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Who suffered most? Parental stress and mental health during the COVID-19 pandemic in Germany

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Supplementary online materials for the article

**Who suffered most? Parental stress and mental health
during the COVID-19 pandemic in Germany**

Jianghong Li, Mareike Bünning, Till Kaiser, & Lena Hipp

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Table S1: Sample Characteristics

	Respondents participated at least in wave 1 [#]			Respondent participated in all 4 waves			
	Mean/ proportion	SD	N	Mean/ proportion	SD	N	
Psychological distress	3.90	1.59	2810	3.94	1.57	887	
Parenting stress	7.09	3.65	2791	7.26	3.55	881	
Women	0.79	0.40	5192	0.83	0.37	1770	***
2+ children	0.59	0.49	5196	0.61	0.49	1771	
Children < 11 years	0.85	0.36	5150	0.83	0.37	1763	
Single parent	0.09	0.28	5163	0.08	0.27	1764	
University degree	0.75	0.44	5159	0.83	0.37	1763	***
Tight income	0.06	0.24	5168	0.04	0.20	1770	***
Working at usual workplace	0.16	0.37	5049	0.14	0.35	1739	*
Home office	0.61	0.49	5049	0.67	0.47	1739	***
Not working	0.22	0.41	5049	0.19	0.39	1739	**
25-34 years old	0.19	0.40	5196	0.15	0.36	1771	***
35-44 years old	0.58	0.49	5196	0.60	0.49	1771	
45-54 years old	0.22	0.42	5196	0.25	0.43	1771	*
No migration background	0.86	0.35	5170	0.87	0.34	1767	
1st generation migrant	0.08	0.27	5170	0.07	0.26	1767	
2nd generation migrant	0.07	0.25	5170	0.06	0.23	1767	
Overcrowded household	0.07	0.26	5163	0.07	0.25	1763	
Adequate household	0.30	0.46	5163	0.30	0.46	1763	
More than adequate household	0.63	0.48	5163	0.63	0.48	1763	
Townsize >50000 inhabitants	0.65	0.48	5154	0.69	0.46	1763	**
South	0.25	0.43	5180	0.22	0.41	1769	**
North	0.15	0.36	5180	0.16	0.37	1769	
West	0.25	0.43	5180	0.24	0.43	1769	
East	0.13	0.33	5180	0.14	0.34	1769	
Berlin	0.22	0.41	5180	0.25	0.43	1769	*
<i>N</i>	5196			1771			

Note: The parenting stress scale ranges from 0 to 12 and the psychological distress scale from 0 to 8.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$: Results from t-tests/ tests of proportion between full and balanced sample.

[#] These are participants who answered the survey questions in wave 1 (t1) but did not answer the survey questions at all of the later time points (t2, t3, t4): they were missing at one of the later survey time points.

Table S2: OLS Regression on Parenting Stress adjusting for Parents' Division of Child Care

	t0	t1	t2	t3 t4
Men	ref.	ref.	ref.	ref.

Women	0.06	0.30	-0.03	-0.08
1 Child	ref.	ref.	ref.	ref.
2+ Children	0.23	-0.01	0.37*	0.55**
Child(ren) >= 11 years	ref.	ref.	ref.	ref.
Child(ren) <11 years	0.68**	2.02***	2.25***	1.65***
Partnered parent	ref.	ref.	ref.	ref.
Single parent	0.15	-0.86	-0.35	-0.11
Division of childcare ¹	0.11	0.59***	0.61***	0.49***
Home office	ref.	ref.	ref.	ref.
At usual workplace	0.08	-0.74	-0.38	-0.52**
Not working	0.01	-1.29***	-0.94***	-0.68**
No tertiary degree	ref.	ref.	ref.	ref.
Tertiary degree	0.46*	-0.11	-0.00	0.10
Income sufficient	ref.	ref.	ref.	ref.
Income tight	0.51	1.27*	0.51	1.10**
25-34 Years old	ref.	ref.	ref.	ref.
35-44 Years old	0.05	0.24	0.46	0.17
45-54 Years old	0.17	0.23	0.00	0.31
No migration background	ref.	ref.	ref.	ref.
1st Generation migrant	0.21	0.30	-0.07	0.16
2nd Generation migrant	-0.19	-1.24*	-0.27	0.27
Overcrowded household	ref.	ref.	ref.	ref.
Adequate	-0.02	0.64	0.41	0.62
More than adequate	-0.01	0.51	0.25	0.44
Place of residence < 50000 inhabitants	ref.	ref.	ref.	ref.
50,000+ Inhabitants	-0.03	0.23	0.05	0.08
Region: Berlin	ref.	ref.	ref.	ref.
South	0.00	0.00	0.00	0.00
North	0.19	-0.45	-0.14	-0.12
West	0.19	-0.31	0.11	-0.32
East	-0.16	-0.06	-0.71**	-1.25***
N	1651	836	1676	1669
R2	0.18	0.18	0.18	0.18

