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Why do very unattractive workers earn so much?☆

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ABSTRACT

Kanazawa and Still (2018) showed that very unattractive workers earned more than unattractive workers, sometimes more than average-looking or attractive workers, because they had higher levels of intelligence and education, but they did not explain *why* very unattractive workers had higher intelligence and education. There are both theoretical and empirical reasons to expect that some intelligent men may prefer to marry very unattractive women. The analysis of the National Longitudinal Study of Adolescent Health (Add Health) shows that very unattractive women were significantly more likely to be married at Age 29 than unattractive or average-looking women, and their spouses or partners earned significantly more than those of unattractive or average-looking women. If intelligent men have historically preferred to marry very unattractive women generation after generation, then, because both general intelligence and physical attractiveness are highly heritable, this can explain why very unattractive workers are more intelligent and achieve higher education, thereby earning more. It can also explain why the positive correlation between intelligence and physical attractiveness is not larger despite assortative mating of intelligent men of higher status and physically attractive women over many generations.

1. Introduction

Economists have widely documented the "beauty premium" – or, conversely, the "ugliness penalty" – on wages. Population-based surveys showed that individuals who were above average in physical attractiveness earned more money, and those who were below average in physical attractiveness earned less money, than average-looking individuals in the United States and Canada (Fletcher, 2009; Judge et al., 2009; Hamermesh and Biddle, 1994), the United Kingdom (Harper, 2000; Kinge, 2016), and Germany (Caliendo and Gehrsitz, 2016; Oreffice and Quintana-Domeque, 2016). Within specific professions, graduates of law schools who were physically more attractive made more money as lawyers after five years of practice than their classmates who were physically less attractive (Biddle and Hamermesh, 1998), and physically more attractive MBA graduates made more money in their careers in management than physically less attractive MBAs (Frieze et al., 1991). The operation of the beauty premium has also been documented in a large number of laboratory experiments (Hosoda et al., 2003; Mobius and Rosenblat, 2006). A pioneer in the field of the economics of beauty succinctly summarized the current state of knowledge in a recent book aptly titled *Beauty Pays: Why Attractive People Are More Successful* (Hamermesh, 2011).

In documenting the "beauty premium" and "ugliness penalty" on wages, all of the studies cited above grouped together "very attractive" and "attractive" individuals into the "above average" category, and "very unattractive" and "unattractive" individuals into the "below average" category. Recent evidence suggested, however, that very unattractive individuals might be qualitatively very different from unattractive individuals. For example, Kanazawa and Still (2018) showed that, while unattractive individuals earned less than others, very unattractive workers always earned more than unattractive workers, sometimes more than average-looking or even attractive workers, seemingly contrary to previous findings in the economics of beauty. In previous studies that grouped together very unattractive and unattractive workers, the positive effect of being very unattractive on earnings might have been drowned by the negative effect of being unattractive, because there were always more unattractive than very unattractive individuals in all samples. The qualitatively different nature of very unattractive workers became evident only when they were separated from unattractive workers in statistical analyses.

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Why, then, do very unattractive workers earn more than unattractive or average-looking workers? Kanazawa and Still (2018) explained the unexpectedly higher earnings of very unattractive workers in terms of their intelligence and education; very unattractive workers possessed significantly higher levels of intelligence and education than unattractive workers, sometimes higher than average-looking or attractive workers. Their higher intelligence and educational achievement can therefore explain their higher earnings. However, Kanazawa and Still (2018) did not explain *why* very unattractive workers had higher levels of intelligence or education than those who were more attractive.

Even though Kanazawa and Still did not provide an explanation for why very unattractive individuals were on average more intelligent and educated, the key to such an explanation was buried in their paper. Their Table 1 presented the interrater agreement (mean Rwg) on physical attractiveness measurement by four different raters over 13 years, separately for five different levels of physical attractiveness (very unattractive, unattractive, about average, attractive, very attractive). It showed that, for both female and male respondents, the interrater agreement on their physical attractiveness was very high, *except* for very unattractive respondents. The mean Rwg for unattractive, about average, attractive, and very attractive individuals ranged from 0.6352 to 0.8280 for women, and from 0.6341 to 0.8527 for men. For very unattractive individuals, however, it ranged from 0.0180 to 0.1398 for women, and from 0.2184 to 0.3890 for men. The distribution of Rwg suggested that raters agreed on who was unattractive, about average, attractive, or very attractive, but they did not always agree on who was very unattractive. Put differently, it meant that, if you are unattractive, you are unattractive to most, but if you are very unattractive, you are attractive to some.

It then logically follows that some desirable potential mates might find very unattractive individuals attractive enough to marry, while such desirable potential mates might not find unattractive individuals attractive enough to marry. Since intelligence is an individual trait highly and universally valued in a potential mate (Buss, 1989), the logic suggests that intelligent individuals may be more likely to marry very unattractive individuals than to marry unattractive individuals.

