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Male and Female Balance Sheet

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This paper isolates gender differences in IQ that refer to the current generation of women in developed nations and where samples appear large and representative. At no age do such women begin an IQ decline vis-à-vis males. They suffer from a spatial deficit that might dictate fewer of them in "mapping jobs". Against a male average of 100, they have a fluid intelligence of 100 (university Raven's data) to 100.5 (Raven's data from five modern nations); and a crystallized intelligence of 97.26 (WAIS data plus non-Wechsler IQ) to 100 (non-Wechsler GQ).

No matter whether we take the lower values or a mean value, we would expect females to match males on mathematics and do no better than males at school. Both expectations are false. If there are genetic differences between men and women, these have more to do with character than intellect. First, women tend to be less violent and combative than men. Compared to schoolgirls, boys hand in assignments late, miss school more often, drop out more often, and must be disciplined more often. Second, women from infancy are more sensitive to other human beings. The ratio of women falls from dominant to rare as we go from social science to medicine and biology, to chemistry, to math and physics. There are two ways of viewing this progression: either women value math less insofar as it has no immediate human application; or women are deterred by the fact that math gets more difficult as you go from psychology to mathematics. Since either of these traits could be genetic in origin, I can see no easy way of obtaining conclusive evidence one way or the other.

Key Words: Sex differences, Intelligence, Raven test, Wechsler test

Once again we owe a debt to Richard Lynn for assembling exhaustive data on male versus female differences on IQ tests. I wish to compliment him for addressing a subject that many ignore because they put a quiet life ahead of truth. As for his data, I want to make certain distinctions: between fluid intelligence and crystallized intelligence; between the role of genes and environment; and between the influence of intellect and character on cognitive achievement. Lynn does not discuss genes directly but he gives the kind of evolutionary scenario that implies differential selection between the sexes for personal traits.

The Ravens' data

Lynn has offered a huge amount of data from Raven's Progressive Matrices, and I have analyzed it and added supplementary material in my book, *Are We Getting Smarter* (2012, pp. 141-157). Lynn's interpretation is plausible if you merge all Raven's studies. But that means lumping the current generation of women with past generations, large and representative samples with convenience samples, and non-elite samples with elite samples composed of university students. With this in mind, I isolated Raven's data from six advanced nations in which women have (usually) enjoyed the effects of modernity, and which allow us to compare females with males both below and above the age of 14. Other criteria: the data must be recent and of high quality, for example large standardization samples.

Although the university samples are elite, they are so numerous and international that I believe they tell us something about university students in general at least in advanced nations. Paradoxically, I argue that the fact that university females have a lower mean IQ than males is evidence for genetic parity rather than male superiority.

University samples

Gender parity hypothesis: In the general population of 17 to 22 year olds, we will assume that males and females are equal: they have the same mean IQ (100) and standard deviation (SD) (15). An SD of 15 is the usual value when you include the whole population but lower values hold for non-representative groups. For example, university students include only the higher IQ scores and the measure of this reduction in range is that they would have an SD well below 15.

Let us also assume that women can qualify for university with a lower IQ than men, say that the university IQ threshold for males is 100 and for females 95. If so, male university students would have a mean IQ of 111.97 (the bottom half of the IQ curve is gone) and a standard deviation of 9.04 (the missing half reduces the full curve's SD). Females would have a mean of 108.99 (the bottom 37 percent of the curve gone) and an SD of 9.97 (less than half of their curve is gone). The male mean would be 2.98 points higher (111.97 – 108.99); and the female SD would be 110 percent of the male (9.97 divided by 9.04).

To elaborate: if the university population is drawn from the upper 50 percent of males and the upper 63 percent of females, then of course the male sample is more elite and will have a higher mean IQ. And if the university population contains a larger portion of the full female IQ curve than the male, then of course the female sample is more complete and will come closer to their population SD than the male sample will.

Male superiority hypothesis: In the general population, males have a mean IQ of 100, females a mean of 95, and both an SD of 15. The university IQ threshold for males and females is the same at 100. If so, male university students would still have a mean of 111.97 and an SD of 9.04. Females would have a mean of 110.30. The bottom 63 percent of the curve gone would raise the mean of the remainder by 1.02 SDs (1.02 x 15 = 15.30, which plus 95 = 110.30). Females would have an SD of 8.18 (with the bottom 63 percent gone). Therefore, the male mean would be 1.67 points higher (111.97 - 110.30); and the female SD would be just over 90 percent of the male SD (8.18 divided by 9.04).

The interesting thing is that the male superiority hypothesis predicts a male IQ advantage (among university students) slightly *smaller* than that predicted by the gender parity hypothesis! Everyone can see the effect of the male superiority hypothesis on SDs: the SD of university females would have to be *lower* than that of males (the upper half of males can get into university, but only the upper 37 percent of females). The equality hypothesis clearly predicts the opposite: a *higher* SD for university women. So keep your eye on the SDs.

What does the Raven's data say?

I reviewed the university data collected by Irwing and Lynn (2005). My thesis of gender parity applies to the current generation in nations or groups where women enjoy modernity. Therefore, I set aside university data from 1964 to 1986 (in favor of that from 1998 to 2004), data from developing nations, and one set which did not specify the nature of the Raven's test. The remaining data cover 6230 subjects.

