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Exploring the unique impact of COVID-19 measures on autistic child development and parenting stress: comparing two cohorts in The Netherlands

Ward, O.F.; Hoopen, L.W. ten; Bocanegra, B.; Truijens, F.L.; Greaves-Lord, K.; Visser, K.; ... ; Dekker, L.P.

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Exploring the unique impact of COVID-19 measures on autistic child development and parenting stress: comparing two cohorts in The Netherlands

Olivia F. Ward, Leontine W. ten Hoopen, Bruno Bocanegra, Femke L. Truijens, Kirstin Greaves-Lord, Kirsten Visser, Wietske A. Ester, Dennis Bastiaansen, Elisabeth H. M. Van Rijen and Linda P. Dekker

Abstract

Purpose – *The purpose of this study is to explore how the COVID-19 pandemic, and related preventative measures, impact global stressors on autistic children, adolescents and their families.*

Design/methodology/approach – *This exploratory study compared two cohorts, one spanning just before and throughout the pandemic, and one during a non-pandemic period, to explore child functioning and parenting stress in families with autistic children. Autism symptom development was assessed using the Social Responsiveness Scale-2 at three-time points, while emotional and behavioral functioning was examined across two-time points using the Brief Problem Monitor. Parenting stress was assessed using the Parenting Stress Questionnaire.*

Findings – *Results indicated no significant differences between the cohorts in parent-reported autism symptoms or the emotional and behavioral functioning of autistic children and adolescents. Whereas no differences emerged in children's functioning, during the COVID-19 pandemic period parents reported more parental role restriction and physical health problems along with fewer parenting problems compared to parents during a non-pandemic period.*

Originality/value – *These findings provide insight into how families were potentially influenced by the COVID-19 pandemic. It seems that parents in particular may benefit from more tailored support, such as flexible respite services, remote interventions and self-care programming designed for parents of autistic children, especially in times like a pandemic.*

Keywords COVID-19, Autism spectrum disorder, Emotional functioning, Behavioral functioning, Parenting stress

Paper type Research paper

(Information about the authors can be found at the end of this article.)

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The COVID-19 pandemic brought significant change to daily life, including safety measures of social distancing, mask mandates and quarantines. In 2021, the Netherlands reported 60,000 hospitalizations and 19,400 deaths due to COVID-19 [National Institute for Public Health and the Environment of The Netherlands (RIVM), 2022]. However, for most, the pandemic's repercussions were felt in daily life through school and business closures, limited social gatherings, and reduced access to specialized treatment [National Institute for Public Health and the Environment of The Netherlands (RIVM), 2022]. For families, this often meant adapting to remote work and education, relying on household or virtual support and managing increased caregiving demands. Understanding the pandemic's influence on child functioning and family functioning, particularly among families with children with autism spectrum disorder (ASD), is essential for ensuring

appropriate supports and services are provided. Given the lack of consensus on language preferences, this paper uses both identity-first and person-first language (e.g. [Kenny et al., 2016](#)).

Influence of COVID-19 on autistic individuals and their families

Families of autistic children may have been particularly vulnerable to pandemic-related disruptions due to the core characteristics of ASD. ASD is a neurodevelopmental disorder characterized by early-onset difficulties in social communication, social-emotional reciprocity, hyper- and/or hyposensitivity to sensory inputs and restricted and repetitive behaviors ([APA, 2022](#)). ASD is also associated with high rates of co-occurring anxiety, depression, behavioral/conduct problems and attention-deficit/hyperactivity disorder (see review [Lai et al., 2019](#)). The COVID-19 pandemic provided an opportunity to examine how sudden changes in daily life influenced autistic children's development and parenting stress.

Autism symptoms

Autistic children, who often prefer routine and consistency, faced added challenges due to the pandemic's unpredictability ([Smile, 2020](#)). Studies conducted during the pandemic found increased autistic traits, repetitive behaviors, and reduced access to effective therapy ([Asbury and Toseeb, 2023](#); [Colizzi et al., 2020](#); [Levante et al., 2021](#); [Renzo et al., 2020](#); [White et al., 2021](#)). In addition, reduced access to clinical care may have influenced how autistic youth manage daily changes, potentially exacerbating autism-related symptoms and behaviors ([Renzo et al., 2020](#)). However, autistic children and adults reported relief from reduced social pressure, social distancing measures and adapted socialization that came with the added COVID-19 safety measures ([Bellomo et al., 2020](#); [Castelein et al., 2021](#)).

