



Investigating the world's rich and powerful: Education, cognitive ability, and sex differences



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ABSTRACT

To investigate who becomes a member of the global elite, three groups were examined: the world's billionaires ($N = 1426$), most powerful people ($N = 231$) according to *Forbes* magazine, and World Economic Forum (Davos) attendees ($N = 2624$). All groups were highly educated and cognitively able: roughly 34% of billionaires, 31% of self-made billionaires, 71% of powerful males, 58% of powerful females, and 55% of Davos participants attended elite schools worldwide. Among billionaires and Davos attendees, many majored in business and STEM. In the U.S., top 1% ability individuals were highly overrepresented: 45 times (base rate expectations) among billionaires, 56 times among powerful females, 85 times among powerful males, and 64 times among Davos participants. Many powerful people and Davos attendees resided in the U.S. Education and ability level differences were found across countries and sectors in which billionaires and Davos attendees resided. Even within the top 0.0000001% of wealth, higher education and ability were associated with higher net worth, even within self-made and non-self-made billionaires, but not within China and Russia. Females were underrepresented among all groups, especially among self-made billionaires. These global elites were largely drawn from the academically gifted, with many likely in the top 1% of ability. The clustering of brains, wealth, and power may have important implications.

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1. Introduction

At any given time, society holds a fascination with people who possess wealth or influence. Therefore, it is natural to wonder what personal traits and other factors might be necessary to attain such positions. Although many interlocking individual and societal factors are likely involved, factors that might play a role are the education and cognitive ability level of the individual. One way to empirically investigate this issue is to directly examine three groups of global elites—billionaires, the most powerful people according to *Forbes* magazine, and the rich and powerful people who attend the World Economic Forum in Davos—and retrospectively assess to what degree they were educated and cognitively able (Cox, 1926; Simonton, 2009).

Murray (2008, p. 107) stated that the United States (U.S.) elite “are drawn overwhelmingly from the academically gifted,” essentially those with high cognitive ability. Wai (2013) empirically examined this hypothesis looking at groups of the U.S. elite including senators, House members, federal judges, Fortune 500 CEOs, and billionaires finding the U.S. elite are drawn largely from the cognitive elite. U.S. individuals in the top 1% of ability were highly overrepresented among 2012 billionaires and CEOs, at 45 and 39 times base rate expectations, respectively. Higher education and ability were linked with higher wealth within U.S. billionaires, CEOs, and the top 1% of ability. This added to the large research base connecting cognitive ability with educational and occupational success (Kuncel, Hezlett, & Ones, 2004; Nyborg & Jensen, 2001; Schmidt & Hunter, 2004; Wai, in press), including the accumulation of wealth (Kaplan & Raugh, 2013; Rindermann & Thompson, 2011; Wai,

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Lubinski, & Benbow, 2005). Murray (2008, pp. 107–108) noted other groups of U.S. elites that were not investigated in the prior study (Wai, 2013), including: “journalists in the leading print media” and “the most influential faculty in the nation’s elite universities.” This paper attempts to replicate and expand the findings from Wai (2013) on the U.S. elite, determines whether findings can be extended to the global elite, and explores potential implications.

In order to examine whether the world’s rich and powerful are drawn from the academically gifted, we need samples that would allow a retrospective examination of their education and ability level.

2. Samples

2.1. World’s billionaires

Data on the 1426 ($M = 1289$, $F = 137$; age range = 29 to 98, average ≈ 63) 2013 world’s billionaires were taken from *Forbes* magazine’s database (*The World’s Billionaires, 2013*) (<http://www.forbes.com/billionaires/>). Name, country, college or university, graduate school, major, sector in which wealth was obtained, net worth, age, sex, self-made status, relationship status, and number of children were collected. Internet searches were systematically conducted to verify and update information from the *Forbes* database.

2.2. World’s most powerful people

Data on the world’s most powerful people ($N = 231$) were drawn from three databases compiled by *Forbes*. The first two were the 2012 and 2013 World’s Most Powerful People lists (<http://www.forbes.com/powerful-people/>) and the third was the 2013 World’s Most Powerful Women list (<http://www.forbes.com/power-women/>). Most powerful men lists for 2012 and 2013 were created by removing women from the most powerful people lists (original $N = 71$ in 2012 and 74 in 2013). This resulted in three lists including 66 men in 2012 (Age range = 29 to 88, average ≈ 61), 65 men in 2013 (Age range = 29 to 99, average ≈ 61), and 100 women (Age range = 27 to 87, average ≈ 55). The most powerful people list methodology included four factors: the number of people the person employed or managed, the amount of financial resources they controlled, their number of spheres of influence, and how actively they used their power (see Ewalt, 2012 for more detail). The most powerful women list methodology included similar assessments in the areas of money, media presence, and impact (see Howard, 2013 for more detail). For men the list included billionaires, heads of state, CEOs, financiers, philanthropists, and entrepreneurs. For women the list included billionaires, heads of state, CEOs, entertainment and fashion moguls, media executives, nonprofit heads, politicians, and those in technology. Name, country, college or university, graduate school, age, sex, relationship status, and number of children were collected. Internet searches were systematically conducted to verify and update information from the *Forbes* databases.

2.3. World Economic Forum (Davos) participants

Data on the 2624 ($M = 2212$, $F = 412$; average age $F \approx 49$, $M \approx 52$, average ≈ 51.5 , Arnett & Chalibi, 2014) people who

attended Davos in 2014 were taken from a list compiled by *The Wall Street Journal* (2014). The people invited to attend Davos are “business, political, academic and other leaders of society” (*World Economic Forum, 2014*) who are considered some of the “world’s most powerful people” (*The Guardian, 2014*). Name, title, company, and country were collected from *The Wall Street Journal* list, and college or university, graduate school, major, and sex were systematically collected through internet searches. Individual age, relationship status, and number of children were not systematically available.

3. Method

3.1. Assessing education and ability level

The method for the current study is an extension of that used by Wai (2013) for the U.S. alone. Gaining admission to a top U.S. college, university, or graduate school typically requires scoring at or above a certain level on standardized tests such as the Scholastic Assessment Test (SAT), American College Test (ACT), Graduate Record Examination (GRE), Law School Admissions Test (LSAT) or Graduate Management Admission Test (GMAT), among others. The SAT and ACT have been shown to measure general intelligence (g) or IQ to a large degree (Frey & Detterman, 2004; Koenig, Frey, & Detterman, 2008), and it is reasonable to think that other tests (e.g. international standardized exams) also measure intelligence due to Spearman’s (1927) *indifference of the indicator*—the idea that “ g enters into any and every mental task” (Jensen, 1998, p. 33). Murray (2012, p. 366) concluded: “the average graduate of an elite [U.S.] college is at the 99th [per]centile of IQ of the entire population of seventeen-year-olds,” and defined an elite college to be roughly one of the top dozen schools in the U.S. *News & World Report* rankings (*America’s Best Colleges, 2013*). The list of colleges, universities, and graduate schools indicating top 1% in cognitive ability status within the U.S. can be found in Table 1 of Wai (2013), and in the present study was used within the U.S. and worldwide, as people from around the world often attended U.S. universities. The criteria for selection of these schools were based on the average scores of an institution indicating roughly the top 1% compared to the general U.S. population.¹ However, the majority of individuals attended colleges and universities within their home countries, therefore the *QS World University Rankings (2012)* were used to determine elite school status within each country. As a reasonably select cut point, up to the top 10 schools within each country were considered elite and included. In many cases there were fewer than 10 schools within

¹ Attendance at a national university or liberal arts college that had median combined SAT Critical Reading and Math scores of 1400 or greater according to *U.S. News & World Report (America’s Best Colleges, 2013)* was used as a reasonable indicator that the individual was in the top 1% in cognitive ability compared to the general U.S. population. This resulted in 29 schools which can be found in Table 1 of Wai (2013). Additionally, similar cut scores on the LSAT (12 schools) and GMAT (12 schools) were used as a reasonable indicator that the individual was in the top 1% in cognitive ability. Finally, for students who had graduate degrees outside of law and business, attendance at one of the 29 schools in Table 1 was used as a reasonable indicator that their GRE scores placed them in the top 1% in cognitive ability compared to the general U.S. population. For specific details on the population level statistical calculations that led to these selection criteria, see Wai (2013).

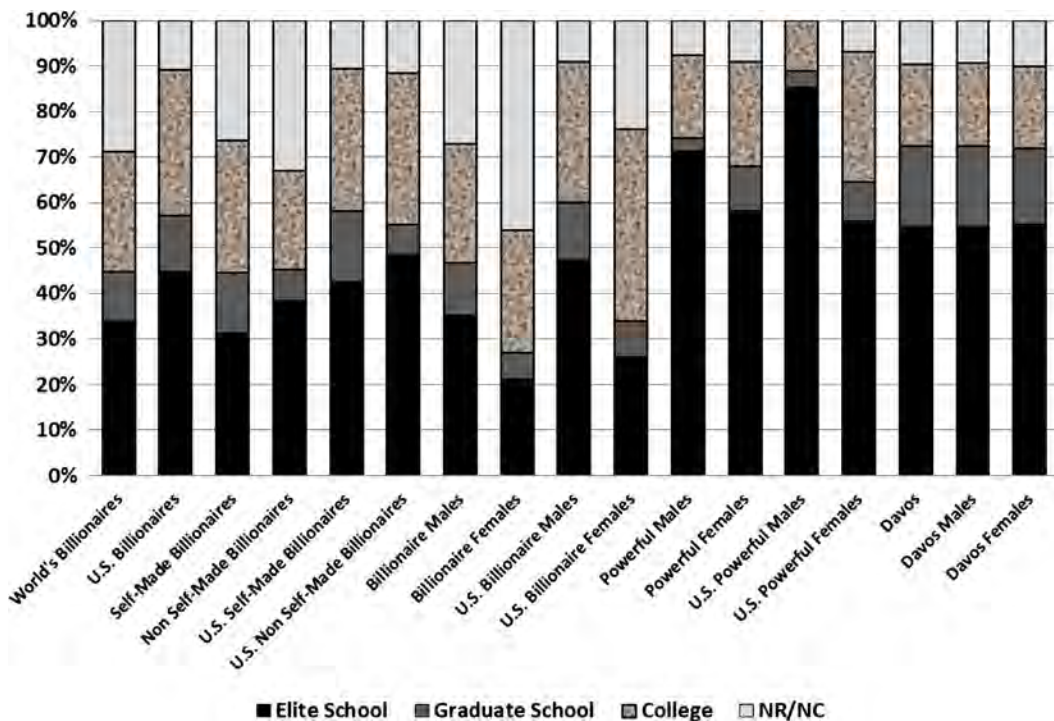


Fig. 1. World's billionaires, powerful people, and Davos attendees: Education and ability level by self-made status and sex.

each country that made it onto the *QS* world rankings, and only the schools on the *QS* rankings were used. Although the method in Wai (2013) reasonably isolated the schools that required standardized test scores indicating top 1% in cognitive ability status, the same method cannot be directly applied for countries worldwide due to varying criteria for university admissions and lack of publicly reported standardized test scores. However, it is reasonable to think that the top colleges and universities within each country would attract a large fraction of the brightest individuals. Therefore, admission to one of these schools is a direct measure of elite school status, and also a reasonable but indirect proxy of high cognitive ability relative to the selection pool within each country – likely within the top 1%.² Some students attend an elite school with lower than typical test scores (e.g., due to athletics, legacy status, political connections; Espenshade & Radford, 2009; Golden, 2006), whereas others who have higher than typical test scores may not have attended an elite school (e.g. financial limitations, scholarship, staying close to home). It is reasonable to think that factors in both directions likely counterbalance one another.