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

1. Division of child care was measured on a five-point scale, ranging from 1 (almost) exclusively my partner to 5 (almost) exclusively me.

Note: The table presents marginal effects and 95% confidence intervals based on OLS regressions with clustered, robust standard errors. The parenting stress scale ranges from 0 to 12. Higher values indicate higher levels of parenting stress. The model was fully interacted with measurement time points. The sample size at t1 is smaller than at the other time points, because the psychological distress/parenting stress questions were only integrated into the survey after its initial launch.

Table S3: OLS Regression on Psychological Distress adjusting for Parents' Division of Child Care

	t0	t1	t2	t3 t4
Men	ref.	ref.	ref.	ref.
Women	0.67***	0.80***	0.91***	0.75***

1 Child	ref.	ref.	ref.	ref.
2+ Children	-0.07	-0.12	-0.05	0.04
Child(ren) >= 11 years	ref.	ref.	ref.	ref.
Child(ren) <11 years	-0.02	0.44*	0.39**	0.47***
Partnered parent	ref.	ref.	ref.	ref.
Single parent	0.22	-0.17	-0.09	0.15
Division of childcare ¹	-0.04	0.18**	0.12**	0.10
Home office	ref.	ref.	ref.	ref.
At usual workplace	-0.05	-0.18	-0.11	-0.19*
Not working	-0.01	-0.22	-0.26**	-0.16
No tertiary degree	ref.	ref.	ref.	ref.
Tertiary degree	-0.14	-0.23	-0.05	-0.17
Income sufficient	ref.	ref.	ref.	ref.
Income tight	0.08	0.61*	0.54***	0.79***
25-34 Years old	ref.	ref.	ref.	ref.
35-44 Years old	0.17	0.14	0.27**	0.09
45-54 Years old	0.15	-0.00	-0.02	0.19
No migration background	ref.	ref.	ref.	ref.
1st Generation migrant	0.03	0.11	0.07	0.15
2nd Generation migrant	0.11	-0.28	0.23	0.27
Overcrowded household	ref.	ref.	ref.	ref.
Adequate	-0.01	0.40	-0.08	-0.02
More than adequate	-0.07	0.33	-0.12	-0.12
Place of residence < 50000 inhabitants	ref.	ref.	ref.	ref.
50,000+ Inhabitants	0.19*	0.11	0.18*	0.23*
Region: Berlin	ref.	ref.	ref.	ref.
South	0.00	0.00	0.00	0.00
North	0.11	-0.04	-0.03	-0.14
West	0.07	0.04	0.04	-0.08
East	-0.01	-0.19	-0.37**	-0.55***
N	1651	837	1678	1672
R2	0.19	0.19	0.19	0.19

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

1. Division of child care was measured on a five-point scale, ranging from 1 (almost) exclusively my partner to 5 (almost) exclusively me.

Note: The table presents marginal effects and 95% confidence intervals based on OLS regressions with clustered, robust standard errors. The psychological distress scale ranges from 0 to 8. Higher values indicate higher levels of psychological distress. The model was fully interacted with measurement time points. The sample size at t1 is smaller than at the other time points, because the psychological distress/parenting stress questions were only integrated into the survey after its initial launch.

