THE INTELLIGENCE OF NATIONS

RICHARD LYNN & DAVID BECKER

The Intelligence of Nations

Richard Lynn & David Becker

UI

Ulster Institute for Social Research

Published by
Ulster Institute for Social Research
London GB

ISBN 9780993000164

Printed in Great Britain

Contents

Online appendix (PDF 2.8 MB)
available to view and download at:
http://www.ulsterinstitute.org/intelnatsappendix

Preface

I published the first study of national IQs and their correlates in 2002 in collaboration with the political scientist Tatu Vanhanen. We published further studies on these in 2006 and 2012. Many more studies have been published and a further update of these is given in the present volume. Unhappily, Tatu Vanhanen died in August 2015, and so was no longer able to work with me in these labours, but I have found a young collaborator in David Becker to whom I am greatly indebted for his excellent compilation of the updated national IQs given in Chapter 2.

I should like to express my appreciation for the contributions of the many dozens of scholars who have published new data on national IQs, the climatic and genetic factors responsible for these, and their economic and social effects that I summarise in Chapter 3. Among those who have made these contributions I should particularly like to thank are Helen Cheng, Emil Kirkegaard, Gerhard Meisenberg, Davide Piffer, Heiner Rindermann, James Thompson and Michael Woodley of Menie. And last, but by no means least, my wife Joyce for her support while I have worked on these problems.

Richard Lynn

Chapter 1. Introduction

The problem of why some nations are rich and others are poor has been discussed since the eighteenth century. It was addressed by Montesquieu (1748) in his *L'Esprit des Lois,* in which he noted that rich nations are mainly in temperate latitudes while poor nations are mainly in tropical and sub-tropical latitudes and suggested that the heat in tropical and sub-tropical latitudes is enervating and reduces the capacity to work. Later in the century, Adam Smith (1776) addressed the same question in his *An Inquiry into the Nature and Causes of the Wealth of Nations,* in which he argued that the principal factors responsible for national wealth were specialisation and the division of labour, the skills of the population and free markets. The skills of the population are dependent on their intelligence, because people with high intelligence acquire more productive skills than those with low intelligence. From this time onwards, numerous theories have been proposed to explain differences in the national differences in wealth.

In 2002 Tatu Vanhanen and I examined the theory that national differences in intelligence make a significant contribution to differences in wealth in our book *IQ and the Wealth of Nations.* We gave IQs for all major 185 nations in the world with populations over 50,000. These consisted of measured IQs of 81 nations and estimated IQs for 104 nations that were ethnically similar to those for which we had measured IQs. We found that national IQs were significantly correlated at .62 with per capita income measured as real GDP (gross domestic product) in 1998 (Lynn and Vanhanen, 2002, p.111). We claimed that this showed that differences in national IQs explained 38 percent of the variance in national per capita income (.62 squared = .38).

We were not wholly surprised that this claim received a mixed reception. Among our negative critics, Susan Barnett and Wendy Williams (2004) asserted that our national IQs were "virtually meaningless"; Hunt and Sternberg (2006) described them as “technically inadequate… and meaningless”; Volken (2003) criticised our national IQs as “highly deficient”; Astrid Ervik (2003) asked "are people in rich countries smarter than those in poorer countries?" and concluded that "the authors fail to present convincing evidence and appear to jump to conclusions"; and Thomas Nechyba (2004) wrote of their "relatively weak statistical evidence and dubious presumptions".

These negative reactions to our work have been well summarized by Juri Allik, professor of psychology at the University of Tartu: “By analogy with many previous controversial discoveries, it is predictable that the first most typical reaction would be denial. Many critics are not able to tolerate the idea that the mean level of intelligence could systematically vary across countries and world regions. Neither are they ready to accept that from the distribution of mental resources it is possible to predict the wealth of nations. The next predictable phase is acceptance of the facts but denying their interpretation. The simplest strategy is to interpret the results as measurement error. A useful strategy is to discover a few small mistakes declaring that all the results are equally suspicious” (Allik, 2007, p. 707).

Others who greeted our national IQs positively were Erich Weede and Sebastian Kampf (2002) who wrote that "there is one clear and robust result: average IQ does promote growth". Edward Miller (2002) wrote that "the theory helps significantly to explain why some countries are rich and some poor"; Michael Palairet (2004) wrote that "Lynn and Vanhanen have launched a powerful challenge to economic historians and development economists who prefer not to use IQ as an analytical input".

In 2006 we published a further study of national IQs and their correlates in our book *IQ and Global Inequality* (Lynn and Vanhanen, 2006). In this we presented measured IQs for 113 nations and estimated IQs for 79 nations, giving a total of 192 nations, comprising all the nations in the world with populations over 40,000. Following the method in our first study, we used the measured IQ of the 113 nations to estimate the IQs for the additional 79 nations that were ethnically similar to those for which we had measured IQs. We found a correlation of .64 between national 1Q and per capita income measured as GDP (Gross National Product) in 189 nations, and thus closely similar to the correlation of .62 reported in our 2002 book. In our 2006 book we extended the analysis beyond economic development and showed that national IQs explain substantial percentages of the variance in national differences a number of other phenomena including literacy (.65), life expectancy (.75), infant mortality (-.77) and democratic institutions (.53).

In 2012 we published a third study of national IQs and their correlates in our book *Intelligence: A Unifying Construct for the Social Sciences* (Lynn and Vanhanen, 2012). In this we gave revised and updated measured IQs for 161 nations and territories, and estimated IQs for an additional 41 smaller nations and territories, giving IQs for all 202 nations and territories in the world with populations over 40,000. We found that national IQs were significantly correlated with GDP per capita in 2003 at .71, significantly higher than our two previous correlations of .62 and .64, and showing that national IQs explained 50 percent of the variance in national per capita income (.71 squared = .50). We also found that national IQs were significantly correlated with adult literacy (.64), income inequality assessed by the Gini index (47), the rate of unemployment (-.76), researchers in research and development (.67), gender inequality (-.86), corruption (-.59), life satisfaction (.63) , religious belief (-.48), life expectancy (.76), malnutrition (-.52), tuberculosis (-.57), quality of water (.62) and quality of sanitation (.71).

These additional correlates validated our national IQs and a number of scholars came to accept our work on national IQs and its contribution to the explanation of a wide range of national and social phenomena. Heiner Rindermann and Steve Ceci (2009, p. 551) described it as “a new development in the study of cognitive ability: following a century of conceptual and psychometric development in which individual and group (socio-economic, age, and ethnic) differences were examined, researchers have turned their attention to national and international differences in cognitive competence. The goal is to use cognitive differences to understand and predict national differences in a variety of outcomes: societal development, rate of democratization, population health, productivity, gross domestic product (GDP), and wage inequality”.

Martin Voracek (2013) wrote that “The publication of a compilation of national intelligence (IQ) estimates for the world's countries by Lynn and Vanhanen (2002; revised and extended versions: Lynn and Vanhanen, 2006, 2012a) has spawned considerable interest among researchers across a variety of scientific disciplines… Up to now, across dozens of studies, theoretically expected and thus meaningful aggregate-level associations of national IQ with numerous other psychological, socioeconomic, and demographic indicators have been obtained. Variables investigated range from atheism (Lynn, Harvey & Nyborg, 2009), scholastic achievement (Lynn, et al., 2007), fertility (Shatz, 2008), inbreeding depression (Woodley, 2009), health outcomes (Reeve, 2009), and life history traits (Rushton, 2004; Templer, 2008) to homicide (Lester, 2003; Templer, Connelly, Lester, Arikawa & Mancuso (2007) and suicide rates (Voracek, 2004, 2005, 2006, 2007a, 2008), to name just a few examples”. Even Earl Hunt, who initially rejected our national IQs as meaningless, conceded that "in spite of the weaknesses in several of their data points Lynn and Vanhanen's empirical conclusion was correct" (Hunt and Wittmann, 2008).

Further support for the validity of our national IQs was provided by Sergey Kulivets and Dimitri Ushakov (2016) of the Russian Academy of Sciences who wrote: “We propose that problem solving is the mediator between human competencies and achievements. Creation of goods and services is based on problem solving in design, production and delivery... We propose a mathematical model based on these assumptions. The simulation reproduces most important traits of Lynn and Vanhanen’s (2002) findings. The simulation shows a non-linear growth of economic achievements with national IQ growth as well as an increase of between countries variance. Thereby the proposed model can serve as a satisfactory explanation for empirical data on links between national IQs and economic achievements".

Heiner Rindermann (2018) has made a major contribution to updating our national IQs and their economic and social correlates in his book *Cognitive Capitalism: Human Capital and the Wellbeing of Nations*. He gives updated national IQs, which he prefers to call cognitive abilities (CAs), for all 200 nations of any significant size in the world calculated from tests of intelligence and educational attainment in the PISA (Programme for International Student Assessment), TIMSS (Trends in International mathematics and Science Study) and similar studies. He follows our work in scaling these on a metric set at 100 for the United Kingdom, with a standard deviation of 15. His CAs for the world regions are as follows. Northeast Asia: 103; Australia/New Zealand, Central Europe and Western Europe, North America: 99; Scandinavia: 97; Eastern Europe: 96; Southern Europe: 93; Southeast Asia: 85; North Africa/Middle East: 84; South/Central Asia: 79; Latin America: 79; Sub-Saharan Africa: 69. These IQs are closely similar to those given in my *Race Differences in Intelligence* (Lynn, 2015).

Rindermann gives a correlation of .82 for 161 countries between national cognitive abilities and per capita income assessed as logged GDP in 2010, showing that two thirds of the variance in national per capita income can be explained by the cognitive abilities of the populations (.82 squared = .67). This correlation is higher than those we reported in 2002 at .62 for 185 countries for GDP per capita and in 2012 at .71 for 192 countries. He has constructed a measure of national "well-being" from wealth, health, life satisfaction, trust, democracy, rule of law, gender equality and low crime, corruption and divorce. He shows that there is a positive correlation of .71 between this and cognitive ability and concluded that "national well-being mainly depends on the cognitive ability level of a society" (p. 382). He also reports a number of other significant correlates of national cognitive abilities that are given in Chapter 3. Another of Rindermann's important contributions is that he has shown that the cognitive abilities of "the intellectual class" (the top 5 percent) generally have a greater positive effect on national achievements and other desirable outcomes that those of the average, confirming the study by Rindermann, Sailer & Thompson (2009).

In 2017 Robert Sternberg wrote to me that he was inviting the nineteen most cited psychologists on intelligence to contribute chapters on their work to a book he was editing *The Nature of Human Intelligence* and that as I was one of these, he was extending the invitation to me. I accepted the invitation and sent him *The Intelligence of Nations*, which was duly included when the book was published by the Cambridge University Press in 2018. Thus, in the course of twelve years my national IQs had made the transition from "technically inadequate… and meaningless" (Hunt and Sternberg, 2006) to mainstream acceptance.

Chapter 2. National IQs

2.1. Introduction

All data, terminology and methods reported or employed in this chapter are taken from version 1.3.1 of the NATIONAL IQ DATASET (NIQ-dataset V1.3.1), published online on 08.25.2018. The NIQ-dataset V1.3.1 is a working file, continuously updated as necessary. This file, its most up-to-date form at the time of writing, is the subject of this book, which is itself a revision and reissuing of the dataset found in Lynn and Vanhanen (2002), validated by Lynn and Meisenberg (2010) and further updated by Lynn and Vanhanen (2012). Accordingly, its basic methodical approach and the majority of the sources upon which it draws resemble those found in its predecessors. As with these predecessors, studies and reports of psychometric intelligence measurements from all around the world have been collected, selected according to suitability, corrected as necessary, and averaged for as many countries as possible.

The main difference between this study and the previously published studies is with regard to the level of detail provided. The previous studies have been criticised for, in various cases, drawing upon unrepresentative, small or incomparable samples with regard to particular nations (e.g., Richardson, 2004; Barnett & Williams, 2004, Hunt & Sternberg, 2006; Hunt & Carlson, 2007). In updating these studies, we endeavour to obviate this problem. The central aim of this revision is to standardize each individual step of the process through which we have reached our estimations and made our calculations, so that this information is as clear as possible to other researchers. This permits us to minimize any irregularities and has the advantage of complete transparency, such that other researchers can refollow our steps should they wish to do. In order to achieve this, we had to collect a much larger amount of secondary data than was the case with our predecessors. This was crucial in order to be absolutely clear with regard to the precise nature and character of each sample, the methods employed in intelligence measurement, precisely what corrections needed to be made and how the individual samples from a given nation were aggregated to achieve a national IQ estimate to the greatest possible level of accuracy. As a consequence of this process, the inclusion criteria for this study has been stricter than that of its predecessors and the number of sources is, therefore, lower than is found in the works of Lynn and Vanhanen. However, the level of secondary information is considerably higher than is the case in the analyse which this study develops.

This chapter will act as a technical manual, allowing the reader to understand and reproduce each individual step of our work and to apply the methods to further sources of IQ data as these become available. We will explain our key terms and abbreviations, describe the process by which data were ascertained, present calculations, and explain the reasons why they may be best interpreted in the way we have. For the sake of a better assignment of the terms, the names of variables will be shown in square brackets (e.g., [Country name]), whereas values that can taken by variables are displayed in curled quotation marks (e.g., 'United Kingdom').

Our method can be illustrated most simply by seeing how it would apply to two fictional nations, which we will call Utopia and Dystopia. Utopia is a country which is easy to analyse, because there is abundant high quality, representative data. Dystopia is far more problematic, due to inaccurate, poor quality data or simply a lack of data.

2.2. A Tale of Two Nations: Estimating and Calculating National IQs on Fictional Examples

2.2.1. Sample Identification

Let us suppose that four samples can be found, two for Utopia and two for Dystopia. Information about their identity within the NIQ-dataset can be seen in Table 1. The unique IDs in the first column are combinations of random four-digit numbers from column two and the official three-digit ISO 3166-1 ALPHA-3 code

(ISO, 2013), which prevent mismatches in the dataset. The country name in column four was drawn from The World Fact Book of the CIA (2017, Index: "Country name") and used for all countries in alphabetical order. For the sake of simplicity, we named the four fictional samples, from top to bottom, as U1, U2, D1 and D2.

