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IQs predict differences in the technological development of nations from 1000 BC through 2000 AD

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ABSTRACT

National IQs and measures of technological development given by Comin, Easterly and Gong (2010) are presented for 133 nations for the year 1000 BC, for 134 nations for 0 AD, for 120 nations for 1500 AD and for 133 nations for 2000 AD. It is shown that national IQs are significantly correlated with national differences in technological development at 0.42 in 1000 BC, 0.18 in 0 AD, 0.63 in 1500 D, and 0.75 in 2000 AD.

1. Introduction

The quantification of IQs for all nations in the world by Lynn and Vanhanen (2002, 2006) has generated a research program that has shown that national IQs are significantly associated with and potentially explain substantial percentages of the variance in a wide range of social and economic phenomena, including educational attainment, cognitive output, per capita income, economic growth, democratic political institutions, health, longevity, and a variety of other epidemiological, demographic and sociological variables reviewed in Lynn and Vanhanen (2012).

The objectives of this paper are to examine how far differences in national IQs are associated with the level of technological development in contemporary times, and whether this association has been present during the last three thousand years.

2. Method

Comin, Easterly and Gong (2010) have assembled datasets on the technological development of nations in the years 1000 BC, 0 AD, 1500 AD and 2000 AD. They match the predecessors of contemporary nations to contemporary nations by aligning the borders of the cultures and civilizations in 1000 BC, 0 AD, and 1500 AD with those of present day nations. For example, the technologies used by the Aztecs and their predecessors during pre-colonial times are adopted as those in Mexico in 1500 AD. They measure technological development in 1000 BC and 0 AD from the presence of 12 technologies in the sectors of transportation (pack animals and vehicles), agriculture (extent), military (bronze and iron weapons), industry (pottery and metalwork), and communications (symbols and writing). They average the scores for the five sectors to give a single score for the two historic periods. They measure technological development in 1500 AD from the presence of 24 technologies. For example, they measure technological development in communications from the presence of movable block printing, books and paper, and in transportation from the presence of ocean going ships, the wheel, the magnetic compass, and horse drawn vehicles. For 2000 AD, they measure the per capita possession of ten technologies consisting of electricity, the internet, personal computers, cell phones, telephones, cargo aviation, passenger aviation, trucks, cars, and tractors using data for the 1990s. They give data for technological development for 133 nations for 1000 BC, 134 nations for 0 AD, 120 nations for 1500 AD and 133 nations for 2000 AD. It may be useful to note that their measures are not of inventions of technologies but for the use of technologies in these "snapshot" years. In many cases the

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technologies were invented in one country and copied in neighboring countries.

To examine how far these measures of technological development are associated with IQs, we use the data for contemporary national IQs initially published by Lynn and Vanhanen (2002, 2006) and updated by Meisenberg and Lynn (2011). In addition to the IQs given in Meisenberg and Lynn (2011), in the present analysis an IQ of 89.5 is given for Israel/Palestine calculated as the average of Israel 94.4 and Palestine 84.6; and an IQ of 73.3 for Lesser Antilles is given as the mean of Netherlands Antilles (87), St. Lucia (62) and St. Vincent (71).

National IQs are also given for the predecessors of contemporary nations in 1000 BC, 0 AD and 1500 AD in order to examine the relation of these to the technological development data for the predecessors of contemporary nations given by Comin, Easterly and Gong (2010). For many nations there has been little change in the demographic nature of the populations during the 3000 years examined in this study. For these it is assumed that the IQs have remained the same in the four years 1000 BC, 0 AD, 1500 AD and 2000 AD. However, there are some nations in which there has been considerable change in the demographic nature of the populations during the last five centuries as a result of colonization mainly by Europeans and in some cases by Asians who have replaced or interbred with the indigenous populations. These are all the nations in the Americas, Australia, New Zealand, Singapore and Papua New Guinea. For these, the IQs of the indigenous populations given in Lynn (2006, p.169) are used for 1000 BC, 0 AD, 1500 AD. Thus, Australia in 1000 BC, 0 AD and 1500 AD was inhabited by aborigines and is assigned the Aboriginal IQ of 62. New Zealand was inhabited by the Maori before European colonization and is assigned the Maori IQ of 90 given in Lynn (2006, p.169). All the nations in the Americas were inhabited by Native American Indians before European colonization and are assigned an IQ of 86. Singapore was inhabited by Malays before the population was largely replaced by Chinese in the nineteenth century and is assigned an IQ of 92, the same as that of Malaysia given in Lynn (2006, p.169). Papua New Guinea was inhabited by an aboriginal population in 1000 BC, 0 AD and 1500 AD and is assigned an IQ 63 given in Lynn (2006, p.169).