Emotional and behavioral functioning

Findings on emotional and behavioral functioning throughout the pandemic varied (see review: [Ahmed et al., 2022](#)). Some studies showed that compared to a pre-pandemic period, autistic youth were found to have poorer overall mental health ([Turner et al., 2023](#)), increased aggression, hyperactivity, anxiety, depression, fear and restricted and repetitive behaviors ([Martínez-González et al., 2021](#)) and greater emotional symptoms ([Amorim et al., 2020](#); [Nonweiler et al., 2020](#)). These challenges extended into adulthood with autistic adults reporting poor mental health ([Davidson et al., 2021](#); [Riese and Mukherjee, 2022](#)) and increased rigidity during the pandemic ([Riese and Mukherjee, 2022](#)). However, other studies found that autistic children appeared happier and calmer during the COVID-19 period ([Mumbardó-Adam et al., 2021](#)), potentially due to reduced social stressors and changes in school environments ([Clark and Adams, 2020](#)). These mixed findings highlight the need to better understand the impact of the pandemic conditions on autistic symptoms and emotional and behavioral functioning relative to normative development.

Parenting stress

Within children's social environment, parents play a paramount role in their development ([Smith et al., 2014](#); [Zaidman-Zait et al., 2014](#)), but for parents of autistic children, this role often comes with different challenges ([Schieve et al., 2007](#)). During "typical" periods, parents of autistic children report greater parenting stress compared to non-ASD groups ([Padden and James, 2017](#)). Parenting stress refers to the negative feeling prompted by a misalignment between the demands of parenting and resources of support ([Abidin, 1995](#); [Padden and James, 2017](#)). During the COVID-19 pandemic, this stress was further

amplified by disruptions in education, socialization and therapy (Amirova *et al.*, 2022; Dhiman *et al.*, 2020; Mazzoni *et al.*, 2022). Some parents of autistic children reported higher levels of anxiety and stress, disrupted routines and isolation (Ameis *et al.*, 2020; Colizzi *et al.*, 2020; Dhiman *et al.*, 2020; Ersoy *et al.*, 2020; Haidar and Meadan, 2024; Manning *et al.*, 2021; Ueda *et al.*, 2021). Conversely, others found relief from reduced social and societal pressures and reduced worry regarding their autistic child (Ameis *et al.*, 2020). Some parents reported learning more about their child and benefiting from exploring new strategies to involve their child in family routines, a potential advantage of parents spending more time at home with their children (Mumbardó-Adam *et al.*, 2021; Tokatly Latzer *et al.*, 2021). As parenting stress is associated with adjustments in biological and psychological factors in both the parent and child's life, there is a need to better understand parenting stress during crises (Dijkstra-de Neijs *et al.*, 2020). Understanding how parents respond to stress can inform targeted supports such as problem-solving strategies, resources for self-care and policy-level initiatives.

Current study

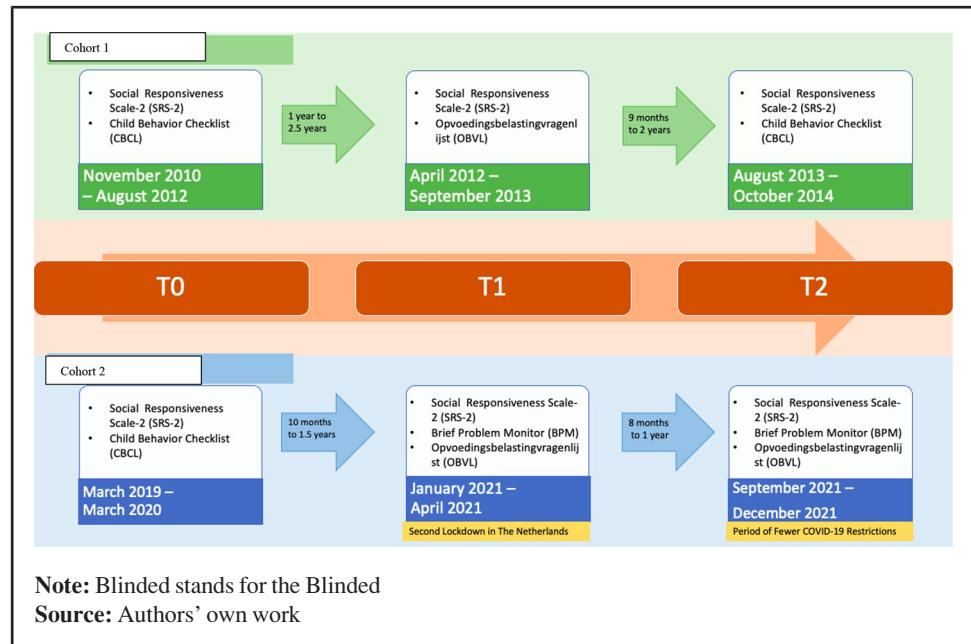
The COVID-19 pandemic presented an opportunity to examine how major life events and stressors affect families of autistic children. This study aimed to compare autistic children's social differences and their emotional and behavioral functioning along with parenting stress during a pandemic and nonpandemic period. Given the relative stability of autism traits (Louwerse *et al.*, 2015), we hypothesized no significant differences in social symptom development across cohorts. However, we hypothesized greater increases in emotional and behavioral challenges in children and adolescents exposed to COVID-19 safety measures compared to those in a typical developmental context (e.g. Ahmed *et al.*, 2022; Amorim *et al.*, 2020; Mutluer *et al.*, 2020; Nonweiler *et al.*, 2020; Renzo *et al.*, 2020). As previous literature described both feelings of increased stress and relief during the pandemic, we aimed to explore how parenting stress varied across the domains of parent-child relationship problems, parenting problems, depressive mood, parental role restriction and physical health problems between parents during the COVID-19 pandemic and parents 10 years before the COVID-19 pandemic (e.g. Alhuzimi, 2021; Amorim *et al.*, 2020; Colizzi *et al.*, 2020; Dhiman *et al.*, 2020; Gillespie-Smith *et al.*, 2021).

