Quality Time: The Effect of Birth Order

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Recent Research have found large birth order effects:
- Black, Devereux, and Salvanes (QJE 2005)
- Conley and Glauber (NBER 2005)

Purpose of this paper:

Examine one potential mechanism: quality time with one's parent
Simulate the aggregate difference by birth order over an individual's childhood
Look at other determinants of quality time.

Birth Order and Educational Outcomes

This research is intertwined with the family size research.

Black, Devereux, and Salvanes (QJE 2005)
  -Census data from Norway
  -outcomes: educational attainment, earnings, and teenage parent
  -uses birth of twins IV
  -large negative effect of birth order.
  - once you control for birth order, the effect of family size disappears

Conley and Glauber (NBER 2005)
  -1990 PUMS
  -outcomes: attend private school and held back a grade
  -uses gender-mix IV
  -negative effect of family size, but no effect on first born, large effect on later-born children

Hanushek (JPE 1992): U-shaped relationship
Behrman and Taubman (1986): later born children have lower educational attainment
Hauser and Sewell (1985): no evidence of birth order effects

American Time Use Survey

Started in January 2003.

First time that a federal statistical agency has collected time use data.

One individual (age 15+) in a household sampled from the outgoing rotations of the CPS.
    -21,000 individuals in 2003, 14,000 in 2004

The person is interviewed the day after about what he did for 24 hours.
    -for each minute of the day: what, where, and with whom.
    -458 categories.

I limit to households with children under age 18
    -use the child as the unit of analysis
    -look at "quality" time.
        -child is primary activity: reading, playing, talking, etc.
        -activities with high level of interaction: eating together.

Focus on children ages 4-13.
                -6-11 for three-child families, 8-11 for four-child families.

Time use of parent by number of children

	Father Number of children in household				Mother Number of children in household			
Weekday	1	2	3	4	1	2	3	4
total	193	195	208	195	251	340	409	456
quality	64	69	77	86	77	128	134	150
reading	1.7	2.2	0.9	1.2	3.3	4.2	3.5	2.7
playing	10.6	10.3	10.5	10.7	7.7	14.9	11.9	10.8
eating	32	31	31	33	29	36	35	38
television	47	37	41	40	44	45	57	50
Weekend								
total	359	410	442	485	407	485	519	520
quality	73	103	103	108	89	126	131	133
reading	1.1	2.4	0.9	2.0	4.0	3.8	2.9	3.3
playing	10.3	17.7	19.8	14.9	10.4	16.4	15.8	20.7
eating	55	63	57	54	52	58	56	56
television	91	77	90	92	64	74	81	69
N	758	1,746	761	189	1,278	2,448	1,058	245

**Average amount of quality time child spends with parent
(by age, family size, birth order, and parent gender)**

Father

Family size	Birth Order	Child's age				
		4-5	6-7	8-9	10-11	12-13
1 child	1st	98.9	70.5	62.6	57.2	48.2
2 children	1st	125.8	103.8	81.5	74.8	54.3
	2nd	91.2	72.5	63.7	54.9	45.1
3 children	1st		124.7	87.2	75.9	64.6
	2nd		87.2	80.0	72.6	48.9
	3rd		75.4	58.9	46.0	63.3
4 children	1st			123.6	105.9	
	2nd			132.2	82.2	
	3rd			62.7	64.5	
	4th			59.9	36.2	

Mother

Family size	Birth Order	Age				
		4-5	6-7	8-9	10-11	12-13
1 child	1st	124.0	96.3	80.6	65.9	54.3
2 children	1st	188.3	148.0	121.3	94.8	77.5
	2nd	144.1	108.4	89.5	74.8	56.2
3 children	1st		183.4	128.5	103.4	82
	2nd		127.9	104.8	92.4	64.2
	3rd		106.3	76.5	67.0	69.9
4 children	1st			132.5	108.0	
	2nd			118.3	102.2	
	3rd			112.9	71.8	
	4th			83.9	50.6	

Identification Strategy

Control for number of children, child's age, and observable parent characteristics and compare time spent by the child's birth order.