3. Results

Descriptive statistics for the variables are given in Table 1. Column 1 lists the nations. Columns 2 through 5 give the data assembled by Comin, Easterly and Gong (2010) on technological development in 1000 BC, 0 AD, 1500 AD and 2000 AD. Column 6 gives IQs for 1000 BC, 0 AD and 1500 AD (designated Historical IQs). Column 7 gives IQs for 2000 AD (designated Contemporary IQs). Table 2 gives the correlations between the variables, with the sample sizes in parentheses.

4. Discussion

The results show that historic national IQs are significantly correlated with national differences in technological development in the years 1000 BC ($r = 0.42$), 0 AD ($r = 0.18$) and 1500 AD ($r = 0.63$), and that contemporary national IQs are significantly correlated with national differences in technological development in the year 2000 AD ($r = 0.75$).

The principal reason for the lower correlation of 0.42 between historic national IQs and technological development in 1000 BC compared with the correlation of 0.75 between contemporary national IQs and technological development in 2000 AD is that in 1000 BC technological development was more advanced in the warm temperate nations of southern Europe, North Africa and the Middle East than in the colder temperate but higher IQ nations of northern and central Europe. Thus, in 1000 BC all the nations of northern and central Europe had a score of 0.6 on technological development, while scores of 1.0 were obtained in the southern European nations of Bosnia and Herzegovina, Croatia, Greece, Italy and Serbia, and in the North African and Middle East nations of Afghanistan, Chad, Iran, Mauritania, Morocco, Pakistan, Sudan and Turkey, and scores of 0.9 were obtained in Algeria and Egypt. A similar association between latitude and technological development was present in 1000 BC in East Asia. Technological development was highest at 0.9 in the warmer latitudes of southern China (measured in the civilization in the valley of the Yangtze) and Hong Kong than in more northerly Korea (0.6) and Japan (0.1).

The explanations proposed for these changes are geographical and climatic. The first civilizations were developed in the valleys of the Tigris, Euphrates, Indus, Nile and Yangtze rivers because these flooded annually and deposited silt on which agricultural surpluses were grown that supported urban populations that produced the technological developments and other discoveries. These technological developments spread by diffusion to neighboring countries in which they were present by 1000 BC. For example, technological developments made in the Indus valley in Pakistan giving it a score of 1.0 had spread to neighboring Afghanistan and Iran by 1000 BC, giving both of these a score of 1.0. At this time, technological development in the nations of northern and central Europe and in Korea and Japan in northern Asia was retarded by distance from the countries that made these discoveries and by the harsher climates compared with the warmer climates that were more favorable to the early development of agriculture as noted by Hart (2007, p.414).

Despite these anomalies, the correlation between historic national IQs and the technological development of nations in 1000 BC is positive at 0.42. The main reason for this is that technological development was low in all the nations of sub-Saharan Africa except Chad and Mauritania, both of which scored 1.0. But in 21 of these nations technological development was low at 0.3, while in the remaining six more southerly nations of sub-Saharan Africa technological development was zero, i.e. in Botswana, Zimbabwe, South Africa, Lesotho, Namibia and Mozambique. The low IQs in these nations make a considerable contribution to the positive association between IQ and the technological development of the complete sample of nations in 1000 BC.