Box 1 shows that the results confirm the gender parity hypothesis: males have an IQ advantage of 2.73 points (predicted 2.98); the female SD is 106 percent of the male (predicted 110). I suspect that the latter shortfall is because females do not quite have SD parity in the general population. Mathematics and science have a robust correlation with Raven's. Ceci and Williams (2010) found that while there was no difference between the genders at the mean on these tests, the male SD was larger. Lynn seems to concede this point. He cites Eysenck who puts the female SD at 14 in the general population, a value a bit below where we would put it today.

Box 1 (for details, see Table AIV1 in Appendix IV of Flynn, 2012)
There are nine recent university samples with adequate data. In each SD at 14 in the general population, a value a bit below where we would put it today.case, I give the nation, the date, the male advantage in IQ points, and the percentage you get when you divide the female SD by the male SD. Where the female SD is larger, it equals more than 100 percent of the male SD; where smaller, it equals less than 100 percent.

Canada (1998)	2.45 IQ points – 105%
Canada (2000)	4.34 IQ points – 104%
South Africa (2000)	2.19 IQ points – 82%
Spain (2002)	2.81 IQ points – 110%
Spain (2004)	2.47 IQ points – 102%
Spain (2004)	2.72 IQ points – 109%
USA (1998)	4.44 IQ points – 119%
USA (2004)	2.13 IQ points – 97%
USA (2004)	2.93 IQ points – 110%
Average:	2.94 IQ points – 104%
Weighted Average:	**2.73 IQ points – 106%**

You get a perfect fit for the university data if you posit the following values for the general population: the genders equal for mean IQ at 100; the female SD at 14.62, slightly lower than male at 15; a female IQ threshold for university at 96, that is, 4 points lower than the male at 100. The university results are far from those predicted by the male advantage hypothesis: a 1.67-point male advantage and a female SD at only 90 percent of male. Once again, the true values are 2.73 and a female SD at 106 percent.

The fact that the within–university female SD is so much larger than the male is devastating. How could the female SD soar above the male SD among university students except due to a lower IQ threshold, one that allowed a larger proportion of females into university? In fact, if you assume a common IQ threshold for male and female university students, it is impossible to explain both the male IQ advantage and the larger SD for females we find in the university data (Flynn, 2012, Appendix IV).

Students in general

I have not yet provided direct evidence for the hypothesis that females enter university with a lower IQ threshold than males. Between 1990 and 2000, female high school graduates in America had a Grade Point Average (GPA) well above boys (Coates & Draves, 2006). Gurian (2001) estimates that boys get 70 percent of the Ds and Fs and girls get 60 percent of the As. About 80 percent of high school dropouts are boys. Coates and Draves find a similar pattern in the United Kingdom, Ireland, Scandinavia, Australia, New Zealand, and Canada. No advanced nation has as yet been found to be an exception.

The Organization for Economic Co-operation and Development (OECD) published the results for 15-year olds on a test of reading proficiency (PISA, 2006). In every one of the 57 nations, high school girls outperformed boys. The merged results suggest that the female IQ threshold for university entrance is about 3 points below the male threshold, and that the mean IQ of female university students is about 2 points below males. US data were not available from the OECD. However, the Nation's Report Card shows that the median for girls' reading proficiency was at the 67th percentile of the boys' curve (Grigg et al., 2003). This means that the US gender gap is a bit high but comparable to nations like Austria, Belgium, Germany, Italy, Norway, and Sweden.

It should be noted that males do marginally better than females for mathematics (PISA, 2006, Table 6.2c). I assume that reading and good grades bolster confidence to go to university; and that lacking mathematics proficiency discourages few students. Rather they choose a non-science major. The Nation's Report Card also shows that American girls open up an even greater gap for written composition: their median was at the 75th percentile of the boys' curve.

I will state what I think a judicious conclusion: unless different gender IQ thresholds are falsified, university samples suggest parity. It can easily be tested. Get a sample of the entering class, and test to see whether men begin to disappear at an IQ level say 4 points above where women begin to disappear.

Current standardization data from six nations

Five nations offer current data from standardization samples. In Argentina, the Universidad Nacional of La Plata standardized Raven's between 1996 and 2000 on 1695 students. They ranged from 13 to 30 years of age. The sample was designed to simulate a random sample of the city's in-school population

(Rossi-Casé, 2000). Standardization samples tested in 1984 and 1986 afford data from New Zealand and Australia (de Lemos, 1988; Reid & Gilmore, 1988). The South African data are from Lynn (2002), who reports the results Owen (1992) got when he derived South African norms for Raven's by tests administered between 1985 and 1988. Thus, some samples are from the mid- to late-1980s but they are the latest I could find. In 2000, Raven's was standardized in 27 Estonian-speaking schools (Lynn et al., 2004) on students aged 12-18 (1250 males and 1441 females).

The Estonian samples for ages 16 to 18 show radically reduced SDs thanks to the elite character of those tested at those ages (the academic stream). Using a proper value for Raven's SD, the results as presented showed that males aged 16-18 outscored females by 1.05 IQ points. I perceived that this was because the age samples were flawed; for example, they consistently omitted girls who were progressing faster through school (the brightest) and compared them to boys who were more representative. They even showed girls aged 13 with a lower Raven's raw score than those aged 12, something that could not be true of the general population. I isolated the main sources of bias and devised corrections (Flynn, 2012, Box 34 & pp. 272-283). These had a profound effect on Estonian gender comparisons.