There are also theoretical reasons to expect intelligent men to be attracted to very unattractive women. An evolutionary psychological theory suggests that general intelligence may have evolved as a domain-specific psychological mechanism to solve evolutionarily novel adaptive problems that our ancestors did not routinely and recurrently encounter (Kanazawa, 2004). As a result, not only are more intelligent individuals better able to solve evolutionarily novel problems, they are also more likely to acquire and espouse evolutionarily novel preferences and values that our ancestors did not possess (Kanazawa, 2010, 2012). According to the Savanna-IQ Interaction Hypothesis (Kanazawa, 2010) or the intelligence paradox (Kanazawa, 2012), more intelligent individuals are more likely to acquire and espouse "unnatural" preferences and values that go against their evolutionary design. Since men are evolutionarily designed to value physical attractiveness in their mates (Buss, 1989, 1994), more intelligent men may be more likely to prefer to mate with very unattractive women.

Table 1
Proportion currently married (vs. single) at Age 29 by physical attractiveness, by sex.

	Physical attractiveness measured at				
	Age 16	Age 17	Age 22	Age 29	Match
Women					
Very unattractive	0.5682	0.6216	0.5360	0.5034	0.5248
Unattractive	0.3580	0.3028	0.4085	0.3842	0.4051
About average	0.4478	0.4657	0.4760	0.5003	0.5148
Attractive	0.5569	0.5467	0.5310	0.5228	0.5424
Very attractive	0.5559	0.5522	0.5665	0.5467	0.5676
Men					
Very unattractive	0.4833	0.3929	0.3333	0.4471	0.4103
Unattractive	0.4150	0.3557	0.2903	0.2701	0.2917
About average	0.4210	0.4088	0.4217	0.4283	0.4458
Attractive	0.4571	0.4642	0.4754	0.4849	0.5021
Very attractive	0.4519	0.5276	0.4706	0.3733	0.3849

If more intelligent men are more likely to go against their evolutionary design and prefer to mate with some very unattractive women, then, because both general intelligence and physical attractiveness are highly heritable (Kanazawa and Kovar, 2004), their offspring are likely to be simultaneously more intelligent and very unattractive. This can potentially explain why very unattractive individuals in Kanazawa and Still (2018) were more intelligent and educated, thus earning more.

In this paper, we will examine, first, whether very unattractive women may be more preferred as potential mates than unattractive women, due to greater disagreement on who are very unattractive, and, second, whether more intelligent men may be disproportionately more likely to prefer to mate with very unattractive women, because they are more likely to espouse "unnatural" mating preferences that go against their evolutionary design.

2. Empirical analyses

2.1. Data

The National Longitudinal Study of Adolescent Health (Add Health) is a large, nationally representative and prospectively longitudinal study of young Americans. A sample of 20,745 adolescents were personally interviewed in their homes in 1994–1995 (Wave I) when they were on average 16 years old. They were again interviewed in 1996 (Wave II; $n = 14{,}738$; mean age = 17), in 2001–2002 (Wave III; $n = 15{,}197$; mean age = 22) and in 2007–2008 (Wave IV; $n = 15{,}701$; mean age = 29). We limited all of our empirical analyses to respondents who participated in all four waves. Additional details of sampling and study design are provided at http://www.cpc.unc.edu/projects/addhealth/design. Descriptive statistics for all key variables, as well as distributions of respondents in each physical attractiveness category and residential status, separately by sex, are in Appendix tables.

2.2. Physical attractiveness

At the conclusion of the in-home interview at each wave, the Add Health interviewer rated the respondent's physical attractiveness on a five-point ordinal scale (1 = very unattractive, 2 = unattractive, 3 = about average, 4 = attractive, 5 = very attractive). We used the measures of physical attractiveness from all four waves, by four different interviewers over 13 years, as the independent variables. In addition, we estimated the respondent's physical attractiveness closest to the time when their current relationship (marriage or cohabitation) began, as a measure of physical attractiveness "at match." Thus, when their current relationship began prior to 1994, we used the Wave I measure of physical attractiveness; Wave II measure if it began between 1994 and 1996; Wave III measure if it began between 1996 and 2002; and Wave IV measure if it began after 2002.

2.3. Indicator of respondent's mate value

As an indicator of respondent's mate value, we measured whether the respondent was currently married (1 if currently legally married, 0 if currently single, excluding cohabitation) or cohabiting with a partner (1 if currently cohabiting, excluding marriage, 0 if currently single) at 29.

2.4. Indicator of respondent's spouse's/partner's intelligence

Unfortunately, Add Health does not measure the respondent's spouse's or partner's intelligence or education directly. The only available measure on the respondent's spouse or partner is their earnings. So we used the respondent's spouse's or partner's earnings at 29 as a proxy for the latter's intelligence, as more intelligent workers on average earn more than less intelligent workers (Kanazawa and Still, 2018). Note that, while the independent variable (physical attractiveness) was measured four times over 13 years, all dependent variables (marriage, cohabitation, and spouse's/partner's earnings) were measured only at 29.