A further contribution to the positive association between historical national IQ and the technological development of nations in 1000 BC is made by the nations of the Americas. These are all assigned an IQ of 86, and only Peru and Chile have a technological development score as high as 0.4 (based on the Inca civilization). Eleven of these countries have a technological development score of 0.3, one has a score of 0.2

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Table 1
Technological development (TD), historic IQs and contemporary IQs.

Country	TD BC 1000	TD AD 0	TD AD 1500	TD AD 2000	Historic IQ	Contemp IQ
Afghanistan	1.00	1.00	0.62	0.28	75.0	75.0
Albania	–	0.70	–	0.34	82.9	82.9
Algeria	0.90	1.00	0.78	0.35	82.8	82.8
Angola	0.30	0.60	0.17	0.23	69.9	69.9
Argentina	0.00	0.00	0.03	0.48	86.0	92.3
Australia	0.10	0.10	0.00	0.90	62.0	99.2
Austria	0.60	1.00	0.90	0.79	98.8	98.8
Bangladesh	0.30	1.00	0.63	0.27	81.0	81.0
Belarus	0.60	0.70	–	0.33	95.1	95.1
Belgium	0.60	1.00	0.90	0.77	99.2	99.2
Belize	0.30	0.60	0.23	–	86.0	76.7
Benin	0.30	0.60	0.17	0.27	67.7	67.7
Bhutan	0.30	1.00	–	–	84.2	84.2
Bolivia	0.00	0.50	0.16	0.39	86.0	87.0
Bosnia and Herzegovina	1.00	0.70	0.82	0.39	93.3	93.3
Botswana	0.00	0.60	0.10	0.37	77.2	77.2
Brazil	0.10	0.30	0.13	0.46	86.0	86.0
Bulgaria	0.50	0.70	–	0.55	93.3	93.3
Burkina Faso	0.30	0.60	0.51	0.24	71.0	71.0
Cambodia	0.50	0.70	0.75	0.25	92.0	92.0
Cameroon	0.30	0.60	0.17	0.33	68.2	68.2
Canada	0.10	0.10	0.13	0.93	86.0	100.4
Central African Rep	–	1.00	0.23	0.27	64.0	64.0
Chad	1.00	1.00	0.40	0.27	67.1	67.1
Chile	0.40	0.40	0.16	0.52	86.0	89.5
China	0.90	1.00	0.88	0.33	105.9	105.9
Colombia	0.30	0.30	0.13	0.47	86.0	83.5
Congo, Dem. Rep.	0.30	0.60	0.23	0.28	72.7	72.7
Congo, Rep.	0.30	0.60	0.23	0.35	68.0	68.0
Cook Islands	–	–	0.13	–	89.0	89.0
Costa Rica	0.30	0.30	0.13	0.53	86.0	89.4
Cote d'Ivoire	0.30	0.60	0.17	0.33	68.6	68.6
Croatia	1.00	0.70	–	0.67	97.5	97.5
Cuba	0.30	0.30	0.13	0.38	86.0	86.8
Czech Republic	0.60	1.00	0.82	0.59	98.8	98.8
Denmark	0.60	1.00	0.90	0.83	97.4	97.4
Ecuador	0.30	0.40	0.16	0.40	86.0	86.3
Egypt	0.90	1.00	0.78	0.37	82.7	82.7
El Salvador	0.30	0.60	0.23	0.34	86.0	78.9
Equatorial Guinea	0.30	–	0.17	0.35	72.3	72.3
Estonia	0.60	0.70	–	0.68	99.8	99.8
Ethiopia	0.30	1.00	0.53	0.22	68.5	68.5
Fiji	–	–	0.13	–	85.0	85.0
Finland	0.60	1.00	0.69	0.87	100.8	100.8
France	0.60	1.00	0.93	0.81	98.0	98.0
Gabon	0.30	0.60	0.17	0.43	76.6	76.6
Gambia	0.30	0.60	–	0.26	62.0	62.0
Germany	0.60	1.00	0.90	0.81	98.6	98.6
Ghana	0.30	0.60	0.38	0.30	70.5	70.5
Greece	1.00	1.00	0.93	0.65	93.1	93.1
Guatemala	0.30	0.60	0.23	0.37	86.0	78.5
Guinea	0.30	–	0.40	0.22	66.5	66.5
Guinea-Bissau	–	0.60	0.27	0.23	66.5	66.5
Guyana	0.30	0.30	0.13	0.35	86.0	86.0
Honduras	0.30	0.30	0.23	0.37	86.0	81.0
Hong Kong	0.90	1.00	0.88	0.69	105.7	105.7
Hungary	0.60	0.70	0.90	0.56	98.2	98.2
India	0.70	0.70	0.76	0.32	82.6	82.6
Indonesia	0.50	0.70	0.66	0.32	85.8	85.8
Iran	1.00	1.00	0.81	0.39	85.6	85.6
Iraq	–	1.00	0.78	0.37	87.0	87.0
Ireland	–	1.00	0.80	0.79	95.7	95.7
Israel/Palestine	–	1.00	–	0.72	89.5	89.5
Italy	1.00	1.00	0.90	0.71	95.9	95.9
Japan	0.10	0.70	0.82	0.76	104.1	104.1
Jordan	–	1.00	–	0.47	86.7	86.7

