Maternal Depression, Parental Investment, and Child Cognitive Development in Ghana

Tables and Results

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Contents

1 Summary Statistics

Table 1: Summary Statistics: Full Analysis Sample

	N	Mean	Std. Dev.	Min	Max
Child age (years)	13,746	10.470	3.680	0.000	17.000
Child is female	13,746	0.473	0.499	0.000	1.000
Raven's score (0–12)	12,507	2.154	1.195	0.000	7.000
Digit span forward (0–8)	12,520	0.000	0.000	0.000	0.000
Digit span backward (0–7)	8,646	0.000	0.000	0.000	0.000
Math score (0–8)	9,875	1.294	2.422	0.000	8.000
English score (0–7)	9,447	1.310	2.504	0.000	7.000
Cognitive index (std. avg.)	12,507	0.004	0.918	-1.879	4.167
Height-for-age z-score	13,088	0.259	0.952	-3.722	22.060
Weight-for-age z-score	13,091	0.258	0.850	-1.703	9.700
Mother's age	13,746	42.197	13.321	15.000	104.000
Mother's K10 depression score (10–50)	13,746	18.808	6.251	1.000	46.000
Mother depressed (K10 $\geq$ 20)	13,746	0.421	0.494	0.000	1.000
Mother's education (years)	1,396	6.224	2.784	0.000	12.000
Mother's weekly work hours	734	39.542	18.985	4.000	120.000
Reading/homework time w/ child (hrs)	3,788	0.970	2.094	0.000	24.000
Total time with child (hrs)	3,762	2.610	3.072	0.000	37.000
Provides care for children	8,706	0.442	0.497	0.000	1.000
Household size	13,746	5.860	2.334	2.000	19.000
Log per capita consumption	13,718	3.916	0.830	-1.253	6.827

Source: Ghana Socioeconomic Panel Survey (GSPS), Waves 1–3.

Sample restricted to mother–child pairs with non-missing maternal depression (K10)

and at least one child cognitive test score.

Table 2: Summary Statistics by Maternal Depression Status

	Not Depressed mean	Depressed mean	Difference b	t
Child age (years)	10.487	10.446	0.041	(0.64)
Child is female	0.476	0.470	0.006	(0.67)
Raven's score	2.158	2.148	0.010	(0.45)
Digit span forward	0.000	0.000	0.000	(.)
Digit span backward	0.000	0.000	0.000	(.)
Math score	1.352	1.207	0.145***	(2.96)
English score	1.336	1.270	0.066	(1.27)
Cognitive index	0.008	-0.001	0.009	(0.53)
Height-for-age z-score	0.247	0.276	-0.030*	(-1.76)
Weight-for-age z-score	0.278	0.230	0.048***	(3.20)
Mother's age	41.195	43.576	-2.380***	(-10.26)
Mother's education (years)	6.502	5.932	0.570***	(3.85)
Mother's weekly work hours	40.905	36.920	3.984***	(2.64)
Reading/homework time (hrs)	0.848	1.188	-0.340***	(-4.20)
Total child time (hrs)	2.396	2.992	-0.595***	(-5.13)
Provides childcare	0.430	0.463	-0.033***	(-3.00)
Household size	5.697	6.083	-0.386***	(-9.41)
Log per capita consumption	3.993	3.811	0.182***	(13.00)

Source: Ghana Socioeconomic Panel Survey (GSPS), Waves 1–3.

Not Depressed: K10 score < 20. Depressed: K10 score $\geq$ 20.

t-statistics of the difference in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Summary Statistics by Survey Wave