3.2. Assessing billionaire “self-made” status

Because not all billionaires were responsible for generating initial wealth, those who were self-made may have had different

² For example, similar to the U.S., in order to gain admission to China's elite colleges, students are required to take the national college entrance examination (the CEE or gaokao). The total score is the main criteria for college admission. Li, Meng, Shi, and Wu (2012, p. 80) note that “CEE scores are essentially good measures of student ability or IQ. In Chinese society, CEE scores are well accepted as direct measures of intelligence.”

educations and cognitive ability levels compared to those who inherited their wealth. *Forbes* had a self-made designation; however, internet searches were used to further refine it. A billionaire was considered self-made if they were designated so by the *Forbes* staff and no evidence was found through the internet searches they had inherited a large sum of money or a company from which they built their fortune. Using these stricter criteria lowered the number of self-made billionaires (62%) compared to the *Forbes* designation (67%).

The present study addressed the following questions for the global elite:

1. How educated and cognitively able are these groups?
2. Are self-made billionaires different from billionaires overall and those not self-made?
3. Are there sex differences within these groups?
4. Do education and cognitive ability vary across countries and sectors?
5. Among billionaires, are higher education and cognitive ability associated with higher net worth?
6. Among billionaires and Davos participants, what were the most popular majors?

The present study also expanded the investigation conducted by Wai (2013) on the 2012 U.S. billionaires and Fortune 500 CEOs to the 2013 world billionaires and Davos CEOs, simultaneously testing whether prior U.S. findings could be replicated in a larger, updated, and in the case of CEOs, different samples. Other U.S. elite groups are also investigated. Relationship status and number of children were examined for billionaires and powerful people, as well as the age pattern of the global elites and Harvard University

attendance. To assess significance between groups when appropriate, independent sample *t* tests and confidence intervals around the differences between proportions were computed (Agresti, 2007). In addition, *h* for the effect size for proportions (Cohen, 1988), along with *d*, the standard effect size measure, were computed when appropriate.

4. Results

4.1. Billionaire education and ability level by self-made status and sex

Fig. 1 presents data on the education and ability level for each group in four primary independent categories (see specific values in Appendix A). *Elite school* indicates the percentage of people who attended one of the top schools in the U.S. (see Wai, 2013, Table 1) according to the *U.S. News & World Report (America's Best Colleges, 2013)*, or one of the top schools in the world according to the *QS World University Rankings (2012)*, and roughly represents a group likely in the top 1% of ability. *Graduate school* indicates the percentage having attended some graduate school independent of the elite school category and roughly represents the top percentiles of ability. *College* indicates the percentage having attended college but not graduate school or an elite school. *NR/NC* indicates the percentage that either did not report their education or had no college. When doing internet searches, some people did not report educational information in their biographies or it simply could not be found. Therefore in many cases it was unclear whether the person did not go to college or simply did not report this information publicly, hence the NR/NC combined category. These four categories sum to 100%.

Among 2013 billionaires, a lower percentage of the world (33.9%) compared to the U.S. (44.8%) attended an elite school. 5.6% of the world and 11.3% of the U.S. attended Harvard (see Appendix A). If the term elite is broadened to include elite school or graduate school attendance, then 44.8% met this criteria and are likely in the top percentiles of ability. The majority attended at least college. In 2012, U.S. billionaires had 45.0% in the elite school category (Wai, 2013) replicated by 44.8% in 2013. In the current study these U.S. findings were expanded worldwide. This means that individuals in the top 1% of cognitive ability were ≈ 45 times overrepresented among U.S. billionaires.

The elite school percentages for the world's self-made (31.1%) and U.S. self-made (42.6%) billionaires were slightly lower than overall values, with 5.5% and 12.3% attending Harvard, respectively. However, the elite school percentages for the world's non-self-made (38.3%) and U.S. non-self-made (48.5%) billionaires were higher than overall values, with 5.8% and 9.7% attending Harvard, respectively. Wai (2013) did not distinguish between self-made and non-self-made billionaires, so an important empirical test was conducted to see if these two groups differed significantly on elite school attendance. Non-self-made (38.3%) was significantly higher than self-made (31.1%) for the world's billionaires (95% CI PD: 0.02, 0.12, *significant*, $h = 0.15$). However, non-self-made (48.5%) was not significantly higher than self-made (42.6%) for U.S. billionaires (95% CI PD: -0.04 , 0.15, *not significant*, $h = 0.12$).

A greater percentage of the world's billionaire males (35.2%) vs. females (21.2%) attended an elite school, and overall, males were more educated than females. 6.1% of males and 1.5% of females attended Harvard. U.S. percentages were higher, with males (47.2%) having greater elite school attendance than females (26.0%) and a higher education level overall. 12.2% of males and 4.0% of females attended Harvard.

4.2. World's most powerful people education and ability level by sex

Fig. 1 and Appendix A also show powerful males (71.2%) and females (58.0%) had very high elite school attendance, with 92.4% of males and 91.0% of females having attended some college, and 19.7% of males and 13.0% of females having attended Harvard. Data in Fig. 1 comes from the 2012 powerful men list, but data in 2013 can be found in Appendix A. 84.6% of all men and 96.2% of U.S. men in 2012 were also in the 2013 list. In part due to this high overlap, findings in 2012 and 2013 were nearly identical. U.S. elite school percentages were higher for males (85.2%) but lower for females (55.9%), showing that they were ≈ 85 and ≈ 56 times overrepresented among their respective groups. All U.S. males and 93.2% of females attended college, and 40.7% of males and 18.6% of females attended Harvard. The original *Forbes* most powerful people list included 66 men and 5 women in 2012 and 65 men and 9 women in 2013. Therefore, males were overrepresented among the world's powerful by a factor of between 7.2 and 13.2 to 1.

4.3. Davos education and ability level by sex

Fig. 1 and Appendix A also show that Davos overall, males, and females, had similar ($\approx 55\%$) elite school attendance. The graduate school ($\approx 17\%$), college ($\approx 18\%$), NR/NC ($\approx 10\%$), and Harvard (roughly 9%) categories were also aligned. 18.6% of Davos attendees had MBAs, with males (19.3%) higher than females (15.3%). The U.S. Davos attendees (63.7%), males (64.9%), and females (59.1%) had slightly higher elite school attendance compared to Davos overall. Thus, U.S. individuals in the top 1% of cognitive ability were ≈ 64 times overrepresented. An analysis was conducted looking just at Davos CEOs, with males and females having similar elite school percentages ($\approx 55\%$). Regarding MBAs, Davos CEOs had a high percentage overall (27.8%), with males (29.2%) higher than females (14.9%). Within the U.S., roughly 60% of all CEOs, 60% of males, and 63% of females attended an elite school. In 2012, U.S. Fortune 500 CEOs had 38.6% in elite schools (Wai, 2013), so Davos CEOs were more select. Although overall there were 5.4 males for each female, Davos within group comparisons showed sex similarities rather than differences.

In addition to CEOs, the groups of U.S. elites not examined in Wai (2013) but mentioned by Murray (2008) were media and academia. Additionally, government & policy as well as powerful men and women were relevant. Table 1 shows all of these sources of data combined. 55.6% of Davos media, 74.2% of Davos government & policy, and 90.1% of Davos academia attended an elite school and were in the top 1% of cognitive ability. Harvard attendance among U.S. Davos elites ranged from about 13% to 36%.

Table 1

Ability and education level among the U.S. elite.

	Elite school (top 1%)	Graduate school	College	NR/NC	Harvard	Sample size (N)	M to F ratio
Federal judges	40.9%	59.1%	0%	0%	11.9%	789	2.3
Billionaires	45.0%	11.6%	31.4%	12.0%	11.3%	424	7.8
Self-made billionaires	42.6%	15.5%	31.4%	10.5%	12.3%	277	33.6
Senators	41.0%	42.0%	16.0%	1.0%	12.0%	100	4.0
House members	20.6%	47.5%	30.8%	0.9%	6.6%	441	4.4
Fortune 500 CEOs	38.6%	28.4%	27.2%	5.8%	13.2%	500	28.3
Davos CEOs	59.9%	19.4%	17.1%	3.6%	15.3%	222	7.2
Davos media	55.6%	11.1%	25.6%	7.8%	13.3%	90	3.1
Davos academia	90.1%	8.8%	1.1%	0%	27.5%	91	2.8
Davos government & policy	74.2%	19.4%	3.2%	3.2%	35.5%	31	2.9
Davos overall	54.6%	17.6%	18.1%	9.5%	18.5%	661	3.8
Powerful men	85.2%	3.7%	11.1%	0%	40.7%	27	–
Powerful women	55.9%	8.5%	28.8%	6.8%	18.6%	59	–

4.4. U.S. and Harvard representation

59.0% of powerful females, 40.9% of powerful males, 31.0% of billionaires, and 25.2% of Davos attendees came from the U.S. alone. Of these U.S. groups, 18.6% of powerful females, 40.7% of powerful males, 11.3% of billionaires, and 18.5% of Davos attended Harvard. [Appendix D](#) also shows that among U.S. billionaires, technology (15.7%) and investments (24.0%) had

high Harvard representation and among U.S. Davos, consulting (21.6%), academia (27.5%), investments (31.3%), and government & policy (35.5%) had high Harvard representation.