Method

Procedures

Data from two cohorts, Cohort 1 (Social Spectrum Cohort: Duvekot *et al.*, 2017) and Cohort 2 (Rotterdam Autism Consortium: Dekker *et al.*, 2022), comprised children and adolescents with a clinical diagnosis of ASD and their families from one of the three prominent mental health-care institutions in the Rotterdam region of the Netherlands. Data were collected at three time points (T0, T1 and T2) with approximately similar intervals between time points. A visual representation of the cohorts, timeline and measurements is provided (Figure 1). Data in Cohort 1 were collected 6–10 years before the COVID-19 pandemic. In Cohort 2, the COVID-19 pandemic began after T0. This led to significant adaptations in everyday life, such as the closing of schools, working from home (children and parents), quarantines, social distancing and mask mandates at T1 and T2; however, by T2 COVID-19 restrictions were less severe, namely, fewer social distancing requirements and increased COVID-19 testing [National Institute for Public Health and the Environment of The Netherlands (RIVM), 2022]. Cohort 1 recruited participants ages 2½ to 10, while Cohort 2 recruited participants ages 4 to 21. Given the age difference between cohorts, age was controlled for where relevant. Table 1 shows the participant demographic information. Parents consented to data collection from their clinical file (T0) and completed online questionnaires about themselves and their autistic child at T1 and T2. Participants in Cohort 1 received compensation for their travel expenses and children were offered a small prize and

Figure 1 A visual timeline of the data collection process by cohort



participants in Cohort 2 received graded compensation of €10 at T1 and €25 at T2 to help promote long-term participation and minimize dropout. Local medical ethics committees approved both the Blinded and Blinded studies (ethical approvals blinded for review).

Measures and participants

Measures and participants were organized by theme. Power calculations were conducted separately for each theme, providing estimates for the ability to detect small and medium effect sizes. Detecting smaller effects typically requires larger sample sizes, as such effects are more susceptible to being obscured by measurement error or variability (Cohen, 2013).

Autism symptoms. The Social Responsiveness Scale-2 (SRS-2), school-age version for children 4–18, measured autistic traits at T0, T1 and T2 (Constantino, 2013). The 65-item parent-report questionnaire used a four-point Likert scale (“not true” to “always true”). Both total scores (ranging from 0 to 195, with higher scores indicating more severe deficits in social interactions) and clinical subdomain scores on “awareness” (eight items), “cognition” (12 items), “communication” (22 items), “motivation” (11 items) and “restricted and repetitive behaviors” (12 items) were analyzed. The SRS-2 has strong reliability and validity (Bruni, 2014). Cohort 1 inclusion criteria required a total raw score of 75 or higher aligning with Constantino (2013) guidelines for ASD (Duvekot *et al.*, 2017). This criterion was not applied to Cohort 2, as all participants had a clinical autism diagnosis (Dekker *et al.*, 2022). To evaluate whether the two cohorts were comparable in terms of autism severity at baseline, an independent samples *t*-test was conducted on the SRS-2 total and subscale scores. Results revealed no significant differences between the groups at T0: total score $t(88)=0.22$, $p=0.83$, Social Awareness $t(88)=-0.23$, $p=0.82$, Social Cognition $t(88)=0.58$, $p=0.56$, Social Communication $t(88)=-0.12$, $p=0.45$, Social Motivation $t(88)=-1.53$, $p=0.07$, Restricted and Repetitive Behaviors $t(88)=0.96$, $p=0.17$. These findings suggest that the cohorts did not differ significantly in autism severity at the initial assessment.

Table 1 Demographic information

	SRS-2				BPM				PSQ			
	Cohort 1 (n = 66)		Cohort 2 (n = 24)		Cohort 1 (n = 37)		Cohort 2 (n = 24)		Cohort 1 (n = 64)		Cohort 2 (n = 49)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
<i>Age of child</i>												
T0	8.70	4.39	7.71	1.90	7.76	1.42	12.9	3.7				
T1	9.53	3.93	9.31	1.91			5	8	8.0	2.2	12.7	4.64
T2	10.26	3.97	9.88	1.83	9.84	1.42			6	0	4	
		3.9	9.8	1.8	4	2	4	0				
		7	8	3								
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Sex of child</i>												
Female	11	16.7	8	33.3	8	21.6	9	37.5	11	17.2	15	30.61
Male	55	83.3	16	66.7	29	78.4	15	62.5	53	82.8	34	69.39
<i>Informant role</i>												
Biological mother	59	89.4	22	91.7	30	81.1	22	91.7	58	90.6	42	85.71
Biological father	7	10.6	1	4.2	7	18.9	0	0	6	9.4	5	10.20
Foster mother	0	0	1	4.2	0	0	2	8.3	0	0	2	0.04
Foster father	0	0	0	0	0	0	0	0	0	0	0	0