Table 1. *Information about sample identification.*

ID	No.	ISO 3166-1 ALPHA-3	Country name	Short
UTO3857	3857	UTO	Utopia	U1
UTO8442	8442	UTO	Utopia	U2
DYS8347	8347	DYS	Dystopia	D1
DYS1795	1795	DYS	Dystopia	D2

2.2.2. Sample Characteristics

In Table 2, [Origin (type)] describes the area of a country from which the whole or the majority of a sample was drawn. 'Nat.' (national) means that the individuals originated from all or a large part of the country's total area which spans across more than only a single county, municipality, governmental area. In an 'urb.' (urban) type sample, the individuals were drawn from one or more urban populations. This term includes both inner cities and suburbs. A 'reg.' (regional) sample is from a smaller or specific named area that contains both urban and rural areas. A 'rur.' (rural) sample is from the countryside or involves people described as mostly economically dependent on the agricultural sector. A more concrete description of the area of origin is listed in the next column. It is mostly the name of the location or the description given by the source. The type of origin could also be 'for.' (foreign), such as if the sample is from refugees or immigrants. When this is the case then the foreign country is named in column two.

The mean socioeconomic status [SES] of the sample is either selected by the source directly or inferred from other information, such as economic circumstances. It is 'm' (medium) if described at the average of the total national population or if absolutely no information is provided, otherwise it is 'l' (low) if below or 'h' (high) if above the national average.

[Sample comp.] describes the type of individuals in the sample. 'Norm.' (normal) is the base value and means that children or adults where drawn without selection for potentially relevant properties such as educational status, ethnic affiliation or health problems. If such selections were carried out, the specific name of the criteria is stated: 'cont.' for a control sample (mostly in clinical studies), 'twi.' for twins (mono- or dizygotic), 'us' for university students, 'hs' for high school students, 'ps' for pre-school students, 'moth.' for mothers, 'lit.' for literate, 'illit.' for illiterate, 'exp.' for experimental (e.g., treatment with drugs, special educational programs, etc.), 'immi.' for immigrants (from or in another country), 'NA' for Native Americans, 'rec.' for recruits (army), and 'oth.' for all others.

The character of a sample, shown in column five, describes the principle of the inclusion of participants. 'Rep.' (representative) and 'nor.' (normative) samples represent the whole population described in columns one to four. The only difference is that normative samples were used for a test-standardization. Individuals in 'ran.' (random) samples were drawn without any selection or representational intentions, and in 'sel.' samples one or more further criteria had influence on the inclusion, such as the exclusion of individuals with very low or very high test-performance.

Columns [Lowest age] and [Highest age] present the outer limits of the age range within a sample. Both variables describe the age in life years of the youngest to oldest individual or mean age of the youngest or oldest subsample (age group). It can happen that a source provides data for individuals or groups outside of the displayed age range but which we were not employed by us. If this occurs, it is clearly indicated and the justification for the exclusion explicitly set out. The 'Mean age' in the next column is either given by the source, calculated as precisely as possible, or is the mean of the 'Lowest age' and the 'Highest age.' 'Age deviation' represents the absolute difference between the mean age of a sample and the median age of its respective nation in years, provided by the CIA (2017, Index: "Median age").

The column [*N* (ind.)] counts the number of individuals of a utilized sample. It may differ from the number given in a source when individuals are excluded or included by us for additional reasons. Its value can also have decimal points if a sample had to be split by us according to percentages.

The [Sample rating] is an overall index of the data quality, according to the sample's properties. A measured IQ is, of course, less representative of a total national population the less representative the sample is. A wider geographic area and an SES near the population average should increase this representativeness. Group differences within a country must also be taken into account, for ethnic and cultural minorities as well as for age groups. Therefore, the base value of [Sample rating] is ‘0.00’ and scores need to be added if the following properties are present:

- If [Origin (type)] is ‘nat.’ → +1.00
- If [Origin (type)] is ‘reg.’ → +0.50
- If [Origin (type)] is ‘urb.’ → +0.50
- If [Origin (type)] is ‘rur.’ → +0.50
- If [SES] is ‘m’ → +1.00
- If [Sample comp.] is ‘norm.’ → +1.00
- If [Sample comp.] is ‘twi.’ → +1.00
- If [Sample char.] is ‘rep.'' → +1.00
- If [Sample char.] is ‘nor.’ → +1.00
- If [Sample char.] is ‘ran.’ → +0.50
- If [Age deviation] is ‘<10.00’ → +1.00
- If [Age deviation] is ‘10.00’ – ‘20.00’ → +0.50

After [Sample rating] has been calculated, the result must be divided by the maximum possible value, which is 5.00. For example, if the median ages of Utopia and Dystopia are assumed to be 30.00y, the calculation for the fictional samples would be:

[Sample rating] (U1) = (1.00 + 1.00 + 1.00 + 1.00 + 0.50) / 5.00 = .90

[Sample rating] (U2) = (0.50 + 1.00 + 1.00 + 1.00 + 0.00) / 5.00 = .80

[Sample rating] (D1) = (0.50 + 0.00 + 0.00 + 0.50 + 0.50) / 5.00 = .30

[Sample rating] (U2) = (0.50 + 0.00 + 0.00 + 0.00 + 0.00) / 5.00 = .00

Table 2. *Information about sample characteristics.*

	Origin (type)	Origin (concr.)	SES	Sample omp.	Sample char.	Low. age	High. age	Mean age	Age dev.	*N* (ind.)	Sample rating
U1	nat.	-	m	norm.	rep.	7.00	15.00	10.56	19.44	5690	.90
U2	urb	Capital	m	norm.	nor.	9.00	11.00	9.00	21.00	3450	.80
D1	reg.	North	h	oth.	ren.	12.00	19.00	16.50	13.00	700	.30
D2	rur.	-	l	oth.	sel.	-	-	60.00	30.00	300	.00

Low. age = Lowest age; High. age = Highest age.

2.2.3. Testing Characteristics

Testing characteristics, shown in Table 3, includes information about the tests employed and their application to the sample. The first variable [Test (meas.)] refers to the IQ-test which was used to measure intelligence whereas [Test (calc.)] refers to the test on which scale(s) IQs were calculated in the NIQ-dataset. Both are usually identical. Exceptions occur only on Raven's Matrices and this is if the source gave raw scores for individuals, sub-samples or the whole sample, where the ages are beyond the age scale of the test norms of the test employed. For example, British norms for the Standard Progressive Matrices are available from 6.50y to 15.50y of age. If a source gave raw scores for this test for a sample with a mean age of 20.00y, these raw scores need to be converted to the scale on the Advanced Progressive Matrices before being convertible into IQ. In this case [Test (meas.)] would name 'SPM' but [Test (calc.)] would name 'APM' (see more in: 2.2.4).

Table 3. *Information about testing procedure.*

	Test (meas)	Test (calc.)	Test (part)	Domain	Proced.	Year (meas.)	Year (std.)	Time dev.	Country of std.	Testing rating
U1	SPM	SPM	full	FL	ind.	2000.00	1979.00	21.00	GBR	.83
U2	WISC-R	WISC-R	full	FS	-	1985.00	1983.00	2.00	DEU	.67
D1	SPM	APM	Set A,B,C	FL	grp.	1990.00	1992.00	2.00	GBR	.67
D2	WAIS-III	WAIS-III	Digit span	FS	-	2010.00	1997.00	13.00	USA	.17

A list of all tests that occur at least once within the NIQ-dataset is shown in Table 4 with details about their respective versions and standardizations. The abbreviations used in the dataset and in this book are shown in column 2 and they are usually based on those which are commonly known and widely used. The years of standardizations were drawn from the studies employed or, if no exact information was provided, equated with the year of publication of the respective manual. Therefore, the last column includes manuals as well as secondary literature with additional information.

Table 4. *List of names, versions and standardizations of IQ-tests.*

Name of test	Abbr. name of the exact version	Country (year) of standard	Source of standardization/ norms/test information
Cattell Cultural Fair Tests	CFT1	USA (1950)	Cattell (1950)
		USA (1996)	Cattell (1966)
		DTL (1976)	Weiss & Osterland (1980, p.38; 1997, p.35)
	CFT1-R	DTL (2010)	Weiss & Osterland (2013, p.42)
	CFT2	USA (1960)	Cattell (1960)
		DTL (1968)	Weiss (1987, p.68)
		DTL (1972)	Weiss (1972; 1987, p.66; 2006, p.68)
		USA (1972)	Cattell (1973)
	CFT20	DTL (1977)	Weiss (1987, p.46; 2006, p.68)

Name of test	Abbr. name of the exact version	Country (year) of standard	Source of standardization/ norms/test information
	CFT20-R	DTL (2003)	Weiss (2007)
	CFT3	USA (1961)	Cattell (1961)
		DTL (1967)	Weiss (1971; 1980, p.25)
		USA (1972)	Cattell (1973)
Kaufman Assessment Battery for Children	KABC	USA (1981)	Kaufman & Kaufman (1983)
	KABC-II	USA (2004)	Kaufman & Kaufman (2004)
Mini-Mental State Examination	MMSE	USA (1991)	Ganguli et al. (1991); Lynn (2007)
Naglieri Non-Verbal Ability Test	NNAT	USA (1996)	Naglieri (1997); Rojahn & Naglieri (2006)
		USA (2003)	Naglieri (2003)
Otis-Lennon School Ability Test	OLSAT	USA (1979)	Otis & Lennon (1979)
Raven's Progressive Matrices (Standard; Standard Plus; Coloured; Advanced; Advanced-short; Cognitive Reflection)	SPM	GBR (1979)	Raven (1981, Tab. RS1.10; 2000, Tab. B1); Raven Raven & Court (1999, Tab. 9)
	SPM+	GBR (2007)	Raven (2008b, Tab. A.1)
	CPM	GBR (1938)	Raven (1941)
		GBR (2007)	Raven (2008a, Tab. A.1); Raven, Raven & Court (2006, Tab. 8, Tab.26)
	APM	GBR (1985)	Raven, Raven & Court (1985)
		GBR (1992)	Raven, Raven & Court (1998, Tab. APM6, Tab. APM14, Tab. APM34)
	APM-	DEU (2012)	Rindermann, Falkenhayn & Baumeiste (2014)
	CRT-C2	CHN (1997)	Wang & Qian (1997)
Snijders-Oomen Nonverbal Intelligence Test	SON-R	NLD (1998)	Tellegen et al. (1998)
Stanford-Binet Intelligence Scale	SBIS	USA (1916)	Terman (1916); Becker 2003 (2003)
		USA (1937)	Terman & Merrill (1937); Becker (2003)
		USA (1960)	Terman & Merrill (1960); Becker 2003
		USA (1972)	Terman & Merrill (1972); Becker (2003)

Name of test	**Abbr. name of the exact version**	**Country (year) of standard**	**Source of standardization/ norms/test information**
		USA (1986)	Thorndike, Hagen & Sattler (1986); Becker (2003)
		USA (2003)	Roid (2003); Becker (2003)
Weschler Preschool and Primary Scale of Intelligence	WPPSI	USA (1964)	Weschler, 1967; Lynn (2015)
	WPPSI-R	USA (1989)	Weschler (1989)
	WPPSI-III	USA (2002	Weschler (2002)
		DEU (2011)	Weschler (2014)
Weschler Intelligence Scale for Children	WISC	USA (1947)	Weschler (1949); Roca (1955)*
		FRA (1954)	Frydman & Lynn (1989)
	WISC-R	USA (1974)	Weschler (1974)*
		ISR (1976)	Lieblich, Ben-Shakhar & Ninio (1976); Lieblich & Kugelmas (1981)
		DEU (1983)	Tewes (1985)
		NLD (1986)	Van Haassen et al. (1986); Polderman et al. (2006)
		NLD (2006)	Van Haassen et al. (2006); Polderman et al. (2006)
	WISC-III	USA (1989)	Weschler (1991a)
		GBR (1991)	Weschler (1991b)
	WISC-IV	USA (2003)	Weschler (2003)
		USA (2005)	Weschler (2005b)**
		GBR (2004)	Weschler (2004)
		DEU (2006)	Petermann & Petermann (2014, p.27)
Weschler Adult Intelligence Scale	WAIS	USA (1955)	Weschler (1955)
		PRI (1965)	Green & Martinez (1967, p.12)
		NLD (1970)	Stinissen et al. (1970)
	WAIS-R	USA (1980)	Weschler (1981)*; Tewes (1994, p.12)

Name of test	Abbr. name of the exact version	Country (year) of standard	Source of standardization/ norms/test information
		DEU (1988)	Tewes (1994, p.13)
		NLD (1997)	Weschler (1997b); Hoekstra, Bartels & Boomsma (2007)
	WAIS-III	USA (1997)	Weschler (1997a)
		CAN (1997)	Weschler (2001); Lange et al. (2005)
		DEU (2006)	von Aster, Neubauer & Horn (2006)
		FIN (2007)	Weschler (2005a); Roivainen (2010)
	WAIS-IV	USA (2008)	Weschler (2008)
		GBR (2009)	Wesch,ler (2010)
		DEU (2012)	Petermann (2016, p.49)
Weschler Abbreviated Scale of Intelligence	WASI	USA (1999)	Weschler (1999)
	WASI-II	USA (2011)	Weschler (2011)

*Adaption to Hispanic children without new standardization.
**Standardization on US-Hispanics (mostly Mexican).

[Test (Part)] is ‘full’ if all sets or scales of a test were used to measure intelligence or, if only a selection of test parts was used, these parts are stated.

The intelligence [Domain] a particular test is accepted as measuring is named in the next column. Fluid intelligence (‘FL’) is measured by the Cattell Cultural Fair Tests, the Naglieri Non-verbal Ability Test and the Raven’s Progressive Matrices, but the Kaufman Assessment Batteries, the Mini-Mental State Examination, the Otis-Lennon School Ability Test, the Stanford-Binet Intelligence Scales and the Wechsler Intelligence Scales measure full-scale IQ (‘FS’), which consists of results from verbal (V-IQ) and performance (P-IQ) subscales.