4.5. Age pattern

The average age of these global elites ranged from relatively youthful Davos attendees (51.5 years) to powerful people

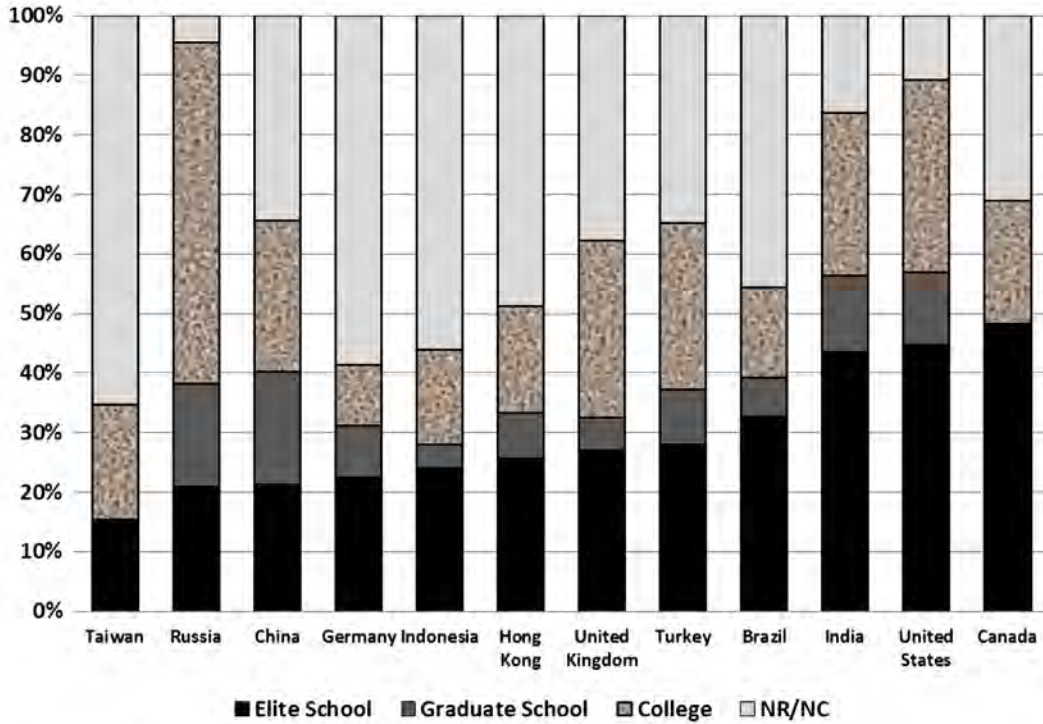
Table 2

Billionaires and Davos attendees male–female ratios within country by self-made status.

World's billionaires	M/F ratio	Sample size (N)	Self-made billionaires	M/F ratio	Sample size (N)
Canada	All male	29	Canada	All male	23
Indonesia	All male	25	Germany	All male	18
United Kingdom	All male	37	India	All male	21
Russia	109.0	110	Indonesia	All male	8
India	26.5	55	Taiwan	All male	16
Taiwan	25.0	26	Turkey	All male	15
China	16.4	122	United Kingdom	All male	29
Hong Kong	8.8	39	Russia	104.0	105
United States	7.8	442	United States	33.6	277
Germany	4.3	58	Brazil	25.0	26
Brazil	4.1	46	Hong Kong	23.0	24
Turkey	3.3	43	China	22.6	118
Total	9.4	1426	Total	47.7	877

Davos attendees	M/F ratio	Sample size (N)
UAE	19.0	40
Saudi Arabia	13.5	29
Netherlands	13.0	42
Korea	12.5	27
India	10.4	125
Brazil	10.0	33
Japan	9.9	76
Italy	9.7	32
Germany	8.9	119
Mexico	8.5	38
Switzerland	7.5	212
Russia	7.4	76
Norway	5.3	25
France	5.2	74
United Kingdom	5.1	282
South Africa	3.8	58
United States	3.8	661
Canada	3.6	41
Hong Kong	3.5	27
China	2.8	64
Turkey	1.9	26
Total	5.4	2624

A. Billionaires



B. Davos Attendees

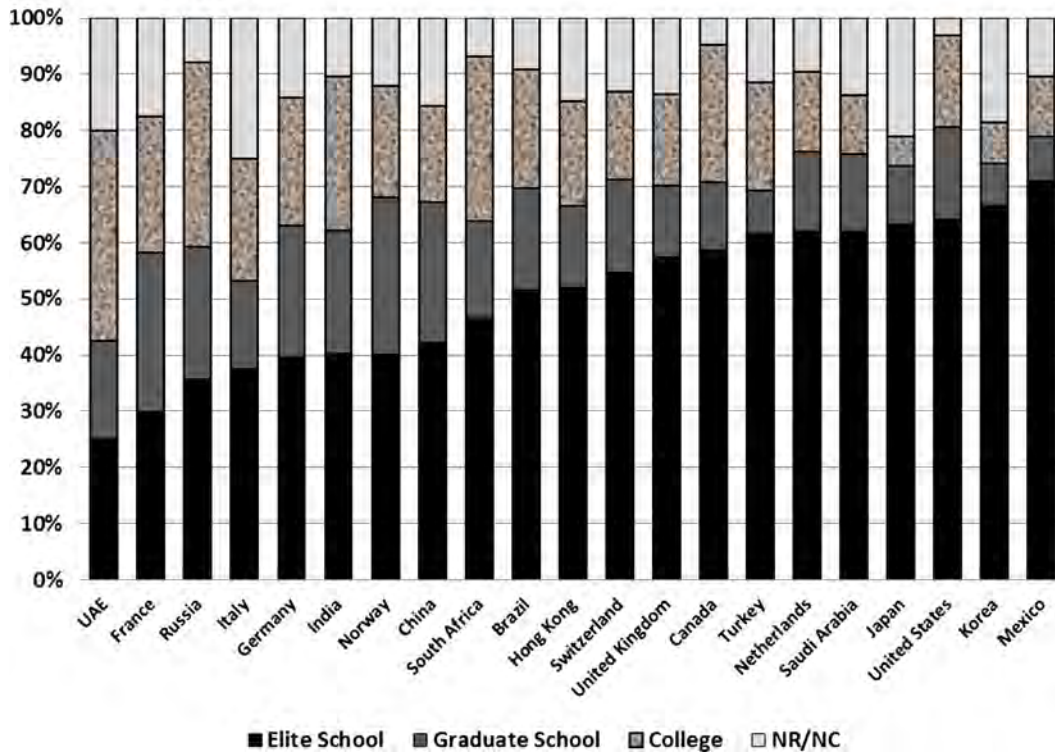
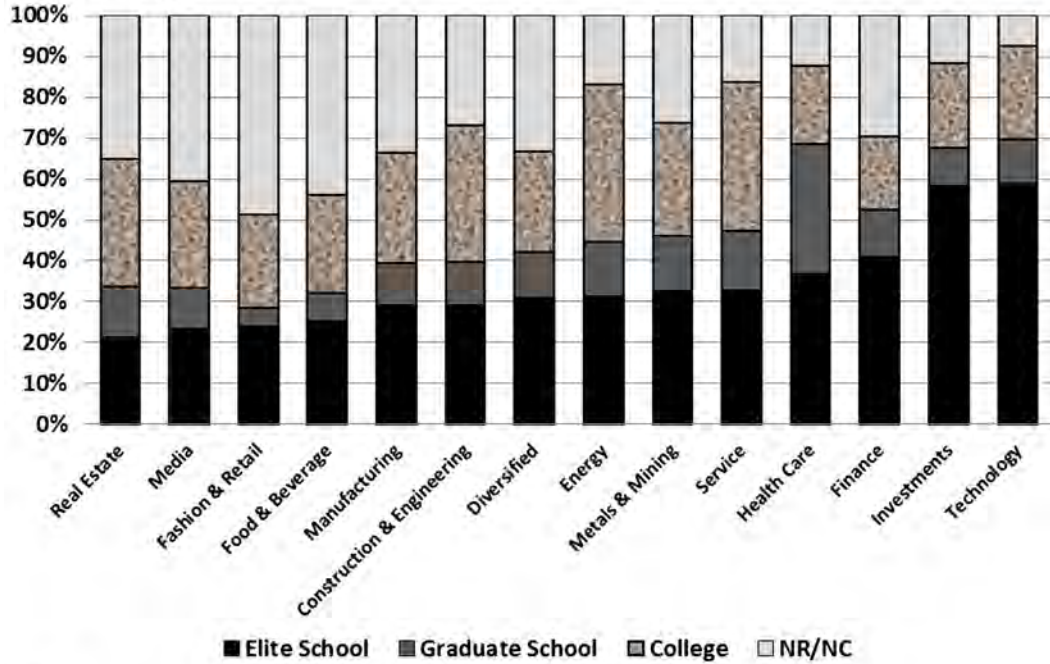


Fig. 2. World's billionaires and Davos attendees: Education and ability level by country. Panel A. Billionaires. Panel B. Davos attendees.

(≈57.8) to billionaires (63.1). However, across Davos attendees (F = 49, M = 52), powerful people (F = 54.9, M = 60.7), and billionaires (F = 61.9, M = 63.2), females were consistently

younger than their male counterparts. Among other things, perhaps this indicates the recent rise of females into the global elite, especially among Davos and the world's powerful.

A. Billionaires



B. Davos Attendees

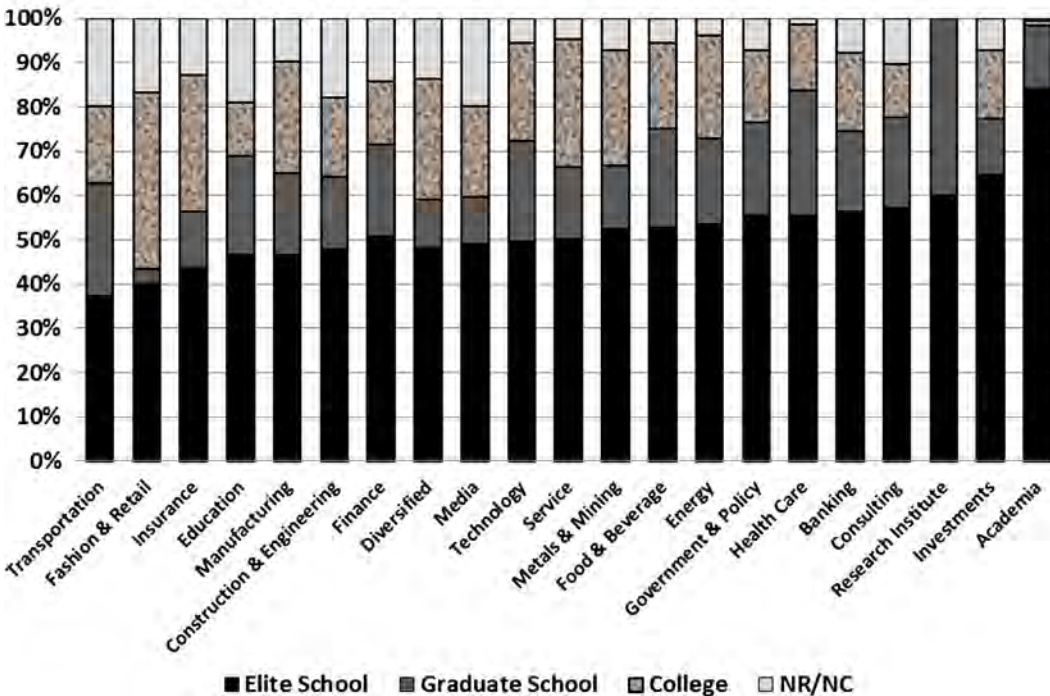


Fig. 3. World's billionaires and Davos attendees: education and ability level by sector. Panel A. Billionaires. Panel B. Davos attendees.

