Supplementary Materials for Haworth et al. The heritability of general cognitive ability increases linearly from childhood to young adulthood

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Supplementary Table 1: Means (and Standard Deviations) for General Cognitive Ability (g) by Zygosity and Sex at Each Site and ANOVA Results

		g	Zygosity		Sex		ANOVA		
GHCA Site	Mean Age (SD) and Range	All	MZ	DZ	Female	Male	Zygosity	Sex	Zygosity* sex
US Ohio	6.07 (0.68) 4.33-7.92	0.00 (1.00) n = 586	0.03 (1.06) n = 244	-0.01 (0.96) n = 342	-0.04 (1.03) n = 339	0.06 (0.97) n = 247	*p* =0 .920 $\eta^2 < 0.001$	*p* = 0.324 $\eta^2 = 0.003$	*p* = 0.525 $\eta^2 = 0.001$
United Kingdom	11.57 (0.69) 10.08-13.74	0.00 (1.00) n = 8508	-0.06 (0.98) n = 3156	0.03 (1.01) n = 5352	-0.07 (0.99) n = 4762	0.09 (1.00) n = 3746	*p* = 0.002 $\eta^2 = 0.002$	*p* < 0.001 $\eta^2 = 0.004$	*p* = 0.126 $\eta^2 = 0.001$
US Minnesota	13.00 (2.83) 11.00-17.00	0.00 (1.00) n = 3740	-0.01 (1.00) n = 2374	0.02 (1.00) n = 1366	-0.13 (1.00) n = 1948	0.14 (0.98) n = 1792	*p* = 0.495 $\eta^2 < 0.001$	*p* < 0.001 $\eta^2 = 0.011$	*p* = 0.064 $\eta^2 = 0.002$
US Colorado	13.12 (3.86) 6.00 – 25.00	0.00 (1.00) n = 5728	-0.06 (0.99) n = 2600	0.05 (1.00) n = 3128	-0.08 (0.99) n = 2931	0.08 (1.01) n = 2797	*p* = .003 $\eta^2 = 0.003$	*p* < .001 $\eta^2 = 0.006$	*p* = .052 $\eta^2 = 0.001$
Australia	16.00 (0.45) 15.00-22.00	0.00 (1.00) n = 1713	-0.05 (0.99) n = 679	0.03 (1.01) n = 1034	-0.14 (0.98) n = 888	0.15 (1.00) n = 825	*p* = 0.376 $\eta^2 = 0.001$	*p* < 0.001 $\eta^2 = 0.018$	*p* = 0.228 $\eta^2 = 0.002$
Netherlands	17.99 (14.47) 5.67-71.03	0.00 (1.00) n = 1917	-0.02 (1.01) n = 874	0.02 (0.99) n = 1043	-0.04 (1.02) n = 1022	0.05 (0.98) n = 895	*p* = 0.494 $\eta^2 < 0.001$	*p* = 0.056 $\eta^2 = 0.004$	*p* = 0.811 $\eta^2 < 0.001$

Note. MZ = monozygotic; DZ = dizygotic; η^2 = eta squared (effect size). n indicates number of individuals. ANOVA performed on one randomly selected member of each twin pair.

Results from the ANOVA indicate significant effects of sex on four of the six samples, with males scoring higher than females, although effect sizes of this effect are small. There were significant effects of zygosity in two of the six samples and a significant interaction between sex and zygosity in one sample.

Supplementary Table 2: Individual Differences Model-fitting Results for each Site: Model Fit and Parameter Estimates (95% confidence intervals in parentheses)

GHCA Site	Model	$\Delta\chi^2$	Δdf	p	AIC	A	C	E
US Ohio	**ACE**					0.32 (0.10 - 0.55)	0.42 (0.20 - 0.60)	0.26 (0.20 - 0.34)
	No A	8.045	1	0.005	6.045		0.65 (0.58 - 0.71)	0.35 (0.29 - 0.42)
	No C	11.932	1	0.001	9.932	0.75 (0.68 - 0.80)		0.25 (0.20 - 0.32)
United Kingdom	**ACE**					0.48 (0.40 - 0.55)	0.19 (0.13 - 0.26)	0.33 (0.31 - 0.36)
	No A	141.899	1	1.02×10^{-32}	139.899		0.52 (0.50 - 0.54)	0.48 (0.46 - 0.50)
	No C	31.246	1	2.27×10^{-8}	29.246	0.68 (0.66 - 0.71)		0.32 (0.29 - 0.34)
US Minnesota	**ACE**					0.54 (0.44 - 0.66)	0.22 (0.11 - 0.32)	0.23 (0.21 - 0.26)
	No A	140.557	1	2.01×10^{-32}	138.557		0.66 (0.64 - 0.69)	0.34 (0.31 - 0.36)
	No C	14.233	1	0.0002	12.233	0.77 (0.75 - 0.79)		0.23 (0.21 - 0.25)
US Colorado	**ACE**					0.61 (0.54 - 0.68)	0.22 (0.15 - 0.28)	0.17 (0.16 - 0.19)
	No A	357.631	1	9.23×10^{-80}	355.631		0.66 (0.64 - 0.68)	0.34 (0.32 - 0.36)
	No C	33.645	1	6.61×10^{-9}	31.645	0.83 (0.82 - 0.85)		0.17 (0.15 - 0.18)
Australia	ACE					0.70 (0.57 - 0.83)	0.13 (0.00 - 0.25)	0.17 (0.16 - 0.19)