3. Results

Table 1 presents the proportion of respondents who were married (vs. single) at 29, and Table 2 presents the proportion of respondents who were cohabiting (vs. single), by physical attractiveness, separately by sex. They show that very unattractive respondents – both men and women – were *always* more likely to be married or cohabiting than unattractive respondents, sometimes more than average-looking or attractive respondents (except for cohabitation for men, when physical attractiveness was measured at 16 or at match), but this pattern was much stronger for marriage than for cohabitation and among women than among men. Table 3 presents the results of binary logistic regression analyses for marriage and Table 4 presents those for cohabitation. Table 3 shows (in the top panel) that very unattractive women (reference category) were always significantly more likely to be married than unattractive women (16: $b = -0.858$, $p = .002$; 17: $b = -1.330$, $p < .001$; 22: $b = -0.515$, $p = .023$; 29: $b = -0.485$, $p = .026$; match: $b = -0.484$, $p = .039$). Further, when physical attractiveness was measured at 16 or 17, very unattractive women were significantly more likely to be married than average-looking women (16: $b = -0.484$, $p = .028$; 17: $b = -0.634$, $p = .064$). In sharp contrast, none of the coefficients were statistically significant for men (in the bottom panel), except for 29 and match, when very unattractive men were significantly more likely to be married than unattractive men (29: $b = -0.781$, $p = .005$; match: $b = -0.524$, $p = .075$). Table 4 shows, however, that very unattractive women (or men) were no more likely to be cohabiting than any other category of respondents, except for women when physical attractiveness was measured at 17 ($b = -0.762$, $p = .098$). Contrary to previous research in evolutionary psychology (Buss, 1989, 1994), physically attractive women did not appear to have an advantage in marriage or cohabitation over very unattractive women (*none* of their coefficients were significantly positive), and very unattractive women appeared to have an advantage over unattractive and average-looking women. If we combined the "attractive" and "very attractive" categories, the combined category of women (or men) were not significantly more likely to be married for any of the five measures of physical attractiveness. Appendix Fig. 1 graphically presents the mean proportion currently married, by physical attractiveness, separately by sex, when physical attractiveness was measured at: (a) 16; (b) 17; (c) 22; (d) 29; and (e) match.

Table 5 presents the mean earnings of the respondent's spouse or cohabitation partner (among those respondents who were married or cohabiting at 29 only), in a combined sample of currently married and cohabiting respondents (Panel (a)), in a sample of currently married respondents only (Panel (b)), and in a sample of currently cohabiting respondents only (Panel (c)). It shows that, once again, with only a couple of exceptions, spouses or partners of very unattractive respondents *always* earned more than those of unattractive or average-looking respondents, often more than those of attractive or even very attractive respondents. The pattern of spouse's or partner's earnings presented in Table 5 was eerily similar to the data presented in Kanazawa and Still (2018, Table 4), where very unattractive respondents always earned more than unattractive respondents, sometimes more than average-looking or attractive respondents. Table 6 presents the results of OLS regression analysis of the natural log of spouse's or partner's earnings. Panel (a) shows that very unattractive women's spouse or partner always earned significantly more than those of unattractive women except when physical attractiveness was measured at 17 (16: $b = -0.708$, $p = .020$; 17: $b = -0.270$, $p = .488$; 22: $b = -1.154$, $p < .001$; 29: $b = -0.707$, $p = .005$; match: $b = -0.845$, $p = .001$). Further, very unattractive women's spouse or partner earned significantly more than those of average-looking women when physical attractiveness was measured at 29 ($b = -0.497$, $p = .009$) or match ($b = -0.350$, $p = .064$). Once again, in sharp contrast, none of the regression coefficients were statistically significant in the same direction among men. When physical attractiveness was measured at 29 or match, some of the coefficients were statistically significant *in the opposite direction*; spouses or partners of more attractive men earned significantly more than those of very unattractive men. Table 6 also shows the same results among the separate sample of currently married respondents only (Panel (b)) and that of currently cohabiting respondents only (Panel (c)). The coefficients in the separate samples were largely of the same sign and magnitude as those in the combined sample, but some coefficients were not statistically significant due to smaller sample sizes. Appendix Fig. 2 graphically presents the mean earnings of spouses or partners, by physical attractiveness, separately by sex, when physical attractiveness was measured at: (a) 16; (b) 17; (c) 22; (d) 29; and (e) match.

Table 2
Proportion currently cohabiting (vs. single) at Age 29 by physical attractiveness, by sex.