In all nations where data were drawn from schools, I had to adjust for the fact that more males than females are school dropouts, which eliminates a low-scoring group from the male sample. These adjustments were minor (about 0.4 points).

Table 1 gives summary results for these five nations. Almost all show a slight IQ advantage for females (Australia suggests parity) and none show a fall off with age, particularly when the suspect value from Estonia at age 12 is discarded. The values for the older subjects from Argentina could not be adjusted for a higher male dropout rate because, at those ages, factors other than academic failure affect the percentage of those in the in-school population.

Lynn (1994, 1999; also Lynn & Irwing, 2004) has been consistent in naming 15 as the age at which males forge ahead, but this does not debar a hypothesis that the age of onset is 16 or 17. This would render inconclusive all data except those from Argentina and Estonia. But even two nations put a heavy burden on any hypothesis that women have inferior genes for fluid intelligence. It is possible that these two nations foster a cognitive environment that favors women over men, but the supporting evidence would have to go far beyond Raven's scores. In addition, age 17 divides high school from university. The overwhelming drift of the university data shows that this age does not mark the beginning of a female decline.

Table 1. *Raven's: Female IQs (male set at 100) from five nations by age.*

Nation	Ages										
	12	13	14	15	16	17	18	19	20-24	25-29	30
Estonia	(106.4)[1]	103.1	100.8	103.1	100.4	100.1	100.8				
Argentina		100.1				100.8*			100.4	100.1+	100.3+
South Africa				100.8							
New Zealand				101.4+							
Australia				99.99**							
Average	**(106.4)**	**101.6**	**100.5**	**100.9**		**100.5**	**100.8**	**100.8**	**100.4**	**100.1+**	**100.3+**

[1] The bracketed value for age 12 in Estonia cannot be valid. It is based on a raw score for girls at that age that is higher than their raw score at age 13.

+ These values could not be adjusted against census data to compensate for a possible heavier male dropout rate.

* Census data forced me to merge some Argentine ages when making adjustments (e.g. it covered ages 15-19 en bloc). However, there is no fiddle here: unadjusted score differences between male and female were virtually uniform over all ages from 15 to 19.

** The value for ages 15-16 for Australia is the average of a timed and untimed administration of the test. All other administrations were untimed.

Note that I qualify my conclusion by restricting it to societies that allow women full modernity. The South African data above is for whites only, but the same source gives results for women that are less modernized. Assuming gender parity for whites in South Africa (set at 100), Indian women were at 96, Coloured women at 97, and Black women at 95.

I have also studied a sixth "modern" nation where we have reliable data. Israel is an exception that proves the rule. Flynn (1998) reports military data from Israel for 17-year olds who took a shortened version of Raven's from 1976 to 1984. Men outscored women by the equivalent of 1.4 IQ points. The female deficit is entirely due to the fact that about 20 percent of the women were primarily from Orthodox homes, usually of Eastern European origin. They had a mean IQ of about 90.6, about 10 points below the mainstream of Israeli women. The women were either married at age 17 and a half, or were wards of their fathers until passed on to their husbands. Unlike men, Orthodox women are forbidden to read the Torah, much less participate in debates about its meaning.

These data are from the 1980's. Here I wish to compare data on crystallized intelligence among school children (age 6-16). Lieblich (1985; no. = 2111) reports WISC-R Performance IQs (closest to Raven's) that show Jewish girls with a 2.85 IQ point deficit — close to the total sample of 17-year-olds that had a 1.40-point deficit on Raven's. However, Cahan (2005; no. = 1100) reports a nil deficit (actually it was 0.15 points). The deficits for Full Scale IQ are more worrying at 4.80 (1985) and 2.85 (2005) points. Does Israel still have a huge minority of women that it denies modernity? I am aware that the Orthodox would say that this is indeed their objective and that it preserves their very identity. Whatever the merit of their spiritual success, Israel may pay a heavy price in the unrealized potential of so many of its women.

Lynn's recent Raven's data

Lynn does not alter his conclusions based on his total Raven's data, which were that from the age of 16 on, women begin to show an IQ deficit of 5 points (general population) and 4.6 points (in university). He adds two new studies.

In 2013, 136 Jewish adults (62 women and 74 men) from Serbia took Raven's. The female disadvantage was 4.05 IQ points (Čvorović & Lynn, 2014). The 2011 Serbian census shows 1185 Jews of whom 787 declared themselves as Jewish while others declared their religion as Judaism. The sample is from the remnants of a community destroyed by the Holocaust and further decimated by migration. Of course, it is not a Serbian sample (population 7.5 million). Whether they are even representative of adult Serbian Jews is unclear: the local Rabbi (there is only one Synagogue left in Serbia) and personal contacts recruited them. They are rather like a convenience sample from a Synagogue in Washington D.C. However, the fact that their average age was 54.5 years bars them from tracing a female deficit that begins at the age of 16.

