

Appendix C: Supplemental Tables

Table C1: Descriptive statistics of control variables

Variable	Mean	SD
<i>Time varying variables</i>		
Equivalised household income (thousands of AUD)	39.709	25.292
Hours of informal care (deviation from the mean)	-0.202	2.780
Hours of formal care (deviation from the mean)	-0.121	2.687
Formal care as main childcare arrangement (dummy)	0.158	0.365
Informal care as main childcare arrangement (dummy)	0.182	0.386
Family shocks		
Serious health issue of parents (dummy)	0.061	0.239
Serious health issue of close relatives (dummy)	0.102	0.303
Death of grandparents or siblings (dummy)	0.037	0.188
Death of other family members or friends (dummy)	0.184	0.388
New baby in the family (dummy)	0.061	0.239
Mothers' psychological distress (Kessler scale)	2.702	2.921
Non-working mothers (dummy)	0.246	0.431
Mothers' weekly working hours	18.459	15.823
Mothers with a university degree (dummy)	0.403	0.491
Non-working fathers (dummy)	0.030	0.171
Fathers' weekly working hours	45.373	13.787
Child's age (months)	93.509	12.195
<i>Time invaring variables</i>		
Intensive care at birth (dummy)	0.141	0.348
Male (dummy)	0.510	0.500
First-born child (dummy)	0.453	0.498
Mothers with university degree (dummy)	0.408	0.492
Non-working mothers (dummy)	0.20	0.40
Number of siblings in the household	1.59	0.94
N. children	1,313	
Type of school		
Catholic school (dummy)	0.237	0.425
Private school (dummy)	0.136	0.342
Pupil-teacher ratio	20.857	6.890
N. children	828	

Notes. Mean and standard deviations (SD) are computed using the main sample for all the variables, except for school inputs. Child-related time invariant variables are computed using information in wave 1, when children are 4-5 years old, while mothers- and household-related variables are measured in wave 3. Statistics of time variant variables are obtained pooling wave 2 and 3 when children are 6-7 and 8-9 years old.

Table C2: Models for child's total time in different activities:
Estimated effects for the full set of covariates

	Cognitive skills	Socio-emotional skills	Physical health	Income	Age	Hours informal care	Hours formal care	Informal care	Formal care	Endog. test p-value
School time	-15.432 (31.919)	-12.860 (49.693)	-39.307 (36.278)	-0.071 (1.877)	-4.961*** (1.474)	-16.454 (18.643)	54.265*** (20.799)	-50.519 (111.227)	67.061 (133.681)	0.550
Learning time	-39.814** (19.864)	-21.932 (46.357)	-2.555 (24.670)	-0.497 (0.647)	11.515 (7.314)	3.242 (6.463)	-5.357 (7.169)	-12.397 (38.393)	9.788 (46.063)	0.005
Socialising time	19.070 (25.112)	-56.391 (39.095)	36.739 (28.541)	2.159 (1.477)	1.147 (1.160)	-18.682 (14.667)	-28.165* (16.363)	164.465* (87.507)	75.312 (105.172)	0.133
Exercising time	-5.367 (20.325)	32.208 (31.643)	15.393 (23.101)	0.520 (1.195)	1.553* (0.939)	11.568 (11.871)	-21.711 (13.244)	-106.135 (70.827)	18.991 (85.125)	0.280
Play time	-5.575 (13.285)	-16.786 (20.683)	15.450 (15.099)	-0.047 (0.781)	-0.767 (0.613)	6.338 (7.759)	-0.781 (8.657)	-22.755 (46.294)	-27.844 (55.640)	0.748
Basic care time	15.627* (9.192)	-3.070 (14.310)	2.924 (10.447)	-0.627 (0.540)	-1.284*** (0.424)	4.351 (5.369)	-8.334 (5.989)	-10.980 (32.030)	20.918 (38.495)	0.916
Sleep time	6.061 (22.150)	15.760 (34.483)	9.371 (25.174)	-0.921 (1.302)	-5.696*** (1.023)	7.821 (12.937)	-8.615 (14.433)	-54.374 (77.184)	19.253 (92.766)	0.132
Other time	-5.745 (16.100)	-16.703 (25.064)	-13.694 (18.298)	0.062 (0.947)	0.613 (0.743)	10.501 (9.403)	10.051 (10.491)	50.853 (56.102)	-35.238 (67.427)	0.724
Media time	-0.374 (16.192)	55.724** (25.208)	-6.811 (18.403)	-0.552 (0.952)	6.900*** (0.748)	-6.682 (9.457)	1.116 (10.551)	-6.600 (56.422)	-136.238** (67.813)	0.350

Notes. Standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. Each row refers to a different model for a specific time investment, measured in minutes per week, and shows the results of the child fixed-effect estimation with IV (without IV) if the endogeneity test's p-value is below (above) 5%. The instruments for the model expressed in first difference are the double-lagged human capital measures.