	Physical attractiveness measured at				
	Age 16	Age 17	Age 22	Age 29	Match
Women					
Very unattractive	0.3559	0.4167	0.2658	0.2885	0.2947
Unattractive	0.2518	0.2500	0.2632	0.2424	0.2879
About average	0.3017	0.3130	0.3083	0.3333	0.3469
Attractive	0.3333	0.3308	0.3358	0.3140	0.3267
Very attractive	0.3396	0.3126	0.3325	0.3138	0.3065
Men					
Very unattractive	0.2619	0.3929	0.3478	0.2769	0.2459
Unattractive	0.2909	0.2857	0.2903	0.2395	0.2766
About average	0.2948	0.2831	0.2919	0.2924	0.3060
Attractive	0.2766	0.3029	0.2869	0.3122	0.3098
Very attractive	0.3302	0.3077	0.3077	0.2531	0.2262

4. Discussion

The analyses of the Add Health data showed that very unattractive women were significantly more likely to be married (but not cohabiting) than unattractive women at 29, sometimes more than average-looking women, and their spouses or cohabitation partners earned significantly more than those of unattractive or average-looking women. This suggested that more intelligent men, who were more likely to earn more (Kanazawa and Still, 2018), may be more likely to marry very unattractive women, either because there were lower degrees of consensus on who constituted very unattractive women or because more intelligent men were more likely to prefer to marry very unattractive women or both. If this pattern of intelligent men marrying and reproducing with very unattractive women existed generation after generation, then, because both intelligence and physical attractiveness are highly heritable (Kanazawa and Kovar,

Table 3
Binary logistic regression of whether currently married (vs. single) at Age 29, by sex.

	Age 16	Age 17	Age 22	Age 29	Match
Women					
Physical attractiveness					
Unattractive	−0.858**	−1.330***	−0.515*	−0.485*	−0.484*
	(0.271)	(0.385)	(0.227)	(0.218)	(0.234)
About average	−0.484*	−0.634†	−0.240	−0.012	−0.040
	(0.221)	(0.342)	(0.185)	(0.170)	(0.175)
Attractive	−0.046	−0.309	−0.020	0.078	0.070
	(0.221)	(0.342)	(0.186)	(0.171)	(0.176)
Very attractive	−0.050	−0.287	.123	0.174	0.173
	(0.226)	(0.347)	(.196)	(0.187)	(0.191)
Constant	0.274	0.496	0.144	0.013	0.099
	(0.215)	(0.339)	(0.179)	(0.164)	(0.169)
χ^2 (df = 4)	64.697***	55.772***	28.671***	17.458**	15.397**
Number of cases	4,484	4,485	4,483	4,482	4,153
Men					
Physical attractiveness					
Unattractive	−0.277	−0.159	−0.201	−0.781**	−0.524†
	(0.296)	(0.415)	(0.355)	(0.277)	(0.294)
About average	−0.252	0.066	0.377	−0.076	0.145
	(0.263)	(0.390)	(0.320)	(0.223)	(0.235)
Attractive	−0.105	0.292	0.595†	0.152	0.371
	(0.265)	(0.391)	(0.321)	(0.225)	(0.237)
Very attractive	−0.126	0.546	0.575†	−0.306	−.106
	(0.278)	(0.401)	(0.337)	(0.249)	(.261)
Constant	−0.067	−0.435	−0.693	−0.213	−0.363
	(0.258)	(0.387)	(0.316)	(0.218)	(0.230)
χ^2 (df = 4)	5.166	27.328***	29.742***	37.924***	33.353***
Number of cases	3,702	3,710	3,720	3,718	3,375

Note: Main entries are unstandardized regression coefficients.
(Numbers in parentheses are standard errors).
† $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed).

Table 4
Binary logistic regression of whether currently cohabiting (vs. single) at Age 29, by sex.

	Age 16	Age 17	Age 22	Age 29	Match
Women					
Physical attractiveness					
Unattractive	−0.496	−0.762†	−0.014	−0.237	−0.033
	(0.335)	(0.460)	(0.308)	(0.283)	(0.296)
About average	−0.246	−0.449	0.208	0.210	0.240
	(0.278)	(0.418)	(0.261)	(0.223)	(0.233)
Attractive	−0.100	−0.368	0.334	0.121	0.149
	(0.279)	(0.419)	(0.262)	(0.225)	(0.234)
Very attractive	−0.072	−0.451	0.319	0.121	0.056
	(0.286)	(0.425)	(0.275)	(0.247)	(0.255)
Constant	−0.593	−0.336	−1.016	−0.903	−0.872
	(0.272)	(0.414)	(0.255)	(0.216)	(0.225)
χ^2 (df = 4)	7.410	5.079	6.216	6.676	4.136
Number of cases	3,234	3,233	3,234	3,230	2,926
Men					
Physical attractiveness					
Unattractive	0.145	−0.481	−0.265	−0.196	0.159
	(0.391)	(0.422)	(0.349)	(0.331)	(0.352)
About average	0.164	−0.494	−0.258	0.076	0.302
	(0.355)	(0.391)	(0.315)	(0.283)	(0.303)
Attractive	0.075	−0.398	−0.282	0.170	0.319
	(0.359)	(0.393)	(0.318)	(0.286)	(0.306)
Very attractive	0.329	−0.376	−0.182	−0.123	−0.109
	(0.371)	(0.411)	(0.342)	(0.314)	(0.338)
Constant	−0.1036	−0.435	−0.629	−.960	−1.121
	(0.351)	(0.387)	(0.310)	(0.277)	(0.297)
χ^2 (df = 4)	3.449	2.769	1.050	6.070	7.845†
Number of cases	2,948	2,956	2,963	2,961	2,628