Appendix B shows the wide age range of billionaires. Canada (70.7 years) and Taiwan (69.0) had the oldest and China (52.6) and Russia (51.6) had the youngest billionaires. China and Russia were significantly lower in average age than the other countries perhaps indicating the recent rise of a younger generation in these countries into the global elite.

4.6. Billionaire and Davos sex differences by country

Billionaire sex differences by country were examined by taking male–female ratios. Table 2 shows overall, the male–female ratio was 9.4 to 1, with Turkey having the lowest ratio (3.3 to 1), and Russia (109.0 to 1), the United Kingdom (all male), Indonesia (all male), and Canada (all male) having the highest. The majority of female billionaires were not self-made (86.9%), mostly inheriting their wealth from a spouse or family. Examining self-made billionaires separately provided a different picture, for example, most countries had no females. Overall, the male–female ratio was 47.7 to 1 with Hong Kong (23.0 to 1) and China (22.6 to 1) having the lowest ratios and Russia having the highest (104.0 to 1) apart

from countries with all males. In 2013, there were 18 female self-made billionaires (8 from the U.S., 5 from China, and 1 each from Hong Kong, Brazil, Italy, Russia, and Spain). Appendix D profiles their achievements. Six of them founded their own company and built their wealth alone, and the remainder were co-founders or took over their spouse's business. All of these women were considered self-made because they worked to achieve their wealth and did not simply inherit a company or a large sum of money.

Male–female ratios also varied by country among Davos attendees. Overall the ratio was 5.4 to 1, with the highest ratios in the UAE, Saudi Arabia, and Netherlands (≥ 13 to 1) and the lowest ratios in China and Turkey (< 3 to 1). This matches with the lowest ratio found among Chinese self-made billionaires, and within Turkish billionaires overall.

4.7. Overall sex differences

Overall, females were underrepresented among the global elite. This held to a moderate degree among Davos (5.4 to 1), a larger degree among billionaires (9.4 to 1), Davos CEOs (9.6

Table 3
Billionaire education level, ability, and wealth by self-made status and country.

	Sample Size (N)	Elite school	Graduate school	College	NR/NC	Harvard
<i>a. All billionaires</i>						
Billionaire worth \geq median	735	37.3%	9.4%	24.4%	29.0%	6.4%
Billionaire worth $<$ median	691	30.2%	12.6%	28.4%	28.8%	4.8%
N		Elite school	SD	N	Not Elite school	SD
Billionaires	483	\$4.61 billion	7.09	943	\$3.40 billion	4.19
<i>b. Self-made billionaires</i>						
Billionaire worth \geq median	458	34.3%	11.8%	28.6%	25.3%	6.1%
Billionaire worth $<$ median	419	27.7%	15.0%	29.8%	27.4%	4.8%
N		Elite school	SD	N	Not elite school	SD
Billionaires	273	\$4.59 billion	8.03	604	\$3.22 billion	4.10
<i>c. Non-self-made billionaires</i>						
Billionaire worth \geq median	281	40.9%	5.7%	19.6%	33.8%	6.4%
Billionaire worth $<$ median	268	35.4%	8.6%	23.9%	32.1%	5.2%
N		Elite school	SD	N	Not elite school	SD
Billionaires	210	\$4.64 billion	5.66	339	\$3.72 billion	4.34
<i>d. U.S. billionaires</i>						
Billionaire worth \geq median	233	47.6%	10.3%	29.2%	12.9%	12.4%
Billionaire worth $<$ median	209	41.6%	14.4%	35.4%	8.6%	10.0%
N		Elite school	SD	N	Not elite school	SD
Billionaires	198	\$5.18 billion	8.42	244	\$3.47 billion	4.07
<i>e. Non U.S. billionaires</i>						
Billionaire worth \geq median	521	31.5%	9.0%	22.3%	37.2%	3.5%
Billionaire worth $<$ median	463	26.1%	11.9%	25.3%	36.7%	2.6%
N		Elite school	SD	N	Not elite school	SD
Billionaires	285	\$4.21 billion	5.98	699	\$3.38 billion	4.24
<i>f. China billionaires</i>						
Billionaire worth \geq median	61	21.3%	18.0%	31.1%	29.5%	0%
Billionaire worth $<$ median	61	21.3%	19.7%	19.7%	39.3%	0%
N		Elite school	SD	N	Not elite school	SD
Billionaires						
<i>g. Russia billionaires</i>						
Billionaire worth \geq median	55	18.2%	21.8%	56.4%	3.6%	0%
Billionaire worth $<$ median	55	23.6%	12.7%	58.2%	5.5%	1.9%
N		Elite school	SD	N	Not elite school	SD
Billionaires	23	\$3.54 billion	4.39	87	\$3.97 billion	4.26

to 1), and powerful people (7.2–13.2 to 1), and a significant degree among self-made billionaires (47.7 to 1).

4.8. Billionaire and Davos education and ability level by country

Fig. 2, panel A, and Appendix B chart billionaire education and ability level by country, ranked by elite school status. Countries were included with samples ≥ 25 . Canada (48.3%) and the U.S. (44.8%) had the highest elite school attendance, and Russia (20.9%) and Taiwan (15.4%) had the lowest. Among billionaires, 71.1% of the world and 89.1% of the U.S. attended at least some college. Among Davos, these percentages were 90.3% and 96.4% respectively. The U.S. had the largest number of billionaires (442), followed by China (122), Russia (110), Germany (58), and India (55) with samples ≥ 50 . The oldest billionaires came from Canada (average age ≈ 71) and Taiwan (69) and the youngest came from Russia (52) and China (53). 97% of Chinese and 96% of Russian billionaires were self-made, vs. only 32% of Indonesian and 31% of German billionaires.

Fig. 2, panel B, and Appendix B also show Davos education and ability level by country ranked like the billionaires. The UAE, France, and Russia were the least likely to attend an elite school ($<36\%$) whereas Korea, Japan, U.S., and Mexico were the most likely to do so ($>63\%$). The U.S. had the largest number of Davos attendees (661), followed by the United Kingdom (282), Switzerland, where Davos is held (212), India (125), and Germany (119), with samples ≥ 100 .

Across the billionaires and Davos group Canada and the U.S. tended to have high and Russia tended to have low percentages attending elite schools. Otherwise the patterns across countries were different.

4.9. Billionaire and Davos education and ability level by sector

Fig. 3, panel A, and Appendix C show billionaire education and ability level by sector, ranked by elite school attendance. Investments and Technology had the highest elite school attendance ($\approx 58\%$) and fashion & retail, media, and real estate had the lowest (≈ 21 – 24%). Health care had the highest percentage attending graduate school independent of the elite school category. Sectors with the most billionaires were fashion & retail (168), followed by investments (151), real

estate (128), diversified (126), and food & beverage (100), with samples ≥ 100 . The sectors with the oldest billionaires were media (68) and fashion & retail (66) and the youngest were metals & mining and technology (both 56). 84% of technology and 76% of real estate billionaires were self-made, whereas 47% of food & beverage and diversified and 45% of service billionaires were self-made.

Fig. 3, panel B, and Appendix C also show Davos education and ability level by sector, ranked like the billionaires. Davos attendees were grouped into sectors based on the billionaire categories as well as others that naturally emerged by investigating each company or institution in internet searches. Academia (84.1%) and investments (64.8%) had the highest elite school attendance, whereas fashion & retail and transportation had the lowest ($\leq 40\%$). Sectors with the most at Davos were government & policy (448), media (325), and technology (220) with samples ≥ 200 .

When looking at patterns that replicated across billionaires and Davos, fashion & retail tended to have the lowest elite school attendance and health care and investments tended to have the highest. For billionaires, investments (16.6%), finance (14.1%), and technology (9.8%) had the highest Harvard attendance. For Davos, research institute (16.0%), investments (16.5%), and academia (17.6%) had the highest Harvard attendance.

4.10. Billionaire education level, ability, and wealth

Table 3 shows a series of analyses examining whether more educated and smarter people accumulated a higher net worth, even within the top 0.0000001% of wealth. For billionaires, data was available on net worth as of March, 2013. Table 3a examines whether billionaires with wealth \geq the median of their group had a higher education and ability level than those with wealth $<$ the median. Those with greater wealth were significantly more likely to have attended an elite school (95% CI PD: 0.02, 0.12, *significant*, $h = 0.15$). The average net worth of those who attended an elite school was significantly higher than the average net worth of those who did not ($t = 4.04$, $p < .001$, $d = 0.21$). Table 3b examines self-made billionaires, showing those with greater wealth were significantly more likely to have attended an elite school (95% CI PD: 0.00, 0.13, *significant*,

Table 4
Billionaires and Davos attendees major in college or university.

	With data	Business	Engineering	STEM
Billionaires	42.4%	55.9%	22.8%	29.9%
Billionaires (U.S.)	60.0%	58.1%	14.3%	22.3%
Billionaires (non-U.S.)	34.6%	54.1%	29.4%	35.9%
Davos	75.6%	57.1%	17.1%	23.8%
Davos males	75.3%	59.5%	18.8%	25.4%
Davos females	77.4%	44.2%	8.2%	15.7%
Davos (U.S.)	82.1%	45.8%	12.4%	18.0%
Davos (non-U.S.)	73.5%	42.3%	13.1%	18.5%
Davos males (U.S.)	81.5%	47.7%	13.5%	18.3%
Davos females (U.S.)	84.7%	38.7%	8.0%	16.8%
Davos males (non-U.S.)	73.4%	44.0%	14.3%	20.0%
Davos females (non-U.S.)	74.1%	32.1%	5.5%	9.9%

$h = 0.13$), with the average net worth of elite school attendees significantly higher than the average net worth of those who did not ($t = 3.34, p = .001, d = 0.21$). Table 3c examines non-self-made billionaires, showing those with greater wealth were more likely to have attended an elite school (95% CI PD: $-0.03, 0.14$, not significant, $h = 0.12$), with the average net worth of those who attended an elite school significantly higher than the average net worth of those who did not ($t = 2.13, p = .034, d = 0.18$). Table 3d examines the U.S. billionaires, showing that those with greater wealth were more likely to have attended an elite school (95% CI PD: $-0.03, 0.15$, not significant, $h = 0.12$), with the average net worth of those who attended an elite school significantly higher than the average net worth of those who did not ($t = 2.81, p = .005, d = 0.26$). Table 3e examines non-U.S. billionaires, showing that those with greater wealth were significantly more likely to have attended an elite school (95% CI PD: $0.00, 0.12$, significant, $h = 0.13$), with the average net worth of those who attended an elite school significantly higher than the average net worth of those who did not ($t = 2.47, p = .014, d = 0.08$).