Note(s): M = mean. SD = standard deviation. *n* = number of participants. The SRS-2 refers to the Social Responsiveness Scale-2 (Constantino, 2013). The BPM refers to the Brief Problem Monitor (Achenbach et al., 2011). The PSQ refers to the Parenting Stress Questionnaire or Opvoedingsbelastingvragenlijst (OBVL) in Dutch (Vermulst et al., 2015)

Source(s): Authors' own work

To allow for direct comparison, participants were only included if they were four years or older at T0, resulting in 92 participants (Cohort 1: *n* = 66, Cohort 2: *n* = 26). Power analysis indicated that *n* = 92 provided 99% power to detect a medium effect size (*d* = 0.5) and 53% power for a small effect size (*d* = 0.2) in a repeated-measures analysis of variance (ANOVA) with two groups, three-time measurements and five measurements for the SRS-2 subscales (Faul et al., 2009).

Emotional and behavioral functioning

The Brief Problem Monitor (BPM) assessed emotional and behavioral functioning at T0 and T2 (Achenbach et al., 2011). This 19-item parent-report questionnaire, derived from the Child Behavior Checklist (CBCL) (Achenbach and Rescorla, 2001), uses a three-point Likert scale from "not at all" (0) to "very true" (2). The BPM total score, ranging from 0 to 30, and three subscales Internalizing (six items), Externalizing (seven items) and Attention (six items), were analyzed. Higher scores indicate more problems in children. The BPM has good reliability and validity (Piper et al., 2014).

Participants who originally completed the CBCL had their scores converted to BPM equivalents so that all analyzed data was scored based on the BPM. To ensure uniform BPM/CBCL use, participants younger than five were excluded to ensure consistent use of CBCL cut-offs of 6–18. The final sample included 61 participants (Cohort 1: *n* = 37, Cohort 2: *n* = 24). Power analysis indicated that *n* = 61 provided 97% power to detect a medium effect size (*d* = 0.5) and 34% power for a small effect size (*d* = 0.2) in the group * time interaction for using a repeated measure ANOVA with two groups and two-time measurements and three measurements for the BPM subscales (Faul et al., 2009).

Parenting stress

The Parenting Stress Questionnaire [Opvoedingsbelastingvragenlijst (OBVL) in Dutch; Vermulst et al., 2015] assessed parenting stress at T1. The 34-item parent-report

questionnaire uses a four-point Likert scale (“not true” to “very true”). Total scores range from 34 to 136, with lower scores indicating lower levels of parenting stress. The subdomains include parent–child relationship problem with six items measuring the degree to which the parent views their relationship with their child as stressful, parenting problems domain with seven items referring to the degree to which the parent perceives raising the child as stress inducing, depressive mood domain with seven items measuring the degree in which a parent is unhappy with themselves or their living conditions, parental role restriction domain with six items referring to how much the parent feels restricted in one’s freedom and their frustrations with trying to maintain their own identity and physical health problems domain with eight items relating to the degree in which the parent feels physically healthy and fit. Whereas the total score provides a broad index of parenting stress, examination of subscales allows for examination of differential patterns in parenting that may be potentially masked when relying on a global stress score. The Dutch OBVL shows good reliability and validity (Vermulst *et al.*, 2015), even during periods when increased stress is expected, such as when a child is sick (Conijn *et al.*, 2022).

The final sample included 115 participants (Cohort 1: $n=66$, Cohort 2: $n=49$), providing 99% power to detect a medium effect size ($d=0.5$) and 77% power for a small effect size ($d=0.2$) in the group $\times$ subscale interaction using a repeated measure ANOVA with two groups and five measurements for the OBVL subscales (Faul *et al.*, 2009).

Analyses

The data were coded and cleaned according to the manuals of their respective questionnaires. Analyses were determined by research aim. Null hypothesis tests were conducted using IBM SPSS version 29, and Bayesian analyses were conducted using JASP version 0.143.

Autism symptoms

Repeated-measures ANOVA with Greenhouse–Geisser corrections assessed social trait development with SRS-2 total and subscale scores as the dependent variable, cohort group (Cohort 1 vs Cohort 2) as a between-subject factor, the three-time points (T0, T1 and T2) and SRS-2 subscale (Social Awareness, Social Cognition, Social Communication and Restricted and Repetitive Behaviors) as within-subjects factors. Two outliers were excluded due to absolute standardized residual scores greater than 3 and having influence on the sample, resulting in $n=90$ (Cohort 1: $n=66$, Cohort 2: $n=24$). Given the difference between ages in the two samples and its known relationship to autism symptoms, analysis included age as a covariate (Gotham *et al.*, 2012).

