

Appendix (for on-line publication only)

Figure A.1. Birth Order Effects in Cognitive and Non-Cognitive Indices

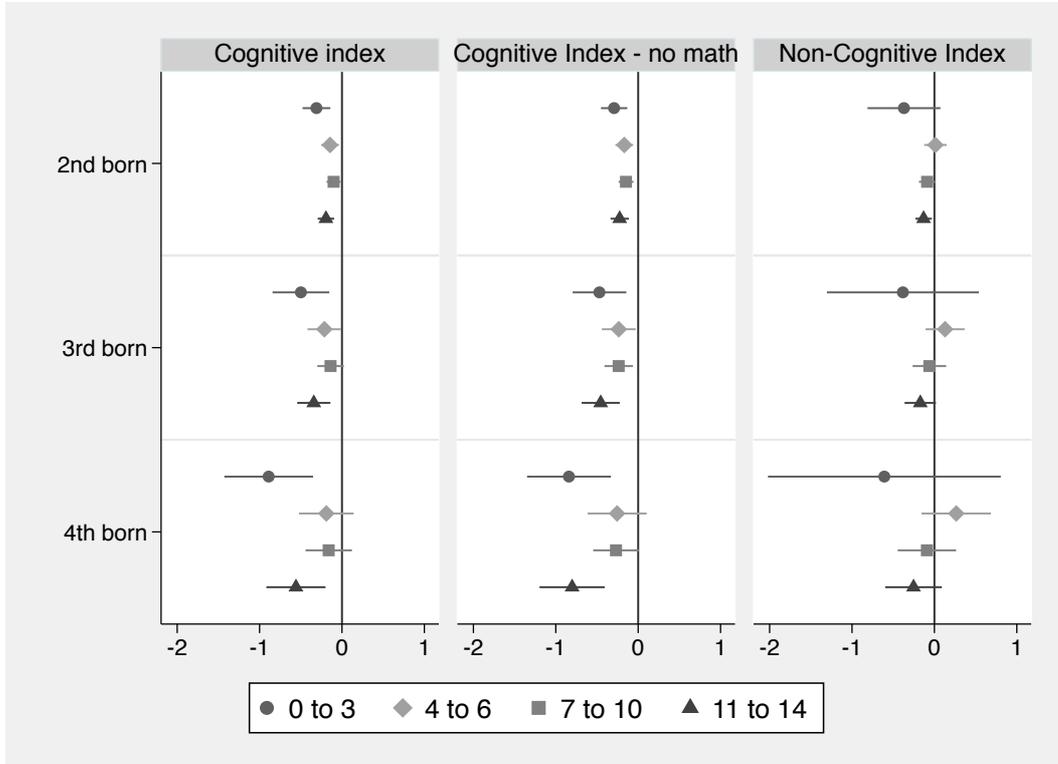


Figure A.2. Birth Order Effects in HOME Scores

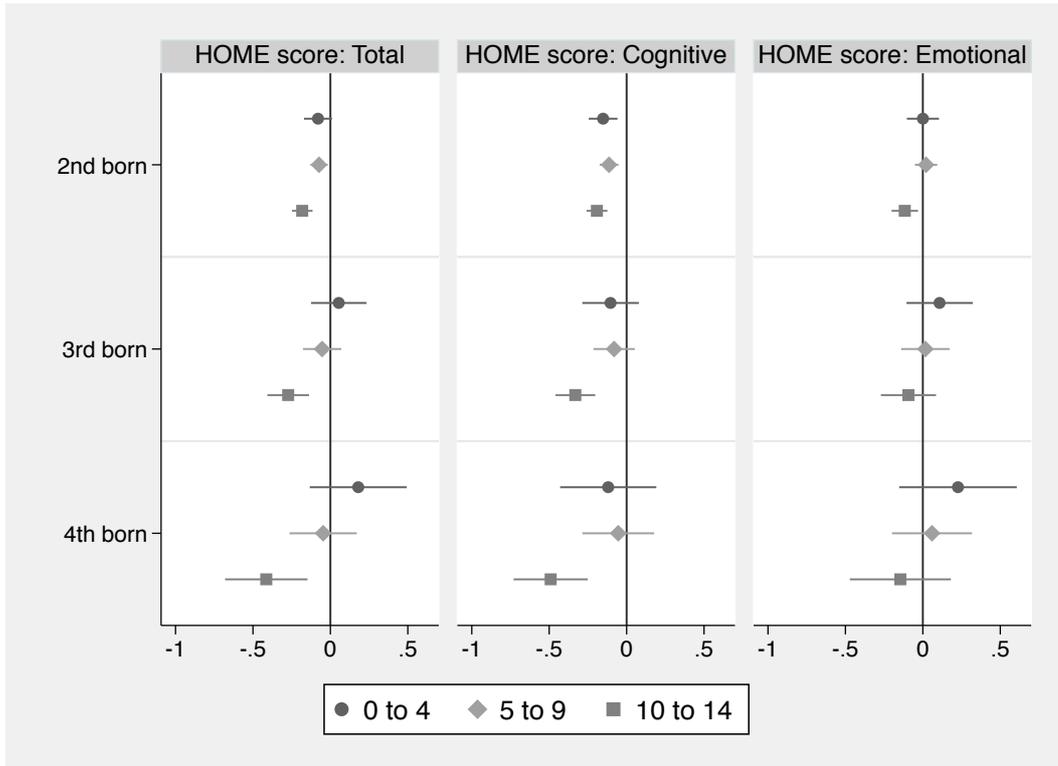


Table A.1 Birth Order Differences in Difficult Temperament and Behavior Problem Index

Difficult Temperament Index							
Family size	Up to 4		Up to 4 children		2 children	3 children	4 children
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2 nd Born	-0.161*** (0.055)	-0.170* (0.090)	-0.173* (0.089)	-0.333 (0.203)	-0.555 (0.355)	0.284 (0.284)	-0.639* (0.346)
3 rd Born	-0.205** (0.093)	-0.005 (0.175)	-0.011 (0.173)	-0.344 (0.424)		1.023* (0.576)	-1.158* (0.697)
4 th Born	-0.369** (0.162)	-0.024 (0.308)	-0.044 (0.308)	-0.547 (0.649)			-1.624 (1.077)
Children	2471	2471	2471	2471	1142	890	439
Behavioral Problem Index							
Family size	Up to 4		Up to 4 children		2 children	3 children	4 children
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2 nd Born	0.007 (0.039)	-0.005 (0.041)	-0.010 (0.040)	-0.013 (0.040)	0.027 (0.069)	-0.111* (0.058)	-0.056 (0.100)
3 rd Born	0.129 (0.081)	0.101 (0.082)	0.095 (0.082)	0.079 (0.081)		0.035 (0.114)	0.022 (0.137)
4 th Born	0.271* (0.151)	0.116 (0.146)	0.109 (0.146)	0.085 (0.142)			0.014 (0.188)
