On the I.Q. of Nations; Smart, Smarter and Smartest?

William McConochie, Ph.D.
TestMaster, Inc.
71 E.15th. Ave.
Eugene, Or. 97041
541-686-9934
Bill@Politicalpsychologyresearch.com.
3/11/09

Do nations vary in average citizen intelligence? According to some researchers they do. For example, in their book I.Q. and the Wealth of Nations Lynn and Vanhanen asserted in 2002 that nations do vary significantly in average intelligence (Lynn & Vanhanan, 2002). This work was followed with several additional publications: I.Q. and Global Inequality in 2006 (Lynn & Vanhanen, 2006), Race differences in Intelligence (Lynn & Vanhanen, 2006), and a comparison of academic achievement and estimated national I.Q.s in a journal article in 2009 (Lynn & Mikk, 2009). In a detailed review of Race Differences in Intelligence Jason Malloy provides an overview of the extensive research over many decades by these and other researchers (Malloy, 2006).

Researchers have debated for years the relationships between race, nations, I.Q., latitude, climate and prosperity. For example, these debates have revolved around correlations between I.Q. and productivity of nations and latitude. Higher I.Q.s are associated with higher per capita income of nations. Differences in Education and nutrition have been offered as explanations for differences in mean I.Q.s and productivity levels of nations. Breast-feeding, higher latitude and larger head size are associated with higher I.Q.s. I.Q.s for some groups tend to increase over time, the "Flynn Effect".

I.Q. and the Wealth of Nations has been criticized soundly (cf. Wikipedia, I.Q. and the Wealth of Nations). Criticism has challenged the adequacies of samples and variety of measures used by Lynn and Vanhanan, variety of time periods of data sources, and in some cases estimates for nation I.Q.s based not on data but simply on proximity to other nations for which data was available. The research by these particular authors has been considered suspect also on the grounds that much of it was funded by the Pioneer Fund, which some have linked to racial superiority promoters, hate

groups and even Nazism. The hypothesis that intellectual differences between nations may reflect possible genetic differences has been considered suspect as a reflection of this underlying political bias.

The present author has conducted intelligence research internationally for the past several years in conjunction with Internet collaborator Fun Education, Inc. of San Diego. Two of the author's tests have been made available to children, largely for free. This project has provided considerable data that can be analyzed to compare nations.

The two tests in question have been termed the Kids I.Q. test and the Spatial I.Q. test (McConochie, 2009a, 2009b). The first is a "verbal" test, the second a "spatial" measure. The tests each have five sections of approximately 40 items each in multiple-choice format. As of May, 2009, these tests will be termed the International Scale I.Q. Test, with Verbal and Spatial sections.

The Kids I.Q. test content requires use of abstract symbols, to solve problems with content headed Information, Similarities, Arithmetic, Comprehension and Vocabulary. The Spatial I.Q. test content requires aptitude for visually perceiving and solving problems in space. The sections are labeled Everyday Physics, Worldly Knowledge, Shapes and Patterns, Directions, and Common Hand Tools. While the Kids I.Q. test was originally designed primarily for children, subsequent norm data has shown that the test can be used for adults as well. As of March, 2009, both tests are normed on both children and adults, over 100,000 for the Kids test and nearly 9,000 for the Spatial test.

The reliability and internal consistency of both tests is very similar to that of the WISC-III test. For example, reliability for the total scores is above .90 for all total scores for all age groups, children and adults, on both tests.

Validity is based first on content and second on internal consistency statistics; section scores correlate with their respective total scores as highly as the Wechsler section scores do with their total scores. Validity has also been demonstrated in a study comparing these tests with other standardized measures of intellectual aptitude (McConochie, 2009c, study in process). This study demonstrates, in general, that the author's two tests correlate with

school grades and with other measures of intelligence as well as other intelligence tests do.

The unique value of this data in the context of the Lynn/Vanhanen (L & V) discussion is that it differs from the I.Q. data offered by L&V. Their data was based on a wide variety of studies using different instruments, populations, and in some cases simply estimates of I.Q.s based on estimated I.Q.'s of neighboring nations.