Emotional behavioral functioning

Repeated-measures ANOVA with Greenhouse–Geisser corrections explored emotional and behavioral functioning with BPM subscale score as the dependent variable, cohort group (Cohort 1 vs Cohort 2) as a between-subject factor, the two time points (T0 vs T2) and BPM subscale (Internalizing, Externalizing and Attention) as within-subjects factors. Analyses were run again including age as a covariate. No outliers were identified.

Parenting stress

Repeated-measures ANOVA with Greenhouse–Geisser corrections examined parenting stress at T1 with OBVL subscale score as the dependent variable, cohort group (Cohort 1 vs Cohort 2) as between-subject factor, and OBVL subscale (Parent–child Relationship Problems, Parenting Problems, Depressive Mood, Parental Role Restrictions and Physical Health Problems). Before data analysis, three outliers were identified due to having an

absolute standardized residual score greater than 3; however, when checking their influence, only two outliers greatly impacted the slope of the regression line and therefore were removed (Andrews and Pregibon, 1978). As a result, we used a sample size of 113 participants, with 64 participants in Cohort 1 and 49 in Cohort 2. Analyses were run again including age as a covariate.

Results

Descriptive statistics of each cohort by research aim can be found in Table 2.

Autism symptoms

Greenhouse–Geisser corrections were applied to all within-subjects effects in the repeated-measures ANOVA. Both the main effect of group, $F(1, 87) = 0.32$, $p = 0.57$, $\eta_p^2 = 0.004$ and the group * time interaction, $F(1.88, 163.53) = 0.76$, $p = 0.46$, $\eta_p^2 = 0.009$, were not significant, suggesting the cohorts showed similar levels and temporal development of the children's autism symptoms (Table 3). The same pattern of results was found when excluding age as a covariate. No post hoc analyses were conducted, as no significant omnibus effects were observed. To further investigate whether the data could provide evidence against this group * time interaction effect, a JZS Bayes factor repeated-measures ANOVA with default prior scales, which included the same factors and covariate, was performed (Rouder et al., 2012). The Bayes factor ($BF = 20.02$) indicated strong evidence in favor of the null model over the alternative that included the group $\times$ time interaction. This means the data were 20 times more likely to occur under the model without the interaction, providing strong evidence that the two cohorts did not differ in their developmental of autism symptoms (for more details on the Bayes factor classification scheme see Van Doorn et al., 2021).

Table 2 Descriptive statistics

Measure/subscale	T0				T1				T2			
	Cohort1		Cohort2		Cohort1		Cohort2		Cohort1		Cohort2	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
<i>Social responsiveness scale-2</i>												
Total score	97.88	20.39	99.54	35.89	103.35	20.77	108.25	29.58	97.05	22.48	102.38	27.27
Social awareness	12.82	3.30	12.63	3.99	13.70	3.17	14.17	2.96	13.15	3.24	13.46	3.28
Social cognition	18.88	5.32	19.83	7.33	20.29	4.75	20.04	6.11	19.47	5.22	19.42	5.45
Social communication	33.03	7.91	32.71	12.31	33.29	8.11	34.63	10.67	31.26	8.16	32.38	10.18
Social motivation	16.50	5.65	14.29	7.13	16.91	4.81	17.38	6.14	15.42	5.03	15.88	6.18
Restricted and repetitive behaviors	16.65	5.53	18.50	8.79	17.35	5.44	20.25	7.92	16.18	5.61	19.46	6.98
<i>Brief problem monitor</i>												
Total score	18.16	6.27	18.25	6.52					15.57	7.28	16.42	7.79
Internalizing	4.19	2.88	4.29	3.06					3.97	2.87	3.71	3.13
Externalizing	6.24	3.10	5.62	3.66					4.46	3.19	4.79	3.38
Attention	7.73	3.02	8.33	2.53					7.14	2.84	7.92	3.83
<i>Parenting Stress Questionnaire</i>												
Total score					60.20	13.90	61.08	13.58				
Parent–child relationship problems					11.00	3.64	10.39	3.27				
Parenting problems					14.83	4.33	13.16	3.61				
Depressive mood					11.95	3.52	11.37	3.11				
Parental role restriction					11.00	3.85	12.98	5.54				
Physical health problems					11.42	2.96	13.18	4.39				
Source(s): Authors' own work												

Table 3 ANOVA results of the social responsiveness scale-2

ANOVA	Within subject effect of subscales	Within subject effect time	Within subject effect subscales * time	Between subject effect
Main effect	$F(3.16, 274.57) = 68.40$, $p < 0.001$, $\eta_p^2 = 0.44^*$	$F(1.88, 163.53) = 0.048$, $p = 0.945$, $\eta_p^2 < 0.000$	$F(5.975, 519.82) = 0.835$, $p = 0.543$, $\eta_p^2 < 0.000$	
Main effect * cohort	$F(3.16, 274.57) = 1.92$, $p = 0.123$, $\eta_p^2 = 0.022$	$F(1.88, 163.53) = 0.76$, $p = 0.46$, $\eta_p^2 = 0.009$	$F(5.975, 519.82) = 1.215$, $p = 0.297$, $\eta_p^2 = 0.014$	$F(1, 87) = 0.32$, $p = 0.57$, $\eta_p^2 = 0.004$
Main effect * age	$F(3.16, 274.57) = 0.389$, $p = 0.771$, $\eta_p^2 = 0.004$	$F(1.88, 163.53) = 1.464$, $p = 0.235$, $\eta_p^2 = 0.017$	$F(5.975, 519.82) = 0.930$, $p = 0.472$, $\eta_p^2 = 0.011$	$F(1, 87) = 0.983$, $p =$ 0.324 , $\eta_p^2 = 0.011$