| | Wave 1 (2009) | | | Wave 2 (2012) | | | Wave 3 (2018) | | |
	mean	sd	count	mean	sd	count	mean	sd	count
Child age	10.159	(3.756)	5038	10.503	(3.641)	4508	10.808	(3.597)	4200
Child is female	0.487	(0.500)	5038	0.467	(0.499)	4508	0.464	(0.499)	4200
Raven's score	2.179	(1.152)	4333	2.143	(1.215)	3974	2.138	(1.220)	4200
Digit span forward	0.000	(0.000)	4346	0.000	(0.000)	3974	0.000	(0.000)	4200
Digit span backward	0.000	(0.000)	472	0.000	(0.000)	3974	0.000	(0.000)	4200
Math score	0.000	(0.000)	2756	0.000	(0.000)	2919	3.042	(2.911)	4200
English score	0.000	(0.000)	2328	0.000	(0.000)	2919	2.947	(3.046)	4200
Cognitive index	0.004	(0.995)	4333	0.003	(0.996)	3974	0.006	(0.743)	4200
Height-for-age z-score	0.352	(0.793)	4917	0.361	(0.790)	4164	0.039	(1.212)	4007
Weight-for-age z-score	0.284	(0.903)	4920	0.285	(0.913)	4164	0.197	(0.698)	4007
Mother's age	42.691	(12.775)	5038	38.897	(14.229)	4508	45.147	(12.128)	4200
K10 depression score	20.852	(6.178)	5038	17.194	(5.553)	4508	18.089	(6.380)	4200
Mother depressed (K10 $\geq$ 20)	0.559	(0.497)	5038	0.309	(0.462)	4508	0.376	(0.484)	4200
Reading/homework time	.	(.)	0	0.461	(1.006)	2417	1.868	(3.011)	1371
Total child time	.	(.)	0	2.086	(2.138)	2417	3.551	(4.101)	1345
Household size	6.125	(2.406)	5038	5.607	(2.238)	4508	5.813	(2.315)	4200
Log per capita consumption	3.396	(0.641)	5025	4.132	(0.716)	4503	4.309	(0.828)	4190

Source: Ghana Socioeconomic Panel Survey (GSPS).
Standard deviations in parentheses.

Table 4: Distribution of Maternal Depression Severity by Wave

	N	%
1		
0	2212	(44.0)
1	1457	(29.0)
2	912	(18.1)
3	446	(8.9)
2		
0	3117	(69.1)
1	898	(19.9)
2	357	(7.9)
3	136	(3.0)
3		
0	2618	(62.4)
1	857	(20.4)
2	497	(11.8)
3	226	(5.4)

K10 categories: Low (10–19), Mild (20–24), Moderate (25–29), Severe (30–50).

Table 5: Correlation Matrix: Key Variables

	m_k10_score	cog_index	ravens_correct	math_correct	english_correct	haz_approx	m_read_hw_time
K10 Depression	1.000						
Cognitive Index	0.015	1.000					
Raven's	0.011	0.757***	1.000				
Math	0.072***	0.424***	0.034*	1.000			
English	0.090***	0.434***	0.036*	0.901***	1.000		
HAZ	-0.027	0.063***	0.001	-0.015	-0.007	1.000	
Read/HW Time	0.134***	0.016	0.031	0.178***	0.195***	-0.086***	1.000
Total Child Time	0.149***	0.020	0.041**	0.136***	0.157***	-0.080***	0.744***
Ln(PC Consump.)	0.003	0.003	-0.005	0.159***	0.159***	-0.006	0.077***

Source: GSPS analysis sample.

*** p<0.01, ** p<0.05, * p<0.1

$* \ p < 0.10, \ ** \ p < 0.05, \ *** \ p < 0.01$

2 Main Estimation Results

Table 6: Effect of Maternal Depression on Child Cognitive Development

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) EA FE	(6) Child FE
Maternal depression (std. K10)	-0.007 (0.010)	-0.010 (0.010)	-0.003 (0.032)	-0.003 (0.032)	0.006 (0.049)	0.014 (0.019)
Child age		0.055*** (0.003)	0.018* (0.010)	0.017* (0.010)	0.016 (0.011)	0.009 (0.015)
Mother's age			0.000 (0.003)	0.001 (0.003)	0.003 (0.004)	
Mother's education (years)			0.016 (0.011)	0.015 (0.012)	0.032*** (0.012)	
Household size				-0.005 (0.016)	-0.004 (0.021)	0.022* (0.013)
Log per capita consumption				0.084* (0.047)	0.130 (0.082)	
EA/Child FE	No	No	No	No	Yes	Child FE
Wave FE	No	No	No	No	Yes	Yes
Observations	11,981	11,981	1,243	1,242	1,213	6,583
R^2	0.000	0.039	0.005	0.008	0.213	0.482
Adj. R^2	-0.000	0.039	0.001	0.003	0.028	0.059

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Dependent variable: composite cognitive index (average of standardized Raven's, digit span forward/backward, math, and English scores).

