Supplementary Materials for:

APOE Effects on Cognition From Childhood To Adolescence

Chandra A. Reynolds[1]*, Andrew Smolen[2], Robin P. Corley [2], Elizabeth Munoz [1], Naomi P. Friedman [2], Soo Hyun Rhee [2], Michael C. Stallings [2], John C. DeFries [2], and Sally J. Wadsworth [2]

Corresponding Author E-mail: chandra.reynolds@ucr.edu

This supplement includes an Appendix with:

Tables S1 to S7
Figure S1

Appendix

Table S1. *APOE* genotype and allele frequencies in unrelated persons from the CAP and LTS samples.

			Unrelated (CAP + LTS)	
APOE genotype	**rs429358**	**rs7412**	***N***	***Percent***
ε22	T/T	T/T	8	1.05
ε23	T/T	C/T	85	11.18
ε24	C/T	C/T	19	2.50
ε33	T/T	C/C	465	61.18
ε34	C/T	C/C	173	22.76
ε44	C/C	C/C	10	1.32
TOTAL			760	--
***APOE* Alleles**			***N***	***Percent***
ε2	--	--	120	7.89
ε3	--	--	1188	78.16
ε4	--	--	212	13.95
Total	--	--	1520	--

Note. CAP = Colorado Adoption Project; LTS = Longitudinal Twin Study.

Table S2. Multilevel random effects for IQ across the Year 7, 12 and 16 assessments: conditional on *APOE*.

		Verbal IQ				Performance IQ				Full Scale IQ			
Random Effects		**Model I**		**Model II**		**Model I**		**Model II**		**Model I**		**Model II**	
Intercept		σ^2	**se**	σ^2	**se**	σ^2	**se**	σ^2	**se**	σ^2	**se**	σ^2	**se**
$\sigma^2_{between}$	A	14.86	12.37 -	13.88	12.34 -	1.19	18.18 -	2.15	18.19 -	13.79	13.49 -	13.50	13.43 -
	C	46.80	10.98 c	48.51	10.91 c	22.10	11.53 a	23.86	11.57 a	40.97	10.42 c	42.19	10.35 c
	DZ	112.49	15.23 c	111.87	15.17 c	50.79	9.83 c	48.80	9.66 c	82.27	12.00 c	81.13	11.89 c
	MZ	149.21	15.06 c	149.81	15.12 c	112.81	11.96 c	111.69	11.86 c	131.63	13.21 c	131.33	13.18 c
σ^2_{within}	A	62.93	14.05 c	64.18	14.19 c	109.37	22.24 c	107.85	22.05 c	78.58	15.58 c	78.71	15.54 c
	C	32.87	8.43 c	30.31	8.13 c	56.63	12.59 c	55.26	12.48 c	37.30	8.45 c	35.54	8.23 c
	DZ	49.54	6.83 c	49.19	6.80 c	53.33	7.63 c	53.38	7.63 c	49.31	6.38 c	49.09	6.36 c
	MZ	1.25	1.95 -	1.24	1.95 -	4.47	2.32 a	4.46	2.32 a	2.40	1.49 -	2.40	1.49 -
$\sigma^2_{residual}$	A	49.09	3.72 c	49.08	3.72 c	52.52	3.97 c	52.48	3.96 c	37.48	2.84 c	37.46	2.84 c
	C	44.23	3.07 c	44.21	3.06 c	57.45	3.97 c	57.48	3.98 c	33.07	2.27 c	33.08	2.27 c
	DZ	43.57	2.39 c	43.58	2.39 c	53.82	2.97 c	53.83	2.97 c	33.17	1.82 c	33.18	1.82 c
	MZ	46.79	2.45 c	46.79	2.45 c	50.97	2.63 c	50.97	2.63 c	33.25	1.73 c	33.25	1.73 c

[a]p < .05, [b]p < .01, [c]p < .001; [f]p<.05 1-tailed, FDR corrected, [t]p<.05 2-tailed, FDR corrected

Note. *N* = 1321. Covariates included: Study (CAP = -.5, LTS = .5), Adopted (0=Not, 1=Adopted), Sex (Male = 0, Female = 1), Age centered at 16 years, ε2 number of alleles (0,1,2); ε4 number of alleles (0,1,2). Random effects by family type are denoted as: A=Adoptive, C=Control, DZ=dizygotic twins, MZ=monozygotic twins. σ^2_{within} = variance in IQ performance within sibships that is systematic across assessments (indicative of sibling dissimilarity); $\sigma^2_{between}$= variance in IQ performance between sibships that is systematic across assessments (indicative of sibling similarity); $\sigma^2_{residual}$ = within-person, occasion-specific variance.