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Table 1 (*continued*)

Country	TD BC 1000	TD AD 0	TD AD 1500	TD AD 2000	Historic IQ	Contemp IQ
Kazakhstan	0.50	1.00	–	0.33	84.7	84.7
Kenya	0.30	1.00	0.23	0.32	75.0	75.0
Korea, South	0.60	1.00	0.85	–	104.8	104.8
Laos	0.50	0.70	0.75	0.29	89.0	89.0
Latvia	0.60	0.70	–	0.58	96.1	96.1
Lebanon	–	1.00	–	0.53	84.6	84.6
Lesotho	0.00	0.60	0.17	0.25	68.7	68.7
Lesser Antilles	–	–	0.13	–	86.0	73.3
Liberia	–	0.60	0.17	0.28	66.4	66.4
Libya	–	1.00	0.78	0.54	84.6	84.6
Lithuania	0.60	0.70	0.85	0.48	94.6	94.6
Macedonia	–	1.00	–	0.41	90.5	90.5
Madagascar	–	1.00	0.33	0.28	78.3	78.3
Malawi	–	0.60	–	–	61.9	61.9
Malaysia	0.50	0.70	0.72	0.57	92.0	92.0
Mali	0.30	1.00	0.51	0.17	69.4	69.4
Malta	–	–	0.90	–	95.2	95.2
Mauritania	1.00	1.00	0.17	0.36	74.1	74.1
Mexico	0.30	0.60	0.26	0.45	86.0	87.7
Micronesia	–	–	0.13	–	84.0	84.0
Moldova	0.50	–	–	0.33	92.5	92.5
Mongolia	0.60	0.60	0.41	0.37	100.0	100.0
Morocco	1.00	1.00	0.41	0.37	82.4	82.4
Mozambique	0.00	0.60	–	0.28	70.4	70.4
Myanmar	0.50	0.70	0.75	0.29	86.7	86.7
Namibia	0.00	0.60	0.10	0.34	70.4	70.4
Nepal	0.40	0.70	0.30	0.23	78.0	78.0
The Netherlands	0.60	1.00	0.90	0.82	100.4	100.4
New Caledonia	–	–	0.13	–	85.0	85.0
New Zealand	–	0.10	0.13	0.92	90.0	99.3
Nicaragua	0.30	0.30	0.13	0.37	86.0	78.8
Niger	–	1.00	0.44	0.23	61.2	61.2
Nigeria	0.30	0.60	0.47	0.27	73.7	73.7
Norway	0.60	1.00	0.90	0.87	97.0	97.0
Oman	–	1.00	–	0.45	84.4	84.4
Pakistan	1.00	1.00	0.73	0.33	84.0	84.0
Panama	0.30	0.30	0.13	0.40	86.0	80.5
Papua New Guinea	0.30	0.30	0.13	0.36	63.0	84.9
Paraguay	0.10	0.10	0.00	0.35	86.0	83.3
Peru	0.40	0.50	0.16	0.38	86.0	84.2
Philippines	–	0.70	0.58	0.37	84.6	84.6
Poland	0.60	1.00	0.85	0.53	96.1	96.1
Portugal	0.60	1.00	0.97	0.67	94.5	94.5
Romania	0.50	0.70	0.70	0.49	90.8	90.8
Russia	0.60	1.00	0.80	0.48	96.5	96.5