Table 3f examines China, showing that those with greater wealth were not more likely to have attended an elite school (95% CI PD: $-0.15, 0.15$, not significant, $h = 0$) with the average net worth of those who attended an elite school not significantly higher than the average net worth of those who did not ($t = -0.05, p = .961, d = -0.01$). Finally, Table 3g examines Russia, showing that those with greater wealth were not more likely to have attended an elite school (95% CI PD: $-0.21, 0.09$, not significant, $h = -0.15$), with the average net worth of those who attended an elite school not significantly higher than the average net worth of those who did not ($t = -0.43, p = .666, d = -0.10$). Therefore, the connection between education, cognitive ability and wealth was found overall and within self-made, non-self-made, U.S., and non-U.S. billionaires, but not within China and Russia.

4.11. Billionaire and Davos major in college or university

What major did billionaires and Davos attendees frequently choose in their college and university studies? Table 4 shows that the data on college or university major was available for 42.4% of billionaires, 60.0% of U.S. billionaires, and 34.6% of non-U.S. billionaires. Although the data available may not be fully representative, of all groups the most common majors included business, engineering, and

STEM. Business included majoring in business, economics, accounting, or attending an MBA program. Engineering included any engineering major. STEM included physics, mathematics, statistics, engineering, and chemistry. Worldwide, there were 55.9% in business, 22.8% in engineering, and 29.9% in STEM. These were not independent groups, as many had more than one major in undergraduate or graduate school. The U.S. had higher numbers in business and lower numbers in engineering and STEM compared to the non-U.S. group.

Major data was available for 75.6% of Davos participants, 82.1% of U.S. participants, and 73.5% of non-U.S. participants. Unlike billionaires, the female sample size was large enough to compare across sexes. For Davos overall, 57.1% majored in business, 17.1% in engineering, and 23.8% in STEM. Males vs. females had higher percentages across all three majors (see Table 4). There were few differences for majors between the U.S. and non-U.S. groups overall, however, males in both the U.S. and non-U.S. groups were more likely to major in business, engineering, and STEM.

Although majors spanned many disciplines, the majority of billionaires and Davos attendees (with data) majored in business, STEM, or engineering. Davos females overall, and within and outside the U.S. were slightly less likely to major in business, and much less likely to major in STEM or engineering. Non-U.S. billionaires and Davos were generally more likely to major in engineering and STEM.

4.12. Billionaire and most powerful people relationship status and children by self-made status and sex

Table 5 shows the average number of children and relationship status by group. On average, billionaires worldwide had 2.54 children. The subgroups were similar, with the exception of billionaire females (2.15) and powerful females (1.74) who had fewer children. Overall, 78.5% of billionaires were married. Self-made billionaires (81.9%), billionaire males (81.8%) and powerful males (74.2%) had the highest percentage married, and powerful females (69.0%) and billionaire females (47.4%) had the lowest. For billionaire females this was due to many widowed and divorced. For powerful females this was due to many single, divorced, and widowed. Overall, females had fewer children and were less likely to be married than males. The average number of children per family in the world is currently 2.47 according to *The World Factbook* (Central Intelligence Agency, 2013), which is similar to the numbers for billionaires, billionaire

Table 5
Billionaire and powerful people relationship status and children by self-made status and sex.

	World's billionaires	Self-made billionaires	Male billionaires	Female billionaires	Powerful males	Powerful females
Sample size (N)	1426	877	1289	137	66	100
Average number of children	2.54	2.57	2.58	2.15	2.51	1.74
Married	78.5%	81.9%	81.8%	47.4%	74.2%	69.0%
Divorced	7.4%	7.1%	6.5%	15.3%	1.5%	9.0%
Separated	0.5%	0.5%	0.5%	0%	1.5%	0%
Widowed	4.1%	2.3%	1.9%	25.5%	3.0%	6.0%
Engaged	0.3%	0.5%	0.3%	0%	0%	1.0%
In relationship	0.1%	0.1%	0.1%	0%	3.0%	1.0%
Single	3.0%	3.0%	2.8%	5.1%	1.5%	14.0%
Unknown	6.1%	4.8%	6.1%	6.6%	15.2%	0%

males, and powerful males, but higher than the numbers for billionaire and powerful females. Worldwide in 2011, about 80% of women and men aged 45–49 had ever married (United Nations, 2011). Comparable percentages in Table 5 are a summation of married, divorced, separated, and widowed. This equated to 90.5% for billionaires overall, 90.7% for male billionaires, 88.2% for female billionaires, 80.2% for powerful males, and 84.0% for powerful females, showing comparable (if not slightly higher) statistics vs. the entire world.

5. Discussion

5.1. The global elite are highly educated and able

The world's global elite are largely drawn from the academically gifted with high elite school attendance. Roughly one third of the world's billionaires attended an elite school likely placing them in the top 1% of cognitive ability. An examination of self-made and non-self-made billionaires showed that although non-self-made billionaires had slightly higher levels of elite education, this difference was significant for the world but not for the U.S. Alongside the finding that within each of these samples higher education and ability were associated with higher net worth (see Table 3), this suggests that the groups are not largely different on the variables examined and the aggregate used in Wai (2013) among U.S. billionaires was reasonable. However, there is ultimately no way of knowing whether the lack of difference reflects genuinely similar characteristics or the imprecision of the identification of these groups.

Elite school attendance among powerful males and females was much higher, with nearly all having attended at least college. Forbes (Ewalt, 2012) described the most powerful people this way: "There are nearly 7.1 billion people on the planet. These are the 71 that matter the most." These 71 were largely male, had attended an elite school (many Harvard), and were mainly from the U.S. elite school attendance for Davos was in between billionaires and powerful people, with nearly everyone attending at least college.

5.2. The U.S. and Harvard graduates are overrepresented among the global elite

A large fraction of the global elite came from the U.S. alone. Harvard had an overwhelming influence in the backgrounds of the global and U.S. elite, especially in certain sectors. This may signify the power of the Harvard brand and networks that give graduates an advantage that has accumulated since the school's founding in 1636. It may also signify the quality of the people (e.g. high SAT scores and motivation) who apply, to make it through the admissions filter, and attend Harvard.

5.3. Females are underrepresented among the global elite

Although there is much discussion today about female underrepresentation in STEM (Ceci & Williams, 2010; Halpern, Benbow, Geary, Gur, Hyde, & Gernsbacher, 2007; Pinker, 2009; Wai, Cacchio, Putallaz, & Makel, 2010), females are also underrepresented among the U.S. elite (Wai, 2013) and global

elite. Fig. 1 shows that among billionaires and powerful people, females were less likely to attend an elite school, however, overall, females had higher average net worth (see Appendix A). Yet although females were underrepresented at Davos overall, the ones who attended were similar to males on education and ability, showing that making it to Davos may be more about position rather than gender. Among billionaires and powerful people, females were more greatly underrepresented than at Davos, which makes sense in that people who become billionaires and assume positions of world power are not usually invited.

Of the accomplished 18 self-made billionaire females profiled in Appendix D, 14 came from the U.S. and China, 6 founded their own companies or earned their wealth alone, and three rose from poverty. This illustrates that opportunity, although not without barriers, may be greater in the U.S. and China relative to other countries. This pattern was mirrored by relatively low male–female ratios in China and the U.S. among self-made billionaires and Davos attendees compared to other countries. However, when comparing the gender inequality in these right tail samples to a worldwide gender inequality index based on the general population (United Nations Development Programme, 2012), although there did appear to be a general association, the findings were not necessarily aligned. For example, the Netherlands ranked first on international gender equality, but had one of the highest male–female ratios (13.0 to 1) among Davos. Conversely, Turkey ranked 68th on international gender equality but had the lowest male–female ratio among Davos (1.9 to 1) and billionaires (3.3 to 1). What these examples illustrate is that gender inequality in the general population may or may not translate into gender inequality in the tails. The multifaceted explanations for female underrepresentation among the global elite is likely complex (Pinker, 2009; Sandberg, 2013), beyond the scope of this paper, and may vary across countries.

5.4. The relationship status and children of the global elite

Overall, the billionaires and most powerful people were not that different in terms of relationship status and children when compared to general population world statistics (Central Intelligence Agency, 2013; United Nations, 2011). However, among billionaires, females were more likely to be divorced or widowed and among powerful people, females were more likely to have fewer children and be divorced, widowed, or single. Perhaps this shows the particular challenges females face when attempting to pursue a demanding career and family life (Ceci & Williams, 2010; Pinker, 2009; Sandberg, 2013).

5.5. The global elite education and ability level varies across country and sectors

Billionaire and Davos education and ability level varied greatly across countries and sectors. Canada and the U.S. had high and Russia and Taiwan had low percentages attending elite schools. Across billionaire and Davos sectors, fashion & retail had low and health care, finance, and investments had high elite school attendance. For billionaires, Fig. 3 shows that similar to the analysis for 2012 U.S. billionaires (Wai, 2013, Fig. 2), investments and technology had the highest elite school attendance. This replicated the 2012 U.S. findings, and expanded

them worldwide.³ Sectors that required high math ability (e.g., technology, investments) had very high elite school attendance. This replicated the pattern of occupation and ability levels in project talent, a stratified random sample (Wai, Lubinski, & Benbow, 2009) within a group in the top 0.0000001% of wealth in the U.S. in 2012 and 2013, as well as worldwide in 2013. The observation by scholars (Cowen, 2013; Gelade, 2008; Krueger, 2012; Mankiw, 2013) that changes in technology have allowed exceptional talent to flourish appears supported by the high density of brainpower in the technology sector, at least among billionaires.

