted of 58 parents who completed the study measures. Due to local ethics committee requirements, demographic characteristics of non-participating families are not available.

As shown in Table 1, parent ratings were available for a total of 58 children with pre-existing specific learning disorder (SLD) or learning difficulty. The mean age of the children was 11.9 years (range 7–17 years). Of these children, 62% were male. With respect to SLD and learning difficulty diagnoses, 18 children had a formal diagnosis of SLD with impairment in either reading or written expression or mathematics, 20 children had a diagnosis of SLD with impairment in multiple domains of academic skill development, 7 had a formal diagnosis of learning difficulty, and 13 had a history of learning difficulty with no formal diagnosis.

**Table 1.** Participant demographic information, *N* = 58.

Child Characteristics	
Age [years], <i>M</i> ( <i>SD</i> )	11.9 (2.7)
Sex [male], <i>n</i> (%)	36 (62.1)
School grade, <i>M</i> ( <i>SD</i> )	6.3 (2.9)
<i>Pre-existing child mental health diagnosis, n (%)</i>	
Anxiety	3 (5.2)
Depression	1 (1.7)
Multiple comorbidities	5 (8.6)
Other	3 (5.2)
No pre-existing mental health diagnosis	46 (79.3)
<i>Pre-existing Learning Disorder (SLD) or Learning Difficulty, n (%)</i>	
SLD with impairment in reading	6 (10.4)
SLD with impairment in written expression	10 (17.2)
SLD with impairment in mathematics	2 (3.4)
SLD with impairment in multiple domains	20 (34.5)
Learning Difficulty diagnosis	7 (12.1)
History of learning difficulty with no diagnosis	13 (22.4)
<i>Parent/Caregiver characteristics</i>	
<i>Respondent, n (%)</i>	
Birth mother	54 (93.1)
Birth father	3 (5.2)
Grandparent	1 (1.7)
Born in Australia, <i>n</i> (%)	49 (84.5)



**Table 1.** *Cont.*

Child Characteristics	
Partnered, <i>n</i> (%)	50 (86.2)
Highest qualification, <i>n</i> (%)	
Certificate/Diploma	10 (17.2)
Bachelor's Degree	17 (29.3)
Postgraduate	28 (48.3)
Year 12 only	3 (5.2)
SES, <i>M</i> ( <i>SD</i> )	69.36 (19.82)
Parent K10, <i>M</i> ( <i>SD</i> )	17.71 (6.71)

*Note:* *M*: mean; *SD*: standard deviation; *n*: sample size; *SES*: socioeconomic status as measured by the Australian Socioeconomic Index 2006 (AUSEI06: McMillan, Beavis, and Jones, 2009).

### 3.2. Educational Experiences of Children during First Wave of COVID-19 Pandemic (T1)

Supplementary Figures S1–S8 summarize parent/caregiver responses to the eight CRISIS tool items related to child and family experience of remote/online learning during COVID-19. A large proportion of parents/caregivers reported challenges balancing their child's educational needs with their own workload (43%) and other household demands and responsibilities (54%). The results showed that a relatively large proportion of children were either unable to engage or found it difficult to engage in online/remote learning platforms. Specifically, 1 in 3 parents (33%) reported that their children 'almost never', 'rarely' or 'sometimes' engaged with online/remote learning during the pandemic.

### 3.3. Child Mental Health Symptoms during COVID-19: Comparison to Pre-Pandemic Ratings

#### 3.3.1. Child Internalising Symptoms

Compared to pre-pandemic mental health symptom ratings (T0), parents reported that their children experienced significantly higher symptoms of worry, negative thoughts, loneliness, and agitation during the pandemic period (all  $p < 0.05$ ).

Relative to the pre-pandemic group mean, child anxiety symptoms on the PROMIS Anxiety scales were higher during the pandemic period; however, the difference with pre-pandemic ratings did not reach statistical significance (see Table 2).