Table S3. Multilevel fixed effects: *APOE* ε4 effects on IQ at the Year 7 assessment.

Verbal IQ	**Model I**				**Model II**			
Fixed Effects	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**
Intercept	112.24	0.97 [c]	110.32	114.15	111.88	1.02 [c]	109.89	113.88
Study	-8.00	1.08 [c]	-10.11	-5.89	-7.93	1.08 [c]	-10.05	-5.82
Adopted	-3.94	1.27 [b]	-6.43	-1.45	-3.88	1.27 [b]	-6.38	-1.39
Sex	-1.82	0.91 [a]	-3.60	-0.03	-1.03	1.10 [-]	-3.20	1.13
Age	-6.96	1.25 [c]	-9.41	-4.50	-7.02	1.25 [c]	-9.47	-4.57
ε2	-0.02	1.08 [-]	-2.14	2.09	0.34	1.57 [-]	-2.75	3.43
ε4	-1.27	0.88 [-]	-2.99	0.46	-0.14	1.20 [-]	-2.50	2.22
Sex*ε2	--	--	--	--	-0.73	2.06 [-]	-4.78	3.32
Sex*ε4	--	--	--	--	-2.40	1.75 [-]	-5.84	1.03
Performance IQ	**Model I**				**Model II**			
Fixed Effects	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**
Intercept	114.31	0.88 [c]	112.58	116.04	114.04	0.92 [c]	112.24	115.85
Study	-5.98	0.99 [c]	-7.91	-4.04	-5.92	0.99 [c]	-7.86	-3.99
Adopted	-1.38	1.21 [-]	-3.77	1.00	-1.34	1.21 [-]	-3.73	1.04
Sex	-2.70	0.82 [b]	-4.31	-1.09	-2.07	1.00 [a]	-4.03	-0.10
Age	-2.60	1.12 [a]	-4.80	-0.39	-2.67	1.12 [a]	-4.88	-0.47
ε2	1.18	1.00 [-]	-0.79	3.15	0.93	1.48 [-]	-1.97	3.83
ε4	-1.95	0.81 [a]	-3.54	-0.36	-0.80	1.12 [-]	-3.00	1.39
Sex*ε2	--	--	--	--	0.37	1.91 [-]	-3.39	4.12
Sex*ε4	--	--	--	--	-2.43	1.62 [-]	-5.61	0.74
Full Scale IQ	**Model I**				**Model II**			
Fixed Effects	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**
Intercept	114.68	0.89 [c]	112.95	116.42	114.33	0.92 [c]	112.52	116.14
Study	-7.89	0.98 [c]	-9.82	-5.96	-7.82	0.98 [c]	-9.75	-5.89
Adopted	-3.14	1.17 [b]	-5.44	-0.84	-3.09	1.17 [b]	-5.39	-0.78
Sex	-2.69	0.83 [b]	-4.31	-1.06	-1.88	1.00 [-]	-3.85	0.09
Age	-5.43	1.13 [c]	-7.66	-3.20	-5.51	1.13 [c]	-7.74	-3.29
ε2	0.50	0.99 [-]	-1.44	2.44	0.69	1.43 [-]	-2.12	3.49
ε4	-1.85	0.80 [a]	-3.41	-0.28	-0.61	1.09 [-]	-2.74	1.53
Sex*ε2	--	--	--	--	-0.41	1.85 [-]	-4.05	3.23
Sex*ε4	--	--	--	--	-2.63	1.59 [-]	-5.75	0.48

[a]p < .05, [b]p < .01, [c]p < .001; [f]p<.05 1-tailed, FDR corrected, [t]p<.05 2-tailed, FDR corrected. LL, UL = lower and upper 95% confidence interval.

