

The Big Five Across Socioeconomic Status:

Measurement Invariance, Relationships, and Age Trends

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Supplemental Material

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Sample Size Tables

In the following tables we report the sample sizes predicted from the masked data and those observed in the confirmatory data. There are discrepancies between these values for at least two reasons. First, for the measurement invariance analysis we preregistered including students in the stage 1 registered report but excluded them from our sample size estimates. This resulted in an additional 600+ observations for each of these analyses. Second, for the regression analyses there was a coding error in the script that assigned the occupational indices to participants resulting in the exclusion of participants from the predicted sample sizes that did not meet exclusion criteria set forth in the stage 1 registered report. This error was corrected in the confirmatory analyses and these participants were included resulting in larger sample sizes than predicted for the analyses with occupational prestige.

Table S1

Predicted and Observed Sample Sizes for HI Measurement Invariance Analysis Across Occupational Prestige

Trait	N		High Occupational Prestige		Medium Occupational Prestige		Low Occupational Prestige		Student	
	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed
extra	2288	3226	299	355	1681	1863	308	321	na	687
agree	2322	3290	323	388	1635	1808	364	384	na	710
consc	2284	3224	301	358	1672	1854	311	324	na	688
neuro	2279	3220	299	357	1671	1851	309	322	na	690
open	2307	3268	322	386	1626	1797	359	379	na	706

Note. The values in the Occupational Prestige categories reflects the *N* for each category.

Table S2*Sample Sizes and Demographics for HI Measurement Invariance Analysis Across Occupational Income*

Trait	N		High Occupational Income		Medium Occupational Income		Low Occupational Income		Students	
	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed
extra	2611	3196	477	373	1672	1662	462	474	na	687
agree	2631	3245	468	363	1638	1639	525	533	na	710
consc	2609	3193	481	376	1664	1653	464	476	na	688
neuro	2602	3188	478	375	1664	1651	460	472	na	690
open	2617	3225	468	363	1629	1628	520	528	na	706

Note. The values in the occupational income categories reflects the *N* for each category

Table S3*Sample Sizes and Demographics for HI Measurement Invariance Analysis Across Income*

Trait	N		< 25		25 - 50		50 - 75		75 – 150		> 150		students	
	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed
extra	3032	3222	537	321	761	678	580	504	820	744	334	288	na	687
agree	3033	3235	526	335	741	639	639	568	816	730	311	253	na	710
consc	3036	3225	536	320	762	679	581	504	821	744	336	290	na	688
neuro	3025	3217	533	317	762	679	579	502	814	738	337	291	na	690
open	3013	3217	516	330	738	636	634	562	811	727	314	256	na	706

Note. Income is in thousands of dollars. The values in the income categories reflects the *N* for each category.

Table S4*Sample Sizes and Demographics for HI Measurement Invariance Analysis Across Education*

Trait	N		No college		Some college or AA		Bachelor's degree		Graduate degree		Students	
	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed
extra	3393	3231	227	227	1228	795	1096	888	842	743	na	578
agree	3454	3306	278	278	1225	794	1057	863	894	789	na	582
consc	3393	3231	227	227	1230	794	1095	888	841	742	na	580
neuro	3389	3227	229	229	1226	791	1093	885	841	741	na	581
open	3434	3284	275	275	1218	783	1051	860	890	788	na	578

Note. The values in the education categories reflects the *N* for each category.

Table S5
Sample Sizes and Demographics for H2 Regression Analysis

Trait	N	
	Predicted	Observed
extra	1694	1921
agree	1692	1954
consc	1692	1921
neuro	1686	1921
open	1714	1954

Table S6*Predicted and Observed Sample Sizes for H3 Age Trends Moderated by SES Analysis*

Trait	Income		Education		Occupational Prestige		Occupational Income	
	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed
extra	2213	2081	2306	2162	1765	1999	2053	1981
agree	2225	2106	2346	2213	1821	2056	2095	2027
consc	2214	2081	2308	2162	1763	1999	2053	1981
neuro	2207	2081	2302	2162	1758	1999	2047	1981
open	2211	2106	2331	2213	1809	2056	2084	2027

