

Supplemental Materials

Genetic and Environmental Contributions to the Development of Childhood Aggression

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Supplementary Table 1

Sample size of the confirmatory dataset at each measurement occasion

	Age 3	Age 7	Age 10	Age 12	Age 14	Age 16
Males						
<i>n</i> Total	17,339	11,281	8,714	7,222	3,630	2,178
<i>n</i> Repeat	0	9,408	8,043	6,840	3,368	2,034
<i>n</i> New	17,339	1,873	671	382	262	144
Females						
<i>n</i> Total	16,968	10,978	8,519	7,051	4,620	3,046
<i>n</i> Repeat	0	9,170	7,828	6,711	4,124	2,793
<i>n</i> New	16,968	1,808	691	340	496	253

Note. The total sample size available at each measurement occasion (*n* Total) is comprised of the individuals who provided data for the first time at that measurement (*n* New) and the individuals who also provided data at a prior measurement occasion (*n* Repeat).

Table 6

Estimated proportion of variance attributable to the total additive genetic effect

	Males					
Variable	Age 3	Age 7	Age 10	Age 12	Age 14	Age 16
<i>Sum Score</i>	0.504 (0.023)	0.567 (0.022)	0.645 (0.023)	0.675 (0.051)	0.514 (0.021)	0.578 (0.020)
Hits Others	0.341 (0.014)					
Hurts Others Accidentally	0.048 (0.007)					
Threatens People		0.242 (0.041)	0.344 (0.051)	0.375 (0.056)	0.456 (0.052)	0.645 (0.050)
Destroys His or Her Things		0.880 (0.010)	0.902 (0.012)	0.875 (0.017)	0.380 (0.039)	0.395 (0.052)

Destroys Others Things	0.899 (0.007)	0.910 (0.009)	0.862 (0.016)	0.908 (0.015)	0.564 (0.046)	0.497 (0.056)
Gets in Fights	0.575 (0.014)	0.276 (0.018)	0.337 (0.026)	0.394 (0.032)	0.624 (0.044)	0.616 (0.049)
Physically Attacks People	0.328 (0.018)	0.258 (0.024)	0.290 (0.029)	0.411 (0.039)	0.526 (0.046)	0.704 (0.056)

Females

Variable	Age 3	Age 7	Age 10	Age 12	Age 14	Age 16
<i>Sum Score</i>	<i>0.433 (0.025)</i>	<i>0.607 (0.028)</i>	<i>0.613 (0.032)</i>	<i>0.652 (0.059)</i>	<i>0.551 (0.025)</i>	<i>0.621 (0.033)</i>
Hits Others	0.518 (0.015)					
Hurts Others Accidentally	0.073 (0.010)					
Threatens People		0.131 (0.034)	0.262 (0.068)	0.291 (0.052)	0.556 (0.059)	0.688 (0.079)
Destroys His or Her Things		0.921 (0.010)	0.875 (0.021)	0.816 (0.030)	0.504 (0.043)	0.522 (0.057)
Destroys Others Things	0.893 (0.007)	0.885 (0.013)	0.827 (0.024)	0.891 (0.023)	0.599 (0.052)	0.434 (0.063)
Gets in Fights	0.242 (0.015)	0.329 (0.028)	0.314 (0.036)	0.326 (0.049)	0.477 (0.057)	0.774 (0.064)
Physically Attacks People	0.445 (0.023)	0.210 (0.029)	0.281 (0.043)	0.334 (0.062)	0.613 (0.054)	0.641 (0.063)

Note. Standard errors appear in parentheses following their corresponding variance

components. Results for the SS models are presented in italics to differentiate them from the item-level results of the IP model. Blank cells correspond to items that were not measured at a given measurement occasion. Recall that all all genetic variance at the first measurement occasion is innovated by definition.