N	4628	4628	4628	4628	2025	1764	839
Self-Perception Profile for Children – General							
Family size	Up to 4		Up to 4 children		2 children	3 children	4 children
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2 nd Born	-0.088* (0.046)	-0.140*** (0.053)	-0.137** (0.053)	-0.155*** (0.053)	-0.172* (0.096)	-0.144* (0.079)	-0.080 (0.110)
3 rd Born	-0.069 (0.081)	-0.161 (0.100)	-0.157 (0.100)	-0.214** (0.102)		-0.131 (0.134)	-0.067 (0.172)
4 th Born	-0.002 (0.156)	-0.079 (0.188)	-0.081 (0.188)	-0.174 (0.195)			-0.252 (0.293)
Children	3794	3794	3794	3794	1629	1461	704
Self- Perception Profile for Children - Scholastic							
Family size	Up to 4		Up to 4 children		2 children	3 children	4 children
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2 nd Born	-0.213*** (0.052)	-0.289*** (0.063)	-0.286*** (0.064)	-0.283*** (0.064)	-0.336*** (0.104)	-0.343*** (0.094)	-0.065 (0.120)
3 rd Born	-0.282*** (0.087)	-0.486*** (0.115)	-0.485*** (0.115)	-0.471*** (0.115)		-0.430** (0.168)	-0.473*** (0.180)
4 th Born	-0.218 (0.156)	-0.385* (0.200)	-0.388* (0.199)	-0.365* (0.201)			-0.668** (0.277)
Children	3794	3794	3794	3794	1629	1461	704
Mother FE	N	Y	Y	Y	Y	Y	Y
Maternal controls	N	N	Y	Y	Y	Y	Y
Family controls	N	N	N	Y	Y	Y	Y