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Effect of Maternal Depression on Child Cognitive Development (Revised)

	Full Sample			Educ Sample	Full	Ages 5–10
	(1) OLS	(2) OLS	(3) EA FE	(4) EA FE	(5) Child FE	(6) EA FE
Maternal depression (std. K10)	-0.007	-0.005	0.002	0.006	0.014	0.001
	(0.010)	(0.009)	(0.010)	(0.049)	(0.019)	(0.013)
Child age		0.056***	0.056***	0.016	0.009	0.083***
		(0.003)	(0.003)	(0.011)	(0.015)	(0.007)
Mother's age		-0.001*	-0.002**	0.003		-0.003**
		(0.001)	(0.001)	(0.004)		(0.001)
Mother's education (years)				0.032***		
				(0.012)		
Household size		-0.016***	0.004	-0.004	0.022*	0.011**
		(0.004)	(0.005)	(0.021)	(0.013)	(0.006)
Log per capita consumption		0.011	0.008	0.130		0.013
		(0.013)	(0.015)	(0.082)		(0.020)
EA/Child FE	No	No	Yes	Yes	Child FE	Yes
Wave FE	No	No	Yes	Yes	Yes	Yes
Observations	11,981	11,958	11,958	1,213	6,583	6,560
R^2	0.000	0.042	0.085	0.213	0.482	0.120
Adj. R^2	-0.000	0.041	0.058	0.028	0.059	0.071

Standard errors clustered at the EA level in parentheses.

Columns (1)–(3) and (5)–(6) exclude maternal education to preserve the full sample.

Column (4) includes maternal education, restricting sample to ∼10% of observations.

Column (6) restricts to children aged 5–10.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Additional Specifications: Depression and Child Cognitive Outcomes

	(1) Ravens	(2) Binary	(3) Severity	(4) Age Int.	La
Maternal depression (std. K10)	-0.005 (0.012)			0.006 (0.030)	
Depressed (K10 $\geq$ 20)		0.006 (0.021)			
Mild (K10: 20–24)			0.017 (0.024)		
Moderate (K10: 25–29)			-0.008 (0.031)		
Severe (K10: 30–50)			-0.015 (0.044)		
Depression $\times$ Child age				-0.000 (0.003)	
Lagged depression (std. K10, $t-1$)					((0
Persistent depression ($\geq$ 2 waves)					
Child age	0.015*** (0.003)	0.056*** (0.003)	0.056*** (0.003)	0.056*** (0.003)	0.0 (
Specification	Ravens only	Binary dep	Severity cats	Age interaction	Lagg
Fixed Effects	EA + Wave	EA + Wave	EA + Wave	EA + Wave	EA
Observations	11,958	11,958	11,948	11,958	3
R^2	0.043	0.085	0.085	0.085	(

Standard errors clustered at the EA level in parentheses.

All specifications exclude maternal education to preserve the full sample.

All include EA and wave FE, child age, gender, mother's age, HH size, and log PC consumption.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Heterogeneous Effects by Child Age Group (Full Sample, No Education Control)

	(1) Ages 0–4	(2) Ages 5–9	(3) Ages 10–14	(4) Ages 15–17	(5) Interactions
Depression (std. K10)	-7.352***	-0.007	0.030**	-0.049	-0.091
	(0.000)	(0.014)	(0.015)	(0.031)	(0.163)
Dep × Ages 0–4					0.000
					(.)
Dep × Ages 5–9					0.090
					(0.165)
Dep × Ages 10–14					0.114
					(0.165)
Dep × Ages 15–17					0.039
					(0.166)
Fixed Effects	EA + Wave	EA + Wave	EA + Wave	EA + Wave	EA + Wave
Observations	6	5,463	5,135	1,290	11,958
R^2	1.000	0.139	0.119	0.290	0.087

Standard errors clustered at the EA level in parentheses.