Table C3: Models for child's time spent with parents in different activities:
Estimated effects for the full set of covariates

	Cognitive skills	Socio-emotional skills	Physical health	Income	Age	Hours informal care	Hours formal care	Informal care	Formal care	Endog. test
Learning time	4.295 (8.361)	9.415 (13.016)	7.172 (9.502)	-0.320 (0.492)	-0.464 (0.386)	-2.660 (4.883)	-8.041 (5.448)	1.793 (29.135)	21.842 (35.016)	0.651
Socialising time	-20.493 (33.450)	231.153*** (78.064)	23.370 (41.543)	1.133 (1.089)	-26.387** (12.316)	-20.213* (10.884)	-21.771* (12.072)	81.671 (64.653)	66.100 (77.569)	0.004
Exercising time	0.529 (15.395)	26.721 (23.967)	-14.449 (17.497)	0.248 (0.905)	-0.207 (0.711)	13.862 (8.992)	-28.527*** (10.031)	-98.973* (53.645)	124.851* (64.475)	0.160
Play time	-10.805 (10.318)	6.238 (16.064)	7.933 (11.727)	-0.151 (0.607)	-0.808* (0.476)	4.570 (6.027)	-1.771 (6.723)	-6.407 (35.956)	13.595 (43.214)	0.739
Basic care time	-0.504 (9.431)	12.399 (14.682)	-0.108 (10.719)	0.103 (0.555)	-2.065*** (0.435)	-1.971 (5.508)	-7.651 (6.145)	12.847 (32.863)	43.604 (39.497)	0.531
Media time	1.407 (13.774)	36.526* (21.443)	7.317 (15.654)	-0.648 (0.810)	5.700*** (0.636)	-0.967 (8.045)	-0.923 (8.975)	-34.180 (47.997)	-49.405 (57.686)	0.796
Total parental time	-19.561 (61.492)	499.858*** (143.507)	68.740 (76.370)	0.201 (2.002)	-10.571 (22.641)	-10.431 (20.008)	-67.094*** (22.192)	-30.168 (118.854)	212.604 (142.597)	0.013

Notes. Standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. Each row refers to a different model for a specific time investment, measured in minutes per week, and shows the results of the child fixed-effect estimation with IV (without IV) if the endogeneity test's p-value is below (above) 5%. The instruments for the model expressed in first difference are the double-lagged human capital measures.

Table C4: Models for child's total time in different activities:
Estimated effects obtained without and with instruments

	FE without IVs			FE with IVs		
	Cognitive skills	Socio-emotional skills	Physical health	Cognitive skills	Socio-emotional skills	Physical health
School time	-15.432 (31.919)	-12.860 (49.693)	-39.307 (36.278)	11.162 (57.365)	-66.267 (133.874)	-128.882* (71.244)
Learning time	15.727 (10.888)	17.218 (16.951)	-3.368 (12.375)	-39.814** (19.864)	-21.932 (46.357)	-2.555 (24.670)
Socialising time	19.070 (25.112)	-56.391 (39.095)	36.739 (28.541)	-40.710 (45.577)	113.157 (106.364)	59.334 (56.604)
Exercising time	-5.367 (20.325)	32.208 (31.643)	15.393 (23.101)	33.080 (36.952)	152.899* (86.237)	43.834 (45.893)
Play time	-5.575 (13.285)	-16.786 (20.683)	15.450 (15.099)	8.659 (24.004)	-58.999 (56.020)	10.830 (29.812)
Basic care time	15.627* (9.192)	-3.070 (14.310)	2.924 (10.447)	10.699 (16.586)	-3.931 (38.708)	13.491 (20.599)
Sleep time	6.061 (22.150)	15.760 (34.483)	9.371 (25.174)	45.886 (40.407)	-154.829 (94.300)	-34.136 (50.184)
Other time	-5.745 (16.100)	-16.703 (25.064)	-13.694 (18.298)	-30.585 (29.077)	8.412 (67.858)	-13.999 (36.112)
Media time	-0.374 (16.192)	55.724** (25.208)	-6.811 (18.403)	18.943 (29.236)	84.961 (68.230)	41.021 (36.310)