If a test administration was carried out on individuals (‘ind.’) or groups (‘grp.’) it is named in the column marked [Procedure]. Individual or group testing can lead to different results, especially in Raven’s Matrices, and this distinction should therefore be taken into account (Raven, Raven & Court, 1998, p.58; 1999, p.63-66; Bakhiet & Lynn, 2014b).

[Year (meas.)] states the year the test was administered to the sample, which is either stated directly or indirectly within a source. Because this information is mandatory for further calculations, we used the first year a source was published to get an approximation of the real year if no other information were available. The year a test was standardized ([Year (std.)]) cites information from manuals and other literature listed in Table 4. It always refers to the test named in column [Test (calc.)] and not in [Test (meas.)]. [Time deviation] is simply the absolute difference between [Year (meas.)] and [Year (std.)]. [Country of std.] named the 3166-1 ALPHA-3 code of the country in which the test was standardized.

The [Testing rating] is an overall index for the data quality. We assume the use of only a part of a full test as a possible source for errors due to a lag of mutually confirming values on individual scales or necessary extrapolations on imprecise formulas. Factors such as [Time deviation] and tests not being normed in GBR draws further necessary corrections for FLynn Effects and cross-national norm differences. Such corrections might lead to errors due to calculations being made on a limited precise database (see around Table 10). So, the base value of [Testing rating] is ‘0.00’ and scores need to be added if the following properties are present:

- If [Test (part)] is ‘full’ → +1.00
- If [Time deviation] is ‘<10.00’ → +1.00
- If [Time deviation] is ‘10.00’ – ‘20.00’ → +0.50
- If [Country of std.] is ‘GBR’ → +1.00

After this calculation, the result must be divided by the maximum possible value, which is 3.00. The calculations for the fictional samples are:

[Testing rating] (U1) = (1.00 + 0.50 + 1.00) / 3.00 = .83

[Testing rating] (U2) = (1.00 + 1.00 + 0.00) / 3.00 = .67

[Testing rating] (D1) = (0.00 + 1.00 + 1.00) / 3.00 = .67

[Testing rating] (U2) = (0.00 + 0.50 + 0.00) / 3.00 = .17

Table 5. *Information about testing procedure.*

	Test (meas)	Test (calc.)	Test (part)	Domain	Proced.	Year (meas.)	Year (std.)	Time dev.	Country of std.	Testing rating
U1	SPM	SPM	full	FL	ind.	2000.00	1979.00	21.00	GBR	.83
U2	WISC-R	WISC-R	full	FS	-	1985.00	1983.00	2.00	DEU	.67
D1	SPM	APM	Set A,B,C	FL	grp.	1990.00	1992.00	2.00	GBR	.67
D2	WAIS-III	WAIS-III	Digit span	FS	-	2010.00	1997.00	13.00	USA	.17

2.2.4. Calculation Methods

Table 6 shows a stepwise calculation of raw scores and/or IQ-scores, as they are reported in the sources used, into corrected IQs. The first three columns [Recalc.?], [Special calc.?] and [Test-conv.?] show 'Y/N' indices if an IQ-score was recalculated by us from raw scores or not; if a raw or IQ-score was taken by us directly from a source (or in a simple calculation, e.g., mean or sum) or from a more complex special calculation; and if the raw score was converted by us into an IQ-score via the applied norms of the same test as was used during measurement.

[Raw score (uncor.)] gives the measured raw scores taken from the source directly, by simple or more complex calculations. [Raw score (cor.)] however gives the raw scores after test conversion and/or extrapolation. If no raw scores, but only IQs, were provided by a source, these columns remain blank.

Table 6. *Information about calculation methods.*

	Recalc.?	Special calc.?	Test conv.?	Raw score (uncor.)	Raw score (cor.)	IQ (uncor.)	Test time adjust.	Country (cor.)	Method rating	IQ (cor.)
U1	Y	Y	N	35.62	35.62	101.06	-4.41	0.00	.66	96.65
U2	N	N	N	-	-	99.50	-1.20	-1.20	.00	97.10
D1	Y	Y	Y	32.17	14.01	91.48	0.42	0.00	.33	91.90
D2	N	N	N	-	-	94.00	-3.06	-2.50	.00	88.44

Before going to the next variable, we would like to illustrate how such special calculations and raw score corrections can be proceed, by using our sample for U1 and D1. Suppose the source for U1 gives SPM-raw scores separated for females and males and five age groups as shown in Table 7. This would be an ideal case on which we can calculate raw scores for the total sample as the simple mean of both sexes for each age group. Even if this were possible, no weightings for sex or age groups were calculated, to avoid distortions due to sampling errors. Raw scores from Raven's Matrices were converted into IQ-scores by using conversion formulas, which were constructed to fit to the norms from the GBR-standardization employed. A detailed description of the construction of these functions is provided around Table 9. The mean raw score of 35.62 and the mean IQ-score of 101.06 were used in Table 6 as uncorrected and corrected raw scores, and as uncorrected IQ-scores.

Table 7. *Detailed special calculation for U1.*

Age (y)	Mean raw-scores (SPM)			IQ-scores GBR (1979)
	Female	Male	Total	Total
8.00	25.19	24.63	24.91	100.43
9.00	32.33	32.81	32.57	101.21
10.00	38.00	38.37	38.19	100.82
11.00	40.35	41.20	40.78	102.00
12.00	40.98	42.34	41.66	100.86
M=10.00	**M=35.37**	**M=35.87**	**M=35.62**	**M=101.06**

Table 8 shows the same for D1, but certain problems necessitated a more complex method. At first, only three of five sets of the SPM were used in the test administration, which makes an extrapolation to the full test necessary. This was achieved by using a conversion formula based on data from Raven, Raven and Court (1998, Table APM14). The SPM-raw score on the sets A, B and C together is 32.17 and extrapolated to a full SPM-raw score of 47.30. The next problem occurs due to the age groups employed. The SPM was designed for 6.50y to 15.50y olds and not for 16.00y to 20.00y olds, as in the D1 sample. A particular Raven's Progressive Matrices test designed for higher ages is the APM and Raven, Raven and Court (1998, Table APM34) showed the relationship between both test scales. Also for this purpose, a conversion formula was created, which converts the full SPM-raw score of 47.30 into 14.01 on the full APM-scale. This score is at the 28.50th percentile of the 1992 standardization in GBR and equivalent to an uncorrected IQ of 91.48. The mean total raw score of 32.17, the mean raw score on the APM-scale of 14.01, and the mean IQ-score of 91.48 were used in Table 6 as uncorrected raw scores, corrected raw scores and as uncorrected IQ-scores.

Table 8. *Detailed special calculation for D1.*

Age	Mean raw-scores (SPMABC)			Mean raw-scores (SPMFS)	Mean raw-scores (APM)	IQ-scores GBR (1992)
	Female	Male	Total	Total	Total	Total
16.00	30.84	31.91	31.36	45.48	12.23	93.83
17.00	31.15	32.73	31.94	46.77	13.43	93.84
18.00	31.44	32.89	32.17	47.29	13.95	92.14
19.00	31.93	33.11	32.52	48.13	14.82	90.18
20.00	32.67	32.98	32.83	48.85	15.61	87.41
M=10.00	**M=31.61**	**M=32.72**	**M=32.17**	**M=47.30**	**M=14.01**	**M=91.48**

There are two connected problems when using norms provided by Raven's manuals to find the corresponding IQ to a raw score. The first one arises because norm tables were made for use on individuals, which only can have (positive) integers as raw scores, whereas means from groups are mostly non-integers. This is a minor problem if raw scores from samples are similar to those from the GBR-standardization. For example, the SPM-norms from 1979 (Raven, 2000, Table B1) assign for 7.00y olds a raw score of 17.00 to the 50.00th percentile, equivalent to an IQ of 100.00, and a raw score of 16.00 to the 42.00th percentile, equivalent to an IQ of 96.97. An up- or down-rounding of a raw score of 16.50 would adjudicate about 3 IQ-points in difference. But in cross-national research, raw scores are often in the outer area of the standard range. This was shown by Dutton et al. (2018) in two samples from South Sudan. There, mean raw scores were mostly at or below the 1.00st British percentile and therefore in a range where British norms no longer gradate. Raw scores of 6.00, 7.00, 8.00 or 9.00 were assigned to the 1.00st percentile for the 7.00y olds, equivalent to an IQ of 65.10, but a raw score of 10.00 to the 5.00th percentile and equivalent to an IQ of 75.33, which makes a difference of around 10 IQ-points. In addition, norms do not pay attention to IQ-variances within the raw score range of 6.00 to 9.00. This problem can be obviated by the use of graphed percentile norms from the manuals. However, their relatively large percentile-intervals (mostly 5.00%) create inaccuracies in other ways.

Because Raven's Matrices are very common in measurements of very low IQ-populations (e.g., Bakhiet et al.'s 2018 meta-analysis), we decided to solve the problem in other ways. By using the norm tables from the Raven's manuals, we constructed formulas which describe the relationship between raw scores and IQ-scores for each age group in an optimal way. As a criterion for their validity we considered a strong match of the IQ-score results from our formulas with those according to the norm tables, operationalized as an $r>.99$ and a difference in age group means of 0.00. The relationship between raw scores and IQ-scores is usually non-linear and therefore better described by polynomial formulas of degree 3.

The same principal was used to create formulas for conversions of raw scores of one Raven's test into raw scores of another Raven's test, or to convert raw scores from a (number of) sub-sets into full-scale raw scores. Table 9 shows all formulas employed, the tables within the manuals from which these were constructed, the kind of conversion, the age group to which they can be applied, and the correlation between results from functions and from norm tables.

Table 9. *Conversion-formulas for Raven's Matrices.*

Test-standardization	Formula	Conversion	Age group	$r_{resf \to resn}$
SPM(GBR) 1979	IQ=0.0013*RS³-0.1349*RS²+5.6575*RS+36.8616	RS→IQ	6.50	.9983
	IQ=0.0027RS³-0.2345*RS²+8.2014*RS+12.5835	RS→IQ	7.00	.9964
	IQ=0.0021*RS³-0.1663*RS²+5.7372*RS+31.7053	RS→IQ	7.50	.9965
	IQ=0.0011*RS³-0.1056*RS²+4.497*RS+36.9301	RS→IQ	8.00	.9967
	IQ=0.0008*RS³-0.0505*RS²+2.3943*RS+50.9825	RS→IQ	8.50	.9974
	IQ=0.0025*RS³-0.203*RS²+6.6539*RS+13.4587	RS→IQ	9.00	.9983
	IQ=0.0011*RS³-0.0772*RS²+2.8805*RS+46.8039	RS→IQ	9.50	.9990
	IQ=0.0016*RS³-0.1166*RS²+3.9383*RS+31.3702	RS→IQ	10.00	.9987
	IQ=0.0006*RS³-0.0372*RS²+2.251*RS+33.9102	RS→IQ	10.50	.9988
	IQ=0.00001*RS³+0.0315*RS²-0.326*RS+62.2413	RS→IQ	11.00	.9980
	IQ=-0.0002*RS³+0.0476*RS²-1.0255*RS+75.766	RS→IQ	11.50	.9976
	IQ=-0.0003*RS³+0.0657*RS²-1.6022*RS+75.2753	RS→IQ	12.00	.9985
	IQ=0.0004*RS³-0.0077*RS²+0.6352*RS+56.8582	RS→IQ	12.50	.9987
	IQ=0.0003*RS³+0.0012*RS²+0.4427*RS+53.8743	RS→IQ	13.00	.9978
	IQ=0.0007*RS³-0.0315*RS²+0.9688*RS+55.3452	RS→IQ	13.50	.9986
	IQ=0.0002*RS³+0.0086*RS²+0.1364*RS+56.1119	RS→IQ	14.00	.9987
	IQ=0.0002*RS³+0.0131*RS²-0.3511*RS+65.7756	RS→IQ	14.50	.9978
	IQ=0.0006*RS³-0.0514*RS²+2.669*RS+26.488	RS→IQ	15.00	.9985
	IQ=0.0002*RS³+0.018*RS²-0.4395*RS+60.9281	RS→IQ	15.50	.9986
	SPMFS=0.0011*SPMABC³-0.0502*SPMABC²+2.1461*SPMABC -6.4075	RS→RS	All	.9993
	SPMFS=0.0014*SPMDE³-0.0989*SPMDE²+3.7601*SPMDE +8.2547	RS→RS	All	.9994

Test-standardization	Formula	Conversion	Age group	$r_{resf \to resn}$
	SPMFS=-0.0001*SPMCDE³-0.0048*SPMCDE²+1.7917*SPMCDE+8.0334	RS→RS	All	.9994
	SPMpRS=0.00031*SPMRS³-0.0226*SPMRS²+1.1881*SPMRS-0.6	RS→RS	All	.9994
	CPMRS=0.00004*SPMRS³-0.0137*SPMRS²+1.2934*SPMRS-0.7504	RS→RS	All	.9995
	APMRS=0.00057*SPMRS³-0.0469*SPMRS²+1.621*SPMRS-18.1044	RS→RS	All	.9988
CPM(GBR) 2007	IQ=-0.0007*RS³-0.0589*RS²+6.5481*RS+17.0222	RS→IQ	4.50	.9992
	IQ=0.0016*RS³-0.1479*RS²+7.1508*RS+15.0761	RS→IQ	5.00	.9984
	IQ=0.0036*RS³-0.2618*RS²+9.0458*RS+2.9569	RS→IQ	5.50	.9990
	IQ=0.0027*RS³-0.1961*RS²+7.4182*RS+11.351	RS→IQ	6.00	.9985
	IQ=0.0042*RS³-0.2615*RS²+7.9292*RS+8.5066	RS→IQ	6.50	.9984
	IQ=0.0014*RS³-0.0611*RS²+3.2267*RS+37.4412	RS→IQ	7.00	.9978
	IQ=0.0046*RS³-0.2844*RS²+8.2371*RS-3.4924	RS→IQ	7.50	.9984
	IQ=0.0017*RS³-0.0337*RS²+1.7508*RS+42.8999	RS→IQ	8.00	.9979
	IQ=0.0003*RS³+0.0809*RS²-1.0346*RS+58.9624	RS→IQ	8.50	.9983
	IQ=0.0037*RS³-0.1934*RS²+5.8195*RS+4.7031	RS→IQ	9.00	.9985
	IQ=0.0138*RS³-1.0174*RS²+27.509*RS-180.9587	RS→IQ	9.50	.9981
	IQ=0.0115*RS³-0.8308*RS²+22.494*RS-139.4158	RS→IQ	10.00	.9985
	IQ=0.0195*RS³-1.5286*RS²+42.229*RS-323.2426	RS→IQ	10.50	.9966
	IQ=0.0121*RS³-0.8599*RS²+22.842*RS-146.6493	RS→IQ	11.00	.9971
	IQ=0.0125*RS³-0.8882*RS²+23.75*RS-162.6461	RS→IQ	11.50	.9963
	CPMFS=-0.0633* CPMA³+ 1.8174*CPMA²-12.849*CPMA+36.4636	RS→RS	All	.9995
	CPMFS=0.0189*CPMAb³-0.3222*CPMAb²+3.995*CPMAb+2.2305	RS→RS	All	.9972
	CPMFS=-0.0117* CPMB³+0.0973*CPMB²+3.0072*CPMB+4.3008	RS→RS	All	.9976
	SPMRS=0.0014*CPMRS³-0.047*CPMRS²+1.3646*CPMRS-0.1167	RS→RS	All	.9991