Lynn cites Deary et al. (2004) as evidence for a 4.35-point female deficit on Raven's using the Lothian cohorts (samples representative of Scotland). When the 1921 cohort was tested at about age 80, males had a 1.5 raw score advantage. The SD of 8.8 was somewhat attenuated and I have put it at 10 for the total population, giving a male advantage of 2.25 IQ points. When the 1936 cohort was tested at about age 65, men had a 0.9 raw score advantage and thus an IQ advantage of 1.35 points. However, quibbling over the size of the female deficit is irrelevant. Once again, the advanced age of the subjects forbids any conclusions about the onset of a Raven's deficit. More important, all of these subjects were born at a time well before the generation in which Scottish women can be said to have achieved modernity.

The Wechsler data

I have used the same method with Lynn's Wechsler data. This meant:

(1) Jettisoning nations like China, Japan, Bahrain, Iran, Israel, Mauritius, Sudan, Taiwan, and South Korea as cases in which women may not have achieved modernity. If any object to this, construe my conclusion as applying to women outside of Asia and Africa. I have also separated Italy out for special treatment. Including it in the adult data would only raise the male advantage for Full Scale IQ by 0.4 points. But having read the Neapolitan novels (Ferrante, 2012, 2013, 2014, 2015) and surfed the internet ("current status of women in Italy"), I felt I had to stress the fact that Italy's male advantage is three times that of my other adult data collectively.

(2) Jettisoning all data prior to the WPPSI, WISC-R, and WAIS-R as clearly applying to an earlier generation. The WPPSI (normed 1964.5) sneaks in because of the youth of its cohorts. Those aged 4-7 would also be included in the WAIS-IV cohorts; that is those aged 46-49 in 2007. When I compare Italians on the WISC-IV (as children) with those on the WAIS-R (as adults), it might seem that the latter are from an earlier era. In fact, the WAIS-R was normed in Italy only in 1996 (Orsini & Laicardi, 1997).

(3) Jettisoning small convenience samples in favor of large samples, preferably standardization samples. The WPPSI data and most of the WAIS-III and WAIS-IV data are from standardization samples. None of the other data sets selected numbers less than 519 with the exception of Finland (407), a careful study done by the Psychological Corporation itself. I eliminated the WISC-R data from Knopic and DeFries (1998), despite a size of 852, because the sample was drawn from twins who served as control participants in the Colorado Learning Disabilities Research Center.

Results

In Table 2, I present my results study by study for Full Scale IQ, Verbal IQ, and Performance IQ. The most recent Wechsler tests eschew the Verbal and Performance categories in favor of four Index scores for Verbal Comprehension, Working Memory, Perceptual Reasoning, and Processing Speed. To get comparable values with earlier tests, I have averaged the first two to get a Verbal score and the second two to get a Performance score. This maintains continuity as much as possible in terms of subtests. In Table 3, I organize my results by age expressed in conventional IQ scores and do the same for Italy.

Table 2. *Wechsler tests: Male (plus) and Females (minus) advantages by test for Full Scale (FS), Verbal (V), and Performance (P) IQs expressed in Standard Deviation Units.*

Nation	Test	N	FS	V	P	Reference
USA	WPPSI	1199	-0.06	-0.02	-0.01	Kaiser & Reynolds, 1985
	WPPSI average		-0.06	-0.02	-0.01	
	IQ point average		**-0.90**	**-0.30**	**-0.15**	
Belgium	WISC-R	761	0.12	0.16	0.10	van der Sluis et al., 2008
Germany	WISC-IV	1650	0.07	0.19	0.00	Goldbeck et al., 2010
Germany	WISC-IV	1650	0.06	0.135	-0.10	Goldbeck et al., 2010
Netherlands	WISC-R	2027	0.14	0.16	0.08	Born & Lynn, 1994
Netherlands	WISC-R	737	0.25	0.26	0.00	van der Sluis et al., 2008
New Zealand	WISC-R	897	0.06	0.09	0.00	Lynn et al., 2005
Scotland	WISC-R	1361	0.18	0.31	0.01	Lynn & Mulhern, 1991
USA	WISC-R	1868	0.12	0.19	0.01	Jensen & Reynolds, 1983
USA	WISC-III	2200	0.11	0.095	-0.19	Irwing & Lynn, 2005
	WISC average		0.123	0.177	-0.01	
	IQ point average		**1.85**	**2.65**	**-0.15**	
Brazil	WAIS-III	3494	0.07			Victora et al., 2015
Canada	WAIS-III	1104	0.11			Longman et al., 2007
Chile	WAIS-IV	887	0.20	0.205	0.145	Diaz & Lynn, 2016
Finland	WAIS-III	407	0.07	0.08	0.07	Finland Psych. Corp., 2006
Hungary	WAIS-IV	1110	0.08	0.175	-0.07	Rózsa et al., 2010
Netherlands	WAIS-III	519	0.24	0.28	-0.11	van der Sluis et al., 2006
Spain	WAIS-III	1369	0.24	0.185	0.210	Colom et al., 2002
USA	WAIS-R	1880	0.15	0.15	0.09	Matarazzo et al., 1986
USA	WAIS-III	2450	0.18	0.235	-0.115	Irwing, 2012
USA	WAIS-IV	2200	0.15	0.225	-0.03	Piffer, 2016
	WAIS average		0.15	0.15	0.024	
	IQ point average		**2.24**	**2.30**	**0.36**	