Analyses with Confirmatory Data

Hypothesis 1

Table S7

Latent Mean Differences across Education in Fully-Invariant Models

	No college			Some college			Graduate degree		
	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>
E	0.03	[-0.12, 0.19]	0.03	0.02	[-0.09, 0.13]	0.02	0.03	[-0.08,0.14]	0.03
A	-0.16	[-0.28, -0.03]	-0.20	-0.01	[-0.09, 0.08]	-0.01	-0.02	[-0.1,0.07]	-0.02
C	-0.23	[-0.34, -0.12]	-0.36	-0.04	[-0.11, 0.02]	-0.07	0.05	[-0.02,0.12]	0.08
N	0.17	[0.04, 0.30]	0.21	0.06	[-0.02, 0.15]	0.08	-0.04	[-0.12,0.05]	-0.04
O	-0.15	[-0.27, -0.03]	-0.19	-0.09	[-0.17, 0.00]	-0.11	0.05	[-0.03,0.13]	0.06

Note. Each represents the latent mean difference between the group in the column header and the largest group (Bachelor's degree holders in this case). E = extraversion; A = agreeableness; C = conscientiousness; N = neuroticism; O = openness. 'Diff.' corresponds to the (raw) difference in latent means; 95% CI corresponds to the 95% Confidence Interval around the (raw) latent mean difference; *d* corresponds to cohen's *d* for that difference.

Table S8*Latent Mean Differences across Self-Reported Income in Fully-Invariant Models*

	>150,000			50,000 - 74,999			25,000 - 49,999			< 25,000		
	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>
E	0.27	[0.10, 0.43]	0.25	0.04	[-0.09, 0.16]	0.04	-0.05	[-0.17, 0.06]	-0.05	-0.13	[-0.29, 0.02]	-0.12
A	0.04	[-0.08, 0.17]	0.06	0.03	[-0.07, 0.12]	0.03	-0.01	[-0.10, 0.08]	-0.02	0.01	[-0.11, 0.13]	0.01
C	-0.02	[-0.12, 0.07]	-0.04	-0.09	[-0.16, -0.01]	-0.14	-0.09	[-0.17, -0.02]	-0.15	-0.23	[-0.32, -0.14]	-0.37
N	-0.22	[-0.34, -0.09]	-0.26	-0.03	[-0.13, 0.07]	-0.04	0.10	[0.00, 0.19]	0.12	0.28	[0.15, 0.40]	0.33
O	0.08	[-0.04, 0.20]	0.10	0.04	[-0.05, 0.13]	0.05	-0.08	[-0.17, 0.01]	-0.10	0.05	[-0.05, 0.16]	0.07

Note. Each represents the latent mean difference between the group in the column header and the largest group (75,000 – 149,999). E = extraversion; A = agreeableness; C = conscientiousness; N = neuroticism; O = openness. ‘Diff.’ corresponds to the (raw) difference in latent means; 95% CI corresponds to the 95% Confidence Interval around the (raw) latent mean difference; *d* corresponds to cohen’s *d* for that difference.

Table S9*Latent Mean Differences across Occupational-Derived Income in Fully-Invariant Models*

	Low			High		
	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>
Extraversion	-0.01	[-0.13, 0.11]	-0.01	-0.09	[-0.22, 0.03]	-0.09
Agreeableness	0.00	[-0.09, 0.09]	0.00	-0.21	[-0.31, -0.12]	-0.27
Conscientiousness	-0.12	[-0.19, -0.04]	-0.19	-0.09	[-0.16, -0.02]	-0.14
Neuroticism	0.15	[0.05, 0.24]	0.18	-0.06	[-0.15, 0.03]	-0.07
Openness	-0.18	[-0.27, -0.09]	-0.24	0.00	[-0.09, 0.08]	0.00

Note. Each represents the latent mean difference between the group in the column header and the largest group (Median). E = extraversion; A = agreeableness; C = conscientiousness; N = neuroticism; O = openness. ‘Diff.’ corresponds to the (raw) difference in latent means; 95% CI corresponds to the 95% Confidence Interval around the (raw) latent mean difference; *d* corresponds to cohen’s *d* for that difference.