Test-standardization	Formula	Conversion	Age group	$r_{resf \to resn}$
SPM+(GBR) 2007	$IQ=0.0012*RS^3-0.0675*RS^2+3.6958*RS+37.66$	RS→IQ	7.50	.9968
	$IQ=0.0006*RS^3-0.0258*RS^2+2.6539*RS+41.8414$	RS→IQ	8.00	.9979
	$IQ=0.0002*RS^3+0.0015*RS^2+1.8986*RS+44.5699$	RS→IQ	8.50	.9980
	$IQ=0.0004*RS^3+0.0006*RS^2+1.4633*RS+48.7988$	RS→IQ	9.00	.9985
	$IQ=0.0022*RS^3-0.1249*RS^2+4.3658*RS+22.1914$	RS→IQ	9.50	.9962
	$IQ=0.0013*RS^3-0.0467*RS^2+2.2516*RS+37.224$	RS→IQ	10.00	.9977
	$IQ=0.0023*RS^3-0.1548*RS^2+5.7319*RS+1.0562$	RS→IQ	10.50	.9974
	$IQ=0.0029*RS^3-0.1998*RS^2+6.8904*RS-9.9529$	RS→IQ	11.00	.9975
	$IQ=0.002*RS^3-0.1268*RS^2+4.9601*RS+6.5463$	RS→IQ	11.50	.9962
	$IQ=0.0007*RS^3-0.0205*RS^2+2.0751*RS+30.3405$	RS→IQ	12.00	.9977
	$IQ=-0.0009*RS^3+0.1082*RS^2-1.3871*RS+59.6956$	RS→IQ	12.50	.9975
	$IQ=-0.0013*RS^3+0.155*RS^2-3.1027*RS+77.5269$	RS→IQ	13.00	.9985
	$IQ=-0.0018*RS^3+0.2136*RS^2-5.1987*RS+98.6733$	RS→IQ	13.50	.9978
	$IQ=-0.0018*RS^3+0.2164*RS^2-5.1534*RS+94.0126$	RS→IQ	14.00	.9983
	$IQ=-0.0019*RS^3+0.2227*RS^2-5.1002*RS+88.897$	RS→IQ	14.50	.9980
	$IQ=-0.0013*RS^3+0.1643*RS^2-3.3725*RS+72.2973$	RS→IQ	15.00	.9989
	$IQ=-0.0011*RS^3+0.1412*RS^2-2.7208*RS+67.2887$	RS→IQ	15.50	.9985
	$IQ=-0.0009*RS^3+0.1116*RS^2-1.5764*RS+54.1963$	RS→IQ	16.00	.9987
	$IQ=-0.0001*RS^3+0.0212*RS^2+1.4384*RS+24.28$	RS→IQ	16.50	.9971
	$IQ=-0.0017*RS^3+0.1942*RS^2-4.4721*RS+85.0008$	RS→IQ	17.00	.9961
	$IQ=0.00006*RS^3-0.017*RS^2+3.7782*RS-22.0825$	RS→IQ	17.50	.9960
	$IQ=0.00006*RS^3-0.017*RS^2+3.7782*RS-22.0825$	RS→IQ	18.00	.9960
	$IQ=0.00006*RS^3-0.017*RS^2+3.7782*RS-22.0825$	RS→IQ	18.50	.9960
	$SPMRS=-0.0003*SPMpRS^3+0.0183*SPMpRS^2+1.0684*SPMpRS-0.5233$	RS→RS	All	.9987
APM(GBR) 1992	$IQ=0.0015*RS^3-0.1316*RS^2+5.4187*RS+50.1287$	RS→IQ	14.00	.9979

Test-standardization	Formula	Conversion	Age group	$r_{resf \to resn}$
	$IQ=0.0016*RS^3-0.1352*RS^2+5.4012*RS+49.1784$	RS→IQ	14.50	.9993
	$IQ=0.0011*RS^3-0.0953*RS^2+4.4971*RS+53.1255$	RS→IQ	15.00	.9994
	$IQ=0.0012*RS^3-0.1054*RS^2+4.7053*RS+51.9158$	RS→IQ	15.50	.9992
	$IQ=0.0018*RS^3-0.1318*RS^2+4.8058*RS+51.469$	RS→IQ	16.00	.9997
	$IQ=0.002*RS^3-0.1335*RS^2+4.5709*RS+51.6769$	RS→IQ	17.00	.9998
	$IQ=0.0019*RS^3-0.1201*RS^2+4.1309*RS+52.7253$	RS→IQ	18.00	.9998
	$IQ=0.0016*RS^3-0.0923*RS^2+3.4923*RS+53.4957$	RS→IQ	19.00	.9998
	$IQ=0.0016*RS^3-0.0779*RS^2+3.0839*RS+52.1656$	RS→IQ	20.00	.9993
	$IQ=0.0016*RS^3-0.0779*RS^2+3.0839*RS+52.1656$	RS→IQ	22.50	.9993
	$IQ=0.0016*RS^3-0.0779*RS^2+3.0839*RS+52.1656$	RS→IQ	25.00	.9993
	$IQ=0.0016*RS^3-0.0779*RS^2+3.0839*RS+52.1656$	RS→IQ	27.50	.9993
	$IQ=0.0016*RS^3-0.0779*RS^2+3.0839*RS+52.1656$	RS→IQ	30.00	.9993
	$IQ=0.0019*RS^3-0.104*RS^2+3.5935*RS+51.2353$	RS→IQ	32.50	.9991
	$IQ=0.0023*RS^3-0.13*RS^2+4.1032*RS+48.9749$	RS→IQ	35.00	.9988
	$IQ=0.0022*RS^3-0.1175*RS^2+3.8247*RS+50.9157$	RS→IQ	37.50	.9993
	$IQ=0.0023*RS^3-0.1244*RS^2+3.9055*RS+52.3609$	RS→IQ	40.00	.9988
	$IQ=0.0018*RS^3-0.0941*RS^2+3.3831*RS+55.3464$	RS→IQ	42.50	.9981
	$IQ=0.0012*RS^3-0.0638*RS^2+2.8608*RS+59.4719$	RS→IQ	45.00	.9967
	$IQ=0.0013*RS^3-0.0625*RS^2+2.7965*RS+60.0381$	RS→IQ	47.50	.9972
	$IQ=0.0012*RS^3-0.0551*RS^2+2.6442*RS+61.8816$	RS→IQ	50.00	.9963
	$IQ=0.0009*RS^3-0.0432*RS^2+2.4902*RS+63.7675$	RS→IQ	52.50	.9966
	$IQ=0.0006*RS^3-0.0313*RS^2+2.3361*RS+65.6552$	RS→IQ	55.00	.9963
	$IQ=0.0008*RS^3-0.0431*RS^2+2.6164*RS+64.0779$	RS→IQ	57.50	.9972
	$IQ=0.0009*RS^3-0.0549*RS^2+2.8966*RS+63.5515$	RS→IQ	60.00	.9975
	$IQ=-0.0013*RS^3+0.0454*RS^2+1.5683*RS+70.182$	RS→IQ	62.50	.9916
	$IQ=0.0007*RS^3-0.0475*RS^2+2.8064*RS+65.8748$	RS→IQ	65.00	.9975

Test-standardization	Formula	Conversion	Age group	$r_{resf \rightarrow resn}$
	IQ=-0.0003*RS^3-0.0019*RS^2+ 2.1873*RS+71.3174	RS→IQ	67.50	.9975
	IQ=0.0001*RS^3-0.0145*RS^2+ 2.3264*RS+72.928	RS→IQ	70.00	.9961
	APMFS=1.02*APM40+2.6968	RS→RS	All	>.9999
	SPMRS=0.0019*APMRS^3-0.136* APMRS^2+3.7706*APMRS+16.2732	RS→RS	All	.9990

Notes: IQ = IQ-scores; RS = raw scores; SPM = Standard Progressive Matrices (with sub-sets A, B, C, D, E) from: Raven (1981, Table RS1.10), Raven (2000, Table B1), Raven, Raven & Court (1999, Table 9, 26, APM34); CPM = Coloured Progressive Matrices (with sub-sets A, Ab, B) from: Raven (2008a, Table A.1), Raven, Raven & Court (2006, Table 8, 26), SPM+/SPMp = Standard Progressive Matrices Plus from Raven (2008b, Table A.1), Raven, Raven & Court (1998, Table APM34); APM = Advanced Progressive Matrices (full-scale and with "40" minutes time restriction) from Raven, Raven & Court (1998, Tab. APM6, APM14); Differences between mean results from formulas (resf) and norm-tables (resn) for each age group < 0.0000.

As far as we know, this method has never been applied before by other authors and it should be discussed here. It can be argued that, despite the validation, a partial deviation between the functional results and the original equivalences cannot be excluded. Overall, we found no significant differences between the application of both methods. One such example is shown in Table 10. The overall-difference between results from both methods is 1.39 (*SD*=2.01) with an effect size of *d*=0.22 and without significance (*t*=0.5915; *p*=.559), therefore both results are close to each other. Differences can become bigger for single age groups, such as 6.19 for 7.00y olds. In this particular case, the raw score of 17.00 is at the 5.00th percentile, equivalent to an IQ of 75.33, but adding one single raw score would raise it to the 9.00th percentile and equivalent to an IQ of 79.89, which is close to our result of 81.52. However, our method of using functions instead of norm tables is more valid if applied to samples with different age groups instead to a single age group. Additionally, these functions have the positive side effect of smoothing the original norms and they avoid errors due to individual and manual conversions.

Table 10. *Detailed special calculation for a sample from Brazil with alternative raw to IQ-scores conversions.*

Age (y)	Mean raw scores (SPM)	IQresf	Percentile	IQresn	IQresf – IQ resn
5.00	13.00	86.56	16.00th	85.08	1.48
5.50	14.00	88.16	25.00th	89.88	-1.72
6.00	15.00	87.61	16.00th	85.08	2.53
6.50	16.00	85.63	16.00th	85.08	0.55
7.00	17.00	81.52	5.00th	75.33	6.19
7.50	17.00	76.95	5.00th	75.33	1.62
8.00	18.00	73.41	2.30rd	70.07	3.34
8.50	19.00	70.57	2.30rd	70.07	0.50
9.00	20.00	73.33	5.00th	75.33	-2.00
9.50	21.00	75.86	5.00th	75.33	0.53
10.00	22.00	75.80	5.00th	75.33	0.47
10.50	23.00	76.65	5.00th	75.33	1.32
11.00	24.00	73.53	2.30rd	70.07	3.46
11.50	25.00	71.29	2.30rd	70.07	1.22
M	**18.86**	**78.35**	**-**	**76.96**	**1.39**
SD	**-**	**6.05**	**-**	**6.38**	**2.01**

Notes: Source: Raven, Raven & Court (2006, Table 17), IQresf = IQs calculated by formulas; IQresn = IQs calculated by raw score to percentile-equivalences provided by norm tables from Raven (2008a, Table A.1). IQ-scores are uncorrected. $r_{IQresf \to IQresn} = .95$; $M_{resf} - M_{resn} = 1.39$; Cohen's *d* ($M_{resf} \to M_{resn}$) = 0.22; *t* = 0.5915 (*p*=.559).

Back to the four fictional samples: The uncorrected IQ-scores now need to be adjusted in three steps of which the first one is the most important and complex. The 20th century saw a massive secular increase in IQ-test scores within different countries, mostly Western or developed countries. This phenomenon was first found in 1938 by Merrill in a US-sample during a re-standardization of the SBIS. It became later known as the FLynn-Effect, named after Richard Lynn, who discovered it in 1982 in the USA and Japan, and the New Zealand Political Scientist James Flynn, who made a first systematic description of the effect in 1984 and a comprehensive report in 2012. Daley et al. (2003) discovered the FLynn-Effect in Kenya between 1984 and 1994 and therefore for first time in a developing country. In 2015 an extensive meta-analysis was conducted by Pietschnig and Voracek on data from 271 independent samples across the 20th century and the early years of this century. IQ-gains (and losses) were found in 31 different countries from all over the world, showing overall an increase but with differences in the time of onset and the strength of this increase.

These FLynn-Effects (hereafter abbreviated as “FE”) lead to the phenomenon of IQ- or norm-inflation, which manifests itself as an overestimation of IQs if norms employed are older than the year of measurement, or an underestimation if scores from a measurement in an earlier year were converted to IQs by using more recent norms (Lynn & Vanhanen, 2012, p.10). This phenomenon needs to be compensated for in order to make IQ-scores from different times comparable, with respect to the country of standardization and measured IQ-domain. The basic rules are:

- If [Year (meas.)] > [Year (std.)]