Notes: All regressions are weighted to account for oversampling of minorities and include mother fixed effects. Standard errors clustered at the family level are in parentheses. * denotes significance at 10 percent, ** at 5 percent, *** at 1 percent. Sample is restricted to children with complete prenatal input information and from non-twin families. All assessments are age-standardized scores that have been renormalized to have a mean of 0 and a standard deviation of 1. All specifications control for regional dummies, maternal age and its quadratic, gender of the child, age difference with oldest and precedent sibling, age of the child at assessment, and a series of cohort dummies. Mother controls include average per capita lifetime family income and employment status year after birth (employed, unemployed, out of labor force, or in active force) and highest grade completed at the child's birth. Family controls include presence of father figure and family size measured at the time of the assessment.

Table A.2 Birth Order Differences in Difficult Temperament and Behavior Problem Index

Ages	DTI		Behavioral Problem Index	
	0 to 3	4 to 6	7 to 10	11 to 14
	(1)	(2)	(3)	(4)
2 nd Born	-0.333 (0.203)	0.008 (0.063)	-0.065 (0.050)	-0.023 (0.054)
3 rd Born	-0.344 (0.424)	0.112 (0.109)	-0.007 (0.098)	0.054 (0.113)
4 th Born	-0.547 (0.649)	0.236 (0.193)	-0.033 (0.171)	-0.036 (0.205)
Children	2471	3858	4208	3824
Ages	SPPC - General		SPPC - Scholastic	
	8 to 10	11 to 14	8 to 10	11 to 14
	(1)	(2)	(3)	(4)
2 nd Born	-0.459*** (0.124)	-0.125** (0.061)	-0.349*** (0.130)	-0.301*** (0.071)
3 rd Born	-0.717** (0.280)	-0.138 (0.123)	-0.253 (0.277)	-0.517*** (0.133)
4 th Born	-0.886* (0.458)	-0.091 (0.229)	-0.350 (0.501)	-0.340 (0.231)
Children	2203	3516	2203	3516
Mother FE	Y	Y	Y	Y
Maternal controls	Y	Y	Y	Y
Family controls	Y	Y	Y	Y

Notes: All regressions are weighted to account for oversampling of minorities and include mother fixed effects. Standard errors clustered at the family level are in parentheses. * denotes significance at 10 percent, ** at 5 percent, *** at 1 percent. Sample is restricted to children with complete prenatal input information and from non-twin families. All assessments are age-standardized scores that have been renormalized to have a mean of 0 and a standard deviation of 1. All specifications control for maternal age and its quadratic, gender of the child, age difference with oldest and precedent sibling, age of the child at assessment, and regional and cohort dummies. Mother controls include average per capita lifetime family income and employment status year after birth (employed, unemployed, out of labor force, or in active force) and highest grade completed at the child's birth. Family controls include presence of father figure and family size measured at the time of the assessment.