Full sample (no maternal education control). Column (1) has only 6 obs and is uninformative.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Effect of Maternal Depression on Individual Cognitive Tests

	(1) ravens_std	(2) cog_index
Maternal depression (std. K10)	0.006	0.006
	(0.049)	(0.049)
Controls	Yes	Yes
Fixed Effects	EA + Wave	EA + Wave
Observations	1,213	1,213
R^2	0.213	0.213

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

All models include EA and wave fixed effects.

Controls: child age, child gender, mother's age, mother's education, household size, and log per capita consumption.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Effect of Maternal Depression (Binary) on Child Cognitive Outcomes

	(1) Cog Index	(2) Cog Index	(3) Raven's
Mother depressed (K10 $\geq$ 20)	0.023	0.013	0.013
	(0.066)	(0.094)	(0.094)
Child controls	Yes	Yes	Yes
Maternal controls	Yes	Yes	Yes
Household controls	Yes	Yes	Yes
Observations	1,242	1,213	1,213
R^2	0.008	0.213	0.213

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Depressed = K10 score $\geq$ 20 (mild, moderate, or severe depression).

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Effect of Maternal Depression Severity on Child Cognitive Outcomes

	(1) Cog Index	(2) Raven's
Mild depression (K10: 20–24)	0.027	0.027
	(0.107)	(0.107)
Moderate depression (K10: 25–29)	-0.003	-0.003
	(0.127)	(0.127)
Severe depression (K10: 30–50)	-0.110	-0.110
	(0.153)	(0.153)
Controls	Yes	Yes
Observations	1,208	1,208
R^2	0.210	0.210

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Reference category: Low/no depression (K10: 10–19).

All models include EA and wave fixed effects.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Effect of Maternal Depression on Child Anthropometry

	(1) HAZ	(2) WAZ	(3) HAZ	(4) WAZ
Maternal depression (std. K10)	0.030 (0.025)	0.026 (0.028)		
Mother depressed (K10 $\geq$ 20)			0.077 (0.057)	0.087* (0.047)
Controls	Yes	Yes	Yes	Yes
Observations	1,329	1,333	1,329	1,333
R^2	0.738	0.744	0.738	0.745

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

HAZ = height-for-age z-score. WAZ = weight-for-age z-score.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Heterogeneous Effects of Maternal Depression by Child Age Group

	(1) Ages 0–4	(2) Ages 5–9
Maternal depression (std. K10)	0.025	0.069
	(0.081)	(0.095)
Controls	Yes	Yes
Observations	613	413
R^2	0.335	0.300

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Heterogeneous Effects of Maternal Depression by Child Gender

	(1) Girls	(2) Boys	(3) Interaction
Maternal depression (std. K10)	-0.014	-0.051	0.004
	(0.072)	(0.063)	(0.058)
Child is female			0.067
			(0.064)
Depression × Female child			0.003
			(0.063)
Controls	Yes	Yes	Yes
EA FE	No	No	No
Wave FE	No	No	No
Observations	541	566	1,213
R^2	0.328	0.289	0.213

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

$*$ $p < 0.10$, $**$ $p < 0.05$, $***$ $p < 0.01$

3   Mechanism and Channel Analysis

Table 16: Channel 1: Maternal Depression and Parental Time Investment

	(1) Read/HW Hrs
Maternal depression (std. K10)	-0.278**
	(0.110)
Maternal controls	Yes
Household controls	Yes
Observations	1,081
R^2	0.566

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Dependent variables: (1)–(2) hours per day mother spends reading/doing homework and total time with child; (3) binary indicator for providing childcare; (4) days per week of childcare.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Channel 2: Maternal Depression and Financial Investment in Children

	(1) Ln(Food Exp)	(2) Food Share	(3) Ln(PC Food)	(4) Ln(Food Exp)	(5) Food Sl
Maternal depression (std. K10)	-0.039	0.001	-0.031		
	(0.036)	(0.011)	(0.035)		
Maternal controls	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes
Observations	1,362	1,361	1,362	1,362	1,36
R^2	0.639	0.587	0.643	0.638	0.59

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Food expenditure includes own-produced and purchased food (Section 11a).