The U.S. media have used billionaires Bill Gates and Mark Zuckerberg as examples illustrating why completing college is not necessary for success (e.g., Lin, 2010; Williams, 2012), when in fact they are exceptions to the rule. However, college may not be as important (at least for attaining billionaire or Davos status) in some other countries and sectors based on these analyses. In Russia, the U.S., India, Canada, and China, for example, the majority of billionaires had a degree, but this did not hold for the rest of the world. Additionally, the Russian percentage with college degrees sticks out in Fig. 2 panel A, but this may be because “a higher education is easy to obtain and a necessary but not sufficient condition for joining the elite ... [and] is merely one element in a system of social filters, a prerequisite that confirms a certain level of competence” (Voronkova, Sidorova, & Kryshtanovskaia, 2012, p. 15). Across sectors, for billionaires, elite school attendance appeared most important for technology and investments. For Davos attendees, elite school attendance appeared important for investments, and was remarkably high among academia showing an elite school degree to be one filter for an academic to have a chance to be at Davos. This illustrates the variation across countries and sectors in the emphasis and relative value placed on prestige of college degree and the ability to access important networks through college attendance.

Contrasting the percentages in the NR/NC category (light gray bars) across panels A and B in Figs. 2 and 3 shows that among billionaires a college degree is not nearly as important as it is among Davos attendees. This shows that if one is primarily after making extraordinary amounts of money a college degree may not be as important, however, a

³ An analysis was also performed within the U.S. vs. outside the U.S. for billionaires and Davos (see Appendix D). For billionaires, a similar pattern was found in both groups with technology having a high level of elite school attendance and education. The exception was for investments, which in the U.S. was at the very top (71.2% attended an elite school) but was much lower for the rest of the world (29.8%). For Davos, a similar pattern was also found in both groups with investments and academia having the most education. However, elite school attendance was higher in the U.S. for investments (U.S. = 74.6%, non-U.S. = 58.7%) and finance (U.S. = 60.0%, non-U.S. = 40.5%). The U.S. investment and finance sectors likely select on elite education and cognitive ability to a larger degree than the rest of the world. Perhaps this is due to U.S. elite college grads and economists increasingly choosing Wall Street in recent years (Freeland, 2012; Gudrais, 2008; Philippon & Reshef, 2012). Yang (2014) showed that in the last several years, between 6% and 25% of students from Harvard, Yale, Princeton, University of Pennsylvania, MIT, Stanford, Duke, Brown, Dartmouth, Cornell, Columbia, Johns Hopkins, University of Chicago, and Georgetown have gone into “banking.” All of these schools were included as elite in this paper. In particular, this may be an important factor driving income inequality in the U.S. in recent years: high IQ people choosing to turn money into more money.

prestigious college degree appears extremely important if you want to be included in certain influential circles.

5.6. *Even within billionaires, wealth is connected to education and ability*

Even within the top 0.0000001% of wealth, there were differences in education and ability between those who earned more vs. less money. Within all billionaires, self-made billionaires, non-self-made billionaires, U.S. billionaires, and non-U.S. billionaires, higher education and ability level was associated with higher net worth. This study adds to, expands, and strengthens the literature linking education, ability, and wealth (Kaplan & Rauh, 2013; Murray, 1998; Nyborg & Jensen, 2001; Rindermann & Thompson, 2011; Zax & Rees, 2002), and provides worldwide evidence that does not support an ability threshold hypothesis (Kuncel & Hezlett, 2010; Park, Lubinski, & Benbow, 2007; Wai et al., 2005)—or the idea that more ability does not matter beyond a certain point in predicting real world outcomes. However, this finding did not hold up in Russia and China. During internet searches it was noted that Russian billionaires were sometimes connected to Vladimir Putin or the Russian government. For example, Boris and Arkady Rotenberg “were [Putin’s] childhood friends and former sparring partners” (Forbes Staff, 2013). Within China some billionaires had connections to the Chinese government. For example, Zong Qinghou relied on his high-level party membership to build his distribution network (Rosen, 2011). These are only anecdotes, and data was not systematically available online. However, within these two countries mention of political connections being tied to wealth was publicly discussed in biographies and media to an atypical extent. Perhaps when the opportunity to rise as an entrepreneur is significantly tied to political connections, individual ability is more weakly or unassociated with success.

5.7. *The global elite choice of college or university major*

Freeland (2012) discussed “the rise of the alpha geeks,” those who have a facility with numbers and a background in one of the STEM fields, increasingly joining the ranks of the super rich. Although a majority of billionaires and Davos attendees majored in business, a large fraction majored in engineering and STEM. However, there were fewer U.S. compared to non-U.S. engineering and STEM majors (especially among billionaires), and Davos females were less likely to major in engineering and STEM. This demonstrates that a major in STEM may not only be important for high level STEM careers (Ceci & Williams, 2010; Wai, Lubinski, Benbow & Steiger, 2010), but also for attaining extraordinary power and wealth (Wai, 2012).

5.8. *Prospective and retrospective longitudinal data show cognitive ability matters for occupational expertise*

Prospective longitudinal data sources have shown that people in the top fraction of cognitive ability identified when young end up quite successful later in life. This has been shown for both the top 1% of the U.S. (Study of Mathematically Precocious Youth: Park et al., 2007; Wai et al., 2005; Project Talent: Wai, in press) and the top 5% of the world (Rindermann & Thompson, 2011). The data presented in this paper serve as case controls and retrospective longitudinal data sources showing

that occupationally successful people were likely in the top 1% of cognitive ability for both the U.S. (see Table 1) and the world (see Fig. 1 and Appendix A). When combined, these multiple sources of longitudinal data show that cognitive ability clearly matters in the development of educational and occupational expertise (Wai, *in press*). The findings in Table 1 examining occupationally successful U.S. individuals also provide case controls for extremely talented U.S. students (i.e., the top 0.01%; Kell, Lubinski, & Benbow, 2013) who have now reached occupational success nearly at the level as the people examined in this study. Given that the global elite showed an average ability level likely well below the top 0.01%, this shows that to become part of the U.S. and world elite much more than cognitive ability matters. Other factors that likely matter are motivation, the willingness to work long hours, as well as gaining access to networks, among other individual and societal influences.

5.9. The likely influence of “elite fractions”

A large body of research has linked a nation's average cognitive ability to prosperity (Hunt, 2012; Jones & Schneider, 2006; Lynn & Vanhanen, 2002). Rindermann and Thompson (2011, p. 762) have emphasized the importance of the smart fraction or right tail of cognitive ability of a nation in influencing prosperity, specifically “the intellectual level of the cognitive elite, which facilitates cultural and social progress generally.” The data presented here provide a look at various national *elite fractions* and their retrospective intellectual level through educational attainment (see Fig. 2 and Appendix B). These elite fractions are not representative of the cognitive elite of each country, but they do provide a sense of the influence of particular countries among these groups of the global elite, through sample size. For example, in addition to the U.S., the countries that were largely overrepresented among billionaires were China and Russia. Among Davos attendees these countries were the United Kingdom, Switzerland, India, and Germany. It is telling that the U.S. was the only country that was dominant in both groups and also ranked near the top for elite school attendance among billionaires (44.8%) and Davos (63.7%).

Beyond nations, elite fractions are also influential in various sectors. Among billionaires, fashion & retail, investments, real estate, diversified, and food & beverage dominated, showing extreme wealth is largely made off of clothes, goods, wealth, property, and food. Among Davos attendees, the three largest sectors were government & policy, media, and technology showing the influence politicians, the press, and technology companies have on our society today.

5.10. What does it mean to be “self-made”?

In recent years, fewer billionaires have grown up wealthy (Kaplan & Rauh, 2013). As Frank (2011, p. 67) puts it: “The idle rich are being replaced by the workaholic wealthy.” In this study, 31.1% of self-made compared to 38.3% of non-self-made billionaires attended an elite school, with 73.6% of self-made and 67.1% of non-self-made billionaires having attended college. The U.S. percentages were higher. These results were based on only one definition of *self-made*: that the individual did not inherit a company or large sum of wealth but built their fortune. Billionaires came from extreme wealth and poverty, but the majority likely fell somewhere in between: comfortable

middle to upper class environments. Beyond wealth, consider nobody chooses their parents or the genes and environments that are passed on to them. Therefore, many of the individuals in this study may have been granted head starts in wealth but also in personal traits such as intelligence, energy, drive, looks, charm, discipline, and conscientiousness that helped them accumulate advantages throughout life. So even if they become the workaholic wealthy and powerful, if they had so many head starts, it is worth considering whether their power and wealth has been entirely earned based on individual effort. This provides a different way of thinking about what it means to be self-made. For example, billionaire Warren Buffett has said he won the *ovarian lottery* (Weisenthal, 2013). Heckman (2008) calls this the *accident of birth* and considers it a major source of inequality.

5.11. Are the global elite highly educated, smart, and well-connected?

Kaplan and Rauh (2013, p. 161) examined the *Forbes* 400 richest Americans across the last four decades, concluding that access to education has become more important in wealth generation, and that “Future research should aim to understand what facet of educational access is driving its increasing importance for wealth generation. Specifically, education provides skills but it also provides access to networks.” One unexplored facet of educational access is the increasing competition among the most academically gifted students for elite school admission which is due to the fact that standardized tests used in college admissions essentially function as intelligence or IQ tests (U.S.: Frey & Detterman, 2004; Koenig et al., 2008; China: Li et al., 2012). The finding that the majority of billionaires, powerful people, and Davos participants attended elite schools is thus not only a reflection of their education and cognitive ability level, but also the network power these elite schools gave them access to, which includes many other people who had been highly selected on intelligence and motivation, among other traits. Some parents appear concerned in getting their children into elite schools which may not be entirely unfounded based on the findings in this study if the goal is to join the global elite. It is probably both the personal traits of the individual that get them in the door and the network power that may ease and amplify their success. However, access to elite schools, at least in the U.S., appears largely dominated by students from financially secure backgrounds (Bastedo & Jaquette, 2011), which raises the issue of social mobility (Clark, 2014). As Clark (2014, p. 279) puts it: “Most parents, particularly upper class parents, attach enormous importance to the social and economic success of their children. They spare no expenditure of time or money in the pursuit of these goals. In these efforts, they seek only to secure the best for their children, not to harm the chances of others. But the social world only has so many positions of status, influence, and wealth.”

5.12. The clustering of brains, wealth, and power

What happens when many smart people also tend to hold a disproportionate share of global wealth and power? Here are anecdotes from a handful of the billionaires examined in

this study. Bill Gates has unveiled his grand plan to improve our world (Gates, 2013). One of Mark Zuckerberg's goals is to connect the entire world to the internet (Zuckerberg, 2014). Elon Musk wants to create a Martian colony of 80,000 people (Knapp, 2012). Jeff Bezos recently bought *The Washington Post*, owns the store that sells nearly everything, wants to explore space, and has dreams of saving humanity (Stone, 2013). And Larry Page, in discussing his plans for our future, recently said he would prefer to invest his money in Elon Musk rather than give it to charity (Wohlsen, 2014). Beyond Davos, another example of an event which gathers people who are highly selected for brains, wealth, power, and social influence are the yearly Edge Foundation dinners (Brockman, 2014). What this study shows is that cognitive segregation (Hunt, 2014; Murray, 2012; Sowell, 2009) most certainly exists within each group studied worldwide, but that these very smart, wealthy, and powerful people are likely grouping together and influencing one another.