Supplementary Table 2

Estimated proportion of variance attributable to transmitted effects of the shared environment

Males					
Variable	Age 3 to 7	Age 7 to 10	Age 10 to 12	Age 12 to 14	Age 14 to 16
<i>Sum Score</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Threatens People	0.025 (0.005)	0.076 (0.019)	0.212 (0.034)	0	0
Destroys His or Her Things	0	0	0	0	0
Destroys Others Things	0	0	0	0	0
Gets in Fights	0.083 (0.010)	0.245 (0.020)	0.255 (0.027)	0	0
Physically Attacks People	0.087 (0.011)	0.323 (0.024)	0.263 (0.029)	0	0
Females					
Variable	Age 3 to 7	Age 7 to 10	Age 10 to 12	Age 12 to 14	Age 14 to 16
<i>Sum Score</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Threatens People	0.008 (0.005)	0.071 (0.028)	0.021 (0.013)	0	0
Destroys His or Her Things	0	0	0	0	0
Destroys Others Things	0	0	0	0	0
Gets in Fights	0.120 (0.015)	0.278 (0.035)	0.309 (0.053)	0	0
Physically Attacks People	0.144 (0.018)	0.272 (0.035)	0.253 (0.049)	0	0

Note. Standard errors appear in parentheses following their corresponding variance components. Results for the SS models are presented in italics to differentiate them from the item-level results of the IP model. Scores at the first measurement occasion (Age 3) can have no transmitted variance by definition, and the two blank rows correspond to the items that were only measured at the first measurement occasion. Cells marked 0 reflect the fact that shared environmental effects were fixed to zero for all items in the self-report data and for the two

“destruction” items in the mother-report data, and the fact that the effect of the shared environment was fixed to be fully innovated in the SS model.

Supplementary Table 3

Estimated proportion of variance attributable to innovated effects of the shared environment

Males						
Variable	Age 3	Age 7	Age 10	Age 12	Age 14	Age 16
<i>Sum Score</i>	<i>0.215 (0.023)</i>	<i>0.212 (0.020)</i>	<i>0.145 (0.020)</i>	<i>0.145 (0.049)</i>	<i>0</i>	<i>0</i>
Hits Others	0.346 (0.013)					
Hurts Others Accidentally	0.842 (0.008)					
Threatens People		0.132 (0.023)	0.061 (0.015)	0.179 (0.032)	0	0
Destroys His or Her Things		0	0	0	0	0
Destroys Others Things	0	0	0	0	0	0
Gets in Fights	0.232 (0.013)	0.446 (0.018)	0.197 (0.021)	0.216 (0.027)	0	0
Physically Attacks People	0.229 (0.015)	0.470 (0.021)	0.259 (0.026)	0.223 (0.029)	0	0
Females						
Variable	Age 3	Age 7	Age 10	Age 12	Age 14	Age 16
<i>Sum Score</i>	<i>0.299 (0.025)</i>	<i>0.207 (0.026)</i>	<i>0.145 (0.028)</i>	<i>0.115 (0.058)</i>	<i>0</i>	<i>0</i>
Hits Others	0.217 (0.013)					
Hurts Others Accidentally	0.748 (0.011)					
Threatens People		0.029 (0.018)	0.059 (0.025)	0.018 (0.011)	0	0
Destroys His or Her Things		0	0	0	0	0
Destroys Others Things	0	0	0	0	0	0
Gets in Fights	0.634 (0.014)	0.410 (0.027)	0.231 (0.035)	0.262 (0.055)	0	0
Physically Attacks People	0.156 (0.016)	0.492 (0.030)	0.227 (0.035)	0.215 (0.053)	0	0

Note. Standard errors appear in parentheses following their corresponding variance

components. Results for the SS models are presented in italics to differentiate them from the

item-level results of the IP model. Blank cells correspond to items that were not measured at a given measurement occasion. Cells marked 0 reflect the fact that shared environmental effects were fixed to zero for all items in the self-report data and for the two “destruction” items in the mother-report data. Recall that all all shared environmental variance at the first measurement occasion is innovated by definition.

Supplementary Table 4

Estimated proportion of variance attributable to the total effect of the shared environment