➔ IQ-gains in the [Country of std.] need to be deducted from [uncor. IQ]

➔ IQ-losses in the [Country of std.] need to be added to [uncor. IQ]

- If [Year (meas.)] < [Year (std.)]

➔ IQ-gains in the [Country of std.] need to be added to [uncor. IQ]

➔ IQ-losses in the [Country of std.] need to be deducted from [uncor. IQ]

Furthermore, Pietschnig and Voracek (2015) not only found differences in the strength (and direction) of IQ-changes between countries but also between different domains of intelligence. Providentially, they estimated annual IQ-changes by country and test domain, so we have a systematically conducted foundation with high data quality which we can use for our corrections. Table 11 lists all estimates of FEs employed for corrections. We will demonstrate this correction by using our four fictional samples.

Table 11. *FLynn-Effects by country, domain and time span.*

Country	Domain	Time Span	Annual change
Canada	FS	1946-1976	+0.44
China	FL	1984-2011	+0.21
Germany	FS	1956-2008	+0.60
Germany	FL	1956-2005	+0.65
Finland	FS	1988-2009	+0.20
France	FS	1938-1993	+0.44
United Kingdom	FS	1932-2008	+0.11
United Kingdom	FL	1935-2008	+0.21
Israel	FS	1971-1984	+0.58
Netherlands	FS	1952-2005	+0.36
Netherlands	FL	1952-2005	+0.35
United States	FS	1909-2006	+0.34
United States	FL	1924-2003	+0.52

Notes: FS = Full-scale IQ; FL = Fluid IQ; data from Pietschnig & Voracek (2015).

The general equation is:

$$[IQ(cor.)] = [IQ(uncor.)] + ([Year(std.)] - [Year(meas.)]) \times ann.FE$$

The equations for the fictional samples are:

$$U1{:}\ 96.65 = 101.06 + (1979 - 2000) \times 0.021$$
$$U2{:}\ 98.30 = 99.59 + (1983 - 1985) \times 0.060$$
$$D1{:}\ 91.90 = 91.48 + (1992 - 1990) \times 0.021$$
$$D2{:}\ 94.00 = 94.00 + (1997 - 2010) \times 0.000$$

In detail: The uncorrected IQ of U1 is 101.06 and was measured in the year 2000 with the SPM and the norms used for raw score to IQ-score conversions were standardized in GBR in 1979. This makes a difference of 21.00y in which the FL-IQ in GBR increased by 4.41 (0.21 * 21). Consequently, we need to calculate 101.06 – 4.41 = 96.65. The uncorrected IQ of U2 is 99.59 and was measured in the year 1985 with the WISC-R, standardized in DEU in 1983. This makes a difference of 2 years in which the FS-IQ in DEU increased by 1.20 (0.60 * 2). Consequently, we need to calculate 99.59 – 1.20 = 98.30. The uncorrected IQ of D1 is 91.48 and was measured in the year 1990 with the SPM, but the re-estimation was made with the APM standardized in GBR in 1992. This makes a difference of 2 years in which the FL-IQ in GBR increased by 0.42 (0.21 * 2). Therefore, we need to calculate 91.48 + 0.42 = 91.90. The uncorrected IQ of D2 is 94.00 and was measured in the year 2010 with the WAIS-III standardized in USA in 1997. This makes a difference of 13 years but no data for a Flynn-effect were available for 2007 and beyond, so the difference was limited to 9 years (2006 – 1997) in which the FS-IQ in the USA increased by 3.06 (0.34 * 9). Therefore, we need to calculate 94.00 – 3.06 = 90.94.

If the [Country of std.] of the norms employed is not GBR, another correction is necessary. This would follow the simple formula: [Country cor.] = [uncor. IQ] + (national IQ of country of standardization – 100.00). To avoid circular calculations, we could not use the national IQs calculated in the NIQ-dataset. As a suitable orientation the national IQs provided by Lynn and Vanhanen (2012) appeared. They lead to the following rules:

- If [Country of std.] is 'CAN'→ 100.40 - 100.00 = +0.40
- If [Country of std.] is 'CHN'→ 105.80 - 100.00 = +5.80
- If [Country of std.] is 'DEU'→ 98.80 - 100.00 = -1.20
- If [Country of std.] is 'ESP' → 96.60 - 100.00 = -3.40
- If [Country of std.] is 'FIN' → 100.90 - 100.00 = +0.90
- If [Country of std.] is 'FRA'→ 98.10 - 100.00 = -1.90
- If [Country of std.] is 'ISR' → 94.60 - 100.00 = -5.40
- If [Country of std.] is 'NLD'→ 100.40 - 100.00 = +0.40
- If [Country of std.] is 'USA'→ 97.50 - 100.00 = -2.50

Some of the Wechsler Intelligence Scales for Children and Wechsler Intelligence Scales for Adults are also available in a form for US-Hispanics and named Escala de Inteligencia Wechsler para Ninos (EIWN) and Escala de Inteligencia Wechsler para Adultos (EIWA). In 1955 (Rocca, 1955), 1974 (Wechsler, 1974) and 1980 (Wechsler, 1981; Tewes, 1994, p.12) these were translations of the Anglophone versions and the norms were from samples representing the whole US-population. But the EIWA was also standardized by Green and Martínez (1967, p.12) to Puerto Rico (PRI) in 1965. Malloy (2004) converted the means of this normative sample to 83.10 by using US-norms from 1955. The necessary correction for FE is -3.40 (USA; FS; -0.34 * 10) and for the country USA -2.50. This resulted in a mean score of the PRI-norm sample of 77.20 and to the rule:

- If [Country of std.] is ‘PRI’ → 77.20 - 100.00 = -22.80

Despite the corrections that have been made to date, from time to time it was unavoidable to make individual corrections. Such additional corrections were relatively isolated and were only done if absolutely necessary. Therefore, they will be noted within the single country reports in 2.3.

As in the steps before, a rating was also made for the methods. Different methods to convert raw scores to IQ-scores might be causes for errors, why samples must be better rated when reporting raw scores that can then be converted to IQs using our methods. If no raw scores were reported and IQs must be taken directly from the source, it cannot be ruled out that methodical peculiarities affected the results. Second, we rate all forms of raw score corrections as possible causes of errors. This is true for regular corrections, due to inaccuracies of formulas or given data, as well as for additional corrections, because they might violate our claim of standardized methods. Therefore, the following rules have been set:

- If [Raw-score (uncor./cor.)] is ‘value’ → +1.00
- If [Raw-score (uncor.)] = [Raw-score (cor.)] → +1.00
- If [Add. cor.] is ‘0.00’ → +1.00

After the summation, the result must be divided by the maximum possible value, which is 3.00. The calculation for the fictional samples are:

[Method rating] (U1) = (1.00 + 1.00 + 0.00) / 3.00 = .67
[Method rating] (U2) = (0.00 + 0.00 + 0.00) / 3.00 = .00
[Method rating] (D1) = (1.00 + 0.00 + 0.00) / 3.00 = .33
[Method rating] (U2) = (0.00 + 0.00 + 0.00) / 3.00 = .00

Finally, the last column shows the corrected IQs ([IQ (cor.)]) for each sample, calculated by summing [IQ (uncor.)] + [Test time adjust.] + [Country-cor.] + [Add. cor.]. In Table 12 these are now compared to those from Lynn and Vanhanen by calculating real and absolute differences, and the overall data quality. Our four examples are fictional, therefore the L&V-scores in column 2 are likewise. The real differences in column 3 show whether there is an over- or underestimation of the IQs in the NIQ-dataset compared to the scores from Lynn and Vanhanen, whereas the absolute comparison only shows the amount of deviation. Values for [IQ (L&V)] were taken from the working material of Lynn and Vanhanen and are therefore partly different from those published in 2012.

Table 12. *Information about comparisons and final ratings.*

	IQ (cor.)	**IQ (L&V)**	**IQ)L&V)- IQ(cor.)**	**|IQ(L&V)- IQ(cor.)|**	**Full rating**	**QN-Factor**
U1	96.65	98.00	1.35	1.35	0.68	3880.08
U2	97.10	96.00	-1.10	1.10	0.53	1814.38
D1	91.90	-	-	-	0.47	328.86
D2	88.44	-	-	-	0.08	23.93

The [Full rating] is a simple mean of the variables [Sample rating], [Testing rating] and [Method rating]. By multiplying them by [*N* (Ind.)] of the sample (see variable in Table 2), the [QN-Factor] (Qualitative Number) was calculated to weight corrected IQs both by sample size and data quality in subsequent steps.

$$[QN\text{-}Factor] = [N(ind.)] \times (M_{([Sample\ rating];[Testing\ rating];[Method\ rating])})$$

The equations for the fictional samples are:

$$U1: 4533.03 = 5690 \times (M_{(.90;.83;.66)})$$
$$U2: 1690.50 = 3450 + (M_{(.80;.67;.00)})$$
$$D1: 303.33 = 700 + (M_{(.30;.67;.33)})$$
$$D2: 17.00 = 300 + (M_{(.00;.17;.00)})$$

2.2.5. Calculating National Means from Psychometric Data

National mean IQs will be either calculated as five variables with increasing complexity from psychometric data or by alternative sources if no psychometric data were available. Here we start with the first of these two possibilities.

The IQs presented as [NIQ (UW)] or short [UW], also termed "unweighted national IQ" are the simple means from all samples of a country without any additional calculations or adjustments. If more than two samples for a country were available, the standard deviations (*SD*) for [UW] would also be calculated and reported. The IQs presented as [NIQ (NW)] or short [NW] are the means from all samples from a country weighted by sample size ([*N* (ind.)]) and the IQs presented as [NIQ (QNW)] or short [QNW], also termed "weighted national IQ", are the means from all samples from a country weighted by data quality and sample size ([QN-Factor]). Additionally, [SAS-IQ] will be calculated from country results in international school assessment studies, as explained later in 2.4. For Utopia we assume a [SAS-IQ] of '100.00', for Dystopia of '90.00'. By averaging the [QNW] with the [SAS-IQ], the [QNW+SAS] will turned out, also named as "final national IQ".

The general equations are:

$$[NIQ\ (UW)] = \left(\frac{\sum_{i=1}^{n}[IQ(cor.)]_i}{n(samples)}\right)$$

$$[NIQ\ (NW)] = \left(\frac{\sum_{i=1}^{n}[IQ(cor.)]_i \times [N(ind.)]_i}{\sum_{i=1}^{n}[N(ind.)]_i}\right)$$

$$[NIQ\ (QNW)] = \left(\frac{\sum_{i=1}^{n}[IQ(cor.)]_i \times [QN\text{-}Factor]_i}{\sum_{i=1}^{n}[QN\text{-}Factor]_i}\right)$$

For the fictional country Utopia, the equations would be:

$$U\text{: }[NIQ\ (UW]) = \left(\frac{96.66 + 97.10}{2}\right) = 96.88$$

$$U\text{: }[NIQ(NW)] = \left(\frac{96.66 \times 5690 + 97.10 \times 3450}{5690 + 3450}\right) = 96.82$$

$$U\text{: }[NIQ(QNW)] = \left(\frac{96.66 \times 4533.03 + 97.10 \times 1690.50}{4533.03 + 1690.50}\right) = 96.78$$

For the fictional country Dystopia, the equations would be:

$$D\text{: }[NIQ\ (UW)] = \left(\frac{91.90 + 88.44}{2}\right) = 98.39$$

$$D\text{: }[NIQ\ (NW)] = \left(\frac{91.90 \times 700 + 88.44 \times 300}{700 + 300}\right) = 90.86$$

$$D\text{: }[NIQ\ (QNW)] = \left(\frac{91.90 \times 303.33 + 88.44 \times 17.00}{303.33 + 17.00}\right) = 91.72$$

This standard procedure was not used for [NW] and [QNW] if samples for different minorities like races or ethnicities were available for a nation with strong ethnic heterogeneity. This was the case for Brazil, Kazakhstan, Mexico, Serbia, the USA and South Africa. In all these cases, IQs for the different minorities were weighted by their share on the total populations, in addition to the general weighting factors. If samples for different minorities and full population were given simultaneously, separate means were calculated for both kinds of samples, then averaged. E.g., for USA, samples representing the whole population across all or many ethnicities were averaged, samples divided by ethnicities were also averaged with respect to the share of the ethnicities on the total population, then the results were averaged once again. The percentages for ethnic shares were taken from CIA (2017, Index: "Ethnic groups") and presented in Table 13. However, this was only done when very different IQ-scores were expected for the different ethnic groups in a country.

Table 13. *Shares of ethnicities on total populations used for calculation of national means representing ethnic composition.*

Country	Ethnicities (shares)
Brazil	Whites (47.70%); Mulatto (43.10%); Black (7.60%); Asian (1.10%)
Canada	Amerindian/Native Americans (4.20%)
Kazakhstan	Kazakh (63.10%); Russian (23.70%); Uzbek (2.90%)
Mexico	Mestizo (62.00%); Native Americans (28.00%); Whites (10.00%)
Serbia	Serbs (83.30%); Roma (2.10%); Bosniaks =2.00%	Christian (90.60%); Muslim (9.40%)
United States	Whites (72.40%); Hispanics (16.30%); Blacks (12.60%); Asian (4.8%); Amerindian (0.90%)
South Africa	African (80.20%); White (8.40%); Coloured (8.80%); Indian/Asian (2.50%)

Notes: Shares of ethnicities on total populations used for calculation of national means representing ethnic composition. Terms and data from CIA (2017, Index: "Ethnic groups").

2.2.6. Calculating National Means from School Assessment Data

Additional to the psychometric data a "SAS-IQ" was calculated from country results in international school assessment studies. Various studies had been confirmed a strong positive correlation between psychometric measured IQs of countries and their performances on the different scales of international school assessment test (Lynn & Vanhanen, 2002, 2012; Lynn & Mikk, 2007, 2009; Lynn & Meisenberg, 2010) as well as high loadings of psychometric IQ and school assessment scales on a common "Big G-Factor" (Rindermann, 2007a, b). Thus, these scores can be used to complement, correct and validate the different psychometric results.