Table S10*Latent Mean Differences across Occupational Prestige in Fully-Invariant Models*

	Low			High		
	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>
E	0.07	[-0.06, 0.20]	0.06	-0.22	[-0.35, -0.10]	-0.21
A	-0.11	[-0.21, -0.01]	-0.13	-0.23	[-0.32, -0.14]	-0.29
C	-0.14	[-0.22, -0.06]	-0.22	-0.12	[-0.2, -0.05]	-0.19
N	0.14	[0.04, 0.24]	0.18	-0.03	[-0.13, 0.06]	-0.04
O	-0.07	[-0.17, 0.02]	-0.10	0.01	[-0.07, 0.10]	0.02

Note. Each represents the latent mean difference between the group in the column header and the largest group (Median). E = extraversion; A = agreeableness; C = conscientiousness; N = neuroticism; O = openness. ‘Diff.’ corresponds to the (raw) difference in latent means; 95% CI corresponds to the 95% Confidence Interval around the (raw) latent mean difference; *d* corresponds to cohen’s *d* for that difference.

Table S11*Latent Mean Differences across Education in Partially-Invariant Models*

	No college			Some college			Graduate degree		
	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>
E	---	---	---	---	---	---	---	---	---
A	---	---	---	---	---	---	---	---	---
C	-0.23	[-0.34, -0.12]	-0.36	-0.08	[-0.14, -0.01]	-0.12	0.08	[0.01, 0.15]	0.13
N	0.17	[0.03, 0.30]	0.20	0.06	[-0.03, 0.15]	0.07	0.00	[-0.09, 0.09]	-0.01
O	-0.12	[-0.24, 0.00]	-0.15	-0.08	[-0.16, 0.01]	-0.10	0.04	[-0.05, 0.12]	0.05

Note. Each represents the latent mean difference between the group in the column header and the largest group (Bachelor’s degree holders in this case). E = extraversion; A = agreeableness; C = conscientiousness; N = neuroticism; O = openness. ‘Diff.’ corresponds to the (raw) difference in latent means; 95% CI corresponds to the 95% Confidence Interval around the (raw) latent mean difference; *d* corresponds to cohen’s *d* for that difference. Rows filled with dashes are models that demonstrated invariance and so did not have partially-invariant models.

Table S12*Latent Mean Differences across Self-Reported Income in Partially-Invariant Models*

	>150,000			50,000 - 74,999			25,000 - 49,999			< 25,000		
	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>
E	0.27	[0.10, 0.43]	0.25	0.06	[-0.07, 0.19]	0.05	-0.02	[-0.14, 0.10]	-0.02	-0.10	[-0.25, 0.06]	-0.09
A	---	---	---	---	---	---	---	---	---	---	---	---
C	---	---	---	---	---	---	---	---	---	---	---	---
N	-0.22	[-0.35, -0.10]	-0.27	-0.07	[-0.17, 0.04]	-0.08	0.04	[-0.06, 0.13]	0.04	0.19	[0.06, 0.32]	0.23
O	0.06	[-0.07, 0.18]	0.07	0.06	[-0.03, 0.16]	0.08	-0.04	[-0.13, 0.05]	-0.05	0.10	[0.00, 0.21]	0.13

Note. Each represents the latent mean difference between the group in the column header and the largest group (75,000 – 149,999). E = extraversion; A = agreeableness; C = conscientiousness; N = neuroticism; O = openness. ‘Diff.’ corresponds to the (raw) difference in latent means; 95% CI corresponds to the 95% Confidence Interval around the (raw) latent mean difference; *d* corresponds to cohen’s *d* for that difference. Rows filled with dashes are models that demonstrated invariance and so did not have partially-invariant models.

Table S13*Latent Mean Differences across Occupational-Derived Income in Partially-Invariant Models*

	Low			High		
	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>
Extraversion	---	---	---	---	---	---
Agreeableness	---	---	---	---	---	---
Conscientiousness	---	---	---	---	---	---
Neuroticism	---	---	---	---	---	---
Openness	-0.17	[-0.26, -0.08]	-0.21	-0.01	[-0.10, 0.08]	-0.01

Note. Each represents the latent mean difference between the group in the column header and the largest group (Median). E = extraversion; A = agreeableness; C = conscientiousness; N = neuroticism; O = openness. ‘Diff.’ corresponds to the (raw) difference in latent means; 95% CI corresponds to the 95% Confidence Interval around the (raw) latent mean difference; *d* corresponds to cohen’s *d* for that difference.