Note. *N* = 1176 - 1177. Covariates included: Study (CAP = -.5, LTS = .5), Adopted (0=Not, 1=Adopted); Sex (Male = 0, Female = 1); Age was centered at 7 years; ε2 = number of alleles (0,1,2); ε4 = number of alleles (0,1,2).

Table S4. Multilevel random effects for IQ at the Year 7 assessment: conditional on *APOE*.

		Verbal IQ				Performance IQ				Full Scale IQ			
Random Effects		**Model I**		**Model II**		**Model I**		**Model II**		**Model I**		**Model II**	
Intercept		**σ^2**	**se**	**σ^2**	**se**	**σ^2**	**se**	**σ^2**	**se**	**σ^2**	**se**	**σ^2**	**se**
$\boldsymbol{\sigma^2_{between}}$	A	1.07	21.42 [-]	0.00	. [-]	9.46	20.51 [-]	7.28	20.25 [-]	0.00	. [-]	0.00	. [-]
	C	52.78	19.34 [b]	54.79	19.36 [b]	55.53	15.86 [c]	56.01	16.00 [c]	54.56	14.83 [c]	55.77	14.86 [c]
	DZ	139.66	20.30 [c]	138.40	20.19 [c]	65.12	13.20 [c]	63.15	13.09 [c]	106.91	16.07 [c]	105.04	15.93 [c]
	MZ	147.17	16.90 [c]	147.23	16.90 [c]	118.63	14.26 [c]	118.09	14.21 [c]	129.29	14.37 [c]	128.92	14.33 [c]
$\boldsymbol{\sigma^2_{within}}$	A	143.43	26.11 [c]	145.34	15.48 [c]	123.81	23.69 [c]	125.77	23.74 [c]	125.23	13.32 [c]	125.56	13.36 [c]
	C	92.97	17.86 [c]	90.30	17.61 [c]	75.41	13.74 [c]	75.37	13.81 [c]	65.07	12.39 [c]	63.63	12.23 [c]
	DZ	90.27	9.72 [c]	90.20	9.72 [c]	96.80	10.34 [c]	97.25	10.39 [c]	76.89	8.27 [c]	77.17	8.31 [c]
	MZ	47.66	4.63 [c]	47.66	4.63 [c]	50.23	4.88 [c]	50.23	4.88 [c]	33.08	3.21 [c]	33.08	3.21 [c]

[a]p < .05, [b]p < .01, [c]p < .001; [f]p<.05 1-tailed, FDR corrected, [t]p<.05 2-tailed, FDR corrected

Note. *N* = 1176 - 1177. Covariates included: Study (CAP = -.5, LTS = .5), Sex (Male = 0, Female = 1), Adopted (0=Not, 1=Adopted); Age at assessment (centered at 16 years); ε2 number of alleles (0,1,2); ε4 number of alleles (0,1,2). Random effects by family type are denoted as: A=Adoptive, C=Control, DZ=dizygotic twins, MZ=monozygotic twins. $\boldsymbol{\sigma^2_{between}}$= variance in IQ performance between sibships that is systematic at the assessment (indicative of sibling similarity); $\boldsymbol{\sigma^2_{within}}$ = residual variance reflecting within-pair variance at the assessment (indicative of sibling dissimilarity).

Table S5. Multilevel fixed effects of *APOE* ε4 on IQ across Year 7, 12 and 16 assessments: adding sex by study, race and ethnicity covariates.