Note(s): * $p < 0.05$. Time includes T0, T1 and T2
Source(s): Authors' own work

Emotional and behavioral functioning

Greenhouse–Geisser corrections were applied to all within-subjects effects with more than two levels in the repeated-measures ANOVA. Both the main effect of group, $F(1, 57) = 0.24$, $p = 0.24$, $\eta_p^2 = 0.004$ and the group * time interaction, $F(1, 57) = 1.07$, $p = 0.31$, $\eta_p^2 = 0.018$, were not significant, suggesting that the cohorts showed similar levels and temporal development of emotional and behavioral functioning, while correcting for potential age differences (Table 4). No post hoc corrections were applied. The same pattern of results was found when excluding age as a covariate. Similar JZS Bayes factor repeated-measures ANOVA with default prior scales was performed (Rouder et al., 2012). Across all models, models excluding the group * time interaction were preferred to models that included it by a Bayes factor of 12.78. This provides strong evidence against the hypothesis that the two cohorts differed in their development of emotional and behavioral functioning, suggesting that these outcomes remained consistent across cohorts.

Parenting stress

Greenhouse–Geisser corrections were applied to the within-subjects effect in the repeated-measures ANOVA was performed. An expected main effect of OBVL subscale, $F(2.66, 292.42) = 4.84$, $p < 0.01$, $\eta_p^2 = 0.042$ was found (Table 5). A nonsignificant main effect of group, $F(1, 110) = 0.84$, $p = 0.36$, $\eta_p^2 = 0.008$, but a significant group * subscale interaction, $F(2.66, 292.42) = 10.64$, $p < 0.001$, $\eta_p^2 = 0.088$ (Figure 2) was found, suggesting the cohorts showed similar levels, but different profiles of parenting stress at T1, while correcting for potential age differences. The same pattern of results was found when excluding age as a covariate. Follow-up contrasts indicated that Cohort 2 showed significantly lower levels of Parenting Problems, $t(111) = 2.17$, $p = 0.03$, but significantly higher levels of Parental Role Restrictions $t(111) = 2.54$, $p = 0.01$ and Physical Health Problems $t(111) = 2.24$, $p = 0.03$. To investigate whether the data could provide evidence for this group * time interaction, a JZS Bayes factor repeated-measures

Table 4 ANOVA results of the brief problem monitor

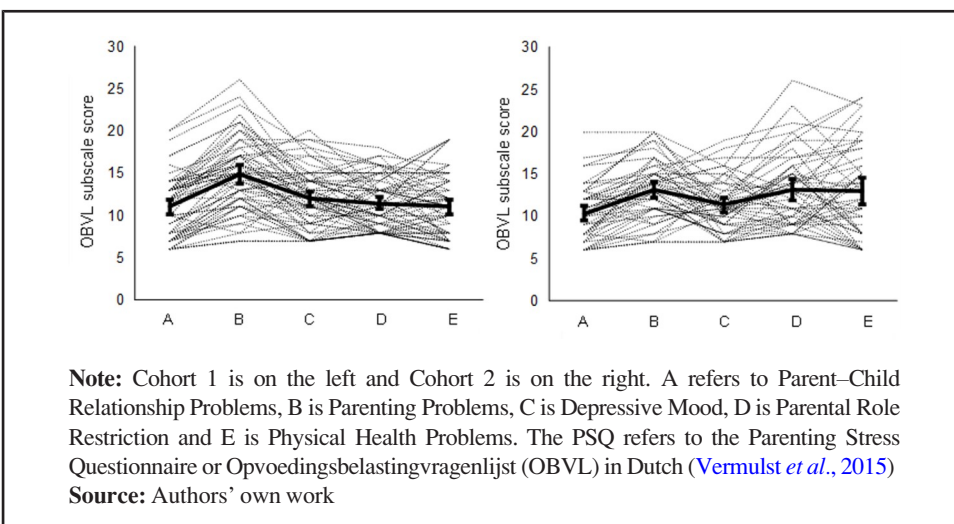
	Within subject effect of subscales	Within subject effect time	Within subject effect subscales * time	Between subject effect
Main effect	$F(1.97, 112.45) = 7.44$, $p < 0.001$, $\eta_p^2 = 0.12^*$	$F(1, 57) = 0.403$, $p =$ 0.528 , $\eta_p^2 = 0.007$	$F(1.963, 291.387) = 2.576$, 0.082 , $\eta_p^2 = 0.043$	
Main effect * cohort	$F(3.16, 274.57) = 1.12$, $p = 0.330$, $\eta_p^2 = 0.019$	$F(1, 57) = 1.07$, $p = 0.31$, $\eta_p^2 = 0.018$	$F(1.963, 291.387) = 0.757$, 0.469 , $\eta_p^2 = 0.013$	$F(1, 57) = 0.24$, $p = 0.24$, $\eta_p^2 = 0.004$
Main effect * age	$F(3.16, 274.57) = 9.234$, $p = 0.893$, $\eta_p^2 = 0.0155$	$F(1, 57) = 2.237$, $p = 0.14$, $\eta_p^2 = 0.038$	$F(1.963, 291.387) = 1.364$, 0.260 , $\eta_p^2 = 0.023$	$F(1, 57) < 0.000$, $p =$ 0.997 , $\eta_p^2 = 0.000$