Table S14*Latent Mean Differences across Occupational Prestige in Partially-Invariant Models*

	Low			High		
	Diff.	95% CI	<i>d</i>	Diff.	95% CI	<i>d</i>
E	0.11	[-0.02, 0.24]	0.10	-0.22	[-0.34, -0.09]	-0.20
A	---	---	---	---	---	---
C	-0.10	[-0.18, -0.01]	-0.16	-0.02	[-0.10, 0.06]	-0.03
N	---	---	---	---	---	---
O	-0.05	[-0.15, 0.04]	-0.07	0.03	[-0.06, 0.11]	0.03

Note. Each represents the latent mean difference between the group in the column header and the largest group (Median). E = extraversion; A = agreeableness; C = conscientiousness; N = neuroticism; O = openness. ‘Diff.’ corresponds to the (raw) difference in latent means; 95% CI corresponds to the 95% Confidence Interval around the (raw) latent mean difference; *d* corresponds to cohen’s *d* for that difference.

Hypothesis 3

Table S15

Unstandardized Regression Coefficients from Age Trend Linear Regression Models (H3) with Partial Observed Scale Scores, Confirmatory Data

	Big Five Personality Trait (dependent variable)			
	Extraversion	Conscientiousness	Neuroticism	Openness
<i>Self-report Income</i>				
Age	0.01 (0.46)		-1.71*** (0.46)	1.35*** (0.29)
Income	1.57*** (0.55)		-1.49*** (0.55)	-0.92* (0.34)
Age X Income	0.27 (0.37)		-0.08 (0.37)	0.34 (0.23)
Observations	2081		2081	2106
<i>Educational Attainment</i>				
Age		2.78*** (0.39)	-2.71*** (0.43)	0.79* (0.32)
Education		2.14*** (0.62)	-1.72* (0.69)	-0.16 (0.49)
Age X Education		-1.01* (0.39)	0.87* (0.43)	1.13*** (0.31)
Observations		2162	2162	2213
<i>Occupational Prestige</i>				
Age	0.69 (0.44)			1.48*** (0.30)
Occ Prestige	-0.02 (0.06)			0.00 (0.04)
Age X Occ Prestige	0.08 (0.05)			0.03 (0.03)
Observations	1999			2056
<i>Occupational Income</i>				
Age	1.01 (0.44)	2.48*** (0.35)	-2.65*** (0.41)	1.45*** (0.30)
Occ Income	0.08*** (0.03)	0.03 (0.02)	-0.05 (0.03)	-0.02 (0.02)
Age X Occ Income	-0.00 (0.02)	-0.02 (0.02)	-0.03 (0.02)	0.02 (0.01)
Observations	1981	1981	1981	2027

Note. Standard error in parentheses. * $p < .05$, *** $p < .005$

Analyses with Exploratory Data

Table S16

Descriptive Statistics for the AIID Confirmatory Data Big Five Traits, Exploratory Data

Trait	N	Mean	SD	Cronbach's Alpha
Extraversion	445	3.82	1.05	.87
Agreeableness	457	4.39	0.78	.79
Conscientiousness	445	4.35	0.82	.82
Neuroticism	445	3.28	0.98	.84
Openness	457	4.71	0.79	.83

Note. BFI traits measured on 6-point Likert scale.

Hypothesis 2

Table S17

Zero-order Correlations Between Observed Scale and Reduced Observed Scale Scores and SES Indicators, Exploratory Data

Trait	Income	Education	Occupational Prestige	Occupational Income
Extraversion	.11* (.10)*	.05	.00 (.01)	.03
Agreeableness	.01	-.07	-.09	-.08
Conscientiousness	.12*	.06 (.06)	.09 (.09)	.04
Neuroticism	-.10* (-.08)	-.02 (.00)	-.04	-.09
Openness	-.06 (-.09)	.10* (.07)	.13* (.13)*	.06 (.05)

Note. Correlations in parentheses indicate the correlations with reduced observed scales with noninvariant items removed and SES indicators. Significance was consistent between observed scales and reduced observed scales. * $p < .05$, *** $p < .005$.