Verbal IQ	**Model I**				**Model II**			
Fixed Effects	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**
Intercept	105.50	1.43 [c]	102.69	108.31	104.97	1.46 [c]	102.11	107.83
Study	-7.48	1.16 [c]	-9.76	-5.20	-7.36	1.16 [c]	-9.64	-5.09
Adopted	-3.45	0.99 [c]	-5.38	-1.52	-3.37	0.99 [c]	-5.31	-1.44
Sex	-1.88	0.73 [a]	-3.32	-0.43	-0.91	0.88 [-]	-2.63	0.82
Sex*study	3.41	1.47 [a]	0.53	6.29	3.29	1.47 [a]	0.41	6.17
Age	-0.36	0.03 [c]	-0.43	-0.30	-0.36	0.03 [c]	-0.43	-0.30
White	1.02	1.32 [-]	-1.57	3.61	1.06	1.32 [-]	-1.53	3.65
Hispanic	-5.41	1.99 [b]	-9.32	-1.50	-5.32	1.99 [b]	-9.23	-1.41
ε2	-0.48	0.86 [-]	-2.17	1.20	0.11	1.21 [-]	-2.27	2.49
ε4	-1.73	0.70 [a,f]	-3.10	-0.37	-0.42	0.94 [-]	-2.27	1.43
Sex*ε2	--	--	--	--	-1.13	1.59 [-]	-4.25	1.98
Sex*ε4	--	--	--	--	-2.82	1.37 [a,t]	-5.50	-0.13
Performance IQ	**Model I**				**Model II**			
Fixed Effects	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**
Intercept	104.81	1.47 [c]	101.93	107.68	104.42	1.49 [c]	101.51	107.34
Study	-10.10	1.07 [c]	-12.21	-8.00	-9.97	1.07 [c]	-12.08	-7.86
Adopted	-1.35	1.06 [-]	-3.43	0.74	-1.27	1.07 [-]	-3.36	0.82
Sex	-1.14	0.70 [-]	-2.50	0.23	-0.36	0.86 [-]	-2.03	1.32
Sex*study	3.98	1.39 [b]	1.25	6.71	3.85	1.39 [b]	1.12	6.57
Age	-0.79	0.03 [c]	-0.86	-0.72	-0.79	0.03 [c]	-0.86	-0.72
White	1.03	1.38 [-]	-1.68	3.73	1.02	1.38 [-]	-1.68	3.72
Hispanic	-0.07	1.82 [-]	-3.63	3.49	-0.17	1.81 [-]	-3.72	3.37
ε2	-0.28	0.84 [-]	-1.92	1.37	-0.79	1.23 [-]	-3.20	1.63
ε4	-1.86	0.70 [b,f]	-3.24	-0.48	-0.29	0.97 [-]	-2.18	1.61
Sex*ε2	--	--	--	--	0.93	1.64 [-]	-2.29	4.15
Sex*ε4	--	--	--	--	-3.32	1.40 [a,t]	-6.07	-0.58
Full Scale IQ	**Model I**				**Model II**			
Fixed Effects	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**
Intercept	105.47	1.38 [c]	102.76	108.18	104.98	1.40 [c]	102.23	107.74
Study	-9.51	1.09 [c]	-11.65	-7.36	-9.38	1.09 [c]	-11.52	-7.23
Adopted	-2.75	1.00 [b]	-4.71	-0.79	-2.68	1.00 [b]	-4.64	-0.71
Sex	-1.67	0.70 [a]	-3.03	-0.30	-0.75	0.84 [-]	-2.40	0.91
Sex*study	4.01	1.40 [b]	1.27	6.75	3.88	1.39 [b]	1.15	6.61
Age	-0.63	0.03 [c]	-0.69	-0.58	-0.63	0.03 [c]	-0.69	-0.58
White	1.17	1.28 [-]	-1.34	3.69	1.21	1.28 [-]	-1.30	3.72
Hispanic	-3.01	1.85 [-]	-6.63	0.61	-3.02	1.84 [-]	-6.63	0.59
ε2	-0.54	0.83 [-]	-2.17	1.09	-0.53	1.18 [-]	-2.85	1.78
ε4	-2.04	0.68 [b,f]	-3.37	-0.71	-0.51	0.92 [-]	-2.32	1.29
Sex*ε2	--	--	--	--	-0.03	1.55 [-]	-3.08	3.01
Sex*ε4	--	--	--	--	-3.29	1.34 [a]	-5.92	-0.66

[a]p < .05, [b]p < .01, [c]p < .001; [f]p<.01 1-tailed, FDR corrected, [t]p<.05 2-tailed, FDR corrected. LL, UL = lower and upper 95% confidence interval.