Table A.3 Birth Outcomes

	Gestational length (weeks)				Born premature (<37 weeks)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2 nd Born	-0.036 (0.100)	-0.017 (0.125)	-0.011 (0.124)	-0.026 (0.125)	-0.012 (0.021)	-0.022 (0.025)	-0.022 (0.025)	-0.020 (0.026)
3 rd Born	0.114 (0.177)	-0.040 (0.224)	-0.036 (0.222)	-0.062 (0.230)	-0.021 (0.037)	-0.002 (0.044)	-0.001 (0.044)	0.005 (0.046)
4 th Born	-0.059 (0.343)	-0.221 (0.429)	-0.217 (0.426)	-0.257 (0.443)	0.043 (0.070)	0.067 (0.082)	0.066 (0.081)	0.073 (0.085)
	Birth weight (oz)				Low birth weight (<5.5 lbs)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2 nd Born	3.778*** (0.974)	4.269*** (0.892)	4.250*** (0.901)	4.296*** (0.915)	0.003 (0.012)	-0.015 (0.012)	-0.015 (0.012)	-0.012 (0.012)
3 rd Born	4.976** (1.991)	4.396** (1.907)	4.375** (1.902)	4.481** (1.918)	-0.006 (0.022)	-0.025 (0.024)	-0.025 (0.024)	-0.016 (0.025)
4 th Born	4.070 (3.336)	3.015 (3.067)	2.839 (3.053)	2.959 (3.121)	-0.003 (0.035)	-0.047 (0.042)	-0.045 (0.041)	-0.028 (0.044)
	High birth weight (>8.75 lbs)				Length at birth (inches)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2 nd Born	0.043** (0.017)	0.037* (0.020)	0.037* (0.020)	0.042** (0.021)	0.194*** (0.072)	0.134* (0.081)	0.147* (0.082)	0.169** (0.082)
3 rd Born	0.043 (0.031)	0.026 (0.042)	0.027 (0.041)	0.042 (0.042)	0.291** (0.134)	0.143 (0.156)	0.158 (0.157)	0.202 (0.160)
4 th Born	0.032 (0.058)	0.010 (0.066)	0.008 (0.065)	0.030 (0.065)	0.299 (0.230)	0.036 (0.282)	0.036 (0.283)	0.122 (0.287)
Children	4850	4850	4850	4850	4850	4850	4850	4850
Mother FE	N	Y	Y	Y	N	Y	Y	Y
Maternal controls	N	N	Y	Y	N	N	Y	Y
Family controls	N	N	N	Y	N	N	N	Y

Notes: All regressions are weighted to account for oversampling of minorities and include mother fixed effects. Standard errors clustered at the family level are in parentheses. * denotes significance at 10 percent, ** at 5 percent, *** at 1 percent. Sample is restricted to children with complete prenatal input information and from non-twin families. All assessments are age-standardized scores that have been renormalized to have a mean of 0 and a standard deviation of 1. All specifications control for regional dummies, maternal age and its quadratic, gender of the child, age

difference with oldest and precedent sibling, age of the child at assessment, and a series of cohort dummies. Mother controls include average per capita lifetime family income and employment status year after birth (employed, unemployed, out of labor force, or in active force) and highest grade completed at the child's birth. Family controls include presence of father figure and family size measured at the time of the assessment.

Table A.4 Birth Outcomes in the 5-percent Random Sample of the National Vital Statistics

	Gestational length (weeks)	Born premature	Birth Weight (grams)	Low Birth Weight (<2,500g)	Overweight at Birth	5-minute Apgar Score (0-10)
	(1)	(2)	(3)	(4)	(5)	(6)
2 nd Born	0.007 (0.005)	-0.016*** (0.001)	122.493*** (1.090)	-0.027*** (0.000)	0.038*** (0.001)	0.079*** (0.002)
3 rd Born	0.009 (0.006)	-0.013*** (0.001)	148.077*** (1.423)	-0.030*** (0.001)	0.051*** (0.001)	0.095*** (0.002)
4 th Born	0.004 (0.009)	-0.005*** (0.001)	162.636*** (2.192)	-0.030*** (0.001)	0.061*** (0.001)	0.102*** (0.003)
5 th Born	0.024 (0.016)	-0.004 (0.002)	179.267*** (3.670)	-0.029*** (0.001)	0.075*** (0.002)	0.104*** (0.005)
6 th Born	0.062** (0.026)	-0.005 (0.004)	197.946*** (5.975)	-0.027*** (0.002)	0.089*** (0.004)	0.101*** (0.008)
7 th Born	0.151*** (0.039)	-0.003 (0.006)	242.206*** (8.752)	-0.035*** (0.003)	0.108*** (0.005)	0.120*** (0.012)
8 th Born	0.278*** (0.052)	-0.029*** (0.008)	274.696*** (12.600)	-0.046*** (0.005)	0.119*** (0.008)	0.114*** (0.019)
9 th Born	0.117 (0.084)	-0.017 (0.012)	284.213*** (19.492)	-0.036*** (0.007)	0.119*** (0.011)	0.090*** (0.029)
10 th Born	0.008 (0.034)	-0.009* (0.005)	131.173*** (8.089)	-0.021*** (0.003)	0.061*** (0.005)	0.083*** (0.013)
N	1,422,544	1,422,544	1,423,666	1,423,666	1,423,666	1,297,506
F-stat	187.255	137.470	828.359	154.475	315.736	154.591
R ²	0.030	0.019	0.104	0.029	0.041	0.025