**Table 2.** Parent ratings of child mental health during the COVID-19 pandemic: comparison with pre-pandemic estimates.

	<i>n</i>	Pre-Pandemic Estimate		During the Pandemic		<i>M<sub>diff</sub></i>	<i>t</i>	<i>p</i> -Value	<i>d</i>
<i>Child internalising symptoms</i>									
Worry, <i>M</i> ( <i>SD</i> )	58	1.81	(0.78)	2.22	(0.85)	0.41	0.41	<0.001	0.70
Happiness, <i>M</i> ( <i>SD</i> )	58	2.14	(0.82)	2.57	(1.15)	0.43	0.43	0.004	1.09
Anxiousness, <i>M</i> ( <i>SD</i> )	58	2.43	(0.90)	2.83	(1.12)	0.39	0.39	0.001	0.89
Fatigue, <i>M</i> ( <i>SD</i> )	57	2.00	(0.88)	2.16	(1.08)	0.16	0.15	0.275	1.08
Loneliness, <i>M</i> ( <i>SD</i> )	58	1.48	(0.77)	2.34	(1.19)	0.86	0.86	<0.001	1.20
Negative Thoughts, <i>M</i> ( <i>SD</i> )	58	2.10	(0.91)	2.45	(1.23)	0.35	0.34	0.001	0.78
Focus, <i>M</i> ( <i>SD</i> )	58	3.05	(0.99)	3.19	(1.27)	0.14	0.13	0.387	1.20
<i>Child externalising symptoms</i>									
Irritability, <i>M</i> ( <i>SD</i> )	58	2.07	(0.95)	2.52	(1.28)	0.45	0.44	<0.001	0.86
Aggression, <i>M</i> ( <i>SD</i> )	58	1.41	(0.72)	1.62	(0.93)	0.21	0.20	0.006	0.55
Restlessness, <i>M</i> ( <i>SD</i> )	58	2.33	(1.01)	2.50	(1.08)	0.17	0.17	0.133	0.86
Temper Tantrums, <i>M</i> ( <i>SD</i> )	58	2.19	(0.94)	2.43	(1.18)	0.24	0.24	0.012	0.70
Screaming, <i>M</i> ( <i>SD</i> )	58	2.05	(0.98)	2.31	(1.17)	0.26	0.25	<0.001	0.54
Self-injury, <i>M</i> ( <i>SD</i> )	28	1.11	(0.31)	1.14	(0.35)	0.04	0.36	0.326	0.18
Repetitive Behaviour, <i>M</i> ( <i>SD</i> )	28	1.39	(0.68)	1.61	(1.03)	0.21	0.21	0.056	0.56
SDQ, <i>M</i> ( <i>SD</i> )	26	11	(6.24)	12.96	(7.05)	1.96	2.42	0.023	0.29
PROMIS, <i>M</i> ( <i>SD</i> )	25	51.96	(11.50)	54.74	(10.27)	2.82	1.45	0.158	0.25

*Notes:* *M<sub>diff</sub>*: mean difference between timepoints; *t*: t-statistic value; *Cohen's d*: effect size were calculated ( $d = 0.2$ , medium when  $d = 0.5$ , and large when  $d = 0.8$ ) (Cohen, 1988); *SDQ*: Strengths and Difficulties Questionnaire—Total Difficulties Score; *PROMIS*: Patient-Reported Outcomes Measurement Information System—Anxiety subscale.

### 3.3.2. Child Externalising Symptoms

Compared to pre-pandemic symptom ratings (T0), parents reported that their children displayed significantly greater symptoms of irritability, aggression, temper tantrums, and screaming during the pandemic period (all  $p < 0.05$ ; see Table 3). As expected, differences also reached statistical significance and were in the expected direction on the SDQ Total Difficulties scale (see Table 2).

**Table 3.** Bivariate correlations between parent and child mental health symptoms, and group means and standard deviations for each mental health symptom dimension.