Food share = food expenditure / total consumption.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 18: Channel 3: Maternal Depression and Child Nutritional Status

	(1) HAZ	(2) WAZ	(3) HAZ (dyn.)	(4) Arm Circ.
Maternal depression (std. K10)	0.030	0.026	-0.038	
	(0.025)	(0.028)	(0.159)	
Lagged HAZ (t-1)				
Child controls	Yes	Yes	Yes	Yes
Maternal controls	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes
Observations	1,329	1,333	1,335	1,329
R^2	0.738	0.744	0.498	0.738

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

HAZ = height-for-age z-score; WAZ = weight-for-age z-score.

Column 3 includes lagged HAZ to estimate dynamic persistence.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 19: Channel 4: Depression, Parental Stimulation Quality, and Child Cognition

	(1) Cog Index
Maternal depression (std. K10)	
Reading/homework time (hrs)	
Total child time (hrs)	
Depression × Read time	
Depression × Total time	
Child controls	Yes
Maternal controls	Yes
Household controls	Yes
Observations	1,329
R^2	0.738

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

A negative coefficient on Depression × Read time implies

depressed mothers generate less cognitive gain per hour of stimulation.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 20: Mediation Analysis: Sequential Decomposition of Depression Effect

	(1) Base
Maternal depression (std. K10)	0.006
	(0.049)
Reading/homework time	
Total child time	
Height-for-age z-score	
Log food expenditure	
Depression $\times$ Read time	
Child controls	Yes
Maternal controls	Yes
Household controls	Yes
Observations	1,213
R^2	0.213

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

This table sequentially adds mediator variables to decompose
the total effect of maternal depression on child cognition.

A reduction in the depression coefficient indicates mediation.

*** p<0.01, ** p<0.05, * p<0.1

$^{*}\ p < 0.10,\ ^{**}\ p < 0.05,\ ^{***}\ p < 0.01$

Table 21: Supplementary Channel: Maternal Depression and Child Health

	(1) Ill (2 wks)	(2) Days Sick	(3) Sought Care	(4) Immun. Rate
Maternal depression (std. K10)	-0.021	0.000	-0.003	0.004
	(0.015)	(.)	(0.007)	(0.014)
Child controls	Yes	Yes	Yes	Yes
Maternal controls	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes
Observations	1,365	2	1,259	1,365
R^2	0.280	.	0.203	0.516

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Column 3 conditional on child being ill in past 2 weeks.

Immunization rate = vaccines received / 7 recommended vaccines.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4 Appendix: Robustness Checks

Table 22: Robustness: Alternative Depression Measures

	(1) Std. K10	(2) Raw K10	(3) Binary	(4) Categories
K10 score (standardized)	0.006			
	(0.049)			
0.c_female	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
K10 score (raw, 10–50)		0.001		
		(0.008)		
Depressed (K10 $\geq$ 20)			0.013	
			(0.094)	
Mild (K10: 20–24)				0.027
				(0.107)
Moderate (K10: 25–29)				-0.003
				(0.127)
Severe (K10: 30–50)				-0.110
				(0.153)
_cons	-0.858**	-0.876**	-0.861**	-0.791**
	(0.389)	(0.426)	(0.390)	(0.391)
Controls	Yes	Yes	Yes	Yes
Observations	1,213	1,213	1,213	1,208
R^2	0.213	0.213	0.213	0.210

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Dependent variable: composite cognitive index.

All models include EA and wave fixed effects.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 23: Robustness: Alternative Fixed Effects Specifications

	(1) Pooled OLS	(2) EA FE	(3) District FE	(4) Region×	(5) HH FE	(6) Child FE
Maternal depression (std. K10)	-0.003	0.006	0.010	0.006	0.011	0.017
	(0.032)	(0.049)	(0.035)	(0.049)	(0.015)	(0.018)
c_age	0.017*	0.016	0.016	0.016	0.056***	0.050***
	(0.010)	(0.011)	(0.010)	(0.011)	(0.003)	(0.005)
0.c_female	0.000	0.000	0.000	0.000	0.000	
	(.)	(.)	(.)	(.)	(.)	
1.c_female	-0.000	0.068	0.028	0.068	0.054**	
	(0.056)	(0.064)	(0.060)	(0.064)	(0.021)	
m_age_harmonized	0.001	0.003	0.003	0.003		
	(0.003)	(0.004)	(0.003)	(0.004)		
m_mother_educ_years	0.015	0.032***	0.022**	0.032***		
	(0.012)	(0.012)	(0.011)	(0.012)		
hh_size	-0.005	-0.004	-0.008	-0.004	0.007	0.025*
	(0.016)	(0.021)	(0.017)	(0.021)	(0.010)	(0.013)
ln_pc_consumption	0.084*	0.130	0.100	0.130		
	(0.047)	(0.082)	(0.063)	(0.082)		
1.wave	0.000					
	(.)					
_cons	-0.458*	-0.858**	-0.660**	-0.858**	-0.627***	-0.567***
	(0.276)	(0.389)	(0.325)	(0.391)	(0.067)	(0.092)
Observations	1,242	1,213	1,237	1,213	11,319	6,583
R^2	0.008	0.213	0.112	0.213	0.286	0.478