The present study used the same I.Q. tests for all children in all nations, during the same recent time period and normed on all children in the sample. Another advantage of the present study is how subjects were chosen. Rather than being chosen or selected by researchers, the participants in this project have been virtually random, in that they were self-selected. While the participants in the present study all had to have some ability to read and understand the English language and had to have access to the Internet, presumably this privilege was reasonably constant across all nations. Scores are not dramatically different across nations, suggesting reasonable command of the English language by participants.

Data was gathered by posting the product on a web site (FunEducation.com) offering intelligence testing and other products, mostly for free. The data was collected over several years, beginning in 2001 with the Kids I.Q. test. Most of the data was gathered between 2005 and December, 2008. Over 100,000 children and adults from over 80 nations came to the site, self-selected, and completed the tests. Approximately 110,000 completed the Kids I.Q. test and 9,000 completed the Spatial I.Q. test by December, 2008. Thus, this data, while not reflecting scores that can be considered to represent strict random measures of each nation's population, does appear to provide reliable and reasonably comparable data across the nations sampled.

Sufficient data for up to 25 nations was available to compute statistics to mirror the Lynn and Vanhanen data, providing a cross-check of their earlier findings. The present data can be considered to have some uniquely favorable characteristics. Elaborating:

a. The data is based on self-selection by children who took the same test. There was no sample selection process designed by the investigator.

Thus, the data is free of some of the biases in data selection that could have colored the Lynn and Vanhanan research.

This is not to say that the samples are necessarily random or representative of each nation but only to say that the same conditions probably govern the sample selection for each nation. These were necessarily children who had familiarity with the English language and access to the Internet. For children in countries where English is their second, or third, language, a degree of privileged status may be presumed. The children were not of the poorest or even poorer class, presumably. They had to have had the opportunity to learn English and they had to have access to the Internet and familiarity with its resources.

b. The norms are the same for all children. The Kids I.Q. test is normed on the over 100,000 children and adults who have taken the test to date, their I.Q.'s calculated based on the present large sample for purposes of this study. And all children from all nations of a given age serve as the norm group for that age. As there are no gender differences in mean scores for a given age, separate norms are not used for boys and girls.

The Spatial I.Q. test data is normed on the approximately 9,000 children and adults who have taken that test to date, by age and gender as appropriate. Males tend to have slightly higher scores than females.

c. The same tests for verbal and spatial intelligence were taken by all children. Only one verbal intelligence test was used and only one spatial test. Children had to have in common only the ability to read English and access to the Internet. The test items were written to be as culture-free as practical.

d. Children and adults took each test independently of the other, so the verbal test provides a source of information independent of that provided by the spatial test. Thus, two independent measures are available to compare with the Lynn and Vanhanen I.Q. data.

e. The data was gathered at roughly the same time interval, between 2001 and 2008, reducing questions about the Flynn effect (the tendency of scores to increase with time) or need to correct for it.

Data file.

The data file for the present discussion is provided in table 1. The gross sample sizes (Kids I.Q, Spatial I.Q) are as follow:

For the "large sample" nations:

Hong Kong (71, 9), New Zealand (1006,92), United Kingdom (9117, 421), Australia (3709, 330), Ireland (1128, 136), Mexico (38, 3), Pakistan (99, 11), Egypt (94, 21), India (714, 95), South Africa (268,49), U.S.A. (58,166, 4491), Canada (4633, 49) and Philippines (523, 70). No data were entered in the data matrix for the four nations with sample sizes below 22 on the Spatial I.Q. test (Hong Kong, Mexico, Pakistan and Egypt.

"Small sample" nations (Kids I.Q. test only):

Malaysia (97), Romania (30), Spain (43), Saudi Arabia (43), France (36), European Union (266), Israel (52), Germany (37), Netherlands (38), Indonesia (33), Bulgaria (52) and United Arab Emirates (69).

Table 1. I.Q. scores and other data for nations.