CRISIS Tool Domain	N	Child Symptoms		Parent Symptoms		r	p-Value
		M	SD	M	SD		
Worry	58	2.22	0.85	2.72	0.89	0.379	0.003
Happiness	58	2.57	1.15	2.64	0.98	0.399	0.002
Anxiousness	58	2.83	1.12	3.05	1.09	0.248	0.060
Irritability	58	2.52	1.28	2.36	1.08	0.465	<0.001
Fatigue	57	3.19	1.27	2.93	1.19	0.364	0.005
Loneliness	58	2.34	1.19	1.79	1.05	0.127	0.341

Note: M: mean; SD: standard deviation; r: Pearson's correlation co-efficient.

### 3.4. Association between Parent Mental Health and Child Functioning

Table 3 displays group means and standard deviations for each of the parent and child psychological health dimensions measured by the CRISIS assessment tool. Preliminary bivariate correlation analyses revealed evidence for statistically significant associations between parent psychological distress and child emotional functioning on symptom-based measures of worry, happiness, irritability, and fatigue (all  $p < 0.05$ , see Table 3).

### 3.5. Predicting Child Mental Health and Behaviour during the COVID-Pandemic

Model 1 incorporated measures from the CRISIS symptom rating tool to evaluate the potential role of parent psychological distress as a risk factor in predicting child mental health during the COVID-19 pandemic. As expected, higher parent psychological distress predicted increased symptoms of child worry ( $p = 0.003$ ).

Model 2 incorporated the K10 and SDQ Total scores as measures of parent psychological distress and child behaviour, respectively. In keeping with Model 1, this model revealed that higher parent distress predicted greater child behavioural difficulties during the pandemic ( $\beta = 0.466$ ;  $p = 0.004$ ).

## 4. Discussion

This prospective study sought to characterise the educational experiences, mental health, and behaviour of Australian children with a pre-existing learning difficulty or specific learning disorder (SLD) during the COVID-19 pandemic in Melbourne, Australia. The study also evaluated the potential role of parent psychological distress as a risk factor for poorer child functioning in this high-risk population. In keeping with initial predictions, a large proportion of parents expressed significant disruption to child educational experience and routines, including challenges related to child engagement in remote learning platforms during COVID-19. Moreover, we found that compared to pre-pandemic symptom ratings (T0), children experienced significantly higher symptoms of worry, negative thoughts, loneliness, agitation, and aggression during the pandemic period. Importantly, findings also showed that higher levels of parent distress predicted greater child worry and more frequent child behavioural difficulties during the COVID-19 pandemic. Taken together, these results underscore the importance of family-centred intervention programs and/or additional supports to help address the specific educational and psychological challenges of this high-risk group during current and future pandemics.

#### *4.1. Educational Experiences during the COVID-19 Pandemic*

In our sample of Australian parents/caregivers of children with pre-existing learning difficulty or SLD, it is perhaps not surprising that a large proportion of our sample expressed significant challenges balancing their child's educational needs with their own workload (43%) and household demands (54%). This finding was coupled with evidence that a large proportion of children with pre-existing learning difficulty/SLD were either unable to engage or found it difficult to engage in online/remote learning. Specifically, 1 in 3 parents (33%) reported that their children 'almost never', 'rarely' or 'sometimes' engaged with online/remote learning during the pandemic. This is consistent with previous findings [11], suggesting that the remote learning environment represents a significant source of friction for vulnerable Australian children with pre-existing learning difficulty or SLDs.

Based on this pattern of findings, we speculate that the remote/online learning environment likely poses several unique challenges for our sample of children with pre-existing learning difficulty or SLDs. Firstly, it is possible that for many children in our study, impairments in reading and written expression interfered with their ability to fully engage with online learning materials, understand and complete task requirements, and move learning forward. Secondly, children with diagnosed learning difficulty or SLDs require substantial individualised support and scaffolding, which was often not routinely available (or was significantly reduced) in the remote/online learning environment. Moreover, since many parents were routinely faced with competing work and family responsibilities during the pandemic, it is possible that some children did not have consistent access to necessary parent/caregiver supervision to aid their learning. Overall, we suspect that a combination of these factors likely contributes to an elevated risk of educational disengagement and mental health difficulties in this vulnerable population of Australian children with pre-existing learning difficulty/SLDs.