Notes: Sample is restricted to children who were not part of multiple births, to mothers between the ages 14 to 45 and fathers between ages 14 to 60 at the time of the child's birth. All regressions control for mother and father's race, education, marital status, age at birth, and maternal weight gain during pregnancy and its squared, type of delivery (vaginal or caesarean), population size in the metropolitan area, and birth year, month, state, and resident status fixed effects. * denotes significance at 10 percent, ** at 5 percent, *** at 1 percent.

Table A.5 Maternal Behavior during Pregnancy in the 5-percent Random Sample of the National Vital Statistics

	Smoked during pregnancy	Number of Cigarettes (per day)	Number of Alcoholic Drinks (per week)	Used Alcohol during pregnancy	Month of 1 st Prenatal Visit	Belated Prenatal Visit (>4 th month)
	(1)	(2)	(3)	(4)	(5)	(6)
2 nd Born	0.024*** (0.001)	0.363*** (0.009)	-0.004*** (0.001)	-0.000 (0.000)	0.115*** (0.002)	0.030*** (0.001)
3 rd Born	0.041*** (0.001)	0.662*** (0.013)	0.003* (0.002)	0.001*** (0.000)	0.273*** (0.003)	0.066*** (0.001)
4 th Born	0.051*** (0.001)	0.880*** (0.023)	0.009*** (0.003)	0.002*** (0.001)	0.447*** (0.006)	0.112*** (0.002)
5 th Born	0.056*** (0.002)	0.901*** (0.040)	0.008 (0.006)	0.001 (0.001)	0.627*** (0.010)	0.158*** (0.003)
6 th Born	0.047*** (0.004)	0.895*** (0.067)	0.036** (0.017)	0.004** (0.002)	0.798*** (0.018)	0.198*** (0.004)
7 th Born	0.015*** (0.005)	0.385*** (0.093)	0.019 (0.013)	0.003 (0.002)	0.990*** (0.029)	0.255*** (0.007)
8 th Born	0.001 (0.007)	0.255* (0.133)	0.061** (0.028)	0.004 (0.004)	1.110*** (0.042)	0.281*** (0.010)
9 th Born	-0.020* (0.011)	-0.149 (0.190)	0.001 (0.015)	0.005 (0.005)	1.304*** (0.061)	0.342*** (0.015)
10 th Born	-0.007* (0.004)	-0.076 (0.060)	0.000 (0.007)	0.002 (0.002)	0.524*** (0.026)	0.138*** (0.006)
N	1,330,746	1,320,711	1,382,631	1,388,698	1,405,740	1,405,740
F-stat	850.349	565.297	16.563	62.795	781.536	660.153
R ²	0.116	0.100	0.003	0.014	0.110	0.095

Notes: Sample is restricted to children who were not part of multiple births, to mothers between the ages 14 to 45 and fathers between ages 14 to 60 at the time of the child's birth. All regressions control for mother and father's race, education, marital status, age at birth, and maternal weight gain during pregnancy and its squared, type of delivery (vaginal or caesarean), population size in the metropolitan area, and birth year, month, state, and resident status fixed effects. * denotes significance at 10 percent, ** at 5 percent, *** at 1 percent.