Table 3. *Female IQs (male set at 100) for current generation in advanced nations, Wechsler data from Table 2 sorted by age*

Ages	Full Scale	Verbal	Performance
		Without Italy	
4-7	100.0	100.30	100.15
6-16	98.15	97.35	100.15
17-90	97.76	97.70	99.65
		Italy	
6-16	100.45	99.25	101.80
17-74	93.35	93.74	94.86

Analysis

The WPPSI data is sparse but taking it at face value, it shows that in America, the roles assigned female and male preschoolers do not differentiate them for IQ test performance. Taking all ages, the first thing to notice is that the genders are essentially equal for Performance IQ throughout life. This is similar to Raven's IQ and adds confirmation to gender parity on that test. The second is that while women are about two IQ points behind for Full Scale IQ both as schoolchildren and adults, there is no reason to single out age 16 or 17 as significant. Even if one takes the 0.39-point loss from WISC to WAIS seriously, it could set in at any age: my best bet would be when women begin to bear disproportionate responsibility for child rearing. However, Full Scale IQ masks a female Verbal IQ deficit of about 2.5 points throughout life. This is surprising given that women perform better at both school and university, and we shall return to it. As for Italy, women go from parity with the current generation of other advanced nations at school to a profound deficit on all three kinds of IQ as adults. Perhaps Italian women, like Orthodox women in Israel, are denied modernity to a degree extraordinary in nations of European origin.

The general intelligence data

In screening this data, I had to relax my criteria or there would be little left, but this means that the results must be taken as tentative. I have jettisoned Asian samples (Iran, Indonesia, and Israel), small convenience samples, and studies whose subjects belonged to an earlier generation. Stage (1988) just qualifies. A large sample of Swedish subjects took something like the Scholastic Aptitude Test in 1984-1986. Since these were students aspiring to university, its inclusion is marginal. Its gender deficit of 0.37 SDs (as reported) is calculated subtest by subtest using the in-sample SD. Two biases work in opposite directions: population SDs would be larger and lower the estimates; but if males do better on almost all subtests their overall advantage would be greater. I will simply assume that these cancel out. Nystrom (1983) was excluded because the sample was selected (in Stockholm) in 1970.

I have omitted Steinmayr et al. (2015), which shows a huge gender difference with females at a deficit of 0.78 SDs (as reported). Its subjects took not a general intelligence test but a general knowledge test: Geography (identifying African countries), History (when was the French revolution), Economics (what factor is not part of the GNP), Science (how many planets have rings), mathematics (what does the symbol ∞ mean – it is the symbol for infinity), arts (which picture was not painted by Picasso), and daily life (which means of transport has the lowest accident rate). It is interesting that the authors applied a screen for gender bias that lowered the female deficit to 0.32 SDs.

Pietschnig, Voracek and Formann (2011) tested psychology students at the University of Vienna. They were overwhelmingly female (326 to 123), so his sample poses problems even more serious than normal university samples. It is a study of IQ gains over time, and all students were scored on items common to an edition normed in 1970 and an edition normed in 2000. Against the older norms, the female deficit was 0.51 SDs; against the current norms, it was down to 0.32 SDs for no reason I can imagine. These are within-sample SDs and therefore attenuated. If you use a population SD of 15, the deficits drop to 0.37 (5.60 IQ points) and 0.23 (3.40 IQ points) respectively.

The remaining studies have large numbers and are current. Some are convenience samples, some likely to be representative, some standardization samples. Van der Linden and Dunkel (2016) is still under submission and I take it on faith. There are eight studies that span ages 16-21; as Lynn says, they range widely and therefore, I follow him by using the median rather than the mean.

Results

It is not easy to construct an age profile from these data but Table 4 makes an effort. Massive data for early adulthood (ages 16-21) show a female IQ deficit of 2.55 points. When sporadic data by age is averaged, the deficit is 2.81 points for all adult years (16-69) and when this is averaged with studies that include adults of all ages, the deficit is 2.84 points or virtually the same. There is one study that included all ages beginning with pre-school that gives 2.4 points.

Table 4. *Female IQs (male = 100) by age based on 14 tests of general intelligence.*

Ages	Female IQ	N	Studies and female deficit in SDs
Median 16-21	**97.45**	40,342	McEwan et al., 1986 (0.32); Lynn, 1992 (0.12); Lynn, 1996 (0.17); Colom & Lynn, 2004 (0.21); Keith et al., 2011 (0.12); Stage, 1988 (0.38); Lemos et al., 2013 (0.17); Roalf et al., 2014 (0.14). Median = 0.17.
28	95.80	900	van der Linden & Dunkel, 2016
56	98.80	900	Deary et al., 2001 (.08)
50-69	96.70	4243	Rabbitt et al., 1995 (0.22)
Average 16-69	**97.19***		
21-70	96.25	22,200	Société Anxa, 2004 (0.25)
17-94	96.70	1146	Kaufman et al., 1995 (0.22)
17-94	98.50	1500	Kaufman & Horn, 1996 (0.10)
Average 16-94	**97.16****		
4-90	**97.60**	2022	Kaufman & Wang, 1992 (0.16)

* The four values for ages 16-21, 28, 56, and 50-69 were averaged.
** The values for ages 16-69, 21-70, 17-94, and 17-94 were averaged.