The three most widely used international school assessment studies were selected. The Programme for International Student Assessment (PISA), the Trends in International Mathematics and Science Study (TIMSS), and the Progress in International Reading

Literacy Study (PIRLS). Long-term results for each country were calculated by averaging the total scores from different volumes of these studies. These total scores, in turn, averaged the results from the different scales and/or age groups/school grades per study. Table 14 provided a survey of all studies, scales, groups, sources, and of the specific GBR-data, which were used to standardize the country scores on an IQ-scale with the mean score of GBR equated with 100.00 and the standard deviation of GBR equated to 15.00, named as [SAS-IQ].

Table 14. *Survey of international school assessment studies used to calculate SAS-IQs.*

Study	Year	Age/Grade	Scale	*M* (GBR)	*SD* (GBR)	Sources
PISA	2000	15 years	Science	532.00	98.00	OECD/UNESCO-UIS (2003, Ann. B1, Table 3.2)
			Reading	523.00	100.00	OECD/UNESCO-UIS (2003, Ann. B1, Table 2.3a)
			Math	529.00	92.00	OECD/UNESCO-UIS (2003, Ann. B1, Table 3.1)
			Total	528.00	96.73	self calculated; SD=pooled
	2003*	15 years	Science	523.50	102.60	self calculated; SD=pooled
			Reading	509.00	101.01	
			Math	512.00	90.51	
			Total	514.83	98.19	
	2006	15 years	Science	515.00	107.00	OECD (2007, Table 2.1c)
			Reading	495.00	102.00	OECD (2007, Table 6.1c)
			Math	495.00	89.00	OECD (2007, Table 6.2c)
			Total	501.67	99.62	self calculated; SD=pooled
	2009	15 years	Science	514.00	99.00	OECD (2010, Annex B1, Table I.3.6)
			Reading	494.00	95.00	OECD (2010, Annex B1, Table I.2.3)
			Math	492.00	87.00	OECD (2010, Annex B1, Table I.3.3)
			Total	500.33	93.80	self calculated; SD=pooled
	2012	15 years	Science	414.13	99.77	OECD (2015)
			Reading	499.32	97.35	
			Math	493.92	94.16	
			Total	502.46	97.12	self calculated; SD=pooled

Study	Year	Age/Grade	Scale	*M* (GBR)	*SD* (GBR)	Sources
	2015	15 years	Science	509.22	99.65	OECD (2016, Annex B1, Table I.2.3)
			Reading	497.97	96.69	OECD (2016, Annex B1, Table I.4.3)
			Math	492.48	92.56	OECD (2016, Annex B1, Table I.5.3)
			Total	499.89	96.34	self calculated; SD=pooled
TIMSS	1995**	4th grade	Math	516.50	90.01	Mullis et al. (1997; Table C.3; SD=pooled)
			Science	543.50	94.51	Martin et al. (1997; Table C.3; SD=pooled)
		8th grade	Math	502.00	90.05	Beaton et al. (1997b; Table E.3; SD=pooled)
			Science	534.50	103.04	Beaton et al. (1997a; Table E.3; SD=pooled)
		Total	Total	524.13	94.55	self calculated; SD=pooled
	1999	8th grade	Math	496.00	83.00	Mullis et al. (2000, Exhibit D.2)
			Science	538.00	91.00	
			Total	517.00	97.09	self calculated; SD=pooled
	2003	4th grade	Math	531.00	87.00	Mullis et al. (2004, Exhibit D.2)
			Science	540.00	83.00	Martin et al. (2004, Exhibit D.2)
		8th grade	Math	498.00	77.00	Martin et al. (2012, Appendix G.4)
			Science	544.00	77.00	Martin et al. (2004, Exhibit D.2)
		Total	Total	528.25	81.11	self calculated; SD=pooled
	2007	4th grade	Math	541.00	86.00	Mullis, Martin & Foy (2008, Exhibit D.2)
			Science	542.00	80.00	Martin, Mullis & Foy (2008, Exhibit D.2)
		8th grade	Math	513.00	84.00	Mullis, Martin & Foy (2008, Exhibit D.2)
			Science	542.00	85.00	Martin, Mullis & Foy (2008, Exhibit D.2)
		Total	Total	534.50	83.78	self calculated; SD=pooled
	2011	4th grade	Math	542.00	89.00	Mullis et al. (2012a, Appendix G.3)
			Science	529.00	82.00	Martin et al. (2012, Appendix G.3)
		8th grade	Math	507.00	85.00	Mullis et al. (2012a, Appendix G.4)
			Science	533.00	85.00	Martin et al. (2012, Appendix G.4)
		Total	Total	527.75	85.20	self calculated; SD=pooled

Study	**Year**	**Age/Grade**	**Scale**	***M* (GBR)**	***SD* (GBR)**	**Sources**
	2015	4th grade	Math	546.00	84.00	Mullis et al. (2016a, Table G3)
			Science	536.00	70.00	Mullis et al. (2016b, Table G3)
		8th grade	Math	518.00	80.00	Mullis et al. (2016a, Table G4)
			Science	537.00	81.00	Mullis et al. (2016b, Table G4)
		Total	Total	534.25	78.67	self calculated; SD=pooled
PIRLS	2001**	4th grade	Reading	540.50	85.51	Mullis et al. (2003; Exhibit B.2; SD=pooled)
	2006**			533.00	83.57	Mullis et al. (2007; Exhibit C.2; SD=pooled)
	2011			552.00	82.00	Mullis et al. (2012b; Appendix F.2)
	2016			559.00	79.00	Mullis et al. (2017; Appendix F.2)

Notes: Columns *M* and *SD* give results from British samples in international school assessment studies used to convert school assessment results to IQ-scores. *No results for GBR from PISA 2003 available and used *M* and *SD* calculated as (pooled) means from the 2000 and 2006 numbers. **Numbers for GBR taken as (pooled) means from England and Scotland.

For Utopia a [SAS-IQ] of 100.00 was assumed and for Dystopia of 90.00. By averaging the [QNW] with the [SAS-IQ], the [QNW+SAS] will turned out, also named as "final national IQ". The general equation is:

$$[NIQ\ (QNW + SAS)] = \frac{\left(\frac{\sum_{i=1}^{n}[IQ(cor.)]_i \times [QN\text{-}Factor]_i}{\sum_{i=1}^{n}[QN\text{-}Factor]_i}\right) + [NIQ\ (SAS)]}{2}$$

For the fictional country Utopia, the equation would be:

$$U\text{: }[NIQ\ (\mathrm{QNW + SAS})] = \left(\frac{96.78 + 100.00}{2}\right) = 96.88$$

For the fictional country Dystopia, the equation would be:

$$D\text{: }[NIQ\ (\mathrm{QNW + SAS})] = \left(\frac{91.72 + 90.00}{2}\right) = 90.86$$

2.2.7. Calculating National Means from the Geographic Neighbourhood.

The gaps that still remained on the world map despite psychometric and school assessment results were filled with data from the geographic neighbourhood of a country. Whenever there was no [QNW+SAS] for a country, the [QNW+SAS] of its up to three neighbourhood countries with the longest common land boundaries were averaged with respect to their shares in the total length of all land boundaries. Neighbourhood countries without [QNW+SAS] were always ignored. For maritime countries without land boundaries the three geographically closest countries with [QNW+SAS] were averaged with equal weight.

These data are shown in Table 15 for the full country list. The described approach was defended by Whetzel and McDaniel (2006) and Gelade (2008) against critiques but it will be re-examined here, in which for all countries, including those with [QNW+SAS], a mean IQ of the individual geographical neighbourhoods ([GEO]) will be determined and compared with the psychometric or school assessment results.

Table 15. *Border-data used for calculation of geographic means.*

ISO 3166-1 ALPHA-3	Total border in km. (M=marit.)	Neighbourhood country 1		Neighbourhood country 2		Neighbourhood country 3	
		ID	Border share in km. (land)	ID	Border share in km. (land)	ID	Border share in km. land)
AFG	5987.00	PAK	2670.00	PAK	1357.00	PAK	921.00
ALB	691.00	GRC	212.00	GRC	186.00	GRC	181.00
DZA	6734.00	MAR	1900.00	MAR	1359.00	MAR	1034.00
AND	118.00	ESP	63.00	ESP	55.00	ESP	-
AGO	5369.00	COD	2646.00	COD	1427.00	COD	-
ATG	M	VCT	1.00	VCT	1.00	VCT	1.00
ARG	11968.00	CHL	6691.00	CHL	-	CHL	1263.00
ARM	1570.00	AZE	996.00	AZE	311.00	AZE	219.00
AUS	M	IDN	1.00	IDN	1.00	IDN	1.00
AUT	2524.00	DEU	801.00	DEU	404.00	DEU	402.00
AZE	2468.00	ARM	996.00	ARM	689.00	ARM	338.00
BHS	M	USA	1.00	USA	1.00	USA	1.00
BHR	M	SAU	1.00	SAU	1.00	SAU	1.00
BGD	4413.00	IND	4142.00	IND	271.00	IND	-
BRB	M	DMA	1.00	DMA	1.00	DMA	1.00
BLR	3642.00	RUS	1312.00	RUS	1111.00	RUS	640.00
BEL	1297.00	FRA	556.00	FRA	478.00	FRA	133.00

ISO 3166-1 ALPHA-3	Total border in km. (M=marit.)	Neighbourhood country 1		Neighbourhood country 2		Neighbourhood country 3	
		ID	Border share in km. (land)	ID	Border share in km. (land)	ID	Border share in km. land)
BLZ	542.00	MEX	276.00	MEX	266.00	MEX	-
BEN	2123.00	NGA	809.00	NGA	-	NGA	386.00
BMU	M	USA	1.00	USA	1.00	USA	1.00
BTN	1136.00	IND	659.00	IND	477.00	IND	-
BOL	7252.00	BRA	3403.00	BRA	1212.00	BRA	942.00
BIH	1543.00	HRV	956.00	HRV	345.00	HRV	242.00
BWA	4347.15	ZAF	1969.00	ZAF	1544.00	ZAF	834.00
BRA	16145.00	BOL	3403.00	BOL	2659.00	BOL	2137.00
BRN	266.00	MYS	266.00	-	-	MYS	-
BGR	1806.00	ROU	605.00	ROU	472.00	ROU	344.00
BFA	3611.00	MLI	1325.00	MLI	-	MLI	602.00
BDI	1140.00	TZA	589.00	TZA	-	TZA	236.00
CPV	M	GMB	1.00	GMB	1.00	GMB	1.00
KHM	2530.00	VNM	1158.00	VNM	817.00	VNM	555.00
CMR	5018.00	NGA	1975.00	NGA	-	NGA	-
CAN	8893.00	USA	8893.00	-	-	USA	-
CYM	M	JAM	1.00	JAM	1.00	JAM	1.00
CAF	5920.00	COD	1747.00	COD	-	COD	1055.00
TCD	6406.00	CAF	-	CAF	1403.00	CAF	-
CHL	7801.00	ARG	6691.00	ARG	942.00	ARG	168.00
CHN	22457.00	MNG	4630.00	MNG	4179.00	MNG	2659.00
COL	6672.00	VEN	2341.00	VEN	1790.00	VEN	1494.00
COM	M	TZA	1.00	TZA	1.00	TZA	1.00
COD	10481.00	AGO	2646.00	AGO	-	AGO	-
COG	5008.00	GAB	-	GAB	1229.00	GAB	-
COK	M	MHL	1.00	-	-	MHL	-
CRI	661.00	PAN	348.00	PAN	313.00	PAN	-
CIV	3458.00	GIN	-	GIN	-	GIN	720.00
HRV	2237.00	BIH	956.00	BIH	600.00	BIH	348.00
CUB	28.50	-	-	-	-	VGB	-
CYP	M	TUR	1.00	TUR	1.00	TUR	1.00
CZE	2143.00	POL	796.00	POL	704.00	POL	402.00
DNK	140.00	DEU	140.00	-	-	DEU	-
DJI	528.00	ETH	342.00	ETH	125.00	ETH	61.00
DMA	M	PRI	1.00	PRI	1.00	PRI	1.00
DOM	376.00	HTI	376.00	-	-	HTI	-
ECU	2237.00	PER	1529.00	PER	708.00	PER	-
EGY	2612.00	SDN	1276.00	SDN	1115.00	SDN	208.00
SLV	590.00	HND	391.00	HND	199.00	HND	-
GNQ	528.00	GAB	-	GAB	-	GAB	-
ERI	1840.00	ETH	1033.00	ETH	682.00	ETH	-
EST	657.00	LVA	333.00	LVA	324.00	LVA	-
ETH	5925.00	SOM	1640.00	SOM	1299.00	SOM	1033.00
FJI	M	MHL	1.00	-	-	MHL	-
FIN	2563.00	RUS	1309.00	RUS	709.00	RUS	545.00
FRA	2751.00	ESP	646.00	ESP	556.00	ESP	525.00
GAB	3261.00	COG	2567.00	COG	-	COG	-
GMB	749.00	SEN	-	-	-	SEN	-
PSE	72.00	ISR	59.00	ISR	13.00	ISR	-