Table S4: Fixed-effects Regressions on Parenting Stress and Psychological Distress

	Parenting Stress	Psychological Distress
t0	ref.	ref.
t1	3.09***	1.42***
t2	2.45***	1.20***
t3	1.52***	0.93***
t4	2.29***	1.46***
Partnered parent	ref.	ref.
Single parent	0.38	0.22
Home office	ref.	ref.
At usual workplace	-0.46***	-0.08*
Not working	-0.36**	0.04
Income sufficient	ref.	ref.
Income tight	0.34	0.17*
_cons	4.18***	2.39***
R2 (within)	0.26	0.30

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The parenting stress scale ranges from 0 to 12 and the psychological distress scale from 0 to 8.

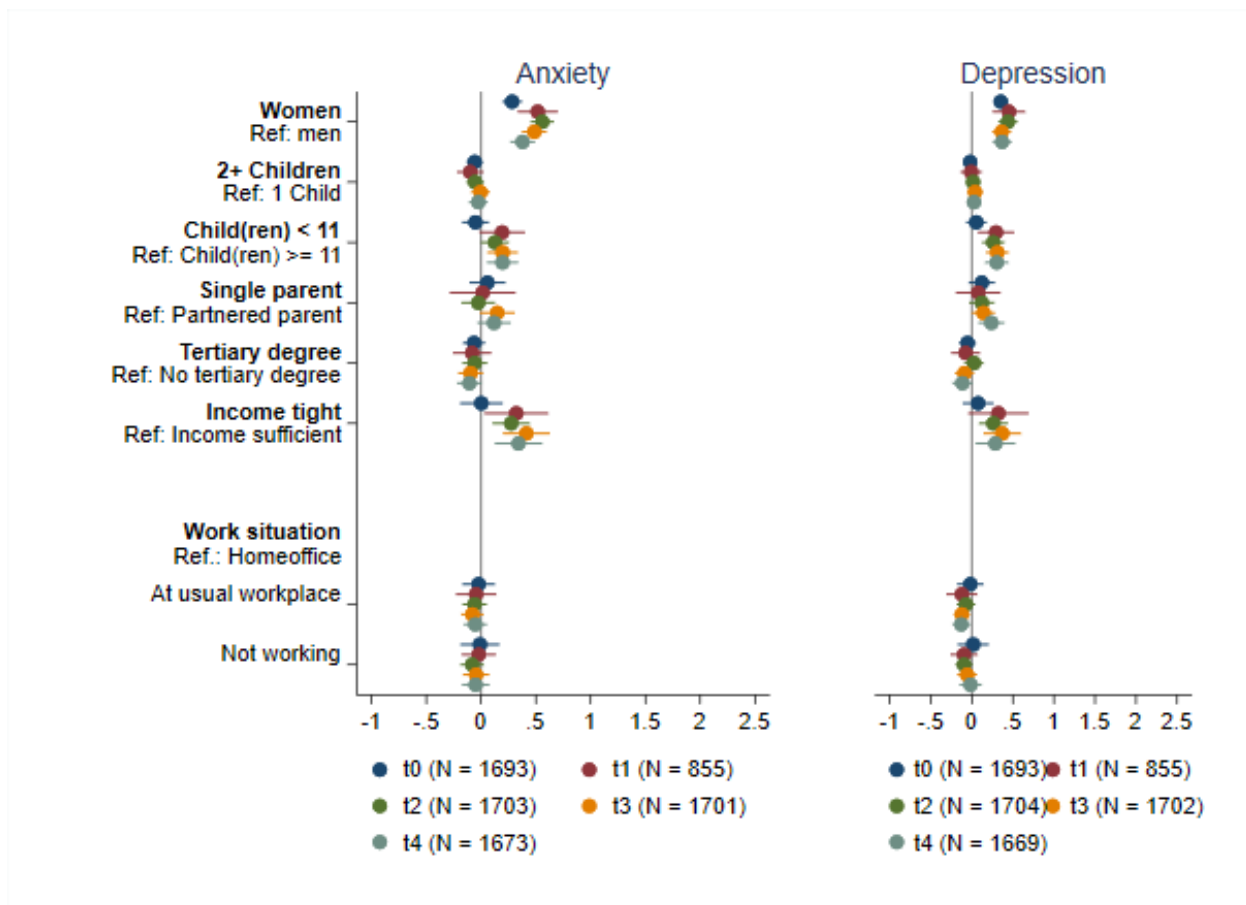


Figure 3: Marginal effects with 95% confidence intervals based on OLS regressions with clustered, robust standard errors.