Num-ber	Country	Lati-tude	Per capita income (thousands)	L&V I.Q.	Spatial total I.Q.	Kids (Verbal) total I.Q. 6-8	Kids I.Q. total I.Q. 9-11	Kids I.Q. 12-14	Kids I.Q. 15-17	Kids I.Q. 18 +
1	Hong Kong	23	29.57	107	97.8	100.0	98.5	99.7	100.2	86.3
2	New Zealand	43	32.25	100	104.3	97.5	97.9	96.2	96.1	104.3
3	U.K.	54	45.23	100	101.0	94.1	93.0	92.4	91.6	98.7
4	Australia	25	25	98	102.0	97.7	98.1	97.6	100.6	100.9
5	Ireland	53	52.2	93	100.0	100.2	99.6	97.1	100.5	102.1
6	Mexico	24	9.56	87		94.9	92.9	90.3	81.4	
7	Pakistan	30	.87	84		95.2	87.8	85.2	79.2	
8	Egypt	26	1.68	83		99.3	98.1	97.9	92.5	
9	India	22	.96	81	78.6	99.5	89.7	89.8	91.3	88.5
10	S. Africa	32	5.9	72	103.2	95.8	96.2	92.0	79.8	
11	U.S.A.	38	45.12	98	101.7	99.8	99.9	99.8	99.9	100.7

12	Canada	50	42.24	97	103.6	95.3	93.7	92.7	91.8	96.7
13	Philippines	10	1.6	86	84.9	102.8	90.5	96.3	90.0	88.7
14	Malaysia	42	13.4	92			84.5			
						Kids I.Q. ages 4-17				
15	Spain	40	30.1	97		94.1				
16	SaudiArabia	24	22.9			81.6				
17	Greece	39	29.1	92		83.3				
18	France	47	33.5	98		100.3				
19	Euro Union	50	32.7			97.6				
20	Israel	31	27.1	94		91.1				
21	Germany	52	34.2	102		96.9				
22	Netherlands	52	39.0	102		96.1				
23	Indonesia	6	3.7	89		84.2				
24	Bulgaria	42	11.3	93		70.2				
25	U. Arab Emirates	24	37.9			90.1				

Added to the data file are latitude and per capita income from recent Internet data sources. This was done first to explore the relationship between I.Q. and income to check the Lynn and Vanhanan hypothesis that I.Q. is positively related to per capita income. Latitude was included also in light of theory and data propounded by biologist Randy Thornhill of the University of New Mexico and others that demonstrates robust relationships between latitude and presence of many social and biological variables, including disease pathogens, variety of religions and languages, frequency of conservative governments and frequency of war. The closer a nation is to the equator, the more that all these other variables are found (Thornhill).

Results.

Score Range Findings.

The present data shows a narrower range of I.Q. score differences across nations than does the Lynn and Vanhanan (L & V) data.

Kids I.Q. test:

The greatest range of differences, found for children 15 through 17 years old on the Kids I.Q. test, is from a low of 79 (Pakistan) to a high of

101 (Australia). This is compared to a low of 72 (South Africa) and a high of 107 (Hong Kong) for L&V over the same 13 nations. Thus, not only is the range of scores smaller on the Kids I.Q. test (22 points versus 35 points) but different nations are highest and lowest in the present data than in the L & V data.

The range of I.Q. differences between nations is even lower in younger age groups. For 6 through 8 year olds, the range is only 9 points: from 94 (United Kingdom, N = 285) to 103 (Philippines, N = 74), or 100 (Hong Kong, N = 942, and Ireland N = 173). And again, the nations that are highest and lowest are different from those in previous comparisons. By extrapolation, at age 1 the I.Q. difference range between these 13 nations would be virtually zero on the Kids I.Q. test.

Spatial I.Q. test:

For the Spatial I.Q. test the range across the 9 of these 13 nations for which sufficient data was available for comparison was from a low of 79 for India (sample N = 134) to a high of 104 for New Zealand (N = 120). (Insufficient data was available to compare different age groups on the Spatial test). These compare to the Lynn and Vanhanan I.Q. scores ranging from 72 for South Africa to 107 for Hong Kong. Again, the range is lower for the Spatial I.Q. test (25 points) than for the L & V data (35 points). And different nations are highest and lowest in the two data sets; India and New Zealand set the limits for the Spatial I.Q. test while South Africa and Hong Kong set the limits in the L & V study.