Note(s): * $p < 0.05$. Time includes T0 and T2
Source(s): Authors' own work

Table 5 ANOVA results of the parenting stress

	Within subject effect of subscales	Between subject effect
Main effect	$F(2.66, 292.42) = 4.84, p < 0.01, \eta_p^2 = 0.042$	
Main effect * cohort	$F(2.66, 292.42) = 10.64, p < 0.01, \eta_p^2 = 0.088$	$F(1, 110) = 0.84, p = 0.36, \eta_p^2 = 0.008$
Main effect * age		$F(1, 110) = 1.285, p = 0.26, \eta_p^2 = 0.012$

Note(s): * $p < 0.05$
Source(s): Authors' own work

Figure 2 A visual representation of PSQ Scores by cohort and subscale

ANOVA with default prior scales which included the same factors and covariate was performed (Rouder *et al.*, 2012). Across all models, models including the group * subscale interaction were preferred to models that excluded it by a BF of 2,728, providing very strong evidence for the hypothesis that the two cohorts differed in their profiles of parenting stress at T1.

Discussion

The COVID-19 pandemic altered daily life, requiring children and their parents to adapt to new social rules, quarantines and public safety measures. This study provides exploratory comparisons, due to the wide age range and cohort differences, that may aid in considering the influence of stressors, such as global pandemics, on families of autistic children. Findings suggest that while autistic children's developmental trajectories are similar 10 years before the pandemic to during the pandemic, parents during the pandemic experienced fewer parenting problems, but more role restriction and physical health problems than their prepandemic peers.

Impact on child development

The developmental trajectory of social symptoms and emotional and behavioral functioning did not differ significantly between cohorts. As hypothesized, social symptoms remained stable over time, consistent with the stability of the diagnosis. Contrary to expectations,

parents did not report increased challenges in emotional and behavioral functioning in their autistic children during the pandemic compared to typical maturation.

Most prior studies lacked pre-pandemic comparison data, making it difficult to attribute findings to the influence of the COVID-19 safety measures (e.g. [Amorim et al., 2020](#); [Colizzi et al., 2020](#); [Gotham et al., 2012](#); [Levante et al., 2021](#); [Renzo et al., 2020](#)). Our findings align with research suggesting that observed symptoms during the pandemic may reflect ongoing challenges. A study that compared emotional and behavioral problems during the COVID-19 pandemic to a prepandemic period similarly found that autistic participants' changes in emotional and behavioral problems remained relatively stable between the two periods ([de Maat et al., 2022](#)). Together, these results indicate that parent-reported symptoms were comparable across time, reinforcing the need to identify resilience factors that help autistic children adapt during disruptions such as the COVID-19 pandemic.

Impact on parenting stress

Parents during the COVID-19 pandemic reported fewer parenting problems, but greater role restriction and physical health problems compared to those in a non-pandemic period. The shift toward hybrid or remote working may have contributed to greater work–life balance and increased flexibility with work. In addition, reduced social pressures ([Ameis et al., 2020](#)) and greater time at home may have alleviated some parenting challenges by fostering greater understanding and connection with their children as previously reported in other studies ([Mumbardó-Adam et al., 2021](#); [Tokatly Latzer et al., 2021](#)). However, parents were also required to fill additional roles of educators and therapists to support their children during the pandemic ([Dhiman et al., 2020](#)) whilst external support was reduced or completely stopped. This means there was not only added parenting responsibilities but also a reduction of breaks in caregiving that came from their child working with educators or therapists. Qualitative reports mimic these findings ([van Rijen et al., 2025](#)). However, it is possible that increased physical health problems reflect general somatic distress linked the health consequences of COVID-19 rather than stress resulting from parenting demands. Similarly, parental role restrictions may stem from competing demands, such as the expectation to maintain work responsibilities while providing full-time caregiving, reflecting broader role restrictions rather than child specific.