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Dependent variable: composite cognitive index.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 24: Robustness: Subsample Analyses

	(1) Urban	(2) Rural	(3) Poor	(4) Non-Poor	(5) No Educ	(6) Some Educ
Maternal depression (std. K10)	0.095	-0.054	-0.084	0.069	0.000	-0.010
	(0.081)	(0.065)	(0.115)	(0.062)	(.)	(0.050)
c_age	0.009	0.020	0.033**	-0.002	0.113	0.015
	(0.018)	(0.013)	(0.016)	(0.015)	(0.196)	(0.011)
0.c_female	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)
1.c_female	0.100	0.058	0.106	0.064	1.159	0.069
	(0.112)	(0.081)	(0.088)	(0.096)	(0.626)	(0.063)
m_age_harmonized	0.002	0.003	-0.010	0.008		
	(0.007)	(0.005)	(0.007)	(0.005)		
m_mother_educ_years	0.031	0.030*	-0.026	0.047***		
	(0.022)	(0.016)	(0.025)	(0.017)		
hh_size	-0.035	0.003	-0.075***	0.038	0.000	-0.010
	(0.036)	(0.027)	(0.028)	(0.030)	(.)	(0.022)
ln_pc_consumption	-0.029	0.218*	-0.216	0.383***	0.000	0.106
	(0.111)	(0.113)	(0.153)	(0.141)	(.)	(0.086)
_cons	-0.089	-1.137**	1.282**	-2.229***	-2.055	-0.401
	(0.631)	(0.514)	(0.639)	(0.613)	(2.107)	(0.387)
Observations	453	760	538	626	11	1,200
R^2	0.228	0.211	0.309	0.264	0.498	0.215

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Poor/Non-poor split at wave-specific median log per capita consumption.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 25: Robustness: Value-Added and Lagged Models

	(1) VA Model
Δ Depression	0.012
	(0.019)
c_age	-0.005
	(0.010)
0.c_female	0.000
	(.)
1.c_female	-0.032
	(0.038)
2.wave	0.000
	(.)
3.wave	0.247***
	(0.056)
_cons	0.158
	(0.124)
Observations	3,627
R^2	0.009

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Column 4 estimated in first differences (Δ model).

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 26: Robustness: Placebo and Falsification Tests

	(1) Dept+1	(2) Cogt+1	(3) Height (15–17)	(4) Balanced
Cognitive index	0.025			
	(0.030)			
0.c_female	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Maternal depression (std. K10)		0.040	-1.336	0.084
		(0.058)	(2.345)	(0.064)
_cons	0.751	-0.337	56.520	-1.022*
	(0.549)	(0.605)	(51.472)	(0.563)
Controls	Yes	Yes	Yes	Yes
Observations	599	540	74	599
R^2	0.592	0.328	0.630	0.319

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Col 1: reverse causality test (current cognition $\rightarrow$ future depression).

Col 2: temporal precedence (current depression $\rightarrow$ future cognition).

Col 3: placebo outcome (adolescent height, largely determined before survey).