Thus, the comparison of these two data sets seems to confirm real differences between nations but raises doubts about the consistency and thus absolute nature of these differences. The differences may reflect differences in instruments, sample selections or cultural factors more than fundamental, e.g. physiological or genetic, differences in the intellectual substrates of nations.

Correlation Findings.

The correlation table for these variables is presented below. Table 2 presents correlations for 13 nations from which relatively large samples were obtained. Table 5 presents correlations for a separate sample of 12 nations from which smaller samples were obtained.

Correlation findings for large sample nations.

Table 2. Pearson Product Moment Correlations between Variables for Large sample nations.

	Lati-tude	Per capita in-come	L&V I.Q.	Spatial total I.Q.	Kids (Verbal) total I.Q. 6-8	Kids I.Q. total I.Q. 9-11	Kids I.Q. 12-14	Kids I.Q. 15-17	Kids I.Q. 18 +
Latitude	1.00								
PCIncome	.74**	1.00							
L&V IQ	.37	.77**	1.00						
Spa IQ	.65*	.70*	.41	1.00					
Kids 6-8	-.45	-.08	.05	-.59	1.00				
Kids 9-11	.31	.60*	.43	.73*	.26	1.00			
Kids 12-14	.00	.48	.53	.32	.63	.84**	1.00		
Kids 15-17	.23	.71*	.73**	.16	.54	.69**	.83**	1.00	
Kids 18+	.69*	.72*	.30	.74*	-.44	.56	.17	.37	1.00

Comments regarding Table 2 data:

a. Column 2. The relationship between I.Q. measures and per capita income ("wealth of nations"): I.Q. appears to be robustly related to wealth measured as per capita income. The correlations are virtually identical and consistently high for adults: Lynn I.Q. (.77**), Kids I.Q. for 15 to 17-year-olds (.71**), Kids I.Q. test for adults (Kid18+) (.72*) and Spatial I.Q. for adults (.70*). Thus, the present data supports the initial Lynn and Vanhanan conclusion that I.Q. is substantially related to national wealth as measured in terms of mean per capita income.

b. Qualification of I.Q. - wealth relationship: Is I.Q more a cultural than genetic resource?

However, the relationship between I.Q. and national wealth is less clear the younger a group is. Sufficient data was available only for the Kids (Verbal) test to study this effect. In general, the younger the group, the lower the correlation between I.Q. and per capita income: 15-17 year olds (.71**), 10-14 year olds (.48), 9-11 year olds (.60*), and 6-8 year olds (-.08). This suggests that the difference in I.Q.s between nations of various wealth levels is not be genetic but rather environmental or cultural.

It suggests that citizens of different nations are born genetically equal. Perhaps the effects of culture that lead to greater productivity, income and wealth also lead to more robust expression of intelligence, at least as measured by the tests used. A likely institution underlying both of these is education. A good educational system empowers citizens to be more vocationally productive. A good educational system, broadly defined, presumably also provides citizens with more of the "tools" that empower them on intelligence tests that are dependent upon language, familiarity with the world and making sense of it.

Indeed, Lynn and Mikk report an overall correlation for 15-year-old children of .84 between estimated national I.Q.s and mean achievement on tests of reading comprehension, mathematical ability and scientific understanding (Lynn & Mikk, 2009). This could be taken to mean that I.Q. contributes strongly to academic achievement. However, the correlation between I.Q. and average high school grades generally runs much lower than .84, more in the neighborhood of .50 to .60 for individual citizens in the present researcher's experience. It seems more reasonable therefore to explain the higher correlation of .84 across nations as a reflection of broader cultural resources that contribute both to intelligence as manifested on intelligence tests and to academic success as measured on achievement tests.

The fact that I.Q. scores for groups in first world nations tend to increase gradually over the years (the Flynn Effect) documents that I.Q. as typically measured reflects more than simply a fixed genetic substrate. Culture contributes, perhaps in terms of nutrition, education or in other unforeseen ways.