Analysis

These results are so close to the Wechsler results as to make no difference: 97.16 as compared to WAIS Full Scale IQ at 97.76. The 97.24 for ages 16-25 is so close to the 97.16 for all adult ages as to signal no watershed year in late adolescence at which female IQ begins to decline. There is nothing that would give us a value for either preschoolers or schoolchildren analogous to the WPPSI or WISC results. If you take the data that covers all ages from 4 to 90, and set age 4 to 7 at gender parity, you get 97.48 for ages 8 to 90. This is quite plausible but tells us no more than that the data do not rule out the possibility of gender parity for preschoolers, as hinted at by the WPPSI.

Gender differences in spatial ability

Lynn cites two studies that give 0.25 and 0.50 SDs (3.75 and 7.50 IQ points) as a female spatial deficit. In this case, I suspect that the higher estimate is closer to the truth thanks to data from Project Talent. Its sample was taken somewhat earlier, in 1960, but was of high quality: a 5% stratified sample of all American high schools, subjects aged 17 and numbering 88,000 (Flanagan et al., 1962, pp. 43-56). However, Project Talent is also relevant to assessing the significance of such a visual deficit. Its tests included both Visual Reasoning (visualizing the outcomes of manipulating figures in two and three dimensional space, plus seeing relationships in highly complex non-verbal patterns) and Mathematics (algebra, analytic geometry, calculus, also fractions and decimals). By the significance of the spatial deficit I mean its implications for achievement, particularly in mathematics, where it might seem most relevant.

Jensen (1980, p. 626) hypothesized that Visuospatial IQ is a potent mediator of mathematical ability and therefore, gender differences may account for the mathematical superiority of males. Later, he appears to have changed his mind. As Lynn notes, Jensen (1998) makes no mention of such a hypothesis in his discussion of gender differences and indeed argues for IQ parity. By then, he had read my analysis of the performance of Jewish Americans on Project Talent (Flynn, 1991, pp. 119-123), and perhaps it influenced him.

Project Talent (Backman, 1972, p. 5, Table 1) shows that when Jewish Americans are normed against non-Jewish white Americans (set at 100), they score 91 for Visuospatial IQ (a deficit of 0.6 SDs) and yet score 111 for Mathematics (an advantage of 0.73 SDs). It is of great interest that the difference between Jewish males and females for Visuospatial ability is almost exactly the same as that between non-Jewish white males and females: so the female deficit among whites in general is replicated within the Jewish subculture. These results are also supported by two smaller studies (Lesser, Fifer & Clark, 1965; Majoribanks, 1972). Not only do Jewish Americans do better on Project Talent Math, they outnumber non-Jewish white American mathematicians and statisticians by a per capita ratio of three to one (Weyl, 1969, Tables IV and V).

I conclude that women would suffer from their spatial deficit in some professions. Given equal incentive and opportunity, we would expect fewer female taxi drivers (they need excellent mapping abilities — at least needed them in the days before automatic guidance systems). But the example of Jewish Americans forbids Jensen's early hypothesis about mathematics. Local mathematicians and statisticians tell me they never manipulate figures in three-dimensional space in their thinking, although I should add that none of them are in Topology (the study of properties preserved through deformations, twisting, and stretching of objects),

The *g* data

When you give a subtest a *g* loading, you are measuring how well performance on it predicts performance on the whole battery of subtests taken collectively. When you rank the subtests into a hierarchy from highest *g* loading to lowest, you get what appears to be a hierarchy from the most cognitively complex subtest to the lowest. For example, digit span forward (just repeating digits from memory in the random order they are read out) has a lower *g* loading than digit span backward (where in addition you have to reverse the order). The latter is clearly a more complex mental operation. Assume that men and women were equal on all Wechsler subtests if you count all the subtests as equal. Now assume you weight the scores according to the *g* loadings (a test with 0.8 gets twice the weight as a subtest with 0.4). That might change the result in favor of men. The genders being equal in term of Wechsler Full Scale IQ might conceal the fact that men have an advantage the more complex the item. With this in mind it makes sense to see if there is a *g* difference between the genders as distinct from an IQ difference. I will call this a GQ difference.

In screening this data, I jettisoned Jensen (1998) on the WAIS as obsolete and took the larger female deficit from his analysis of the WISC-R. His results from other tests are not referenced but he says that the samples are large and representative and that is good enough for me. I have omitted small samples (under 400). I have omitted samples for black and Hispanic Americans in that this opens up a debate about their exposure to modernity. Four samples were for university entrants (Allik, Must & Lynn, 1999; Colom et al., 2000 – both his samples; Stumpf & Jackson, 1994). For the two samples from Aluja-Fabregat et al. (2000), I modified Lynn's reported results after consulting the original. The changes were slight and the fact that this was the only such case attests to his scrupulousness.