Note. Study (CAP = -.5, LTS = .5), Sex (Male = 0, Female = 1), Adopted (0=Not, 1=Adopted); Age was centered at 16 years; White (0=non-White, 1=White); Hispanic (0=non-Hispanic, 1= Hispanic); ε2 number of alleles (0,1,2); ε4 number of alleles (0,1,2). A=Adopted, C=Control, DZ=dizygotic twins; MZ=monozygotic twins. *N* = 1321.

Table S6. Multilevel random effects of IQ across Year 7, 12 and 16 assessments: adding sex by project, race and ethnicity covariates.

		Verbal IQ				Performance IQ				Full Scale IQ			
Random Effects		**Model I**		**Model II**		**Model I**		**Model II**		**Model I**		**Model II**	
Intercept		σ^2	**se**	σ^2	**se**	σ^2	**se**	σ^2	**se**	σ^2	**se**	σ^2	**se**
$\sigma^2_{between}$	A	16.21	12.32 -	15.07	12.30 -	0.96	18.00 -	1.77	18.02 -	13.92	13.31 -	13.50	13.26 -
	C	47.37	11.01 c	49.00	10.95 c	21.06	11.34 a	22.94	11.41 a	40.79	10.37 c	42.12	10.30 c
	DZ	109.30	14.87 c	108.74	14.81 c	49.68	9.67 c	47.78	9.51 c	79.80	11.70 c	78.70	11.59 c
	MZ	142.32	14.42 c	143.07	14.50 c	112.10	11.89 c	111.14	11.81 c	128.36	12.88 c	128.19	12.87 c
σ^2_{within}	A	59.83	13.76 c	61.27	13.94 c	108.09	22.00 c	106.76	21.85 c	76.59	15.32 c	76.91	15.32 c
	C	32.64	8.41 c	30.21	8.12 c	56.61	12.50 c	55.11	12.39 c	37.17	8.42 c	35.35	8.19 c
	DZ	49.24	6.79 c	48.88	6.76 c	53.27	7.62 c	53.30	7.62 c	49.11	6.35 c	48.86	6.33 c
	MZ	1.48	1.97 -	1.47	1.97 -	4.47	2.32 a	4.47	2.32 a	2.49	1.50 a	2.49	1.50 a
$\sigma^2_{residual}$	A	49.13	3.73 c	49.13	3.73 c	52.53	3.97 c	52.50	3.97 c	37.50	2.84 c	37.49	2.84 c
	C	44.29	3.07 c	44.27	3.07 c	57.46	3.97 c	57.49	3.98 c	33.09	2.28 c	33.11	2.28 c
	DZ	43.58	2.39 c	43.58	2.39 c	53.81	2.97 c	53.82	2.97 c	33.17	1.82 c	33.18	1.82 c
	MZ	46.77	2.45 c	46.78	2.45 c	50.97	2.63 c	50.97	2.63 c	33.24	1.73 c	33.24	1.73 c

[a]p < .05, [b]p < .01, [c]p < .001; [f]p<.05 1-tailed, FDR corrected, [t]p<.05 2-tailed, FDR corrected

Note. *N* = 1321. Covariates included: Study (CAP = -.5, LTS = .5), Sex (Male = 0, Female = 1), Adopted (0=Not, 1=Adopted); Age was centered at 16 years; White (0=non-White, 1=White); Hispanic (0=non-Hispanic, 1= Hispanic); ε2 number of alleles (0,1,2); ε4 number of alleles (0,1,2). Random effects by family type are denoted as: A=Adoptive, C=Control, DZ=dizygotic twins, MZ=monozygotic twins. σ^2_{within} = variance in IQ performance within sibships that is systematic across assessments (indicative of sibling dissimilarity); $\sigma^2_{between}$ = variance in IQ performance between sibships that is systematic across assessments (indicative of sibling similarity); $\sigma^2_{residual}$ = within-person, occasion-specific variance.