Table S18

Standardized Regression Coefficients from Models Regressing Observed and Reduced Observed Scores of Big Five Traits on three indicators of SES, Exploratory Data

Trait	Dependent variable		
	Income	Education	Occupational Prestige
Extraversion	.16*	.03	-.07
<i>Income</i>	.14*	.01	-.06
<i>Occ Prestige</i>	.14*	.02	-.05
Agreeableness	.04	-.08	-.06
Conscientiousness	.10	.00	.05
<i>Education</i>	.13*	-.01	.04
<i>Occ Prestige</i>	.12*	.01	.05
Neuroticism	-.10	.04	-.01
<i>Education</i>	-.10	.05	-.02
<i>Income</i>	-.08	.06	-.03
Openness	-.10	.14*	.10
<i>Education</i>	-.13*	.09	.11
<i>Income</i>	-.13*	.11	.11
<i>Occ Prestige</i>	-.14*	.10	.12
<i>Occ Income</i>	-.14*	.10	.12

Note. Models in italics are with reduced observed scores for that trait and indicator of SES as the dependent variable. * $p < .05$, *** $p < .005$

Hypothesis 3

Table S19

*Unstandardized Regression Coefficients from Age Trend Linear Regression Models (H3),
Exploratory Data*

	Big Five Personality Trait (dependent variable)				
	Extraversion	Agreeableness	Openness	Conscientiousness	Neuroticism
<i>Self-report Income</i>					
Age	-0.25 (0.99)	2.20*** (0.73)	1.95* (0.74)	2.51*** (0.76)	-2.16* (0.92)
Income	2.21* (0.91)	-0.29 (0.65)	-1.15 (0.66)	1.05 (0.70)	-1.27 (0.85)
Age X Income	1.82 (0.86)	-0.47 (0.64)	0.90 (0.66)	0.53 (0.66)	-0.98 (0.81)
Observations	431	445	445	431	431
<i>Educational Attainment</i>					
Age	0.53 (0.93)	2.16*** (0.71)	1.54* (0.72)	2.70*** (0.72)	-2.33* (0.87)
Education	0.97 (1.11)	-1.34 (0.84)	1.74* (0.85)	1.21 (0.86)	-0.35 (1.04)
Age X Education	2.32* (1.05)	0.36 (0.80)	0.96 (0.81)	-0.69* (0.81)	-1.00 (0.98)
Observations	444	457	457	444	444
<i>Occupational Prestige</i>					
Age	0.98 (1.08)	2.55*** (0.80)	1.56 (0.85)	2.58*** (0.84)	-2.21* (1.01)
Occ Prestige	0.01 (0.12)	-0.13 (0.09)	0.25* (0.09)	0.16 (0.09)	-0.11 (0.11)
Age X Occ Prestige	0.12 (0.11)	0.09 (0.09)	0.09 (0.09)	0.01 (0.09)	-0.15 (0.10)
Observations	337	344	344	337	337
<i>Occupational Income</i>					
Age	0.31 (0.99)	1.96* (0.76)	1.38 (0.77)	3.24*** (0.76)	-2.47* (0.92)
Occ Income	0.03 (0.04)	-0.05 (0.03)	0.05 (0.04)	0.03 (0.03)	-0.08 (0.04)
Age X Occ Income	0.02 (0.04)	-0.03 (0.04)	-0.01 (0.04)	0.00 (0.03)	-0.07 (0.04)
Observations	429	441	441	429	429

Note. Standard error in parentheses. *p < .05, ***p < .005.

Table S20

Unstandardized Regression Coefficients from Age Trend Linear Regression Models (H3) with Partial Observed Scale Scores, Exploratory Data

	Big Five Personality Trait (dependent variable)			
	Extraversion	Conscientiousness	Neuroticism	Openness
<i>Self-report Income</i>				
Age	-0.66 (1.04)		-1.15 (1.07)	1.72* (0.74)
Income	2.16* (0.96)		-1.38 (0.99)	-1.52* (0.66)
Age X Income	1.93* (0.91)		-1.28 (0.94)	0.97 (0.66)
Observations	431		431	445
<i>Educational Attainment</i>				
Age		3.02*** (0.78)	-2.31* (0.93)	1.13 (0.75)
Education		1.34 (0.94)	0.07 (1.11)	1.23 (0.89)
Age X Education		-0.59 (0.88)	-1.00 (1.05)	0.83 (0.84)
Observations		444	444	457
<i>Occupational Prestige</i>				
Age	0.64 (1.08)	2.68*** (0.88)		0.91 (0.86)
Occ Prestige	0.03 (0.12)	0.17 (0.09)		-0.17* (0.09)
Age X Occ Prestige	0.10 (0.11)	0.01 (0.09)		0.07 (0.09)
Observations	337	337		344
<i>Occupational Income</i>				
Age				0.73 (0.79)
Occ Income				0.03 (0.04)
Age X Occ Income				-0.02 (0.04)
Observations				441

Note. Standard error in parentheses. * $p < .05$, *** $p < .005$