The dependent variables are anxiety and depression measured in all four waves (t1 to t4). Both items are measured on a 5-point scale. These items were added to the survey when data collection was already ongoing, resulting in a lower number of cases at t1. In the first or second wave, respondents also retrospectively rated their levels of anxiety and depression before the pandemic (t0). The following covariates were included in the analyses: age, migration background, size of housing, size of place of residence and region of residence. The marginal effects were obtained from OLS models using a pooled sample across all time points. Coefficients were fully interacted with measurement time point. Stata's coefplot command (Jann 2014) was used to generate the figure.

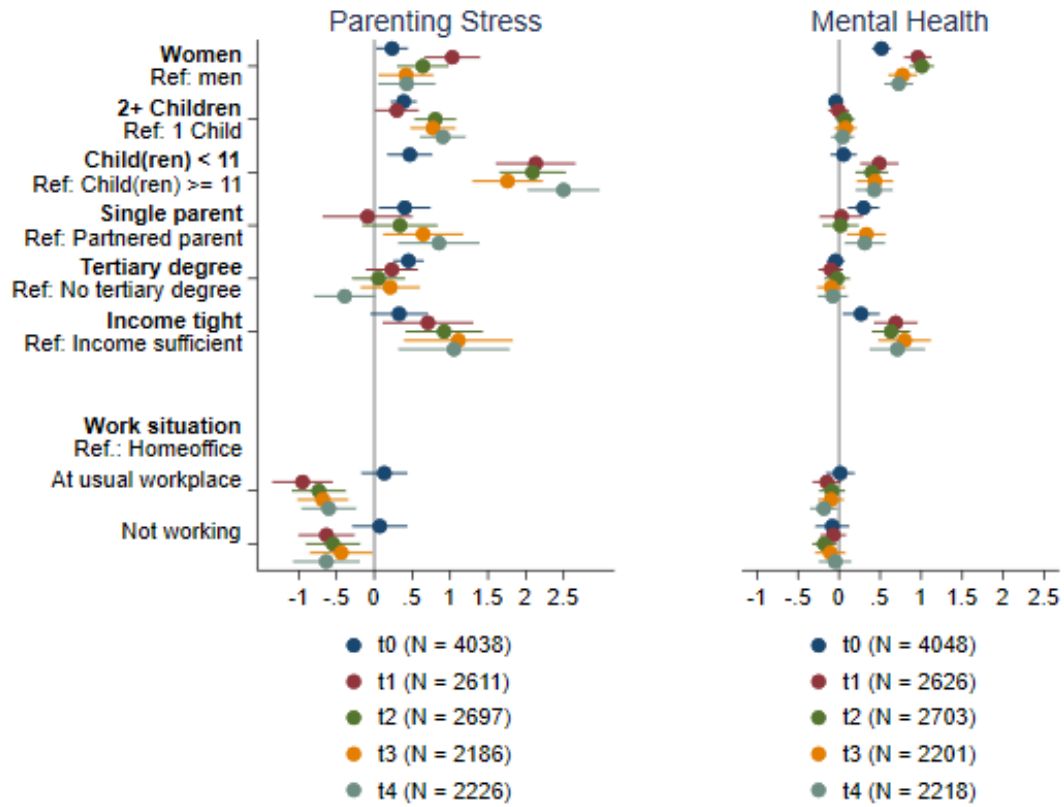


Figure 4. Marginal effects and 95% confidence intervals based on OLS regressions with clustered, robust standard errors based on the full sample including drop-outs.

The parenting stress scale ranges from 0 to 12 and the psychological distress scale from 0 to 8. The questions on parenting stress and psychological distress were added to the survey when data collection was already ongoing, resulting in a lower number of cases at t1. In the first or second wave, respondents also retrospectively assessed their parenting stress and psychological distress before the pandemic (t0). The following covariates were included in the analyses: age, migration background, size of housing, size of place of residence and region of residence. The marginal effects were obtained from OLS models using a pooled sample across all time points. Coefficients were fully interacted with measurement time points. Stata’s coefplot command (Jann 2014) was used to generate the figure.