Males						
Variable	Age 3	Age 7	Age 10	Age 12	Age 14	Age 16
<i>Sum Score</i>	<i>0.215 (0.023)</i>	<i>0.212 (0.020)</i>	<i>0.145 (0.020)</i>	<i>0.145 (0.049)</i>	<i>0</i>	<i>0</i>
Hits Others	0.346 (0.013)					
Hurts Others Accidentally	0.842 (0.008)					
Threatens People		0.157 (0.027)	0.137 (0.032)	0.391 (0.055)	0	0
Destroys His or Her Things		0	0	0	0	0
Destroys Others Things	0	0	0	0	0	0
Gets in Fights	0.232 (0.013)	0.529 (0.018)	0.442 (0.024)	0.470 (0.030)	0	0
Physically Attacks People	0.229 (0.015)	0.557 (0.022)	0.582 (0.026)	0.486 (0.036)	0	0
Females						
Variable	Age 3	Age 7	Age 10	Age 12	Age 14	Age 16
<i>Sum Score</i>	<i>0.299 (0.025)</i>	<i>0.207 (0.026)</i>	<i>0.145 (0.028)</i>	<i>0.115 (0.058)</i>	<i>0</i>	<i>0</i>
Hits Others	0.217 (0.013)					
Hurts Others Accidentally	0.748 (0.011)					
Threatens People		0.037 (0.024)	0.131 (0.051)	0.038 (0.023)	0	0
Destroys His or Her Things		0	0	0	0	0
Destroys Others Things	0	0	0	0	0	0
Gets in Fights	0.634 (0.014)	0.530 (0.028)	0.509 (0.039)	0.571 (0.052)	0	0
Physically Attacks People	0.156 (0.016)	0.636 (0.030)	0.498 (0.040)	0.468 (0.067)	0	0

Note. Standard errors appear in parentheses following their corresponding variance

components. Results for the SS models are presented in italics to differentiate them from the

item-level results of the IP model. Blank cells correspond to items that were not measured at a given measurement occasion. Cells marked 0 reflect the fact that shared environmental effects were fixed to zero for all items in the self-report data and for the two “destruction” items in the mother-report data. Recall that all all shared environmental variance at the first measurement occasion is innovated by definition.

Supplementary Table 5

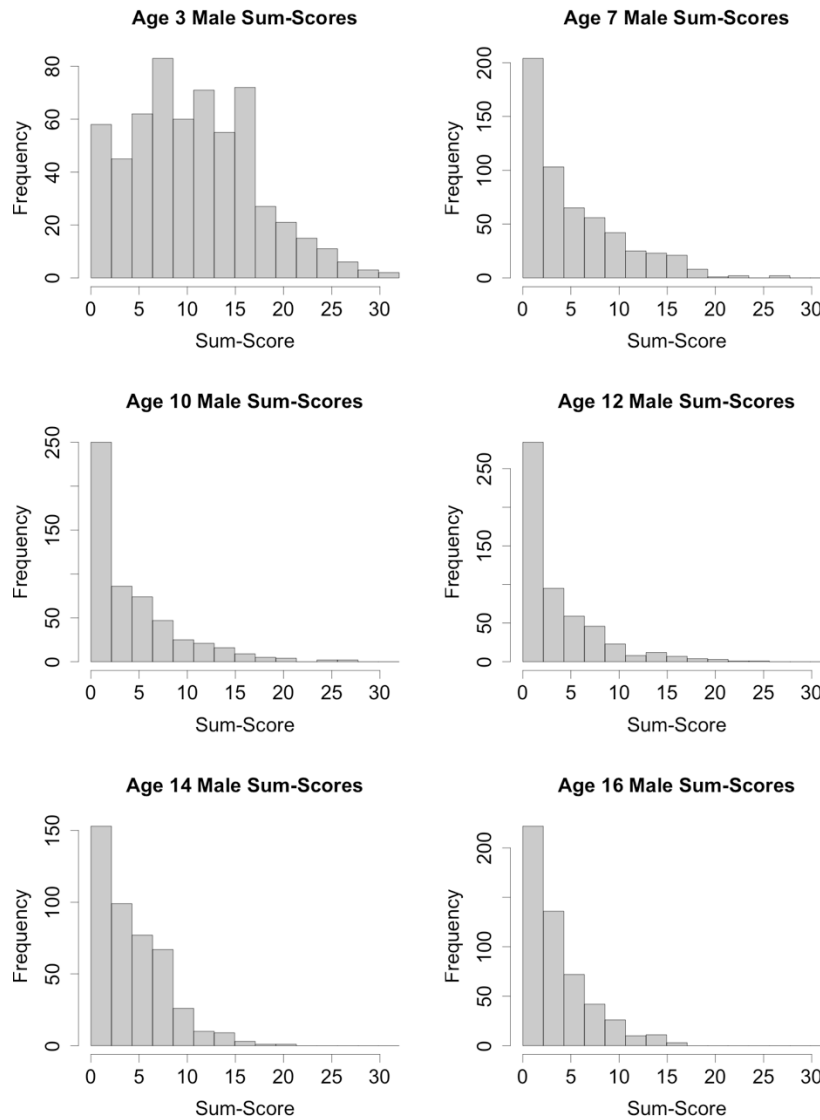
Estimated proportion of variance attributable to the total effect of the non-shared environment