Table S7. Multilevel fixed effects of *APOE* ε4 on IQ across Year 7, 12 and 16 assessments: testing for non-additivity of *APOE* ε4 heterozygotes

Verbal IQ		**Model I.a**				**Model I.b**				**Model I.c**		
Fixed Effects	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**
Intercept	103.28	1.72 [c]	99.90	106.65	107.75	2.11 [c]	103.61	111.89	107.84	2.37 [c]	103.19	112.49
Study	-7.48	1.16 [c]	-9.76	-5.20	-7.47	1.15 [c]	-9.73	-5.20	-7.46	1.15 [c]	-9.73	-5.20
Adopted	-3.45	0.99 [c]	-5.38	-1.52	-3.53	0.98 [c]	-5.44	-1.62	-3.53	0.98 [c]	-5.44	-1.61
Sex	-1.88	0.73 [a]	-3.32	-0.43	-1.84	0.73 [a]	-3.28	-0.40	-1.84	0.73 [a]	-3.28	-0.40
Sex*study	3.41	1.47 [a]	0.53	6.29	3.32	1.47 [a]	0.44	6.19	3.32	1.47 [a]	0.44	6.20
Age	-0.36	0.03 [c]	-0.43	-0.30	-0.36	0.03 [c]	-0.43	-0.30	-0.36	0.03 [c]	-0.43	-0.30
White	1.02	1.32 [-]	-1.57	3.61	0.95	1.31 [-]	-1.62	3.53	0.96	1.32 [-]	-1.62	3.54
Hispanic	-5.41	1.99 [b]	-9.32	-1.50	-5.28	1.99 [b]	-9.19	-1.38	-5.28	1.99 [b]	-9.19	-1.38
ε2 additive	-0.48	0.86 [-]	-2.17	1.20	3.80	1.45 [b]	0.95	6.65	3.80	1.45 [b]	0.95	6.65
ε4 additive	-1.73	0.70 [a]	-3.10	-0.37	-1.75	0.69 [a]	-3.11	-0.39	-1.65	1.30 [-]	-4.20	0.89
ε2 dominance	--	--	--	--	-6.04	1.67 [c]	-9.31	-2.78	-6.04	1.67 [c]	-9.31	-2.78
ε4 dominance	--	--	--	--	--	--	--	--	-0.12	1.44 [-]	-2.94	2.70
Performance IQ		**Model I.a**				**Model I.b**				**Model I.c**		
Fixed Effects	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**
Intercept	102.68	1.75 [c]	99.25	106.10	105.41	2.12 [c]	101.25	109.58	106.59	2.41 [c]	101.85	111.32
Study	-10.10	1.07 [c]	-12.21	-8.00	-10.12	1.07 [c]	-12.22	-8.02	-10.07	1.07 [c]	-12.17	-7.97
Adopted	-1.35	1.06 [-]	-3.43	0.74	-1.39	1.06 [-]	-3.48	0.69	-1.35	1.06 [-]	-3.44	0.73
Sex	-1.14	0.70 [-]	-2.50	0.23	-1.13	0.69 [-]	-2.49	0.23	-1.13	0.69 [-]	-2.49	0.23
Sex*study	3.98	1.39 [b]	1.25	6.71	3.96	1.39 [b]	1.24	6.69	3.94	1.39 [b]	1.21	6.66
Age	-0.79	0.03 [c]	-0.86	-0.72	-0.79	0.03 [c]	-0.86	-0.72	-0.79	0.03 [c]	-0.86	-0.72
White	1.03	1.38 [-]	-1.68	3.73	1.02	1.38 [-]	-1.69	3.72	1.10	1.38 [-]	-1.61	3.80
Hispanic	-0.07	1.82 [-]	-3.63	3.49	0.08	1.82 [-]	-3.49	3.64	0.10	1.82 [-]	-3.45	3.66
ε2 additive	-0.28	0.84 [-]	-1.92	1.37	2.36	1.44 [-]	-0.47	5.19	2.33	1.44 [-]	-0.50	5.16
ε4 additive	-1.86	0.70 [b]	-3.24	-0.48	-1.85	0.70 [b]	-3.23	-0.48	-0.62	1.37 [-]	-3.31	2.08
ε2 dominance	--	--	--	--	-3.77	1.68 [a]	-7.06	-0.48	-3.74	1.68 [a]	-7.03	-0.45
ε4 dominance	--	--	--	--	--	--	--	--	-1.59	1.51 [-]	-4.55	1.37
Full Scale IQ		**Model I.a**				**Model I.b**				**Model I.c**		
Fixed Effects	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**	**B**	**se**	**LL**	**UL**
Intercept	102.89	1.66 [c]	99.64	106.15	106.98	2.03 [c]	103.00	110.97	107.63	2.29 [c]	103.13	112.13
Study	-9.51	1.09 [c]	-11.65	-7.36	-9.51	1.09 [c]	-11.65	-7.38	-9.49	1.09 [c]	-11.63	-7.36
Adopted	-2.75	1.00 [b]	-4.71	-0.79	-2.82	0.99 [b]	-4.77	-0.88	-2.81	0.99 [b]	-4.75	-0.86
Sex	-1.67	0.70 [a]	-3.03	-0.30	-1.64	0.70 [a]	-3.01	-0.28	-1.65	0.70 [a]	-3.01	-0.28