Billionaires are now even privatizing some areas of science (Broad, 2014) showing that how they choose to spend their money, which may depend on their political and policy views (Page, Bartels, & Seawright, 2013), holds immense influence. Additionally, cognitive segregation has also produced an increase in assortative mating, or like marrying like (Greenwood, Guner, Kocharkov, & Santos, 2014). The findings here show that whether we like it or not, there is cognitive, wealth, power, social, and other forms of segregation among a group of elites within each country, and we depend on them to make wise decisions for all of us.

5.13. Are talented people increasingly choosing to pursue wealth and power?

The study of elites (Hacker, 1961; Khan, 2012) has for many years generated enormous public interest and academic work within multiple disciplines, especially in the U.S., due to a focus on income inequality and what variables might explain why a tiny fraction of the population holds an enormous fraction of wealth (Piketty & Saez, 2003; Solow, 2014; Stiglitz, 2011). Mankiw (2013, p. 23) noted that “changes in technology have allowed a small number of highly educated and exceptionally talented individuals to command superstar incomes in ways that were not possible a generation ago.” Krueger (2012, p. 5) explained that skill-based technical change has “favored people with the analytical skills to get the most out of the technology.” Similarly, Aguinis and O'Boyle (2013) argued that changes in the nature of work have led to the emergence of a handful of star performers who disproportionately contribute to output. Perhaps one explanation for the increase in wealth and other forms of inequality might be academically gifted or high IQ star performers—essentially people with the highest analytical skills—increasingly pursuing opportunities that lead to the accumulation of wealth and power (Wai, 2012). However, the data presented in this paper only shows that the current global elites are highly educated and smart, and future research would be helpful in addressing this hypothesis by examining historical trends.

5.14. Limitations of this study

This study used average standardized test scores of a college or university according to the *U.S. News & World Report (America's Best Colleges, 2013)* as an approximation for ability level (Frey & Detterman, 2004; Koenig, Frey, & Detterman, 2008), as well as attendance at a top college or university worldwide according to *QS World University Rankings (2012)* as an approximation for ability level (Li et al., 2012). Although this method did not rely on individual cognitive ability scores which were not publicly available, average test scores from U.S. schools reasonably placed individuals that attended one of these elite schools within the top 1% of ability. For the rest of the world, it is reasonable to think that the very top schools select for the best and brightest within each country. Ultimately, the method cannot disentangle education from cognitive ability. However, using this method may give an underestimate because extremely smart people may not have chosen to attend a top school within their country for multiple reasons (e.g., financial limitations, scholarship, staying close to home). Alternatively, this method may also give an overestimate because there were likely some legacies, athletic admits, students with political connections, or others who were admitted with lower than typical test score and academic metrics (Espenshade & Radford, 2009; Golden, 2006). It is reasonable to think that factors in both directions likely counterbalance one another. The billionaires and powerful people examined in this study are not fully representative of the many other individuals in the top percentiles of ability worldwide, and are likely defined by attributes (such as high motivation, willingness to work and take risks, and a desire for money and power) that are not limited to ability.⁴ Despite these limitations, the patterns within the U.S. were very similar to and were replicated by the patterns worldwide, which provided validity checks for the method.

6. Conclusion

Today highly educated and intelligent individuals are overrepresented among the sliver of people who control a disproportionate share of the world's money and power. This shows the importance of education and cognitive ability in being able to attain a position in the global elite. The clustering of brains, wealth, and power may have important implications.

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⁴ According to the U.S. Census Bureau (2012), in July 2012 the U.S. population was 313,914,040. One percent of this is 3,139,140 people within the top 1% of ability. For estimates of numbers of people in the top percentile of other countries, see Wai and Nisen (2013).

Appendix A. World's billionaires, powerful people, and Davos attendees as a function of self-made status and sex

	Elite school	Graduate school	College	NR/NC	Harvard	Age (average)	Wealth (average)	Children (average)	Sample size (self made)
World's billionaires	33.9%	10.9%	26.3%	28.9%	5.6%	63.1	\$3.81 billion	2.54	1426
Self-made billionaires	31.1%	13.3%	29.2%	26.3%	5.5%	62.5	\$3.65 billion	2.57	877
Non self-made billionaires	38.3%	7.1%	21.7%	33.0%	5.8%	64.1	\$4.07 billion	2.50	549
Billionaires (U.S.)	44.8%	12.2%	32.1%	10.9%	11.3%	66.3	\$4.24 billion	2.95	442
Self-made billionaires (U.S.)	42.6%	15.5%	31.4%	10.5%	12.3%	65.8	\$3.65 billion	2.57	277
Non self-made billionaires (U.S.)	48.5%	6.7%	33.3%	11.5%	9.7%	67.0	\$4.21 billion	2.90	165
Billionaire males	35.2%	11.5%	26.2%	27.1%	6.1%	63.2	\$3.80 billion	2.58	1289 (859)
Billionaire females	21.2%	5.8%	27.0%	46.0%	1.5%	61.9	\$3.96 billion	2.15	137 (18)
Billionaire males (U.S.)	47.2%	12.8%	30.9%	9.2%	12.2%	66.5	\$4.20 billion	3.02	392 (269)
Billionaire females (U.S.)	26.0%	8.0%	42.0%	24.0%	4.0%	64.3	\$4.50 billion	2.46	50 (8)
Powerful males 2012	71.2%	3.0%	18.2%	7.6%	19.7%	60.7	N/A	2.51	66
Powerful males 2013	70.8%	9.2%	12.3%	7.7%	16.9%	61.1	N/A	2.45	65
Powerful females	58.0%	10.0%	23.0%	9.0%	13.0%	54.9	N/A	1.74	100
Powerful males (U.S.) 2012	85.2%	3.7%	11.1%	0%	40.7%	58.2	N/A	2.38	27
Powerful males (U.S.) 2013	84.6%	3.8%	11.5%	0%	34.6%	59.3	N/A	2.36	26
Powerful females (U.S.)	55.9%	8.5%	28.8%	6.8%	18.6%	53.8	N/A	1.73	59

	Elite school	Graduate School	College	NR/NC	Harvard	MBA	Sample size
World Economic Forum (Davos)	54.6%	17.6%	18.1%	9.5%	8.6%	18.6%	2624
Davos (U.S.)	63.7%	16.5%	16.2%	3.2%	18.5%	26.3%	661
Davos males	54.5%	17.7%	18.2%	9.4%	8.5%	19.3%	2213
Davos females	55.0%	16.8%	18.0%	10.0%	9.0%	15.3%	411
Davos males (U.S.)	64.9%	16.6%	14.9%	3.2%	19.7%	27.5%	524
Davos females (U.S.)	59.1%	16.1%	21.2%	2.9%	13.9%	21.9%	137
Davos CEOs	56.2%	18.6%	18.8%	6.2%	8.6%	27.8%	708
Davos CEOs (U.S.)	59.9%	19.4%	17.1%	3.6%	15.3%	35.1%	222
Davos CEO males	56.3%	19.0%	18.3%	6.2%	8.6%	29.2%	641
Davos CEO females	55.2%	14.9%	23.9%	6.0%	9.0%	14.9%	67
Davos CEO males (U.S.)	59.5%	20.5%	16.9%	3.1%	14.9%	37.9%	195
Davos CEO females (U.S.)	63.0%	11.1%	18.5%	7.4%	18.5%	14.8%	27

Appendix B. World's billionaires and Davos attendees by country

World's billionaires	Elite school	Graduate school	College	NR/NC	Harvard	Age (average)	Wealth (average)	Children (average)	Sample size (self made)
Taiwan	15.4%	0%	19.2%	65.4%	0%	69.0	\$2.84 billion	2.42	26 (16)
Russia	20.9%	17.3%	57.3%	4.5%	0.9%	51.6	\$3.88 billion	2.58	110 (105)
China	21.3%	18.9%	25.4%	34.4%	0%	52.6	\$2.16 billion	1.03	122 (118)
Germany	22.4%	8.6%	10.3%	58.6%	1.7%	66.9	\$5.11 billion	1.93	58 (18)
Indonesia	24.0%	4.0%	16.0%	56.0%	0%	66.5	\$2.21 billion	3.44	25 (8)
Hong Kong	25.6%	7.7%	17.9%	48.7%	5.1%	64.6	\$4.95 billion	2.54	39 (24)
United Kingdom	27.0%	5.4%	29.7%	37.8%	4.3%	65.8	\$4.12 billion	2.33	37 (29)
Turkey	27.9%	9.3%	27.9%	34.9%	7.0%	60.4	\$1.73 billion	2.00	43 (15)
Brazil	32.6%	6.5%	15.2%	45.7%	4.3%	65.8	\$4.12 billion	2.33	46 (26)
India	43.6%	12.7%	27.3%	16.4%	5.5%	61.6	\$3.52 billion	2.42	55 (21)
United States	44.8%	12.2%	32.1%	10.9%	11.3%	66.3	\$4.24 billion	2.95	442 (277)
Canada	48.3%	0%	20.7%	31.0%	6.9%	70.7	\$3.17 billion	2.83	29 (23)

Davos attendees	Elite school	Graduate school	College	NR/NC	Harvard	MBA	Sample size
United Arab Emirates (UAE)	25.0%	17.5%	37.5%	20.0%	2.5%	15.0%	40
France	29.7%	28.4%	24.3%	17.6%	1.4%	9.5%	74
Russia	35.5%	23.7%	32.9%	7.9%	2.6%	15.8%	76
Italy	37.5%	15.6%	21.9%	25.0%	3.1%	12.5%	32

Appendix B (continued)

Davos attendees	Elite school	Graduate school	College	NR/NC	Harvard	MBA	Sample size
Germany	39.5%	23.5%	22.7%	14.3%	2.5%	10.1%	119
India	40.0%	21.6%	27.2%	10.4%	7.2%	24.8%	125
Norway	40.0%	28.0%	20.0%	12.0%	4.0%	12.0%	25
China	42.2%	25.0%	17.2%	15.6%	1.6%	14.1%	64
South Africa	46.6%	17.2%	29.3%	6.9%	1.7%	10.3%	58
Brazil	51.5%	18.2%	21.2%	9.1%	3.0%	21.2%	33
Hong Kong	51.9%	14.8%	18.5%	14.8%	3.7%	25.9%	27
Switzerland	54.7%	16.5%	15.6%	13.2%	4.2%	17.9%	212
United Kingdom	57.1%	12.8%	16.3%	13.5%	3.8%	16.0%	282
Canada	58.5%	12.2%	24.4%	4.9%	7.3%	19.5%	41
Turkey	61.5%	7.7%	19.2%	11.5%	3.8%	19.2%	26
Netherlands	61.9%	14.3%	14.3%	9.5%	2.4%	14.3%	42
Saudi Arabia	62.1%	13.8%	10.3%	13.8%	0%	27.6%	29
Japan	63.2%	10.5%	5.3%	21.1%	7.9%	10.5%	76
United States	63.7%	16.5%	16.2%	3.2%	18.5%	26.3%	661
Korea	66.7%	7.4%	7.4%	18.5%	14.8%	14.8%	27
Mexico	71.1%	7.9%	10.5%	10.5%	7.9%	23.7%	38