#### *4.2. Child Mental Health and Behaviour during the COVID-19 Pandemic*

Consistent with previously reported, population-level evidence for worsening mental health among children and families during COVID-19 [1,3,25], there was evidence for a significant deterioration in the mental health and psychological wellbeing in our sample of children with pre-existing learning difficulty or SLD. Specifically, our results revealed that compared to pre-pandemic symptom ratings (T0), parents reported that their children displayed significantly higher symptoms of worry, negative thoughts, loneliness, agitation, and aggression during the pandemic period. Overall, these findings converge with previous reports linking the COVID-19 pandemic to a myriad of social and emotional costs for children and families in both Australia and internationally [6,8,26], and underscore the importance of additional, targeted psychological supports for high-risk children and families.

#### *4.3. Association between Parent Psychological Distress and Child Mental Health*

In support of previous the literature [5,7,9,27,28], our findings suggest that in the context of the COVID-19 pandemic, parent psychological distress may be an important risk factor in predicting poorer child behavioural and emotional outcomes. This pattern of relationships was observed across multiple study measures, such that greater parent psychological distress on the K10 and CRISIS tool predicted more frequent child behavioural difficulties and increased child worry symptoms, respectively. This finding is consistent with the possibility that children may model and replicate parent coping behaviours during times of significant stress and uncertainty. It may also suggest that children and parents could benefit from family-centred interventions and strategies designed to strengthen parent adaptive coping resources during the COVID-19 pandemic.

To our knowledge, this prospective investigation is the first Australian study to characterise the educational experiences, mental health, and behaviour of Australian children with a pre-existing learning difficulty or specific learning disorder (SLD) during the COVID-19 pandemic. While our study findings address an important gap in the extant literature, our



sample size was relatively small, which limited statistical power to detect differences. The sample size also constrained our ability to run more sophisticated predictive models, and to stratify our results by child sex and family socioeconomic status. High sample attrition rates are common in longitudinal research [29] and it is likely that these challenges were amplified in the context of our research conducted during a global pandemic. A further limitation relates to our exclusive reliance on parent/caregiver questionnaire ratings, which may introduce some bias into the study results. Moreover, it is important to acknowledge the limitations of retrospective ratings of pre-pandemic child functioning, which have the potential to bias estimates of pre-injury symptom burden.

## 5. Conclusions

This prospective study sought to characterise the educational experiences, mental health, and behaviour of Australian children with a pre-existing learning difficulty or specific learning disorder (SLD) during the COVID-19 pandemic. In keeping with initial predictions, we found that compared to pre-pandemic estimates of child functioning, children experienced sustained disruption to their education and a significant deterioration in mental health, reflected in significantly increased symptoms of worry, negative thoughts, loneliness, agitation, and aggression during the pandemic period. Importantly, we found that higher parent distress was a key risk factor in predicting worse child functioning, including greater child behavioural difficulties during the pandemic. Taken together, these findings suggest that family-centred intervention and/or additional supports may help to address the unique educational and psychological needs of young people with pre-existing learning differences and their families during present and future global pandemics.

**Supplementary Materials:** The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/covid3090087/s1>, Figure S1. Changes in educational arrangements; Figure S2. Difficulty in communicating with teacher; Figure S3. Difficulty in understanding task requirements; Figure S4. Difficulty in balancing parent (employment) and child learning needs; Figure S5. Difficulty in balancing parent (household demands) and child learning need; Figure S6. Difficulty in accessing online materials; Figure S7. Level of enjoyment during online learning; Figure S8. Level of engagement during online learning.