Note: Main entries are unstandardized regression coefficients.
(Numbers in parentheses are standard errors).
† $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed).

Table 5
Mean spouse's or partner's earnings at Age 29 by physical attractiveness, by sex.

(a) Currently married and cohabiting respondents combined

	Physical attractiveness measured at				
	Age 16	Age 17	Age 22	Age 29	Match
Women					
Very unattractive	$43,568	$42,306	$39,933	$45,868	$42,794
Unattractive	$31,995	$29,675	$29,767	$32,734	$34,446
About average	$37,703	$38,288	$37,954	$38,184	$38,484
Attractive	$43,270	$42,798	$43,388	$44,229	$44,057
Very attractive	$45,598	$46,787	$48,854	$46,413	$46,770
Men					
Very unattractive	$32,243	$36,525	$36,085	$32,744	$32,624
Unattractive	$24,745	$25,602	$26,507	$26,215	$27,359
About average	$28,080	$28,696	$27,674	$27,278	$27,209
Attractive	$30,898	$29,829	$30,838	$30,305	$31,396
Very attractive	$30,563	$29,476	$31,370	$36,893	$35,528

(b) Currently married respondents only

	Physical attractiveness measured at				
	Age 16	Age 17	Age 22	Age 29	Match
Women					
Very unattractive	$44,906	$43,600	$40,547	$47,649	$44,683
Unattractive	$34,790	$31,490	$34,313	$35,245	$37,285
About average	$41,250	$41,216	$41,111	$41,715	$41,838
Attractive	$45,868	$46,233	$46,635	$47,647	$47,233
Very attractive	$49,367	$49,753	$51,943	$48,116	$49,363
Men					
Very unattractive	$30,160	$24,350	$33,147	$30,134	$32,208
Unattractive	$24,139	$26,462	$28,053	$26,680	$27,189
About average	$28,919	$28,390	$27,383	$28,042	$27,612
Attractive	$30,240	$30,407	$31,188	$30,011	$30,862
Very attractive	$30,192	$29,701	$31,569	$34,900	$35,131

(c) Cohabiting respondents only

	Physical attractiveness measured at				
	Age 16	Age 17	Age 22	Age 29	Match
Women					
Very unattractive	$39,634	$39,000	$37,970	$41,119	$37,432
Unattractive	$27,541	$26,918	$19,840	$27,497	$29,285
About average	$30,578	$32,247	$31,261	$30,526	$31,278
Attractive	$35,976	$33,848	$35,156	$35,467	$35,723
Very attractive	$35,753	$37,670	$39,921	$41,204	$37,819
Men					
Very unattractive	$37,450	$48,700	$40,091	$38,781	$33,616
Unattractive	$25,924	$24,313	$24,994	$25,610	$27,550
About average	$26,582	$29,245	$28,216	$25,886	$26,451
Attractive	$32,369	$28,623	$30,023	$30,948	$32,649
Very attractive	$31,240	$28,871	$30,979	$40,680	$36,386

2004), we would expect their offspring to be simultaneously intelligent and very unattractive. This can explain Kanazawa and Still's (2018) hitherto unexplained finding that very unattractive workers earned significantly more than unattractive or average-looking workers because they were more intelligent and educated. However, our present findings were somewhat inconsistent with prior studies of assortative mating on anthropometric attributes of couples, where less physically attractive individuals typically married spouses who were also less desirable on socioeconomic dimensions (Oreffice and Quintana-Domeque, 2010).

Direct comparisons of data presented in Kanazawa and Still (2018) and those presented above in this paper suggested distinctly different nature of marriages of very unattractive women compared to those of very unattractive men. Kanazawa and Still (2018, p. 8) reported that *both* very unattractive women *and* very unattractive men earned significantly more than their unattractive and average-looking counterparts. Yet our results presented above in Table 6 showed that, while the spouses/partners of very unattractive women earned significantly more than those of unattractive and average-looking women, the same was not true of spouses/partners of very unattractive men. Spouses of very unattractive men did *not* earn significantly more than those of more attractive men. Among other things, this suggested that, while very unattractive women might be married to or cohabiting with very unattractive (yet more intelligent and educated) men, very unattractive men were *not* married to or cohabiting with very unattractive women. If they were, their spouses/partners would have earned significantly more than those of unattractive or average-looking men. This was consistent with earlier findings of tradeoffs on the marriage market, where less physically attractive (but otherwise desirable on socioeconomic dimensions) individuals could trade their higher socioeconomic status to marry spouses who were more physically attractive than themselves (Chiappori et al., 2012).