Up to now, my analysis suggests that women have parity with men for fluid *g* (the Raven's data) and are about 2.24 IQ points behind them for crystallized *g* (the WAIS data). The *g* data include many non-Wechsler tests. I surveyed their subtests and concluded that the crystallized versus fluid balance was much the same as for the Wechsler tests; and anticipated that the Wechsler female GQ deficit would hold for them as well. There was one exception: the ASVAB (Armed Services Vocational Aptitude Battery). As Jensen (1998, pp. 276-277) points put, its ten subtests include Auto and Shop Information, Mechanical Comprehension, and Electronic Information. These are far more "crystallized" than any Wechsler subtest and put women at an obvious disadvantage. Therefore, I grouped the data into ASVAB, Wechsler, and non-Wechsler.

Results

Table 5 shows a female deficit of 5.28 GQ points for the ASVAB, which hardly signals a female intelligence deficit. It also shows a deficit of 2.64 points for the

Wechsler tests, and female parity for the non-Wechsler tests. I cannot explain why the last does not match the Wechsler tests. I noted that much of the data is US data and explored the possibility that this discrepancy was peculiar to America. However, when I isolated the USA data, the result was a female deficit of 2.92 GQ points for Wechsler and parity for non-Wechsler, so that is not the explanation. The female GQs for the three kinds of tests would be 94.72, 97.36, and 100.09 respectively.

Table 5. *GQ difference between the genders.*

Nation	Ages	No.	Test	Gender Difference*	Reference
USA	6-16	Large-good	ASVAB	0.366	Jensen, 1998
USA	23	3797	ASVAB	0.45	Meisenberg, 2009
USA	16-17	913	ASVAB	0.24	Nyborg, 2015
Average for the ASVAB				**0.352** **5.28 GQ**	
USA	6-16	1868	WISC-R	0.189	Jensen, 1998
USA	16-89	2450	WAIS-III	0.20	Irwing, 2012
Netherlands	adult	519	WAIS-III	0.30	van der Sluis et al., 2006
Spain	16-94	1369	WAIS-III	0.16	Colom et al., 2002
Spain	16-34	588	WAIS-III	0.03	Dolan et al., 2006
Average for Wechsler tests				**0.176** **2.64 GQ**	
USA	18-23	Large-good	GATB	-0.527	Jensen, 1998
USA	14-17	Large-good	BAS	-0.002	Jensen, 1998
USA	17-18	102,516	SAT	0.24	Jackson & Rushton, 2006
USA	18-79	436	Various	0.14	Johnson & Bouchard, 2006
USA	16	2100	KABC	-0.15	Reynolds et al., 2008
USA	16-59	3884	W-J III	0.08	Keith et al., 2008
USA	16-59	3086	W-J III	-0.17	Keith et al., 2008
Portugal	13	1714	PF	0.13	Lemos et al., 2013
Portugal	16	1519	PF	0.29	Lemos et al., 2013
Scotland	11	70,000	CAT	-0.001	Deary et al., 2007
Spain	13	678	RTB	-0.21	Aluja-Fabregat et al., 2000
Spain	13	887	RTB	-0.17	Aluja-Fabregat et al., 2000
Median for non-Wechsler tests				**0.006** **-0.09 GQ**	

* Plus is a difference in favor of males, minus a difference in favor of females.

Analysis

Table 6 groups the data by age as much as possible, and looks for further subtleties in terms of kind of test. Insofar as there is data for specific ages or small age groups, there is no particular age that signals the beginning of a female decline. The SAT “drop” at ages 17-18 is offset by a “rise” on the GATB at ages

18-23. The SAT sample is biased against women in that it is self-selected toward those who aspire to university. The GATB (General Aptitude Test Battery – used by the US Employment Service) has subtests that include clerical aptitude, motor coordination, finger dexterity, and manual dexterity (Jensen, 1998, p. 285). Perhaps these favor women on balance. The values for schoolchildren and adults on the Wechsler tests are typical. However, there is female parity on the Woodcock-Johnson, which is a bit of a surprise in that its content is close to the Wechsler tests.

Table 6. *Female GQs by age (male = 100) for non-Wechsler and Wechsler tests.*

Nation	Ages	No.	Female GQ
Scotland	11	70,000	100.15 (non-W test)
Portugal & Spain	13	3,279	101.25 (non-W tests)
USA & Portugal	14-17	Large	99.31 (non-W tests)
USA	17-18	102,516	96.40 (SAT)
USA	18-23	Large	107.91 (GATB)
USA	6-16	1868	97.17 (WISC-R)
Spain	16-34	588	99.55 (WAIS-III)
USA & Netherlands & Spain	16-89/94	4338	96.70 (WAIS-III)
USA	16/18-59/89	11,726	99.75 (mainly W-J III)

The problem of external validity

At no age, not 15 or 16 or 17 or older, do modern women in developed nations begin an IQ decline vis-à-vis males. Women suffer from a spatial deficit that might dictate fewer of them in “mapping jobs”. Modern women have a fluid intelligence of 100 (university Raven’s data) to 100.5 (five modern nations Raven’s data); and a crystallized intelligence of 97.26 (WAIS data plus non-Wechsler IQ) to 100 (non-Wechsler GQ). WAIS Verbal IQ is no higher than WAIS Full Scale IQ.

The interesting thing is this: no matter whether we take the lower values or a mean value, we would expect females to match males on mathematics and do no better than males at school and university.