**Author Contributions:** Conceptualization, C.C., E.M. (Elle Morrison), N.P.R., V.A., L.C. and N.T.S.; Methodology, C.C., E.M. (Elle Morrison), N.P.R., V.A., L.C. and N.T.S.; Formal Analysis, E.M. (Elle Morrison) and N.T.S.; Investigation, C.C., E.M. (Elle Morrison), N.P.R., V.A., L.C. and N.T.S.; Resources, L.C., C.C. and C.S.-K.; Data Curation, S.M., C.P., N.K., K.C., G.R., C.B. and E.M. (Emma McIntosh); Writing—Original Draft Preparation, C.C., E.M. (Elle Morrison), N.P.R., V.A., L.C. and N.T.S.; Writing—Review and Editing, C.C., E.M. (Elle Morrison), N.P.R., E.N.B.-C., S.M., C.P., N.K., C.S.-K., G.R., C.B., E.M. (Emma McIntosh), V.A., L.C. and N.T.S.; Supervision, C.C., N.T.S., E.M. (Elle Morrison) and N.P.R.; Project Administration, E.M. (Emma McIntosh) and N.T.S.; Funding Acquisition, V.A. and L.C. All authors have read and agreed to the published version of the manuscript.

**Funding:** This work was supported by the Vanguard Foundation, the Royal Children's Hospital Foundation, the Murdoch Children's Research Institute and Victorian Infrastructure Operating Fund.

**Institutional Review Board Statement:** All subjects gave their informed consent for inclusion before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of The Royal Children's Hospital (Project No. HREC 64840).

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** The data presented in this study are available on request from the corresponding author. The data are not publicly available due to local ethics requirements.

**Acknowledgments:** We wish to acknowledge the kind support of the Murdoch Children's Research Institute.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