One potential theoretical problem with our explanation for why very unattractive workers are more intelligent and educated is that it treats "very unattractive" as a qualitatively distinct category, not as a merely quantitatively higher level of "unattractive." In our explanation, there is a continuum of physical attractiveness from very attractive, to attractive, to about average, to unattractive, but very unattractive individuals are a separate category. Our explanation assumes that children of very unattractive mothers will be more likely, not to be unattractive, but to be very unattractive, and there is no regression to the mean, whereby children of very unattractive mothers will be less unattractive than their mothers. In fact, our explanation will not logically hold if "very unattractive" is merely a higher degree of "unattractive" or if there is a regression to the mean.

There are a couple of reasons to believe that the regression to the mean might be minimal in this situation. First, the patterns of Rwg presented in Kanazawa and Still (2018, Table 1), where Add Health respondents in the "very unattractive" category had very low interrater agreement whereas the respondents in all the other attractiveness categories had extremely high interrater agreement, suggest that very unattractive individuals might be qualitatively different from other respondents. Data presented in Table 7 further bolstered this impression. They compared the standard deviations of earnings in dollars at Age 29, education at 29 (measured in 13 ordinal categories), IQ measured at 16 and 22 (by Peabody Picture Vocabulary Test) and at 29 (by backward digit span), by physical attractiveness category, separately by sex. Levene's equality of variance test showed that very unattractive respondents often (though not always) had significantly greater variance in these characteristics, sometimes by substantively large amounts, than respondents in other attractiveness categories, except for education, where very unattractive respondents tended to have significantly smaller variances. This further suggested that very unattractive individuals were more heterogeneous in individual traits than other individuals.

Second, physical attractiveness has a very high heritability. McGovern et al. (1996) estimated that the heritability of physical attractiveness among women to be $h^2 = 0.64$ (Kanazawa and Kovar, 2004, pp. 235–236), and Mitchem et al. (2014) estimated it to be $h^2 = 0.64$ among women and $h^2 = 0.70$ among men. Rowe et al. (1989) reported that the true correlation (corrected for measurement errors) in physical attractiveness within male and female monozygotic twin pairs was $r = 0.94$. In intergenerational phenotypic transmission, heritability (genetic effects) represents the fixed component, and the environmental effects represent the random component. Regression to the mean is proportional to the size of the random component. The very high heritability of physical attractiveness therefore means that the regression to the

Table 6
OLS regression of ln(spouse's or partner's earnings) at Age 29, by sex.

(a) Currently married and cohabiting respondents combined

	Age 16	Age 17	Age 22	Age 29	Match
Women					
Physical attractiveness					
Unattractive	−0.708*	−0.270	−1.154***	−0.707**	−0.845**
	(0.304)	(0.390)	(0.257)	(0.253)	(0.259)
About average	−0.380	0.113	−0.280	−0.497**	−0.350†
	(0.236)	(0.326)	(0.204)	(0.189)	(0.189)
Attractive	−0.113	0.300	−0.153	−0.226	−0.145
	(0.235)	(0.326)	(0.204)	(0.190)	(0.189)
Very	−0.176	0.345	0.026	−0.173	−0.129
attractive	(0.240)	(0.331)	(0.215)	(0.207)	(0.204)
Constant	3.492	3.036	3.467	3.605	3.520
	(0.229)	(0.322)	(0.198)	(0.182)	(0.182)
R^2	0.006	0.005	0.014	0.008	0.007
Number of cases	3,085	3,083	3,084	3,086	2,957
Men					
Physical attractiveness					
Unattractive	−0.370	−0.274	−0.625	−0.001	0.500
	(0.491)	(0.623)	(0.566)	(0.463)	(0.481)
About average	0.153	0.153	−0.105	0.518	0.699†
	(0.434)	(0.574)	(0.505)	(0.357)	(0.383)
Attractive	0.344	0.191	−0.016	0.743*	0.946*
	(0.438)	(0.576)	(0.507)	(0.360)	(0.386)
Very	0.324	−0.113	0.009	1.195**	1.060*
attractive	(0.456)	(0.593)	(0.533)	(0.407)	(0.430)
Constant	2.389	2.470	2.673	1.971	1.831
	(0.427)	(0.569)	(0.499)	(0.348)	(0.375)
R^2	0.004	0.002	0.002	0.008	0.004
Number of cases	2,149	2,156	2,158	2,156	2,021