Saudi Arabia	–	1.00	0.48	0.49	79.5	79.5
Senegal	0.30	1.00	0.32	0.32	70.6	70.6
Serbia and Montenegro	1.00	0.70	0.82	0.27	90.5	90.5
Sierra Leone	–	0.60	0.17	0.23	64.0	64.0
Singapore	–	0.70	0.72	0.73	92.0	106.9
Slovakia	–	0.70	–	0.63	97.8	97.8
Somalia	0.30	1.00	–	0.29	71.8	71.8
South Africa	0.00	0.60	0.17	0.54	67.0	71.6
Spain	0.60	1.00	1.00	0.68	96.3	96.3
Sudan	1.00	1.00	0.38	0.27	77.5	77.5
Suriname	0.00	0.00	–	–	86.0	89.0
Swaziland	0.00	0.60	–	0.34	80.5	80.5
Sweden	0.60	1.00	0.90	0.86	98.6	98.6
Switzerland	0.60	1.00	0.82	0.87	99.1	99.1
Syria	–	1.00	0.70	0.31	81.6	81.6
Tajikistan	0.40	1.00	–	0.29	79.6	79.6
Tanzania	0.30	1.00	0.23	0.27	73.8	73.8
Thailand	0.50	0.70	0.75	0.43	90.1	90.1
Tonga	–	–	0.13	–	86.0	86.0
Tunisia	–	–	0.78	0.38	84.9	84.9
Turkey	1.00	1.00	0.83	0.42	89.1	89.1
Turkmenistan	0.50	1.00	–	0.41	79.6	79.6
Uganda	0.30	1.00	0.26	0.26	72.4	72.4
Ukraine	0.60	0.60	0.85	0.36	94.3	94.3

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Table 1 (*continued*)

Country	TD BC 1000	TD AD 0	TD AD 1500	TD AD 2000	Historic IQ	Contemp IQ
United Arab Emirates	–	–	–	0.63	86.9	86.9
United Kingdom	0.60	1.00	0.60	1.00	99.1	99.1
United States	0.20	0.30	0.20	0.13	86.0	97.7
Uruguay	0.00	0.00	0.00	0.00	86.0	90.8
Uzbekistan	0.50	1.00	0.50	0.45	79.6	79.6
Venezuela	0.30	0.30	0.30	0.13	86.0	83.3
Vietnam	0.50	0.70	0.50	0.80	94.0	94.0
Yemen	–	1.00	–	–	80.4	80.4
Zambia	0.30	0.60	0.30	0.19	71.2	71.2
Zimbabwe	0.00	0.60	0.00	0.17	73.2	73.2

(the USA), three have a score of 0.1 (Brazil, Canada and Paraguay), while four have a score of zero (Argentina, Uruguay, Suriname and Bolivia). The low IQs (62 and 63) in Australia and Papua New Guinea and the low level of technological development (0.1 and 0.3) also contribute to the positive correlation between IQ and technological development in 1000 BC.