- Westrupp, E.M.; Greenwood, C.J.; Fuller-Tyszkiewicz, M.; Olsson, C.A.; Sciberras, E.; Mikocka-Walus, A.; Melvin, G.A.; Evans, S.; Stokes, M.A.; Wood, A.G.; et al. Parent and child mental health trajectories April 2020 to May 2021: Strict lockdown versus no lockdown in Australia. *Aust. N. Z. J. Psychiatry* **2022**, *56*, 1491–1502. [\[CrossRef\]](#)
- Vally, H.; Bennett, C. COVID in Victoria: 262 Days in Lockdown, 3 Stunning Successes and 4 Avoidable Failures. Available online: <https://theconversation.com/covid-in-victoria-262-days-in-lockdown-3-stunning-successes-and-4-avoidable-failures-172408> (accessed on 4 July 2023).
- Westrupp, E.M.; Bennett, C.; Berkowitz, T.; Youssef, G.J.; Toumbourou, J.W.; Tucker, R.; Andrews, F.J.; Evans, S.; Teague, S.J.; Karantzas, G.C.; et al. Child, parent, and family mental health and functioning in Australia during COVID-19: Comparison to pre-pandemic data. *Eur. Child Adolesc. Psychiatry* **2023**, *32*, 317–330. [\[CrossRef\]](#)
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*; APA: Washington, DC, USA, 2013. [\[CrossRef\]](#)
- McFayden, T.C.; Breaux, R.; Bertollo, J.R.; Cummings, K.; Ollendick, T.H. COVID-19 remote learning experiences of youth with neurodevelopmental disorders in rural Appalachia. *J. Rural Ment. Health* **2021**, *45*, 72. [\[CrossRef\]](#)
- Crescentini, C.; Feruglio, S.; Matiz, A.; Paschetto, A.; Vidal, E.; Cogo, P.; Fabbro, F. Stuck Outside and Inside: An Exploratory Study on the Effects of the COVID-19 Outbreak on Italian Parents and Children's Internalizing Symptoms. *Front. Psychol.* **2020**, *11*, 586074. [\[CrossRef\]](#)
- Tso, W.W.Y.; Wong, R.S.; Tung, K.T.S.; Rao, N.; Fu, K.W.; Yam, J.C.S.; Chua, G.T.; Chen, E.Y.H.; Lee, T.M.C.; Chan, S.K.W.; et al. Vulnerability and resilience in children during the COVID-19 pandemic. *Eur. Child Adolesc. Psychiatry* **2022**, *31*, 161–176. [\[CrossRef\]](#)
- Singh, S.; Roy, D.; Sinha, K.; Parveen, S.; Sharma, G.; Joshi, G. Impact of COVID-19 and lockdown on mental health of children and adolescents: A narrative review with recommendations. *Psychiatry Res.* **2020**, *293*, 113429. [\[CrossRef\]](#)
- Martinsonsone, B.; Stokenberga, I. Parents' perspectives on distance learning during the COVID-19 pandemic in Latvia. In *Remote Learning in Times of Pandemic: Issues, Implications and Best Practice*; Daniela, L., Visvizi, A., Eds.; Routledge: London, UK, 2021; pp. 226–239.
- Russell, B.S.; Hutchison, M.; Tambling, R.; Tomkunas, A.J.; Horton, A.L. Initial Challenges of Caregiving During COVID-19: Caregiver Burden, Mental Health, and the Parent–Child Relationship. *Child Psychiatry Hum. Dev.* **2020**, *51*, 671–682. [\[CrossRef\]](#)
- Sonnenschein, S.; Stites, M.L.; Grossman, J.A.; Galczyk, S.H. "This will likely affect his entire life": Parents' views of special education services during COVID-19. *Int. J. Educ. Res.* **2022**, *112*, 101941. [\[CrossRef\]](#)
- Crowe, L.M.; Clarke, C.; Hearps, S.; Pugh, R.; Kilpatrick, N.; Branson, E.; Payne, J.M.; Haebich, K.M.; McCloughan, N.; Kintakas, C.; et al. Mental health impacts of the COVID-19 pandemic on children and adolescents with chronic health conditions. *medRxiv* **2021**. [\[CrossRef\]](#)
- Harris, P.A.; Taylor, R.; Thielke, R.; Payne, J.; Gonzalez, N.; Conde, J.G. Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational research informatics support. *J. Biomed. Inform.* **2009**, *42*, 377–381. [\[CrossRef\]](#) [\[PubMed\]](#)
- McMillan, J.; Beavis, A.; Jones, F.L. The AUSEI06: A new socioeconomic index for Australia. *J. Sociol.* **2009**, *45*, 123–149. [\[CrossRef\]](#)
- Merikangas, K.; Milham, M.; Stringaris, A.; Bromet, E.; Colcombe, S.; Zipunnikov, V. The Coronavirus Health Impact Survey (CRISIS). Available online: <https://github.com/nimhmbdu/CRISIS> (accessed on 1 May 2023).
- Nikolaïdis, A.; Paksarian, D.; Alexander, L.; Derosa, J.; Dunn, J.; Nielson, D.M.; Droney, I.; Kang, M.; Douka, I.; Bromet, E.; et al. The Coronavirus Health and Impact Survey (CRISIS) reveals reproducible correlates of pandemic-related mood states across the Atlantic. *Sci. Rep.* **2021**, *11*, 8139. [\[CrossRef\]](#)
- Goodman, R. The Strengths and Difficulties Questionnaire: A Research Note. *J. Child Psychol. Psychiatry* **1997**, *38*, 581–586. [\[CrossRef\]](#) [\[PubMed\]](#)
- Goodman, R. Psychometric properties of the strengths and difficulties questionnaire. *J. Am. Acad. Child Adolesc. Psychiatry* **2001**, *40*, 1337–1345. [\[CrossRef\]](#)
- Ader, D.N. Developing the Patient-Reported Outcomes Measurement Information System (PROMIS). *Med. Care* **2007**, *45*, S1–S2. [\[CrossRef\]](#)
- Cella, D.; Riley, W.; Stone, A.; Rothrock, N.; Reeve, B.; Yount, S.; Amtmann, D.; Bode, R.; Buysse, D.; Choi, S.; et al. The Patient-Reported Outcomes Measurement Information System (PROMIS) developed and tested its first wave of adult self-reported health outcome item banks: 2005–2008. *J. Clin. Epidemiol.* **2010**, *63*, 1179–1194. [\[CrossRef\]](#)
- Cella, D.; Yount, S.; Rothrock, N.; Gershon, R.; Cook, K.; Reeve, B.; Ader, D.; Fries, J.F.; Bruce, B.; Rose, M. The Patient-Reported Outcomes Measurement Information System (PROMIS). *Med. Care* **2007**, *45*, S3–S11. [\[CrossRef\]](#)
- Cook, K.F.; Jensen, S.E.; Schalet, B.D.; Beaumont, J.L.; Amtmann, D.; Czajkowski, S.; Dewalt, D.A.; Fries, J.F.; Pilkonis, P.A.; Reeve, B.B.; et al. PROMIS measures of pain, fatigue, negative affect, physical function, and social function demonstrated clinical validity across a range of chronic conditions. *J. Clin. Epidemiol.* **2016**, *73*, 89–102. [\[CrossRef\]](#)
- Kessler, R.C.; Andrews, G.; Colpe, L.J.; Hiripi, E.; Mroczek, D.K.; Normand, S.L.; Walters, E.E.; Zaslavsky, A.M. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol. Med.* **2002**, *32*, 959–976. [\[CrossRef\]](#)