ISO 3166-1 ALPHA-3	Total border in km. (M=marit.)	Neighbourhood country 1		Neighbourhood country 2		Neighbourhood country 3	
		ID	Border share in km. (land)	ID	Border share in km. (land)	ID	Border share in km. land)
DEU	3714.00	AUT	801.00	AUT	704.00	AUT	575.00
GEO	1814.00	RUS	894.00	RUS	428.00	RUS	273.00
GHA	2420.00	TGO	-	TGO	-	TGO	602.00
GRC	1110.00	BGR	472.00	BGR	234.00	BGR	212.00
GRL	M	ISL	1.00	ISL	1.00	ISL	-
GRD	M	VCT	1.00	VCT	1.00	VCT	1.00
GTM	1667.00	MEX	958.00	MEX	266.00	MEX	244.00
GIN	4046.00	MLI	1062.00	MLI	-	MLI	794.00
GNB	762.00	GIN	-	GIN	-	GIN	-
GUY	2933.00	BRA	1308.00	BRA	-	BRA	789.00
HTI	376.00	DOM	376.00	-	-	DOM	-
HND	1575.00	NIC	940.00	NIC	391.00	NIC	244.00
HKG	33.00	CHN	33.00	-	-	CHN	-
HUN	2106.00	SVK	627.00	SVK	424.00	SVK	348.00
ISL	M	IRL	1.00	IRL	1.00	IRL	1.00
IND	13888.00	BGD	4142.00	BGD	3190.00	BGD	2659.00
IDN	2958.00	MYS	1881.00	MYS	-	MYS	-
IRN	5894.00	IRQ	1599.00	IRQ	-	IRQ	959.00
IRQ	3809.00	IRN	1599.00	IRN	811.00	IRN	599.00
IRL	443.00	GBR	443.00	-	-	GBR	-
ISR	1068.00	VGB	-	VGB	307.00	VGB	208.00
ITA	1836.40	CHE	698.00	CHE	476.00	CHE	404.00
JAM	M	CUB	1.00	CUB	1.00	CUB	1.00
JPN	M	KOR	1.00	KOR	1.00	KOR	1.00
JOR	1744.00	SAU	731.00	SAU	379.00	SAU	307.00
KAZ	13364.00	RUS	7644.00	RUS	2330.00	RUS	1765.00
KEN	3457.00	ETH	867.00	ETH	814.00	ETH	775.00
KIR	M	MHL	1.00	-	-	MHL	-
PRK	1607.00	CHN	1352.00	CHN	237.00	CHN	18.00
KOR	237.00	PRK	-	-	-	PRK	-
KWT	475.00	IRQ	254.00	IRQ	221.00	IRQ	-
KGZ	4573.00	UZB	1314.00	UZB	1212.00	UZB	1063.00
LAO	5274.00	VNM	2161.00	VNM	1845.00	VNM	555.00
LVA	1370.00	LTU	544.00	LTU	333.00	LTU	332.00
LBN	484.00	SYR	403.00	SYR	81.00	SYR	-
LSO	1106.00	ZAF	1106.00	-	-	ZAF	-
LBR	1667.00	CIV	-	CIV	-	CIV	299.00
LBY	4339.00	EGY	1115.00	EGY	-	EGY	989.00
LIE	75.00	CHE	41.00	CHE	34.00	CHE	-
LTU	1549.00	BLR	640.00	BLR	544.00	BLR	261.00
LUX	327.00	BEL	130.00	BEL	128.00	BEL	69.00
MAC	3.00	CHN	3.00	-	-	CHN	-
MKD	838.00	GRC	234.00	GRC	181.00	GRC	162.00
MDG	M	TZA	1.00	TZA	1.00	TZA	1.00
MWI	2857.00	MOZ	-	MOZ	-	MOZ	512.00
MYS	2742.00	IDN	1881.00	IDN	595.00	IDN	-
MDV	M	LKA	1.00	LKA	1.00	LKA	1.00
MLI	7908.00	MRT	-	MRT	1359.00	MRT	1325.00
MLT	M	ITA	1.00	ITA	1.00	ITA	1.00

ISO 3166-1 ALPHA-3	Total border in km. (M=marit.)	Neighbourhood country 1		Neighbourhood country 2		Neighbourhood country 3	
		ID	Border share in km. (land)	ID	Border share in km. (land)	ID	Border share in km. land)
MNP	M	PHL	1.00	PHL	1.00	PHL	1.00
MHL	M	IDN	1.00	IDN	1.00	IDN	1.00
MRT	5002.00	MLI	2236.00	MLI	-	MLI	-
MUS	M	SYC	1.00	SYC	1.00	SYC	1.00
MEX	4389.00	USA	3155.00	USA	958.00	USA	276.00
FSM	M	MHL	1.00	-	-	MHL	-
MDA	1885.00	UKR	1202.00	UKR	683.00	UKR	-
MNG	8082.00	CHN	4630.00	CHN	3452.00	CHN	-
MNE	680.00	BIH	242.00	BIH	186.00	BIH	157.00
MAR	2362.50	DZA	1900.00	DZA	-	DZA	18.50
MOZ	4783.00	MWI	1498.00	MWI	1402.00	MWI	840.00
MMR	6522.00	THA	2416.00	THA	2129.00	THA	1468.00
NAM	4220.00	BWA	1544.00	BWA	1427.00	BWA	1005.00
NPL	3159.00	IND	1770.00	IND	1389.00	IND	-
NLD	1053.00	DEU	575.00	DEU	478.00	DEU	-
NCL	M	MHL	1.00	MHL	1.00	MHL	1.00
NZL	M	AUS	1.00	AUS	1.00	AUS	-
NIC	1253.00	HND	940.00	HND	313.00	HND	-
NER	5834.00	NGA	1608.00	NGA	-	NGA	951.00
NGA	4477.00	CMR	-	CMR	-	CMR	-
NOR	2566.00	SWE	1666.00	SWE	709.00	SWE	191.00
OMN	1561.00	SAU	658.00	SAU	609.00	SAU	294.00
PAK	7257.00	IND	3190.00	IND	-	IND	959.00
PAN	687.00	CRI	348.00	CRI	339.00	CRI	-
PNG	824.00	IDN	824.00	-	-	IDN	-
PRY	4655.00	ARG	2531.00	ARG	1371.00	ARG	753.00
PER	7062.00	BRA	1659.00	BRA	1529.00	BRA	1494.00
PHL	M	IDN	1.00	IDN	1.00	IDN	1.00
POL	3071.00	CYP	796.00	CYP	541.00	CYP	535.00
PRT	1224.00	ESP	1224.00	-	-	ESP	-
PRI	M	DOM	1.00	DOM	1.00	DOM	1.00
QAT	87.00	SAU	87.00	-	-	SAU	-
ROU	2844.00	MDA	683.00	MDA	605.00	MDA	601.00
RUS	22408.00	KAZ	7644.00	KAZ	4179.00	KAZ	3452.00
RWA	930.00	BDI	-	BDI	222.00	BDI	221.00
SHN	M	AGO	1.00	AGO	1.00	AGO	1.00
KNA.	M	DMA	1.00	DMA	1.00	DMA	1.00
LCA	M	VCT	1.00	VCT	1.00	VCT	1.00
VCT	M	BRB	1.00	BRB	1.00	BRB	1.00
WSM	M	MHL	1.00	-	-	MHL	-
STP	M	COG	1.00	COG	1.00	COG	1.00
SAU	4272.00	YEM	1307.00	YEM	811.00	YEM	731.00
SEN	2684.00	THA	749.00	THA	-	THA	489.00
SRB	2322.00	ROU	531.00	ROU	366.00	ROU	345.00
SYC	M	SOM	1.00	SOM	1.00	SOM	1.00
SLE	1093.00	GIN	-	GIN	-	GIN	-
SGP	M	MYS	1.00	MYS	1.00	MYS	1.00
SVK	1611.00	HUN	627.00	HUN	541.00	HUN	241.00
SVN	1211.00	HRV	600.00	HRV	299.00	HRV	218.00

ISO 3166-1 ALPHA-3	Total border in km. (M=marit.)	Neighbourhood country 1		Neighbourhood country 2		Neighbourhood country 3	
		ID	Border share in km. (land)	ID	Border share in km. (land)	ID	Border share in km. land)
SLB	M	MHL	1.00	-	-	MHL	-
SOM	2385.00	ETH	1640.00	ETH	684.00	ETH	-
ZAF	5244.00	BWA	1969.00	BWA	-	BWA	1005.00
SSD	6018.00	SDN	2158.00	SDN	1299.00	SDN	-
ESP	1952.70	PRT	1224.00	PRT	646.00	PRT	-
LKA	M	IND	1.00	IND	1.00	IND	1.00
SDN	6819.00	SSD	2158.00	SSD	-	SSD	1276.00
SUR	1907.00	GUY	-	GUY	556.00	GUY	515.00
SWZ	546.00	ZAF	438.00	ZAF	-	ZAF	-
SWE	2211.00	NOR	1666.00	NOR	545.00	NOR	-
CHE	1770.00	ITA	698.00	ITA	525.00	ITA	348.00
SYR	2363.00	TUR	899.00	TUR	599.00	TUR	403.00
TWN	M	CHN	1.00	CHN	1.00	CHN	1.00
TJK	4130.00	AFG	-	AFG	1312.00	AFG	984.00
TZA	4161.00	MOZ	-	MOZ	775.00	MOZ	-
THA	5673.00	BFA	2416.00	BFA	1845.00	BFA	817.00
TLS	253.00	IDN	253.00	-	-	IDN	-
TGO	1880.00	GHA	1098.00	GHA	-	GHA	131.00
TON	M	MHL	1.00	-	-	MHL	-
TTO	M	VEN	1.00	VEN	1.00	VEN	1.00
TUN	1495.00	DZA	1034.00	DZA	461.00	DZA	-
TUR	2816.00	SYR	899.00	SYR	534.00	SYR	367.00
TKM	4158.00	UZB	1793.00	UZB	1148.00	UZB	-
TCA	M	BHS	1.00	BHS	1.00	BHS	1.00
UGA	2729.00	COD	877.00	COD	814.00	COD	475.00
UKR	5618.00	RUS	1944.00	RUS	1202.00	RUS	1111.00
ARE	1066.00	OMN	609.00	OMN	457.00	OMN	-
GBR	443.00	IRL	443.00	-	-	IRL	-
USA	12048.00	CAN	8893.00	CAN	3155.00	CAN	28.50
URY	1591.00	BRA	1050.00	BRA	541.00	BRA	-
UZB	6893.00	KAZ	2330.00	KAZ	-	KAZ	1314.00
VUT	M	MHL	1.00	MHL	1.00	MHL	1.00
VEN	5267.00	COL	2341.00	COL	2137.00	COL	-
VNM	4616.00	LAO	2161.00	LAO	1297.00	LAO	1158.00
VGB	M	PRI	1.00	PRI	1.00	PRI	1.00
YEM	1601.00	SAU	1307.00	SAU	294.00	SAU	-
ZMB	6043.15	COD	2332.00	COD	1065.00	COD	847.00
ZWE	3229.00	MOZ	-	MOZ	834.00	MOZ	-

Notes: M = maritime (no land boundaries) → neighbourhood countries weighted equally (1.00); neighbourhood countries without [QNW+SAS] were ignored.

2.2.8. Final Summary.

Final results for Utopia and Dystopia can be seen in Table 16, where two additional countries “B1” and “B2” were added, for which was assumed that no psychometric or school assessment data were available. As show by the numbers, the IQs of Utopia remained relatively consistent, no matter which calculation method was used, whereas the values for Dystopia vary more. The [QNW+SAS+GEO] of Utopia and Dystopia is equal to their [QNW+SAS] since the geographic mean was not used if [QNW+SAS] was available. If no [SAS-IQ] would be available, [QNW] would be equal to [QNW+SAS] and [QNW+SAS+GEO].

It was assumed that B1 has land boundaries with Utopia and Dystopia of similar length, so its [GEO] is the simple mean of 97.39 and 88.23, or 92.81. For B2 it was assumed that the length of its land boundary to Utopia was twice as long as to Dystopia, so its [GEO] and is 94.37 and closer to Utopia than Dystopia.

Table 16. *National IQs for fictional countries Utopia (U), Dystopia (D) and two between them (B1, B2).*

	NIQ					
	UW	**NW**	**QNW**	**SAS**	**QNW+SAS**	**QNW+SAS+GEO**
U	96.88	96.82	96.78	98.00	97.39	97.39
D	90.17	90.86	91.4	85.00	88.23	88.23
B1	-	-	-	-	-	92.81
B2	-	-	-	-	-	94.37

Notes: National IQs as unweighted [UW], sample size-weighted [NW] and quality+sample size-weighted [QNW] means, from results of international school assessment studies [SAS], combined [QNW+SAS] and completed by geographic means [QNW+SAS+GEO].

2.3. Psychometric Data per Nation

The following section will present summaries of the data underlying the estimations of psychometric IQs for samples and nations. For each record of IQ used, an abstract will be provided which summarizes the main methodological steps as well as any special features. For a detailed disclosure of the data used and the intermediate results, please refer to the digital version of the NIQ-dataset or to *http://www.ulsterinstitute.org/intelnatsappendix* for the online appendix, both of which contain all of this material.

For the purpose of clarity, we would like to explain the terminology used in advance: When speaking of "raw scores", non-age-normed test results will be meant, whereas "scaled scores" (for Wechsler-Scales) and "IQ-scores" or "IQs" will always present age-normed results. "GBR-*P*" stands for the British percentile a score is equivalent to. This will be mostly restricted to samples tested with Raven's Matrices, since here the percentiles were necessary for the conversion of raw scores into IQs. To some extent, percentiles were reported for other countries (e.g., DTL, USA) for the same reasons. "FE-correction" will always mean the [Test time adjustment] for Flynn-Effect-caused norm-inflations, "country-correction" will always mean the necessary adjustment if used norms were not standardized on a sample from GBR. At the end of each country report, "unweighted national IQs" ([UW]) will always be crude means calculated across the corrected IQs of all samples, "weighted national IQs" ([QNW]) were always calculated with weighting of the corrected IQs according to the underlying data-quality and size of the samples. [SAS-IQ] are IQs calculated from international school assessment studies, as it was explained in 2.2.6. A more detailed list of this school assessment results for different studies, volumes, scales and groups will follow in 2.4. In the end, "Final national IQs" are IQs combining weighted and SAS-IQs to a mean value ([QNW+SAS+GEO]).

2.3.1. Angola (AGO)

Only one source could be found for Angola: a control group from a study by Peixoto and Kalei (2013, Table 2) about cerebral malaria consisting of a very small number of individuals from the Central Hospital of Bengula, though the subjects' place of origin was left blank because the low density of hospital beds in Angola (2.50/1000c) (CIA, 2017, Index: "Hospital bed density") makes it likely that the patients came from a larger and unspecified radius.