Males						
Variable	Age 3	Age 7	Age 10	Age 12	Age 14	Age 16
<i>Sum Score</i>	<i>0.281 (0.004)</i>	<i>0.222 (0.007)</i>	<i>0.210 (0.009)</i>	<i>0.180 (0.010)</i>	<i>0.486 (0.021)</i>	<i>0.422 (0.020)</i>
Hits Others	0.313 (0.009)					
Hurts Others Accidentally	0.110 (0.005)					
Threatens People		0.601 (0.048)	0.519 (0.057)	0.234 (0.042)	0.544 (0.052)	0.355 (0.050)
Destroys His or Her Things		<i>0.120 (0.010)</i>	<i>0.098 (0.012)</i>	<i>0.125 (0.017)</i>	0.620 (0.039)	0.605 (0.052)
Destroys Others Things	0.101 (0.007)	<i>0.090 (0.009)</i>	<i>0.138 (0.016)</i>	<i>0.092 (0.015)</i>	0.436 (0.046)	0.503 (0.056)
Gets in Fights	0.194 (0.007)	0.196 (0.011)	0.221 (0.016)	0.136 (0.014)	0.376 (0.044)	0.384 (0.049)
Physically Attacks People	0.443 (0.016)	0.185 (0.014)	0.128 (0.014)	0.103 (0.019)	0.474 (0.046)	0.296 (0.056)
Females						
Variable	Age 3	Age 7	Age 10	Age 12	Age 14	Age 16
<i>Sum Score</i>	<i>0.268 (0.005)</i>	<i>0.187 (0.008)</i>	<i>0.242 (0.013)</i>	<i>0.232 (0.014)</i>	<i>0.449 (0.025)</i>	<i>0.379 (0.033)</i>
Hits Others	0.265 (0.009)					
Hurts Others Accidentally	0.179 (0.008)					
Threatens People		0.832 (0.048)	0.607 (0.080)	0.670 (0.059)	0.444 (0.059)	0.312 (0.079)
Destroys His or Her Things		<i>0.079 (0.010)</i>	<i>0.125 (0.021)</i>	<i>0.184 (0.030)</i>	0.496 (0.043)	0.478 (0.057)
Destroys Others Things	0.107 (0.007)	<i>0.115 (0.013)</i>	<i>0.173 (0.024)</i>	<i>0.109 (0.023)</i>	0.401 (0.052)	0.566 (0.063)
Gets in Fights	0.124 (0.006)	0.141 (0.015)	0.177 (0.024)	0.103 (0.023)	0.523 (0.057)	0.226 (0.064)
Physically Attacks People	0.399 (0.018)	0.154 (0.017)	0.220 (0.033)	0.198 (0.044)	0.387 (0.054)	0.359 (0.063)

Note. Standard errors appear in parentheses following their corresponding variance

components. Results for the SS models are presented in italics to differentiate them from the

item-level results of the IP model. Blank cells correspond to items that were not measured at a given measurement occasion.



Supplementary Figure 1. Sum score distributions for males in the exploratory set. Note that the skew of each distribution was stronger for females because males had higher scores on average.

	Age 3	Age 7	Age 10	Age 12	Age 14	Age 16
Age 3	1.00	0.41	0.36	0.33	0.12	-0.02
Age 7	0.45	1.00	0.64	0.55	0.23	0.18
Age 10	0.53	0.66	1.00	0.67	0.26	0.35
Age 12	0.43	0.57	0.72	1.00	0.37	0.39
Age 14	0.30	0.26	0.26	0.33	1.00	0.45
Age 16	0.15	0.17	0.25	0.32	0.55	1.00

Figure 2. Autocorrelation matrix of overt aggression's categorized sum scores estimated in the exploratory data (males below, females above diagonal). Recall that between ages 3 and 7 and between ages 12 and 14, aggression is measured with different scales. These shifts are marked with solid black lines.