Notes. Standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. Each row refers to a different model for a specific time investment, measured in minutes per week, and shows the results of the child fixed-effect estimation without and with IV. The instruments for the model expressed in first difference are the double-lagged human capital measures.

Table C5: Models for child's time spent with parents in different activities:
 Estimated effects obtained without and with instruments

	FE without IVs			FE with IVs		
	Cognitive skills	Socio-emotional skills	Physical health	Cognitive skills	Socio-emotional skills	Physical health
Learning time	4.295 (8.361)	9.415 (13.016)	7.172 (9.502)	-9.034 (15.074)	19.534 (35.179)	3.387 (18.721)
Socialising time	2.958 (18.061)	-7.561 (28.118)	5.694 (20.527)	-20.493 (33.450)	231.153*** (78.064)	23.370 (41.543)
Exercising time	0.529 (15.395)	26.721 (23.967)	-14.449 (17.497)	20.579 (28.134)	154.567** (65.657)	17.043 (34.941)
Play time	-10.805 (10.318)	6.238 (16.064)	7.933 (11.727)	3.541 (18.607)	3.621 (43.425)	18.637 (23.109)
Basic care time	-0.504 (9.431)	12.399 (14.682)	-0.108 (10.719)	-0.498 (17.040)	25.600 (39.767)	-21.351 (21.163)
Other time	-9.411 (9.049)	-12.063 (14.088)	2.213 (10.284)	-6.900 (16.355)	-48.263 (38.168)	1.588 (20.312)
Media time	1.407 (13.774)	36.526* (21.443)	7.317 (15.654)	-13.657 (24.853)	65.383 (58.001)	27.656 (30.866)
Sleeping time	13.148 (45.121)	-36.463 (70.246)	60.187 (51.282)	-27.232 (81.538)	114.233 (190.290)	56.880 (101.266)
Total quality time (33.226)	-2.120 (51.727)	83.738 (37.762)	13.559	-19.561 (61.492)	499.858*** (76.370)	68.740

Notes. Standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. Each row refers to a different model for a specific time investment, measured in minutes per week, and shows the results of the child fixed-effect estimation without and with IV. The instruments for the model expressed in first difference are the double-lagged human capital measures.

Table C6: First stage regressions for the child's time investment models as reported in Tables 3 and 4

	First stage regressions		
	cognitive skills	socio-emotional skills	physical health
Double-lagged cognitive skills	-0.600*** (0.0252)	0.041** (0.018)	-0.001 (0.023)
Double-lagged socio-emotional skills	0.0175 (0.0275)	-0.298*** (0.020)	0.179*** (0.025)
Double-lagged physical health	-0.0295 (0.0267)	0.077*** (0.019)	-0.543*** (0.024)
Δ household income	0.00121 (0.00135)	0.001 (0.001)	-0.000 (0.001)
Δ child age	-0.0388** (0.0153)	-0.010 (0.011)	0.007 (0.014)
Δ Hours of informal care	0.0209 (0.0134)	0.014 (0.010)	0.003 (0.012)
Δ Hours of formal care	0.0242 (0.0150)	-0.009 (0.011)	0.000 (0.014)
Δ Mainly using informal care	0.0277 (0.0803)	-0.076 (0.057)	-0.097 (0.072)
Δ Mainly using formal care	-0.00778 (0.0965)	0.067 (0.069)	-0.036 (0.087)
Constant	0.945*** (0.363)	0.243 (0.259)	-0.148 (0.326)
F-tests (first stages)	192.7	76.44	170.8
No. children	1,313	1,313	1,313

Notes. Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Δ means first difference. The instruments are the double-lagged cognitive skills, socio-emotional skills and physical health. These first stage regressions results are for the fixed-effect estimation with IV of child's time inputs considered in Tables 3 and 4. The F-tests for the significance of the instruments for each of the human capital measures are reported in the bottom panel.