	No A	113.403	1	1.76×10^{-26}	111.403		0.62 (0.57 - 0.66)	0.38 (0.34 - 0.43)
	No C	3.592	1	0.058	1.592	0.83 (0.80 - 0.85)		0.17 (0.15 - 0.20)
Netherlands	**ACE**					0.44 (0.34 - 0.56)	0.38 (0.26 - 0.48)	0.18 (0.16 - 0.21)
	No A	74.020	1	7.73×10^{-18}	72.020		0.70 (0.67 - 0.74)	0.30 (0.27 - 0.33)
	No C	33.471	1	7.23×10^{-9}	31.471	0.82 (0.80 - 0.85)		0.18 (0.15 - 0.20)

Note. Two fit indices are reported: Δchi-squared (χ^2) and Akaike's information criterion, (AIC [44]). The 'No A' (CE) and 'No C' (AE) models are nested within the ACE model. The best fitting model (in boldface) was chosen on the basis of a change in χ^2 not representing a significant worsening of fit (for a change of *df* of 1, the statistically significant change in χ^2 is 3.84).

Δ*df* = change in degrees of freedom; A = additive genetic influence; C = shared environmental influence; E = nonshared environmental influence.

Univariate continuous analyses on each sample indicate that genetic, shared and non-shared environmental influences were significant in all samples, apart from the Australian sample where an AE ('No C') model provided the best fit.

A standard heterogeneity model was then applied to the data to assess significance of heterogeneity across the six samples. There was significant overall heterogeneity between the six samples (difference in chi squared = 212.275, difference in df = 15, p = 6.73×10^{-37}, AIC = -182.275). The A estimates are correlated with the average age of the samples with the exception of the Netherlands sample which included twins of a wide age range. Estimates from the equated model were A = 0.55 (0.51-0.59); C = 0.21 (0.17-0.25); E = 0.24 (0.23-0.25).

Supplementary Table 3: Means (and Standard Deviations) for General Cognitive Ability (g) by Zygosity and Sex by Age Category and ANOVA Results

		g	Zygosity		Sex		ANOVA		
Age Category	**Mean Age (SD) and Range**	**All**	**MZ**	**DZ**	**Female**	**Male**	**Zygosity**	**Sex**	**Zygosity* sex**
Childhood	9.01 (1.79) 4.33 – 10.99	-0.11 (1.01) n = 5391	-0.17 (1.01) n = 2194	-0.07 (1.00) n = 3197	-0.17 (0.99) n = 2892	-0.04 (1.02) n = 2499	$p = .004$ $\eta^2 = 0.003$	$p = .010$ $\eta^2 = 0.002$	$p = .867$ $\eta^2 < 0.001$
Adolescence	11.62 (0.56) 11.00 – 13.00	0.07 (0.99) n = 9950	0.01 (0.98) n = 4476	0.11 (1.00) n = 5474	-0.01 (1.00) n = 5316	0.15 (0.98) n = 4634	$p < .001$ $\eta^2 = 0.003$	$p < .001$ $\eta^2 = 0.004$	$p = .074$ $\eta^2 = 0.001$
Young Adulthood	16.89 (2.40) 14.00 – 33.88	-0.01 (1.00) n = 6177	-0.02 (1.02) n = 3014	0.01 (0.97) n = 3163	-0.12 (0.98) n = 3251	0.12 (1.00) n = 2926	$p = .523$ $\eta^2 < 0.001$	$p < .001$ $\eta^2 = 0.015$	$p = .735$ $\eta^2 < 0.001$
Combined Sample	12.48 (3.40) 4.33 – 33.88	0.00 (1.00) n = 21518	-0.04 (1.00) n = 9684	0.03 (1.00) n = 11834	-0.08 (0.99) n = 11459	0.09 (1.00) n = 10059	$p < .001$ $\eta^2 = 0.002$	$p < .001$ $\eta^2 = 0.006$	$p = .236$ $\eta^2 < 0.001$

Note. MZ = monozygotic; DZ = dizygotic; η^2 = eta squared (effect size). n indicates number of individuals. ANOVA performed on one randomly selected member of each twin pair.