Appendix C. World's billionaires and Davos attendees by sector

World's billionaires	Elite school	Graduate school	College	NR/NC	Harvard	Age (average)	Wealth (average)	Children (average)	Sample size (self made)
Real estate	21.1%	12.5%	31.3%	35.2%	2.3%	64.6	\$3.12 billion	2.32	128 (97)
Media	23.2%	10.1%	26.1%	40.6%	2.9%	67.6	\$3.82 billion	2.54	69 (37)
Fashion & retail	23.8%	4.8%	22.6%	48.8%	2.4%	65.6	\$4.95 billion	2.40	168 (92)
Food & beverage	25.0%	7.0%	24.0%	44.0%	2.0%	62.8	\$3.76 billion	2.36	100 (47)
Manufacturing	29.2%	10.1%	27.0%	33.7%	0%	63.6	\$2.81 billion	2.17	89 (49)
Construction & engineering	29.2%	10.4%	33.3%	27.1%	0%	62.4	\$2.69 billion	2.90	48 (25)
Diversified	31.0%	11.1%	24.6%	33.3%	1.6%	63.1	\$3.81 billion	2.78	126 (59)
Energy	31.3%	13.3%	38.6%	16.9%	4.8%	61.1	\$4.47 billion	2.45	83 (56)
Metals & mining	32.3%	13.8%	27.7%	26.2%	3.1%	55.5	\$4.81 billion	2.57	65 (48)
Service	32.7%	14.5%	36.4%	16.4%	5.5%	65.4	\$2.59 billion	2.75	55 (25)
Health care	36.8%	31.6%	19.3%	12.3%	8.8%	63.9	\$2.60 billion	2.11	57 (37)
Finance	41.0%	11.5%	17.9%	29.5%	14.1%	64.0	\$2.75 billion	3.15	78 (47)
Investments	58.3%	9.3%	20.5%	11.9%	16.6%	62.6	\$3.74 billion	2.83	151 (100)
Technology	58.7%	10.9%	22.8%	7.6%	9.8%	56.2	\$5.31 billion	1.98	92 (77)
Davos attendees	Elite school	Graduate school	College	NR/NC	Harvard	MBA	Sample size		
Transportation	37.1%	25.7%	17.1%	20.0%	0%	14.3%	35		
Fashion & retail	40.0%	3.3%	40.0%	16.7%	6.7%	23.3%	30		
Insurance	43.6%	12.8%	30.8%	12.8%	7.7%	23.1%	39		
Education	46.6%	22.4%	12.1%	19.0%	10.3%	15.5%	58		
Manufacturing	46.6%	18.4%	25.2%	9.7%	2.9%	23.3%	103		
Construction & engineering	47.8%	16.4%	17.9%	17.9%	3.0%	16.4%	67		
Finance	47.8%	19.4%	13.4%	13.4%	4.5%	25.4%	67		
Diversified	48.2%	10.9%	27.3%	13.6%	2.7%	24.5%	110		
Media	48.9%	10.8%	20.3%	20.0%	7.1%	7.1%	325		
Technology	49.5%	22.7%	22.3%	5.5%	6.8%	22.7%	220		
Service	50.0%	16.3%	29.1%	4.7%	8.1%	18.6%	86		
Metals & mining	52.4%	14.3%	26.2%	7.1%	7.1%	23.8%	42		
Food & beverage	52.8%	22.2%	19.4%	5.6%	2.8%	38.9%	72		
Energy	53.4%	19.5%	23.3%	3.8%	8.3%	17.3%	133		
Government & policy	55.4%	21.2%	16.1%	7.4%	8.9%	8.3%	448		
Health care	55.4%	28.4%	14.9%	1.4%	6.8%	29.7%	74		
Banking	56.2%	18.3%	17.6%	7.8%	8.5%	34.0%	153		
Consulting	56.6%	20.2%	12.1%	10.1%	13.1%	29.3%	99		
Research institute	60.0%	40.0%	0%	0%	16.0%	8.0%	25		
Investments	64.8%	12.5%	15.3%	7.4%	16.5%	36.9%	176		
Academia	84.1%	14.3%	1.1%	0.5%	17.6%	4.9%	182		

Appendix D. World's billionaires and Davos attendees: U.S. vs. non-U.S. education and ability level by sector

U.S. Billionaires	Elite School	Graduate School	College	NR/NC	Harvard	Sample Size (N)	Non-U.S. Billionaires	Elite School	Graduate School	College	NR/NC	Harvard	Sample Size (N)
Fashion & retail	23.7%	7.9%	42.1%	26.3%	2.6%	38	Media	17.1%	8.6%	8.6%	65.7%	0%	35
Food & beverage	24.2%	9.1%	36.4%	30.3%	0%	33	Real estate	18.0%	9.0%	29.0%	44.0%	1.0%	100
Media	29.4%	11.8%	44.1%	14.7%	5.9%	34	Fashion & retail	23.8%	3.8%	16.9%	55.4%	2.3%	130
Real estate	32.1%	25.0%	39.3%	3.6%	7.1%	28	Food & beverage	25.4%	6.0%	17.9%	50.7%	3.0%	67
Energy	33.3%	15.2%	36.4%	15.2%	9.1%	33	Service	26.9%	23.1%	23.1%	26.9%	3.8%	26
Service	37.9%	6.9%	48.3%	6.9%	6.9%	29	Investments	29.8%	12.8%	23.4%	34.0%	0%	47
Technology	60.8%	13.7%	23.5%	2.0%	15.7%	51	Energy	30.0%	12.0%	40.0%	18.0%	2.0%	50
Investments	71.2%	7.7%	19.2%	1.9%	24.0%	104	Technology	56.1%	7.3%	22.0%	14.6%	2.4%	41
Overall	44.8%	12.2%	32.1%	10.9%	11.3%	442	Overall	29.0%	10.4%	23.7%	37.0%	3.0%	984
U.S. Davos attendees	Elite School	Graduate School	College	NR/NC	Harvard	Sample Size (N)	Non-U.S. Davos attendees	Elite School	Graduate School	College	NR/NC	Harvard	Sample Size (N)
Service	48.1%	25.9%	25.9%	0%	18.5%	27	Finance	40.5%	21.4%	14.3%	21.4%	4.8%	42
Media	55.6%	11.1%	25.6%	7.8%	12.2%	90	Technology	43.8%	21.5%	27.3%	7.4%	4.1%	121
Technology	56.6%	24.2%	16.2%	3.0%	10.1%	99	Media	46.4%	10.6%	18.3%	24.7%	4.7%	235
Consulting	59.5%	16.2%	16.2%	8.1%	21.6%	37	Health Care	48.8%	30.2%	18.6%	2.3%	4.7%	43
Finance	60.0%	16.0%	12.0%	0%	4.0%	25	Service	50.8%	11.9%	30.5%	6.8%	3.4%	59
Health care	64.5%	25.8%	9.7%	0%	9.7%	31	Government & Policy	54.0%	21.3%	17.0%	7.7%	7.0%	417
Government & policy	74.2%	19.4%	3.2%	3.2%	35.5%	31	Consulting	54.8%	22.6%	9.7%	11.3%	8.1%	62
Investments	74.6%	7.5%	14.9%	3.0%	31.3%	67	Investments	58.7%	15.6%	15.6%	10.1%	7.3%	109
Academia	90.1%	8.8%	1.1%	0%	27.5%	91	Academia	78.0%	19.8%	1.1%	1.1%	7.7%	91
Overall	63.7%	16.5%	16.2%	3.2%	18.3%	661	Overall	51.6%	17.9%	18.8%	11.6%	5.2%	1963

Appendix E. Profiles of female self-made billionaires

Name	Country	Source of wealth	Description
Dulce Pugliese de Godoy Bueno	Brazil	Amil	Met her former husband, Amil founder, in medical school and helped him build the Brazilian health plan operator.
Wu Yajun & family	China	Long for Properties	With former husband, founded Chongqing Zhongjianke Real Estate Co., later renamed Longfor Properties.
Chan Laiwa & family	China	Fuwah International Group	Being poor, she left high school to start a furniture repair business, which eventually developed into Fuwah International Group.
Zhang Xin & family	China	SOHO China	Born poor, she cofounded Hongshi with her husband, which became SOHO China, the largest real estate developer in China.
He Qiaonv & family	China	Beijing Orient Landscape	Built Beijing Orient Landscape with help from her father's initial investment.
Cheung Yan	China	Nine Dragons Paper Holding	Cofounded Nine Dragons Paper, the largest paper company in China, with husband and younger brother. Her father helped with connections.
Chu Lam Yiu	Hong Kong	Huabao International Holdings	Followed her passion to found her flavorings and fragrance business, later renamed Huabao International Holdings.
Giuliana Benetton	Italy	Benetton	Cofounded the Benetton Group, a fashion company, with three brothers.
Elena Baturina	Russia	Inteco	Launched first enterprise with her elder brother, then founded Inteco, a construction business.
Rosalia Mera	Spain	Inditex and Zara	Cofounded the Inditex and Zara clothing chains with her then husband.
Gayle Cook	United States	Cook Group	Cofounded the medical device company Cook Group with her late husband.
Diane Hendricks	United States	Hendricks Holding Company	Took over the Hendricks Holding Company after her late husband founded it.
Doris Fisher	United States	The Gap	Cofounded The Gap clothing stores with her husband.
Oprah Winfrey	United States	The Oprah Winfrey Show	Born poor and founded The Oprah Winfrey Show.
Stewart and Lynda Resnick	United States	Roll Global	With her husband cofounded the holding company Roll Global, which owns POM Wonderful and FIJI water.
Judy Faulkner	United States	Epic Systems	Founder and chief executive officer of electronic health record company, Epic Systems.
Meg Whitman	United States	Hewlett Packard CEO	President and chief executive officer of Hewlett Packard.
Sara Blakely	United States	Spanx	Founded Spanx, an undergarment company.

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