Although both cohorts were drawn from the same institutions, differences in reported parenting stress may reflect more than just the direct impact of the COVID-19 pandemic. Evolving diagnostic practices, shifting societal expectations or changes in service provision may also have contributed. Moreover, increased parenting stress during the pandemic may not solely reflect difficulties related to the child, but rather the broader strain of navigating competing roles, such as being expected to maintain full-time work while providing full-time caregiving. In this context, parental role restrictions may partly stem from external demands (e.g. public health mandates, employer expectations) rather than increased child needs. Notably, while children's functioning appeared relatively stable, parenting experiences varied. Specifically, some parents reported relief from reduced external obligations, while others faced heightened burdens. These findings underscore the importance of targeted family supports, such as respite care, remote interventions and self-care programs, particularly during times of societal disruption when the boundary between caregiving and other responsibilities becomes increasingly blurred.

Limitations

This study compared two cohorts of autistic children and their families at distinct time points, one during a global pandemic and one during a nonpandemic period. Although both cohorts were drawn from the same region and service providers, the temporal gap between data collection of the cohorts may reflect differences in diagnostic practices,

services and supports available as well as other societal changes. In addition, some PSQ subscales (e.g. physical health, role restriction) may reflect broader pandemic-related stress rather than parenting stress specifically. Furthermore, as this study was developed in response to the unexpected COVID-19 pandemic, cohorts were not perfectly matched. Cohort 1 (Duvekot *et al.*, 2017) had a larger sample size than cohort 2 (Dekker *et al.*, 2022), and both were relatively small. Cohort 1 included children between the ages of 2.5–10 years old, while Cohort 2 included individuals between the ages of 4 and 21 years old. Whereas age was controlled for as a covariate, future research may compare age by groups such as school or developmental level. Both cohorts had more biological male than female participants, a common trend in autism research due to autism being more commonly diagnosed in males and underdiagnosed in females (Halladay *et al.*, 2015). Further exploration is important to ensure that autism research is understood in both males and females. Despite these limitations, this study offers a rare opportunity to examine parenting stress and autistic child development during a prolonged period of societal disruption compared to a period in which such global disruption was not present. Future studies should consider longitudinal designs with matched samples to isolate pandemic-specific effects more precisely.

Conclusion

Within this study, parents were not reporting unique development of their child's autism symptoms or emotional and behavioral functioning during the pandemic compared to a nonpandemic period. However, parents reported more parental role restriction and physical health problems despite fewer parenting problems during the pandemic. These findings highlight the need to support parents, as stressors affecting parents can create a ripple effect throughout the family. While the pandemic introduced many challenges, it also appeared to positively impact some areas of parenting stress, such as reduced societal and work pressures, enabling parents to spend more structured time with their children. Many parents reported engaging in schoolwork and goal-oriented activities with their children, leading to the development of new strategies for support, such as fostering strengths-based activities and creating structured home routines (Tokatly Latzer *et al.*, 2021). The tools and coping mechanisms learned during the pandemic may prove useful in future times of stress or disruption. Overall, the pandemic has led to a greater acknowledgment that parents, especially, those of children with disabilities, need added support, such as respite services, remote interventions and self-care programming, during periods of stress/challenge which in turn will allow parents to be better equipped to support their children.

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Author affiliations

Olivia F. Ward is based at the Department of Psychology, Education and Child Studies, Erasmus University, Rotterdam, The Netherlands, and Department of Psychology, The University of Alabama at Birmingham, Birmingham, Alabama, USA.

Leontine W. ten Hoopen is based at the Department of Child and Adolescent Psychiatry/ Psychology, Sophia Children's Hospital, Erasmus University Medical Center, Rotterdam, The Netherlands, and Erasmus School of Health Policy and Management, Erasmus University, Rotterdam, The Netherlands.

Bruno Bocanegra is based at the Department of Psychology, Education and Child Studies, Erasmus Universiteit Rotterdam, Rotterdam, The Netherlands.

Femke L. Truijens is based at the Erasmus School of Social and Behavioural Sciences, Erasmus University, Rotterdam, The Netherlands.

Kirstin Greaves-Lord is based at the Department of Child and Adolescent Psychiatry/ Psychology, Sophia Children's Hospital, Erasmus MC Sophia, Rotterdam, The Netherlands, and Yulius Academie, Dordrecht, The Netherlands.

Kirsten Visser is based at Sarr Autisme Rotterdam, Rotterdam, The Netherlands.

Wietske A. Ester is based at Sarr Expertisecentrum Autisme, Rotterdam, The Netherlands;

Curium-LUMC, Leiden, The Netherlands and Parnassia Bavo Groep, The Hague, The Netherlands.

Dennis Bastiaansen is based at Yulius Academie, Dordrecht, The Netherlands.

Elisabeth H.M. Van Rijen is based at the Department of Psychology, Education and Child Studies, Erasmus University, Rotterdam, The Netherlands.

Linda P. Dekker is based at the Department of Psychology, Education and Child Studies, Erasmus University, Rotterdam, The Netherlands.

Corresponding author

Linda P. Dekker can be contacted at: l.p.dekker@essb.eur.nl

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