Raven’s IQ correlates with SAT-Mathematics at 0.76, as compared to SAT-Verbal at 0.49 (Frey & Detterman, 2004 – the breakdown into Math and Verbal courtesy of Meredith Frey). When Raven’s is taken twice at an interval of a week to several weeks, it correlates with itself at only .82 (Raven). And yet, there is a dearth of women at the highest level of mathematics. Wechsler IQs (particularly Verbal IQs) are predictive of academic performance; indeed, universities use

SAT-Reading scores to isolate students at risk (Flynn, 2016, pp. 17-19). And yet, as we have seen, female high school graduates in America have a Grade Point Average (GPA) well above boys (boys get 70 percent of the Ds and Fs and girls get 60 percent of the As). About 80 percent of high school dropouts are boys. There is a similar pattern in the United Kingdom, Ireland, Scandinavia, Australia, New Zealand, and Canada. No advanced nation has been found to be an exception (Coates and Draves, 2006; Gurian, 2001).

Intellect and character

I suspect that there are genetic differences between men and women but that these have far more to do with character than intellect. It is politically incorrect to assert that women tend to be cleaner, more attentive to physical appearance, more skilled at arts that make home life attractive, and more likely to use charm rather than (overtly) aggressive behavior to attract the opposite sex. I will rely on those of both sexes who see through their eyes and not their ideologies.

First, women tend to be less violent and combative than men. Our nearest primate relatives suggest that over much of human evolution, males and females were subject to different selective pressures. Males competed for access to females by either violent combat or aggressive displays that intimidated rivals. Since aggressive males fathered the most offspring, their genes became dominant. Females perpetuated their genes to the extent that they raised their children to maturity, so that their children could reproduce. A bond with a male helpmate was advantageous. Therefore, genes for whatever helped domesticate males were positively selected. Much of human history is about the domestication of animals by humans, the domestication of people by living in larger communities (where they had to deflect violence outward), and the domestication of men by women. Violence has dropped over time as women achieved the equality that empowered them versus males in the home (Flynn, 2013, pp. 59-63).

Second, women are more sensitive to other human beings. Simpson et al. (2016): "Sex differences in social behavior are already evident in infancy. Female neonates, compared to males, make more eye contact, are more likely to orient to faces and voices, are rated as more cuddly, and exhibit stronger emotion contagion (e.g., contagious crying) and imitation." Greater eye contact persists from infancy into adulthood (Hittelman & Dickes, 1979; Leeb & Rejskind, 2004). I would like to know how many photo albums women and men compile respectively.

As Table 7 shows, at my university, the ratio of women (who complete degrees) falls from dominant to rare as we go from social science, to medicine and biology, to biochemistry, to chemistry, to applied math, to math and physics. Whether this is true elsewhere I do not know, but it is generally the case that women do better on applied math than on pure math.

Table 7. *University of Otago (2015): Ratio of female to male in various disciplines (completed degrees).*

Major completed	Female	Male	Ratio
Anthropology, Ecology, Psychology, Neuroscience, and Sociology	175	57	3.07-1
Medical School	144	103	1.40-1
Other medical (includes genetics)	87	48	1.81-1
Biology, Physiology and Zoology	80	62	1.29-1
Microbiology	24	18	1.33-1
Biochemistry	19	11	1.73-1
Chemistry	9	21	0.43-1
Applied math and Computers	13	42	0.31-1
Math and Physics	7	33	0.21-1
Economics	25	74	0.34-1

There are two ways of viewing this progression: that women value math more insofar as it has a human application, and less when it lacks any obvious human application, as when the pure mathematician finds the dance of numbers in itself elegant and inspiring. This would suggest that the female character trait of interest in people is responsible. On the other hand, math gets more difficult as you go from psychology to pure mathematics, which would accord with a gender difference in talent. Since either of these traits could be genetic in origin, I can see no easy way of evidencing one or the other. The case of biochemistry (women 1.73 to one) and chemistry (women 0.43 to one) might seem to signal being "people oriented" as a factor. However, it is easier to pick non-calculus options in Biochemistry than Chemistry. There is one anomaly: the ratio against women in economics is high at 0.34 to one. Evidently women do not feel that economics is about people. Given how it is taught, it is hard to disagree.

That fewer women attain the top in business, law firms, and so forth, has an easy explanation: they are less willing to ignore their human associations (spouses, children, friends) to work 80 hours a week like the fanatic upwardly mobile executive.

The reason for the superior female performance at school is abundantly clear: boys are more aggressive and combative and have a much harder time accepting school discipline whether it is rule- or self-imposed. They hand in assignments late (or not at all), miss school more often, drop out more often, and must be disciplined more often. In sum, two differences in character may explain women's under-performance in mathematics and over-performance at school.

Vive la difference

Let us assume what may not be true: that the current generation of women in advanced nations have been fully exposed to modernity and have a cognitive and emotive environment equal in quality to men; therefore, all of today's differences in character and intellect (as measured by mental tests) are largely genetically determined. Offered a trade-off between half of humanity who (statistically) are less murderous and aggressive, value human beings more, and make better students on the one hand, and (not quite) doubling the number of elite mathematicians on the other hand, my own preference is clear.

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