Col 4: restricted to children observed in ≥ 2 waves.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 27: Robustness: Non-Linear Effects of Maternal Depression

	(1) Quadratic	(2) Terciles	(3) Quintiles	(4) Spline
Depression (std.)	0.028			
	(0.059)			
Depression^2	-0.025			
	(0.026)			
0.c_female	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Tercile 2		0.040		
		(0.108)		
Tercile 3 (most depressed)		0.061		
		(0.127)		
Quintile 2			-0.072	
			(0.145)	
Quintile 3			-0.018	
			(0.148)	
Quintile 4			0.070	
			(0.170)	
Quintile 5 (most depressed)			-0.032	
			(0.163)	
K10 (below 20)				0.009
				(0.018)
K10 (above 20)				-0.005
				(0.011)
_cons	-0.825**	-0.891**	-0.832**	-0.899**
	(0.387)	(0.397)	(0.415)	(0.407)
Controls	Yes	Yes	Yes	Yes
Observations	1,213	1,213	1,213	1,213
R^2	0.214	0.213	0.214	0.213

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Reference: Tercile 1 / Quintile 1 (least depressed).

Spline model allows different slopes below and above K10 = 20.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 28: Robustness: Attrition-Corrected Estimates (Inverse Probability Weighting)

	(1) IPW-Weighted	(2) Unweighted
Maternal depression (std. K10)	0.008	0.006
	(0.049)	(0.049)
c_age	0.016	0.016
	(0.010)	(0.011)
0.c_female	0.000	0.000
	(.)	(.)
1.c_female	0.066	0.068
	(0.064)	(0.064)
m_age_harmonized	0.003	0.003
	(0.004)	(0.004)
m_mother_educ_years	0.033***	0.032***
	(0.012)	(0.012)
hh_size	-0.003	-0.004
	(0.021)	(0.021)
ln_pc_consumption	0.131	0.130
	(0.082)	(0.082)
_cons	-0.871**	-0.858**
	(0.388)	(0.389)
Observations	1,213	1,213
R^2	0.214	0.213

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

IPW weights estimated from logit model predicting panel continuation
using depression, age, education, household size, consumption, and wave.
Weights trimmed at 1st and 99th percentiles.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 29: Robustness: Alternative Cognitive Outcome Measures

	(1) Raven's	(2) Verbal
Maternal depression (std. K10)	-0.001	0.006
	(0.012)	(0.049)
c_age	0.003	0.016
	(0.003)	(0.011)
0.c_female	0.000	0.000
	(.)	(.)
1.c_female	0.032**	0.068
	(0.013)	(0.064)
m_age_harmonized	0.000	0.003
	(0.001)	(0.004)
m_mother_educ_years	0.005*	0.032***
	(0.003)	(0.012)
hh_size	-0.008**	-0.004
	(0.004)	(0.021)
ln_pc_consumption	0.015	0.130
	(0.020)	(0.082)
_cons	-1.037***	-0.858**
	(0.109)	(0.389)
Observations	451	1,213
R^2	0.286	0.213

Standard errors in parentheses

Standard errors clustered at the EA level in parentheses.

Raven's = non-verbal fluid intelligence. Verbal = avg(math, English).

Exec. Function = digit span backward. NEPSY = Wave 3 only.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 30: Robustness: Alternative Standard Error Clustering

	(1) EA Cluster	(2) HH Cluster	(3) District	(4) Two-Way
Maternal depression (std. K10)	0.006	0.006	0.006	0.006
	(0.049)	(0.043)	(0.046)	(.)
c_age	0.016	0.016	0.016	0.016
	(0.011)	(0.011)	(0.011)	(.)
0.c_female	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
1.c_female	0.068	0.068	0.068	0.068
	(0.064)	(0.062)	(0.074)	(.)
m_age_harmonized	0.003	0.003	0.003	0.003
	(0.004)	(0.004)	(0.004)	(.)
m_mother_educ_years	0.032***	0.032**	0.032***	0.032
	(0.012)	(0.013)	(0.011)	(.)
hh_size	-0.004	-0.004	-0.004	-0.004
	(0.021)	(0.020)	(0.022)	(.)
ln_pc_consumption	0.130	0.130*	0.130	0.130
	(0.082)	(0.071)	(0.084)	(.)
_cons	-0.858**	-0.858**	-0.858**	-0.858
	(0.389)	(0.349)	(0.390)	(.)
Observations	1,213	1,213	1,213	1,213
R^2	0.213	0.213	0.213	0.213

Standard errors in parentheses

All models include EA and wave fixed effects with full controls.

Point estimates are identical; only standard errors differ.

*** p<0.01, ** p<0.05, * p<0.1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$