Ex.   Family #1: 8 and 5
         Family #2: 11 and 8

(1)   Run separately by family size. (Ex. 3-child family)

$$T = \alpha + \delta'Z + \beta_2 * 2^{nd}\ child + \beta_3 * 3^{rd}\ child + \varepsilon$$

(2)   Pool the different family size groups together and interact family size and birth order.

$$T = \alpha + \delta \cdot Z + \beta \cdot (family\ size) \cdot (birth\ order) + \varepsilon$$

Regression coefficients separately by family size
Dependent variable is quality time child receives with parent

Father

	2 children		3 children		4 children	
	Coef	SE	Coef	SE	Coef	SE
2nd child	**-22.39**	*3.06*	**-17.17**	*4.72*	-1.42	*12.40*
3rd child			**-31.76**	*5.17*	**-46.44**	*11.86*
4th child					**-57.60**	*11.89*
N	2,600		1,342		279	

Mother

	2 children		3 children		4 children	
	Coef	SE	Coef	SE	Coef	SE
2nd child	**-32.67**	*3.02*	**-23.69**	*4.51*	-10.02	*11.19*
3rd child			**-42.78**	*5.12*	**-23.93**	*12.22*
4th child					**-43.65**	*13.76*
N	3,646		1,893		373	

Includes set of family and child characteristics such as parental education, marital status, and work status as well as child's age and gender.

Regression with all of the families pooled together

	Father		Mother	
	Coef.	**SE**	**Coef.**	**SE**
2 child 1st	**16.00**	*3.61*	**36.82**	*3.28*
2 child 2nd	**-6.70**	*3.40*	5.48	*3.07*
3 child 1st	**25.47**	*5.11*	**46.77**	*4.61*
3 child 2nd	8.87	*4.57*	**19.52**	*4.16*
3 child 3rd	-5.62	*4.82*	-1.98	*4.32*
4 child 1st	**58.89**	*11.87*	**46.79**	*9.90*
4 child 2nd	**53.82**	*10.46*	**35.94**	*8.62*
4 child 3rd	5.41	*8.87*	14.57	*8.76*
4 child 4th	-15.06	*10.27*	-10.22	*11.40*
girl	**-6.47**	*2.09*	**3.88**	*1.92*
full	**-24.87**	*4.39*	**-30.43**	*2.32*
part	**-13.35**	*6.10*	**-15.15**	*2.59*
married	7.16	*4.39*	3.40	*3.75*
partner	-6.16	*8.79*	**-13.02**	*6.22*
college	**28.90**	*4.23*	**14.38**	*3.86*
hs grad	**13.97**	*3.78*	4.75	*3.39*
N	4,979		7,190	

Birth Order Differences in quality time child spends with parent

Size	Compare	Father			Mother		
		Tobit	**Mean**	**Median**	**Tobit**	**Mean**	**Median**
2 child	1st vs 2nd	**30.41**	**25.71**	**22.24**	**36.09**	**32.39**	**28.44**
3 child	1st vs 2nd	**20.90**	**15.73**	**17.34**	**30.08**	**27.29**	**20.97**
	1st vs 3rd	**40.41**	**31.60**	**30.35**	**55.06**	**49.69**	**41.80**
	2nd vs 3rd	**19.51**	**15.87**	**13.01**	**24.98**	**22.40**	**20.83**
4 child	1st vs 2nd	5.55	5.92	20.68	11.66	11.75	6.29
	1st vs 3rd	**63.36**	**57.82**	**53.85**	**35.38**	**31.70**	23.06
	1st vs 4th	**92.08**	**75.99**	**66.07**	**64.68**	**55.36**	**44.68**
	2nd vs 3rd	**57.81**	**51.90**	**33.16**	23.72	**19.95**	16.78
	2nd vs 4th	**86.53**	**70.07**	**45.39**	**53.02**	**43.60**	**38.39**
	3rd vs 4th	28.72	**18.16**	12.22	29.30	**23.65**	21.61

Family Fixed Effects Model

$$T_i - \bar{T}_a = \gamma \cdot \Gamma + \beta \cdot 2^{nd} child + \delta \cdot Z + \varepsilon_i$$

Father

	2 children		3 children		4 children	
	Coef	SE	Coef	SE	Coef	SE
2nd child	**-28.87**	*1.42*	**-21.60**	*2.65*	**-25.00**	*7.48*
3rd child			**-53.01**	*2.66*	**-36.74**	*7.37*
4th child					**-73.01**	*7.48*
N	2,212		1,318		548	