Table C7: Models for child's time spent with the mother, father or with both parents

	Cognitive skills	Socio-emotional skills	Endogeneity test (p-value)
Mother time only (27.436)	-35.215 (13.732)	15.208	0.224
Father time only (13.732)	15.208 (21.379)	-8.073	0.083
Both parents time (48.452)	-42.863 (113.074)	341.413***	0.003
F-tests (first stages)	192.7	76.44	

Notes. Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Each row refers to a different model for a specific type of parental time investment, measured in minutes per week, and shows the results of the child fixed-effect estimation with IV (without IV) if the endogeneity test's p-value is below (above) 5%. Besides the endogenous standardised measures of child's human capital (including physical health), other controls include income, child's age and a set of variables for the childcare arrangements. The instruments for the model expressed in first difference are the double-lagged human capital measures. The first stage equations of the IV estimation are identical across all three types of parental time investments and the F-tests for the significance of the instruments for each of the human capital measures are reported in the bottom panel.

Table C8: Models for learning and socialising time:
Omitting to control for the childcare variables

	Cognitive skills	Socio-emotional skills	Endogeneity (p-value)
Learning time	-38.899* (19.924)	-20.484 (46.361)	0.007
Socialising time	-16.859 (33.643)	233.158*** (78.283)	0.004
F-stats (first stages)	190.9	76.42	
N. children		1,313	

Notes. Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The first and second rows report the results for fixed-effect estimation with instrumental variables (FE with IV) for the total time a child spends in learning activities and the time a child spends with their parents socialising (both measured in minutes per week). Besides the endogenous standardised measures of child's human capital (including physical health), other controls include income and child's age. The instruments for the model expressed in first difference are the double-lagged human capital measures. The first stage equations of the IV estimation are identical across the two time inputs and the F-tests for the significance of the instruments for each of the human capital measures are reported in the bottom panel together with the p-value of the robust Durbin-Wu-Hausman test for the exogeneity of the human capital measures.

Table C9: Raw measures and log transformation of child's human capital measures

Dependent variable	Cognitive skills	Socio-emotional skills	Endogeneity (p-value)
Panel A: raw measures			
Learning time	-6.750** (3.348)	4.748 (10.609)	0.004
Socialising time	-2.967 (5.708)	53.243*** (18.087)	0.004
F-stats (first stages)	269.1	57.13	
N. children		1,313	
Panel B: logarithm transformation			
Learning time	-440.345** (214.296)	43.542 (57.907)	0.002
Socialising time	-315.642 (359.530)	196.761** (97.151)	0.051
F-stats (first stages)	366.0	62.80	
N. children		1,240	

Notes. Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The first and second rows of each panel report the results for fixed-effect estimation with instrumental variables (FE with IV) for the total time a child spends in learning activities and the time a child spends with their parents socialising (both measured in minutes per week). In the top panel, results are obtained using the raw measures of child's human capital; while in the bottom panel, a logarithm transformation of the raw measures of child human capital are included in the models (effect is reported by column). Other controls include physical health, income, child's age and a set of variables for the childcare arrangements. The instruments for the model expressed in first difference are the double-lagged human capital measures. The first stage equations of the IV estimation are identical across the two time inputs and the F-tests for the significance of the instruments for each of the human capital measures are reported in the bottom panel together with the p-value for the robust Durbin-Wu-Hausman test for the exogeneity of the human capital measures.

Table C10: Models for learning and socialising time:
Linearity check, heterogeneous effects by level of child's skills

	Cognitive skills	Socio-emotional skills
Dependent variable: Learning time		
Above the median	-49.716** (24.016)	84.618 (62.785)
Below the median	-37.460 (25.716)	-105.456* (60.858)
F-test (first stages)		
Above the median	223.4	54.14
Below the median	217.9	38.41
Endogeneity test (p-value)		0.006
No. children		1,313
Dependent variable: Socialising time with parents		
Above the median	-5.870 (40.062)	253.333** (104.734)
Below the median	-40.371 (42.898)	212.842** (101.519)
F-test (first stages)		
Above the median	223.4	54.14
Below the median	217.9	38.41
Endogeneity test (p-value)		0.014
No. children		1,313