Sex*study	4.01	1.40 [b]	1.27	6.75	3.95	1.39 [b]	1.22	6.68	3.95	1.39	[b]	1.22	6.68
Age	-0.63	0.03 [c]	-0.69	-0.58	-0.63	0.03 [c]	-0.69	-0.58	-0.63	0.03	[c]	-0.69	-0.58
White	1.17	1.28 [-]	-1.34	3.69	1.13	1.28 [-]	-1.38	3.63	1.16	1.28	[-]	-1.34	3.67
Hispanic	-3.01	1.85 [-]	-6.63	0.61	-2.85	1.84 [-]	-6.47	0.77	-2.84	1.84	[-]	-6.46	0.77
ε2 additive	-0.54	0.83 [-]	-2.17	1.09	3.39	1.40 [a]	0.64	6.14	3.36	1.40	[a]	0.61	6.11
ε4 additive	-2.04	0.68 [b]	-3.37	-0.71	-2.04	0.68 [b]	-3.37	-0.72	-1.37	1.28	[-]	-3.88	1.13
ε2 dominance	--	--	--	--	-5.56	1.61 [c]	-8.73	-2.40	-5.54	1.61	[c]	-8.71	-2.38
ε4 dominance	--	--	--	--	--	--	--	--	-0.88	1.41	[-]	-3.64	1.89

[a]p < .05, [b]p < .01, [c]p < .001

Note. Covariates coded as follows: Study (CAP = -.5, LTS = .5), Sex (Male = 0, Female = 1), Adopted (0=Not, 1=Adopted); Age was centered at 16 years; White (0=non-White, 1=White); Hispanic (0=non-Hispanic, 1= Hispanic); ε2 additive for 0 , 1, and 2 alleles (-1,0,1); ε4 additive for 0 , 1, and 2 alleles (-1,0,1); ε2 dominance for 0 , 1, and 2 alleles (0,1,0); ε4 dominance for 0 , 1, and 2 alleles (0,1,0). For Model 1.a, all regression weights are identical to Model 1 (c.f. Supplementary Table S4) apart from the intercept, which now reflects the average IQ across those with ε2/ε2 and ε4/ε4 genotypes.