These results for 1000 BC are consistent with the work of Baker (1974) who assessed the pre-historical technological and other developments of the major races and concluded that the Caucasoid and Mongoloid peoples were the most advanced, the Native Americans were less advanced, and the sub-Saharan African peoples were the least advanced. The present data are more fine-grained insofar as they distinguish between European and South Asian/North African Caucasoids. A more recent analysis arriving at similar conclusions has been presented by Hart (2007).

In 0 AD, historic national IQs are again significantly correlated with technological development but the correlation has fallen to 0.18. At this time, technological development had increased in the nations of northern and central Europe. Thirteen of these nations north of the 45th line of latitude achieved a score of 1.0, and nine achieved a score of 0.7. About the same scores were present in southern Europe, where five nations achieved a score of 1.0, and three achieved a score of 0.7. Thus, while in 1000 BC the nations of northern and central Europe were less developed those in southern Europe, by 0 AD the nations of northern and central Europe had caught up and achieved approximately the same scores as in southern Europe. There was a similar catch up in East Asia where Korea obtained a score of 0.6 in 1000 BC and 1.0 in 0 AD, and where Japan obtained a score of 0.1 in 1000 BC and a score of 0.7 in 0 AD. It is proposed that these catch-ups in the more northerly nations of Europe and East Asia are attributable to diffusion from the more southerly nations in which they originated.

Scores in 0 AD also increased in sub-Saharan Africa, where most countries achieved scores of 0.6, and nine achieved scores of 1.0 (the Central African Republic, Chad, Ethiopia, Kenya, Mali, Madagascar, Mauritania, Senegal and Somalia). However, technological development scores remained low in the Americas, where the highest score of only 0.6 was achieved in only four countries (Belize, El Salvador, Guatemala and Mexico, all obtained by the Aztecs and Maya), followed by 0.5 in Bolivia and Peru and 0.4 in Chile (obtained by the Incas). Nine of these countries obtained scores of 0.3, one had a score of 0.2 (the USA), three a score of 0.1 (Paraguay and Canada, Venezuela), while three had scores of zero (Argentina, Suriname and Uruguay).

Thus, it appears that by 0 AD technological developments that originated in Egypt, Pakistan and Iraq had spread throughout Europe, south Asia and the Middle East, North Africa, and much of sub-Saharan Africa. At the same time, technological developments that originated in southern China had spread north to Korea and Japan and south into Southeast Asia. But these technological developments had not spread to the Americas, where the Aztecs and the Incas had only begun to discover them independently. The relative backwardness of the Americas at this time compared with the higher level of technological development throughout sub-Saharan Africa, is the principal reason why the correlation between historical national IQ and technological development is quite low at 0.18 in 0 AD.

By 1500 AD, the situation had changed again. The correlation between historic national IQs and technological development has increased to 0.63. At this time, technological development had increased in the nations of northern and central Europe. The European nations achieved the highest technological development scores with a range between a low of 0.69 in Finland and a high of 1.0 in Spain and the United

Table 2
Correlation matrix for variables given in Table 1 (sample sizes in parentheses).

Variable	TD 1000 BC	TD 0 AD	TD 1500 AD	TD 2000 AD	Hist IQ	Cont IQ
TD 1000 BC	–					
TD 0 AD	0.63** (110)	–				
TD 1500 AD	0.57** (98)	0.71** (110)	–			
TD 2000 AD	0.12 (109)	0.01 (129)	0.34** (111)	–		
BC IQ	0.42** (133)	0.18* (134)	0.63** (120)	0.61** (133)	–	
Cont IQ	0.35** (133)	0.05 (134)	0.57** (120)	0.75** (133)	0.91** (145)	–

* Denotes statistical significance at the 0.05 level.
** Denotes statistical significance at the 0.01 level.