Notes. Standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. The top and bottom panels report the results for fixed-effect estimation with instrumental variables (FE with IV) for the total time a child spends in learning activities and the time a child spends with their parents socialising (both measured in minutes per week). The models allow the effects of the endogenous standardised measures of child's human capital (including physical health) to differ between children with level of skills above and below the median, measured when children are 6-7. Other controls include income, child's age and a set of variables for the childcare arrangements. The instruments for the model expressed in first difference are the double-lagged human capital measures interacted with two dummies for children with level of skills above and below the median. The first stage equations of the IV estimation are identical across the two time inputs and the F-tests for the significance of the instruments for each of the human capital measures are reported in the bottom panel together with the p-value for the robust Durbin-Wu-Hausman test for the exogeneity of the human capital measures.

Table C11: Models for learning and socialising time:
Invariance check, heterogeneous effects by child's age

	Cognitive skills	Socio-emotional skills
Dependent variable: Learning time		
Age 6-7	-5.416 (12.979)	10.594 (18.222)
Age 8-9	41.429*** (13.052)	23.215 (18.557)
F test for the equality of the coefficients across child's age		
F-statistics		4.23
P-value		0.006
No. children		1,313
Dependent variable: Socialising time with parents		
Age 6-7	-18.926 (21.506)	31.843 (30.193)
Age 8-9	12.629 (21.626)	-53.232* (30.747)
F test for the equality of the coefficients across child's age		
F-statistics		4.48
P-value		0.004
No. children		1,313
Dependent variable: Media time		
Age 6-7	4.921 (19.335)	54.676** (27.145)
Age 8-9	-13.638 (19.443)	59.141** (27.644)
F test for the equality of the coefficients across child's age		
F-statistics		1.09
P-value		0.353
No. children		1,313

Notes. Standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. The three panels report the results for fixed-effect estimation without instrumental variables (FE without IV) for the total time a child spends in learning activities, the time a child spends with their parents socialising and the total time a child spends in media activities (all measured in minutes per week). The models allow the effects of the endogenous standardised measures of child's human capital (including physical health) to differ depending on the period when time investments are observed (age 6-7 and age 8-9). Other controls include income, child's age and a set of variables for the childcare arrangements.

Table C12: Models for learning and socialising time: Adding extra controls

Dependent variable	Cognitive skills	Socio-emotional skills	Endogeneity (p-value)
Additional covariates: mother's degree			
Learning time	-39.362** (19.898)	-22.387 (46.421)	0.006
Socialising time	-20.071 (33.510)	230.729*** (78.179)	0.004
F-stats (first stages)	191.9	76.19	
N. children		1,313	
Additional covariates: parents' working hours			
Learning time	-40.019** (19.905)	-28.054 (46.584)	0.006
Socialising time	-21.511 (33.599)	231.715*** (78.632)	0.003
F-stats (first stages)	192.5	76.05	
N. children		1,286	
Additional covariates: mother's mental health			
Learning time	-40.166** (20.104)	-24.868 (47.659)	0.004
Socialising time	-16.896 (33.482)	225.187*** (79.372)	0.005
F-stats (first stages)	189.4	74.08	
N. children		1,286	
Additional covariate: school inputs			
Learning time	-71.955*** (26.379)	-68.824 (60.158)	0.006
Socialising time	-50.048 (43.225)	172.984* (98.578)	0.221
F-stats (first stages)	111.7	50.06	
N. children		828	

Notes. Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The first and second rows in each panel report the results for fixed-effect estimation with instrumental variables (FE with IV) for the total time a child spends learning and the time a child spends with their parents socialising (both measured in minutes per week). All models include the endogenous standardised measures of child's human capital (including physical health), income, child's age, and a set of variables for the childcare arrangements. Each panel shows the estimates when additional sets of covariates are added to the model: (a) a dummy for mothers who have a university degree, (b) two dummies indicating whether mothers and fathers work and two variables indicating the number of working hours, (c) a dummy indicating whether the mother has mental problems, (d) school inputs proxied by pupil-teacher ratio and indicators of type of school (catholic, governmental, public).^{XI}The instruments for the model expressed in first difference are the double-lagged human capital measures. The first stage equations of the IV estimation are identical across the two time inputs and the F-tests for the significance of the instruments for each of the human capital measures are reported in