Mother

	2 children		3 children		4 children	
	Coef	SE	Coef	SE	Coef	SE
2nd child	**-19.91**	*1.42*	**-11.23**	*2.32*	-7.41	*5.21*
3rd child			**-30.18**	*2.32*	**-20.68**	*5.10*
4th child					**-39.29**	*5.24*
N	3,433		2,032		634	

Birth order differences in quality time by sibling gender composition

Gender Composition	All Fathers	Married Fathers	All Mothers	Married Mothers	% of sample
Boy-boy	33.21	31.36	25.77	25.75	24.4%
Boy-girl	39.14	37.43	21.34	13.18	26.3%
Girl-boy	25.69	25.22	33.42	34.72	25.9%
Girl-girl	25.36	23.77	39.40	46.09	23.3%
N	2,528	2,314	3,538	2,637	

Birth order differences in quality time by birth spacing

Spacing	Father	Mother	% of sample
1 years	13.66	28.76	0.097
2 years	13.27	18.11	0.268
3 years	12.80	**24.95**	0.267
4 years	**37.86**	**37.44**	0.185
5 years	13.51	**42.39**	0.110
6 years	**55.03**	**45.40**	0.073
N	1,142	1,604	

Simulated amount of quality time spent with parents at each age (1,000's of hours).

age	Total quality time each year — 1st child	Total quality time each year — 2nd child	Cumulative quality time — 1st child	Cumulative quality time — 2nd child	2nd child shifted forward 3 years — 1st child	2nd child shifted forward 3 years — 2nd child
4	1.83	1.20	1.83	1.20		
5	1.45	1.21	3.28	2.41		
6	1.30	0.84	4.58	3.25		
7	1.37	0.96	5.95	4.20	1.37	1.20
8	1.14	0.87	7.09	5.07	1.14	1.21
9	0.97	0.59	8.07	5.67	0.97	0.84
10	1.09	0.79	9.15	6.46	1.09	0.96
11	0.86	0.50	10.01	6.96	0.86	0.87
12	0.70	0.40	10.72	7.35	0.70	0.59
13	0.50	0.25	11.22	7.60	0.50	0.79

Conclusion

Birth order difference between 1st and 2nd child:
    Around 20-30 minutes each day

Aggregate difference across ages 4-13 between 1st and 2nd child:
    3,610 hours with both parents

College Educated Parents:
    29 minutes for fathers, 14 for mothers (compared to high school drop-outs)
    15 minutes for fathers, 10 for mothers (compared to high school graduates)

First-born child in a multi-child family
    More time than only child
    Difference increases with family size

Birth Order Difference depends on gender composition and birth spacing
    Potential for testing impact of time vs. money.

Summary statistics of specific types of parent-child interaction

Activity description	Fraction of children with time>0	Mean of those with time>0	Total time across sample	Mean across sample	Included in quality time
reading to/with	7.3%	31.6	28,148	2.31	1
playing, not sports	11.1%	98.4	132,729	10.91	1
helping with homework	10.6%	56.9	73,407	6.03	1
talking with/listening	8.0%	33.5	32,791	2.69	1
helping/teaching	1.9%	38.5	8,889	0.73	1
arts and crafts with	0.2%	54.1	1,623	0.13	1
eating and drinking	72.1%	55.8	489,617	40.23	1
physical care for	44.5%	48.6	262,909	21.60	1
playing sports with	1.2%	65.0	9,494	0.78	1
attending performing arts	0.4%	104.9	5,245	0.43	1
attending museums	0.3%	164.7	5,434	0.45	1
participating in religious practices	1.7%	31.1	6,274	0.52	1
homeschooling of children	0.3%	175.6	5,619	0.46	1
looking after (as primary activity)	6.5%	64.3	50,629	4.16	1
organizing and planning for	2.1%	21.6	5,562	0.46	0
attending events	3.3%	111.4	45,132	3.71	0
picking up/dropping off	22.3%	11.5	31,157	2.56	0
meetings and school conferences	0.4%	48.2	2,508	0.21	0
travel related to caring for	28.5%	22.3	77,469	6.37	0
attending religious services	6.5%	111.8	88,470	7.27	0
watching television	39.9%	134.5	652,933	53.66	0

Note: The unit of analysis above is the individual child, but each measure refers to the amount of time the child spent engaged in the activity with their parent. Sample size is 12,169.