Also consonant with the above findings are the opinions of evolutionary biologist professor Jared Diamond, who summarizes psychological research as failing to convincingly demonstrate genetic differences in intelligence between racial groups. "Even our cognitive abilities as adults are heavily influenced by the social environment that we experienced during childhood, making it hard to discern any influence of preexisting genetic differences, [and] tests of cognitive ability (like IQ tests) tend to measure cultural learning and not pure innate intelligence...the psychologists' efforts to date have not succeeded in convincingly establishing the postulated genetic deficiency in IQs of nonwhite peoples." (Diamond, 1997, p. 20).

In making this comment Diamond understandably cites no references to Lynn and Vanhanan, whose controversial book on I.Q. and the Wealth of Nations was published after Diamond's. However, research on I.Q. differences had been published long before 1997. Thus, it is unclear why specifically Diamond held the above opinion.

c. Relationship between latitude and national wealth.

Latitude seems to contribute in some manner with intelligence in predicting per capita income, as summarized in Tables 3 and 4. Indeed, intelligence and latitude together provide a rather substantial predictor of per capita income (R's from .79 to .85, Table 4).

Table 3. Pearson Product Moment correlations between Nation Mean I.Q. and Nation Latitude.

I.Q. Group.	Correlation. between I.Q. latitude.
Kids I.Q. ages 6-8	-.45
Kids I.Q. ages 9-11	.31
Kids I.Q. ages 12-14	.00
Kids I.Q. ages 15-17	.23
Kids I.Q. ages 18 and up (adults)	.69*
Spatial I.Q. (adults)	.65*
Lynn and Vanhanan I.Q.	.37

Table 4. Intelligence and Latitude as Predictors of Mean Per Capita National Income.

I.Q. Measure combined with Latitude:	Multiple correlation	Sum of Squares	d.f.	F	Signifi-cance
L & V	.85	4511	2	25	.00
Kids I.Q. 18 +	.83	1963	2	6.7	.03
Spatial I.Q.	.80	2225	2	6.3	.03
Kids ages 6-8	.79	1567	2	8.3	.01

However, the fact that I.Q. does not consistently correlate substantially with latitude for younger persons suggests that harsher climates

have not required higher intelligence for survival, as by natural selection. Rather, the cultures in these harsher climates may have adapted to them, providing resources that foster survival. Perhaps harsher climates further from the equator necessitate for survival more production of food, shelter, clothing, energy for heat and other resources than are required to survive in the temperate climes near the equator. This greater production of goods will necessarily translate into greater "wealth" per capita.

d. An anomaly for very young children: I.Q. versus latitude and per capita income. There is an interesting cluster of data for young children ages 6 to 8 in Table 2, row 5. Their verbal intelligence correlates *negatively* with latitude (-.45) and per capita income (-.08) and with spatial intelligence for adults (-.59). How can this be explained?

Diamond offers the opinion that New Guinean children have intellectual advantages over Westerners related in part to the New Guinean life style characterized by absence of passive entertainment (seven hours of television per day for Westerners) and active interactions with their environment instead (Diamond, p. 21).

Could it be that very young children in less developed countries advance in spatial and "environmental" intelligence quicker than those in more developed countries? If so, this might account for these statistics for 6 to 8-year-olds but not for children 9 and up. The differing effects of culture may quickly give these older children in more developed countries a slight advantage on traditional I.Q. tests, overcoming the possible temporary advantage held by very young children in less developed nations.

Small sample correlations.

Table 5. Small Sample nation correlations (N =12, except 9 for cases for which L&V data were not available).

	Latitude	Per capita in-come	L&V I.Q.	Kids Total I.Q (all ages).
Latitude	1.00			
PCIncome	.54	1.00		
L&V IQ	.78* (9)	.84** (9)	1.00	

Kids I.Q.(all ages)	.73**	.73**	.71*	1.00

This small sample national data yields virtually the same results as found in the large nation sample. There are substantial correlations between the two I.Q. measures and per capita income (.84 and .73) and between these measures of intelligence and latitude (.78 and .73). The correlation of .71 between the two measures of intelligence is as expected if they are both reliable and valid measures intelligence. The multiple correlations predicting per capita income from I.Q. and latitude were also substantial for this data sample, .85 for L&V I.Q and .77 for Kids I.Q., both significant at the .02 level or better.