24. Harris, P.A.; Taylor, R.; Minor, B.L.; Elliott, V.; Fernandez, M.; O'Neal, L.; McLeod, L.; Delacqua, G.; Delacqua, F.; Kirby, J.; et al. The REDCap consortium: Building an international community of software platform partners. *J. Biomed. Inform.* **2019**, *95*, 103208. [[CrossRef](#)]
25. Sciberras, E.; Patel, P.; Stokes, M.A.; Coghill, D.; Middeldorp, C.M.; Bellgrove, M.A.; Becker, S.P.; Efron, D.; Stringaris, A.; Faraone, S.V.; et al. Physical Health, Media Use, and Mental Health in Children and Adolescents With ADHD During the COVID-19 Pandemic in Australia. *J. Atten. Disord.* **2022**, *26*, 549–562. [[CrossRef](#)]
26. Marques de Miranda, D.; da Silva Athanasio, B.; Sena Oliveira, A.C.; Simoes, E.S.A.C. How is COVID-19 pandemic impacting mental health of children and adolescents? *Int. J. Disaster Risk Reduct.* **2020**, *51*, 101845. [[CrossRef](#)] [[PubMed](#)]
27. Fosco, G.M.; Sloan, C.J.; Fang, S.; Feinberg, M.E. Family vulnerability and disruption during the COVID-19 pandemic: Prospective pathways to child maladjustment. *J. Child Psychol. Psychiatry* **2022**, *63*, 47–57. [[CrossRef](#)] [[PubMed](#)]
28. Spinelli, M.; Lionetti, F.; Pastore, M.; Fasolo, M. Parents' Stress and Children's Psychological Problems in Families Facing the COVID-19 Outbreak in Italy. *Front. Psychol.* **2020**, *11*, 1713. [[CrossRef](#)] [[PubMed](#)]
29. Nicks, B.A.; Shah, M.N.; Adler, D.H.; Bastani, A.; Baugh, C.W.; Caterino, J.M.; Clark, C.L.; Diercks, D.B.; Hollander, J.E.; Malveau, S.E.; et al. Minimizing Attrition for Multisite Emergency Care Research. *Acad. Emerg. Med.* **2017**, *24*, 458–466. [[CrossRef](#)]

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