(b) Currently married respondents only

	Age 16	Age 17	Age 22	Age 29	Match
Women					
Physical attractiveness					
Unattractive	−0.242	0.117	−0.703**	−0.407†	−0.600**
	(0.265)	(0.341)	(0.217)	(0.218)	(0.225)
About average	−0.149	0.437	−0.110	−0.265†	−0.132
	(0.197)	(0.277)	(0.170)	(0.160)	(0.159)
Attractive	0.044	0.638*	0.061	−0.061	0.022
	(0.196)	(0.277)	(0.169)	(0.161)	(0.159)
Very attractive	0.066	0.543†	0.126	−0.151	−0.031
	(0.201)	(0.281)	(0.178)	(0.175)	(0.170)
Constant	3.509	2.954	3.507	3.652	3.560
R^2	0.006	0.008	0.016	0.007	0.008
Number of cases	2,179	2,179	2,178	2,180	2,102
Men					
Physical attractiveness					
Unattractive	0.257	0.731	−0.495	0.161	0.841
	(0.571)	(0.848)	(0.740)	(0.569)	(0.606)
About average	0.583	1.014	0.416	0.743†	0.859†
	(0.501)	(0.792)	(0.647)	(0.418)	(0.454)
Attractive	0.684	1.098	0.537	0.985*	1.062*
	(0.504)	(0.793)	(0.650)	(0.421)	(0.457)
Very attractive	0.716	0.705	0.442	1.228*	1.018*
	(0.529)	(0.808)	(0.679)	(0.480)	(0.511)
Constant	2.040	1.643	2.205	1.803	1.721
R^2	0.003	0.004	0.005	0.009	0.005
Number of cases	1,420	1,424	1,426	1,425	1,357

(c) Cohabiting respondents only

	Age 16	Age 17	Age 22	Age 29	Match
Women					
Physical attractiveness					
Unattractive	−1.428†	−0.944	−2.099**	−1.306*	−1.249†
	(0.793)	(0.999)	(0.711)	(0.662)	(0.678)
About average	−0.828	−0.596	−0.595	−0.978†	−0.790
	(0.662)	(0.876)	(0.591)	(0.513)	(0.528)
Attractive	−0.547	−0.573	−0.668	−0.640	−0.573
	(0.664)	(0.877)	(0.592)	(0.517)	(0.531)
Very attractive	−0.802	−0.220	−0.251	−0.261	−0.491
	(0.676)	(0.894)	(0.622)	(0.571)	(0.585)

Table 6 (*Continued*)

(c) Cohabiting respondents only

	Age 16	Age 17	Age 22	Age 29	Match
Constant	3.442	3.247	3.338	3.481	3.406
R^2	0.006	0.004	0.018	0.012	0.006
Number of cases	907	905	907	907	856
Men					
Physical attractiveness					
Unattractive	−1.784†	−1.367	−0.933	−0.381	−0.022
	(0.944)	(0.939)	(0.892)	(0.819)	(0.829)
About average	−0.863	−0.734	−0.838	0.028	0.344
	(0.849)	(0.851)	(0.813)	(0.675)	(0.712)
Attractive	−0.510	−0.804	−0.853	0.193	0.668
	(0.857)	(0.856)	(0.820)	(0.683)	(0.720)
Very attractive	−0.625	−0.917	−0.561	1.064	1.126
	(0.885)	(0.904)	(0.870)	(0.760)	(0.796)
Constant	3.261	3.297	3.311	2.358	2.092
R^2	0.012	0.004	0.002	0.011	0.010
Number of cases	730	733	733	732	665

Note: Main entries are unstandardized regression coefficients.
(Numbers in parentheses are standard errors).
Numbers in italics are standardized regression coefficients.
† $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed).

Table 7
Standard deviations of earnings, education and IQ by physical attractiveness, by sex.