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Kingdom, and a median of 0.90. The Northeast Asian nations scored almost as high (China: 0.88; Hong Kong: 0.88; Korea: 0.85; Japan: 0.82). Four of the North African nations scored only a little lower at 0.78 (Algeria, Egypt, Libya and Tunisia), but lower scores were obtained by Morocco (0.41) and Sudan (0.38). Scores had declined in sub-Saharan Africa, where 20 of the 31 countries achieved scores between 0.10 and 0.23, and only two scored higher than 0.50 (Ethiopia: 0.53, and Mali: 0.51). The explanation proposed for this is that most of the technological developments during the period between 0 AD and 1500 AD were made in Europe and China. Those made in Europe had spread to North Africa and to some of the most northerly countries of sub-Saharan Africa (Ethiopia and Mali), but not to the remaining countries of sub-Saharan Africa. Those made in China (0.88) had spread north to Korea (0.85) and Japan (0.82), and south to Cambodia (0.75), Laos (0.75), Malaysia (0.72), Thailand (0.75) and Singapore (0.72).

Technological development scores in 1500 AD remained low in the Americas, where the highest scores are only 0.26 in Mexico and 0.23 in Belize, El Salvador, Guatemala and Honduras, all obtained in the last years of the Aztec civilization before it was destroyed by the Europeans using their higher technological development of ships able to cross the Atlantic, and of guns and steel swords with which they were able to defeat the Native Americans. The Inca civilization of Peru, Chile and Bolivia was in decline with scores of only 0.16. Ten of the remaining countries in the Americas scored only 0.13, while Argentina scored as low as 0.03, and Uruguay scored zero. These scores can be explained by the spread of technological development from the Aztec civilization of Central America southwards into most of the countries east of the Andes, although it had not reached the two most southerly countries of Argentina and Uruguay.

In 2000 AD, technological development scores are highest in the European nations and the four East Asian nations (China, Hong Kong, Japan and Singapore), with average scores of 0.63. These are followed by the 15 mixed race nations of Latin America with an average score of 0.41; the 22 South Asian and North African nations with an average score of 0.40; the 2 Pacific Islander nations with an average score of 0.37; the 7 Southeast Asians nations with an average score of 0.34; the 4 Central Asian nations with an average score of 0.32; and the 36 sub-Saharan African nations with an average score of 0.30. These differences match closely the national IQ differences given in Meisenberg and Lynn (2011), producing the correlation of 0.75 between technological development scores in 2000 AD and contemporary national IQs.

The principal explanation proposed for the higher correlation of 0.75 between contemporary national IQs and technological development in 2000 AD compared with the lower correlations between historical national IQs and technological development in the three historical years is that the technological developments in 2000 AD were all made by the European and the East Asian peoples. This result is predictable on the basis of previous studies showing that nations with high IQs obtain more patents per capita for technological discoveries and inventions. This has been shown by Gelade (2008, p.712) who reports a correlation of 0.51 between national IQs and patents per capita based on 112 nations. This has been confirmed by Rindermann, Sailer and Thompson (2009) who report a correlation of 0.40 between national IQs and patents per capita based on 76 nations and who also show that high IQ nations obtain more science Nobel prizes per capita ($r = 0.34$), an index of greater achievements in science that are related to the level of technological development. A further study showing that national IQs predict scientific achievement has been reported by Rindermann and Thompson (2011).

These positive correlations can be understood because technological advances require high intelligence and hence nations with high IQs achieve more technological advances than nations with low IQs. Once these technological advances have been made, they have been taken up by more affluent and higher IQ nations that can afford to use them, leading to the correlation of 0.94 between technological development and per capita income measured as real GDP at PPP (purchasing power parity) in 1998 given by Lynn and Vanhanen (2006, p.249). The correlation between contemporary national IQs and per capita income in this dataset is 0.70, confirming numerous studies summarized in Lynn and Vanhanen (2012).

The principal conclusion of this study is that it adds a historical dimension to the explanatory power of national IQs by showing that national IQs are not only significantly associated with national differences in technological development in contemporary times but also in the years 1000 BC, 0 AD and 1500 AD. More generally, these results make a further contribution to the problem of why nations differ in technological development and the integration of national IQs with developmental economics.

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