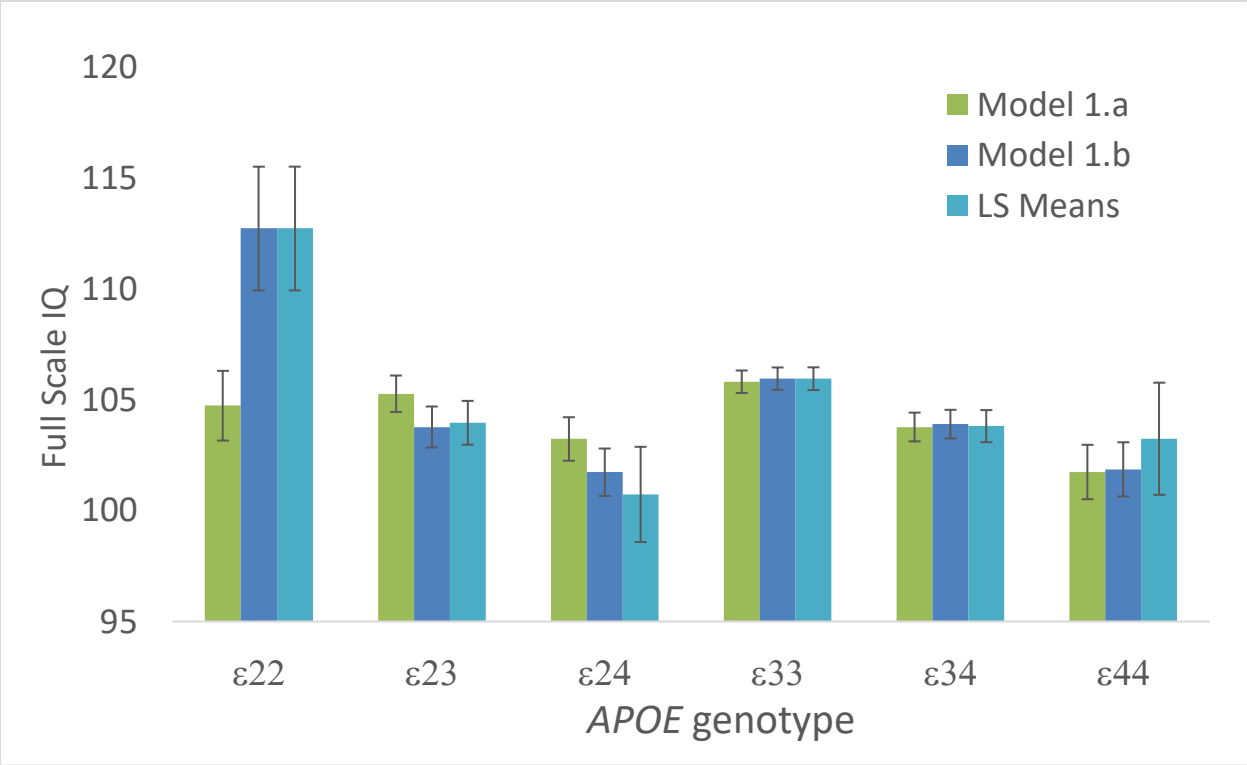

Figure S1. Comparison of Full scale IQ means by models testing for APOE ε2 and ε4 additive effects (Model 1.a) plus ε2 non-additive effects (Models 1.b), versus a no model imposed on APOE genotypes (LS means).

Figure Note. Standard errors shown. Analyses adjusted for nesting of individuals within family type. Estimated means assumed 0 values on all covariates, except for sex which was averaged across males and females (sex = .5) and race (White = 1). In models 1.a and 1.b, *APOE* additive effects were entered for ε2 and ε4. In Model 1.b, the ε2 dominance effect is entered. For the means reported under the label 'LS Means', the same covariate adjustments are made but with no model imposed on genotypes.

Analysis notes (cf., 3.2.1 *Tests of non-additivity*). Figure S1 displays Full scale IQ by *APOE* genotypes, with expected mean IQ values based on Models 1.a and Model 1.b (see Table S7 above) as well as least-squares estimated means adjusted for the same covariates but with no model assumptions for *APOE* genotypes (i.e., *APOE* genotype is treated as a class variable). As indicated in the figure, the Model 1.b estimated means are closer to the least-squares means. The highest IQ was observed for *APOE* ε2/ε2 homozygotes versus all other genotypes, followed by ε3/ε3, and the lowest performance was among those who carry one or more ε4 alleles. Based on the model-free least-squares estimates (LS means), ε2/ε2 differed from all other *APOE* genotypes [contrast = 9.1872 (se= 2.8591); *t* (107) = 3.21, p = .0017]. Although ε2/ε4 displayed the lowest expected IQ, ε2/ε4 did not differ significantly from ε3/ε4 and ε4/ε4 [contrast = -2.7982 (se = 2.5029); *t* (107) = -1.12, p = .2661]. Last, ε3/ε3 differed significantly from ε2/ε4, ε3/ε4 and ε4/ε4 collectively [contrast = 3.3606 (se= 1.2080); *t* (107) = 2.78, p = .0064].