Physical attractiveness at 16	Earnings in 1 K at 29	Education at 29	IQ at 16	IQ at 22	IQ at 29
Women					
Very unattractive	65.61	2.22	17.90	18.12	14.95
Unattractive	18.44*	2.29	14.14†	15.98	15.47
About average	34.14*	2.20	14.92†	17.45	15.23
Attractive	25.17**	2.16	14.62†	16.04	14.66
Very attractive	33.76	2.13	13.74**	13.97†	14.61
Men					
Very unattractive	33.36	2.48	15.76	13.00	13.28
Unattractive	23.35*	1.98	14.82	15.63	14.61
About average	53.86	2.17	15.35	16.54	14.59
Attractive	36.73	2.18	14.16	14.31	15.11
Very attractive	72.66	2.27	13.76	12.98	15.57
Physical attractiveness at 17	Earnings in 1 K at 29	Education at 29	IQ at 16	IQ at 22	IQ at 29
Women					
Very unattractive	22.27	1.69	14.71	19.32	12.59
Unattractive	71.10	2.38**	14.88	16.58	16.98†
About average	30.96	2.24**	14.79	17.22	14.79
Attractive	26.70	2.12	14.43	15.66	14.65
Very attractive	32.43	2.10	14.72	14.86	15.46
Men					
Very unattractive	30.28	2.28	18.83	15.72	14.11
Unattractive	24.55†	2.25	15.33**	16.77	14.48
About average	51.36	2.18	15.27**	15.74	15.03
Attractive	54.78	2.22	14.39*	14.78	14.85
Very attractive	34.53	1.93**	13.46***	15.10	14.29
Physical attractiveness at 22	Earnings in 1 K at 29	Education at 29	IQ at 16	IQ at 22	IQ at 29
Women					
Very unattractive	22.43	2.13	14.87	23.04	16.86
Unattractive	19.33*	2.20*	14.30	16.99†	14.35
About average	21.75	2.22	14.83	17.39*	14.69*
Attractive	31.99	2.15	14.64	14.15***	15.16
Very attractive	51.85	2.03	13.89	15.83***	14.43*
Men					
Very unattractive	26.22	1.96	16.24	26.56	16.52
Unattractive	26.46	2.12***	15.63	16.84*	15.82
About average	48.94	2.16*	15.36	15.76**	14.99
Attractive	51.89	2.21	13.92†	13.91***	14.65
Very attractive	61.84	2.14	15.56	15.72**	13.86

Physical attractiveness at 29	Earnings in 1 K at 29	Education at 29	IQ at 16	IQ at 22	IQ at 29
Women					
Very unattractive	24.93	2.04	13.26	16.73	19.06
Unattractive	18.56*	2.34***	15.35	17.11	15.13**
About average	27.72	2.21*	14.98	16.97	14.69***
Attractive	37.79	2.11	14.43	15.54	14.37***
Very attractive	28.02	2.06	13.82	15.13	15.15**
Men					
Very unattractive	50.70	2.43	15.25	12.67	17.59
Unattractive	39.00	2.28	15.22	18.39	15.03
About average	56.50	2.18	15.25	15.66	15.10
Attractive	42.88	2.13	14.55	14.49	14.24*
Very attractive	38.57	2.18	13.04*	17.07	14.81
Physical attractiveness at match	**Earnings in 1 K at 29**	**Education at 29**	**IQ at 16**	**IQ at 22**	**IQ at 29**
Women					
Very unattractive	25.63	2.03	13.18	17.39	18.94
Unattractive	19.77†	2.37***	14.68	17.30	14.35**
About average	28.12	2.19	14.80	17.32	14.64***
Attractive	38.48	2.11	14.60	14.38	14.42***
Very attractive	28.25	1.99	13.65	15.49	14.97**
Men					
Very unattractive	53.04	2.42	15.34	15.81	17.67
Unattractive	27.66*	2.32	15.27	16.38	15.47
About average	46.42	2.15	15.27	15.57	14.85†
Attractive	57.25	2.11	14.13	14.08	14.14*
Very attractive	39.82	2.17	12.55**	16.72	14.59

Note: † $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed), Levene's equality of variance test, in comparison to Very unattractive

mean will be minimal in the intergenerational transmission of physical attractiveness. Nevertheless, more theoretical work is necessary to see whether "very unattractive" is truly a qualitatively different, distinct category of physical attractiveness, and, if so, why.

A major empirical limitation of the current study is that we did not have direct measures of the respondent's spouse's intelligence or education, and must infer it from their earnings. In order to assess whether more intelligent men are indeed more likely to marry very unattractive women than unattractive or average-looking women, one would need genuine couples data, not individual data, that directly measure the physical attractiveness of the respondents and intelligence of their spouses and partners (or vice versa). To our knowledge, no such data currently exist. Very few datasets with large population samples measure physical attractiveness, and none of them include couples. In order to provide a stronger test of our hypothesis that intelligent men are more likely to marry very unattractive women, we encourage social scientists to take physical attractiveness seriously and measure it in future data collection.

Vandenberg (1972, p. 153) and Buss (1985, p. 49) were the first to propose, purely on the basis of evolutionary logic, that physical attractiveness and intelligence will covary across individuals because of assortative mating of intelligent men of higher status and physically attractive women. Their prediction was subsequently confirmed empirically (Kanazawa, 2011). However, the correlation between intelligence and physical attractiveness, while statistically significantly positive in large samples, is nonetheless very small in magnitude – $r = .381$ in the National Child Development Study in the UK and $r = .126$ in Add Health. Intelligent men's preference to marry or mate with very unattractive women, if robust, can potentially explain why the correlation between intelligence and physical attractiveness is not larger despite the assortative mating of intelligent men of higher status and physically attractive women over many generations.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.ehb.2018.03.003.

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