General discussion.

Higher production of goods and services in latitudes further from the equator, presumably necessitated for survival in those colder climates, would also provide increasing opportunities for education. Greater exposure to education with age could increase the performance of persons on measures of intelligence for nations in those latitudes.

For example, the Wechsler Intelligence test (children's test, third version) uses in its measuring process information and skills that one obtains through educational opportunities of a wide variety, including school, television and reading. This is not to say that these tests are measuring achievement more than aptitude to learn or understand and solve problems. But a degree of familiarity with the world and basic techniques for understanding and solving problems is required to read, comprehend and answer the questions that constitute the Kids I.Q. test, and presumably most other commonly used measures of intelligence. Perhaps in more economically advanced nations, children as they attend school get more consistent and comprehensive exposure to these fundamental "tools" of problems-solving, thus accounting for a slightly greater advantage on I.Q. tests for children in those nations at older ages than at younger ages.

The facts that there are not consistent correlations between intelligence measures and latitude for all age levels and the fact that correlations between intelligence and per capita income of nations appear to

be virtually zero for infants and grow with age suggests that evolutionary processes have not selected persons of higher intelligence for survival in colder climates (higher latitudes).

Rather, it seems reasonable to assume that cultures in those colder climates have adapted via education, technology, etc. to enable them to survive in those climates. These adaptations probably equip citizens as they age with tools that also enable them to excel slightly on commonly used intelligence tests.

These cultural adaptations may also have led to improved nutrition for some nations, with corresponding improvements in mental and physical health and functioning. Thus, the above data supports the view that intelligence as measured is a genetically based trait that is significantly shaped by environment and national culture, broadly defined.

Perhaps the most noteworthy contribution of the above data is the suggestion that correlations between mean nation intelligence and nation per capita income and nation latitude vary with age, and are virtually nonexistent in infancy. The implication is that intelligence as measured has a strong cultural component that is imparted to citizens as they mature from infancy to adulthood. This is not to imply that a given child's intelligence can be dramatically increased by enriching his or her cultural experiences but only to suggest that intelligence for groups is a product in part of factors such as nutrition, education and experience that vary from culture to culture and nation to nation. The present data do not support the conclusion that there are genetic differences underlying intelligence differences between nations.

References:

Diamond, Jared, Guns, Germs and Steel, (1997), New York/ London, W.W. Norton.

Lynn, R. & Vanhanen, T., (2002), I.Q. and the Wealth of Nations Westport, CT, Praeger.

Lynn, R. & Vanhanen, T., (2006), I.Q. and Global Inequality, Augusta, GA, Washington Summit Publishers, Augusta, GA.

Lynn, R. & Vanhanen, T., (2006), I.Q. and Global Inequality. Washington Summit Publishers, Augusta, GA.

Lynn, Richard and Mikk, Jaan, (2009), National IQs predict educational attainment in math, reading and science across 56 nations, Science Direct, http://wwwsciencedirect.com/.science?_ob=ArticleURL&_udi=B6W4M-4....

Malloy, Jason, A world of difference: Richard Lynn Maps World Intelligence, http://www.gnxp.com./blog/2006/02/world-of-differnce-richard-lynn-maps.php.

McConochie, William A., Kids I.Q. Test Manual, 2009a. Available from the author (Bill@Politicalpsychologyresearch.com).

McConochie, William A., Spatial I.Q. Test Manual, 2009b. Available from the author (Bill@Politicalpsychologyresearch.com).

McConochie, William A., International Scale I.Q. Test Validity Study, 2009c. In process by the author (Bill@Politicalpsychologyresearch.com).

Thornhill, Randy. For curriculum vitae and selected publications, see: http://biology.unm.edu/Biology/Thornhill/rthorn.htm

Wikipedia, I.Q. and the Wealth of Nations, http://en.wikipedia.org/wiki/IQ_and_the_Wealth_of_Nations.