The Malaria sample scored lower than the control sample and therefore had to be excluded. The control sample is 23.63y of mean age and obtained 10.80 raw scores on the digit span test of the WAIS-III, which makes 5.00 scaled scores or an uncor. IQ of 75.00. The sample also scored 12.44 on the matrices test of the WAIS-III, which makes a scaled score of 6.00 or an uncor. IQ of 80.00. Both scores were averaged to an uncor. IQ of 77.50, which is at the 6.68th DTL-*P*. This score had to be corrected by -1.20 for FE-correction and -1.20 for country-correction, so the cor. IQ is 75.10. Additionally, the sample scored 41.56 in the symbol search test of the WAIS-III, equivalent to 12.00 scaled scores or a German IQ of 110.00. This score would be dramatically higher than the mean from the two other subtests. It is not included here because symbol search is only intended to estimate index-scores for special abilities. However, a difference between more than 30.00 IQ-points in different subtests is unlikely. Also, it is not to be expected that a Malaria infected group from a developing country has a higher IQ than a group of healthy people in a Western society.

Angola did not participate in one of the observed school assessment studies and so, the cor. IQ-score of **75.10** of the sample corresponds to all of Angola's national IQ-scores.

2.3.2. Argentina (ARG)

De Kohan (1997, Table 2) measured a raw score on SPM of 45.34 on a sample of children with a mean age of 14.00y. In this age-group, this score is at the 46.33rd GBR-*P* and equivalent to an uncor. IQ of 98.62. It had to be reduced by 3.78 for FE-correction to a cor. IQ of 94.84.

Flynn and Rossi-Casé (2012, Table 2) compared two samples from the city of La Plata, one from 1964 with a mean age of 13.50y and one from 1998 with a mean age of 15.50y. The first one scored 38.78 and the second one 48.10 on the SPM, which are at the 18.18th and 59.61nd GBR-*P* and equivalent to uncor. IQs of 86.37 and 103.65. 3.15 had to be added to the first one and 3.99 subtracted from the second sample for FE-correction, so the cor. IQs are 89.52 and 99.70.

In the CPM-manual a raw score for five age-groups (5.00y to 10.00y, mean age = 7.50y) of on average 24.67 were given, which is at the 55.86th GBR-*P* and equivalent to an uncor. IQ of 102.21 (Raven, Raven & Court, 2006, Table 18). We added 2.31 for FE-correction, so the cor. IQ is 104.52.

An old study of Rimoldi (1948, Table 1) reported SPM-raw scores of on average 30.94, which were taken from the individual testing procedure only. The sample is 12.00y of mean age and its score therefore at the 8.81st GBR-*P*, equivalent to an uncor.IQ of 79.91. Adding 2.31 for FE-correction gave a cor. IQ of 86.22.

The unweighted national IQ of Argentina is **94.69** with a standard deviation of 7.41 and decrease to **93.85** if weighted. Argentina participated in PISA (all except 2003), TIMSS-2015 and PIRLS-2001 and gained a SAS-IQ of **79.41**. So, the final national IQ goes down to **86.63.**

2.3.3. Australia (AUS)

The first sample from Australia is a normative one from the CPM-manual (Raven, Raven & Court, 2006, Table 12). It gave 1980th Australian norms from a sample with a mean age of 8.00y from Queensland. It scored on average 23.17, which is at the 30.45th GBR-*P* and equivalent to an uncorrected IQ of 92.33. 5.67 had to be added for FE-correction, which resulted in a cor. IQ of 98.00.

Birney et al. (2017, Table 1) reported a "RPM Sum Score" of 22.54 on the APM from a sample of Australian mid-level managers with a mean age of 34.51y. This score is at the 54.64th GBR-*P* and equivalent to an uncorrected IQ of 101.75, reduced by 3.36 for FE-correction to a cor. IQ of 98.39.

Cotton et al. (2005, Table 1) presented a normative and reliability study of the CPM done with a representative sample from Victoria. It had a mean age of 8.50y and scored 24.98, which is at the 32.47th GBR-*P* and equivalent to an uncor. IQ of 93.18. Only 0.42 had to be added for FE-correction, so the cor. IQ is 93.60.

The SPM-manual (Raven, Raven & Court, 1999, Tab.23) gave raw-scores from a normative Australian sample of children with an age range of 8.00y to 17.00y. We split the Australian sample in on with a mean age of 12.00y and one with a mean age of 16.50y. The younger sample scored on average 41.80, which is at the 54.64th GBR-*P* and equivalent to an uncorrected IQ of 101.75. Raw scores on SPM of the older sample are 49.00, converted to 18.15 on the APM-scale, which is at the 61.97th GBR-*P* and equivalent to an uncor. IQ of 104.57. 1.26 had to be added to the younger sample and 1.47 subtracted from the older, so the cor. IQs are 105.83 and 100.28.

Waschl et al. (2016) measured IQ with the APM on two samples. For the first sample a shortened version of the APM was used, so this sample was therefore ignored by us, but on the second sample the full test was administered. It scored 21.34 with a mean age of 34.47y. This score is at the 49.17th GBR-*P* and equivalent to an uncor. IQ of 99.69, reduced by 3.36 to a cor. IQ of 96.33.

The unweighted national IQ of Australia is **98.74** with a standard deviation of 4.14 and becomes **99.52** if weighted. Australia participated in all observed PISA and TIMSS volumes and in PIRLS-2011 and 2016, and gained a SAS-IQ of **98.96**, very close to the mean psychometric result, which gives a final national IQ of **99.24**.

2.3.4. Austria (AUT)

From a study of Buj (1981, Table 1) a cor. IQ of 103.50 was reported for the CFT administered to a sample of 20.00y olds but without any detailed information about measurement methods. This score had to be corrected for FE with -7.28 and for country with -2.50, so the cor. IQ is 93.72.

Neubauer, Bauer and Huller (1992) gave a SPM-score of 37.47 for a sample of elementary school children with a mean age of 12.95y, therefore equivalent to the 53.69th GBR-*P* and an uncor. IQ of 101.39. We had to reduce this score by 2.52 for FE-correction and got a cor. IQ of 98.87.

Three Styrian samples came from Rindermann, Stiegmaier and Meisenberg (2014, Table 1). The first one was from an administration of the CPM on preschool children with a mean age of 5.50y, which scored 24.33, equivalent to the 90.25th GBR-*P* and an uncor. IQ of 119.44, the second one was from an administration of the SPM on primary school children with a mean age of 10.00y, which scored 33.88 equivalent to the 36.12th GBR-*P* and an uncor. IQ of 94.67. Necessary FE-corrections were -0.21 and -6.09, so the cor. IQs are 119.23 and 88.58. For a third sample APM-raw scores were reported but for the both sets I and II of the APM together, so an IQ-calculation was not possible. The source reported also IQ-scores but corrected for country and FE with methods different from ours. So, we decided to exclude this sample.

The unweighted Austrian IQ is **97.65** with a standard deviation of 12.86 and remained stable at **97.00** after weighting for data quality and sample size. Austria participated in all volumes of PISA, in the volumes 1995, 2007 and 2011 of TIMSS and in the PIRLS-volumes of 2011 and 2016. It gained a SAS-IQ of **98.77**, so the final national IQ is **97.88**.

2.3.5. Bahamas, The (BHS)

The two samples included for the Bahamas show huge differences, in data as well as IQ-results. The first one was measured in 1988 in the OLSAT by (Johnson & Holmes, 1988, Table 2) on a national sample with a mean age of 16.00y. An uncor. IQ of 102.85 was reported but also that only the population above the 75.00th *P* in GCE-scores was used for the study. There is a difference of 10.00 IQ-scores between the 75.00th and 50.00th *P* which have to be deducted from the uncor. IQ additionally to 3.06 for FE, so the cor. IQ of this sample is 87.29.

In 1999 Tynes-Jones (2005) administered three sub-tests of the WISC-III (picture completion, arithmetic, vocabulary) and reported scores of 5, 7 and 8, but also reported potential scores of 6, 8 and 9 estimated by using a bio-ecological model of intelligence. We selected the potential scores for further calculation because they represent achievement under more neutral living conditions. The mean scaled score is 7.67 and at the 21.87th DEU-*P*, equivalent to an uncor. IQ of 88.35.

The unweighted national IQ is **84.22** and increased **86.99** if weighted. Data from international school assessment studies were not available for the Bahamas, so the final national IQ is but the weighted **86.99**.

2.3.6. Bahrain (BHR)

Bakhiet and Lynn (2015e, Table 1) reported scores from the standardization of the WISC-III in Bahrain from a normative sample which scored 95.10 or **86.82** after deducting 5.78 and -2.50 for FE- and country-correction, which is also the unweighted national IQ-score. Bahrain participated in TIMSS 2003-2015 and in PIRLS 2016 and obtained a SAS-IQ of **80.38**, which resulted in a final IQ of **83.60**.

2.3.7. Bangladesh (BGD)

Hamadani et al. (2011, Table 2) published a study about arsenic toxicity from which two samples were taken for Bangladesh. One consisted of 4111 children which completed the WPPSI-III and gained an uncor. IQ of 75.10. The second sample consisted of mothers. The source reported that the IQ of these mothers was measured with the CPM and the sum of the correct answers was used as IQ. However, Table 2 of the source reports FSIQ, PIQ and VIQ for mothers, which could not have been measured with Raven's matrices, which are limited to one single measurement of fluid intelligence. But there is no other test administration reported and therefore, the mothers mean IQ of 75.00 was taken as the CPM-result and corrected by +0.63 for FE to 75.63.

Lynn (2007) cited a study from Kabir and Herlitz (2000) in which two samples, one from literate and the other from illiterate children, were tested on the WPPSI-III. The IQs estimated by Lynn were 90.50 and 77.70. The ratio of literate to illiterate children is reported as 38.50% to 61.50%, which is closely represented by the ration of children in both samples (36.60% vs 63.40%). Therefore, both samples were used without correction for literacy. Both scores had to be reduced by 2.04 for FE-correction, so the cor. IQs are 88.46 and 75.66.

Wasserman (2007, Table 1) reported an IQ of 75.90, measured with WPPSI-III on a sample of 296 children in schools in a rural but described as "not particularly poor" area, which became 72.38 after subtracting 1.02 and 2.50 for FE- and country-correction. The study also reported a raw score of 14.20 on SPM for mothers with a mean age of 30.00y. Converted to the APM-scale and then into IQ this would result in a very low IQ of 42.28. Although there are no details, it is possible that not all sets of the SPM were used and therefore the raw score had to be corrected upward. So, assuming the use of the SPM-sets A, B and C only, the sample would obtain an IQ of 48.18. Assuming the use of the SMP-sets D and E only the sample would score 81.56. The second result seems to be more expectable, however, due to missing methodical information we did not include this score into the dataset.

The unweighted national IQ of Bangladesh is **76.81** with a standard deviation of 6.74 and the weighted and final national IQs are **74.24**. No data from international school assessment studies were available for Bangladesh.

2.3.8. Barbados (BRB)

Galler et al. (1987, Table 1) reported results from three WISC-R administrations on Barbados, one on children with Marasmus, one on children with Kwashiorkor and one control sample. Both ill samples scored lower than the control, so that only this healthy sample was included in the dataset and obtained an uncor. IQ of 95.50. Reducing 4.42 for FE- and 2.50 for country-correction resulted in a cor. IQ of 88.58.

Waber et al. (2014, Table 1) compared a malnutrition and a control group of adults in IQ measured with the WASI. The malnourished adults scored 82.83 but the control group, which was used for the database, much higher with an uncor. IQ of 99.03, corrected by -2.38 and -2.50 for FE and country to 94.15.

No data from international school assessment studies were available for Barbados. The unweighted national IQ is **91.37** and almost the same with **91.38** after weightings.

2.3.9. Belarus (BLR)

A very huge number of breastfed children was tested by Kramer et al. (2008, Table 1) on the WASI. The full statistical population split in to children which were exclusive breastfeed and a control group. The control group gained an uncor. IQ of 101.90 and the exclusive breastfed 109.70. There were no clear numbers about the share of children in Belarusian population which were exclusive breastfeed but the two samples in the study were about the same size. The number of tested children was given as 13,824, a number of finally tested children separated by those who were exclusive breastfed or not was missed, so we split the total number equally to 2x6912. From both scores, 1.70 had to be subtracted for FE-correction and 2.50 for country-correction, so the cor. IQs are 97.70 and 105.50.

School assessment results for Belarus were not available, so the unweighted national IQ is **101.60** and the final national IQ is **101.60**.

2.3.10. Belgium (BEL)

An IQ of 99.70 in CFT was given by Buj (1981, table 1) without any detailed information about measurement methods. Corrected by -7.28 and -2.50 for FE and country resulted in 89.92.

Charlemaine and Pons (1998, Table 5) cited a measurement of Belgian mono- and dizygotic twins from Gestel et al. (1997) with the WISC-R. No data about origin, age and raw scores were provided by this study and the original source was not available. So, the reported IQs of 105.56 (MZ) and 108.46 (DZ) were averaged to a cor. IQ is 106.95 and reduced by 7.82 for FE- and 2.50 for country-correction to a cor. IQ of 96.63.

Detailed sub-test data of a WISC-R administration on Belgian children were reported by van der Sluis et al. (2008, Table 1). Summed scores were 112.12 which were converted to a FS-IQ of 109.00 (according to German norm-tables) and had to be reduced by 9.00 and 1.20 for FE- and country-correction to 98.80.

The unweighted national IQ of Belgium was calculated as **95.12** with a SD of 4.63 and increased to **97.07** after weightings. Belgium participated in all observed volumes of PISA, in TIMSS 1995, 2011 and 2015, and in PIRLS 2006 to 2016, on which it obtained a SAS-IQ of **97.92**. The final national IQ is **97.46**.

2.3.11. Bermuda (BMU)

The first measurement of IQ at the Bermuda Islands came from Scarr and McCartney (1988, Table 7) and was conducted with the SBIS on a sample of children with a mean age of 3.75y. An uncor. IQ of 103.10 was reported, reduced by 5.44 and 2.50 for GFE- and country-correction to 95.16. Only the control sample was used whereas the treatment sample scored higher with 106.6 and was excluded.

Similar IQs were measured by Scarr et al. (1994, Table 5) two times on a sample of children with the SBIS. At two years of age, children scored 102.50 and at four years of age they scored 100.15. Both had to be corrected by -4.42 and -2.50 for FE and country to 95.58 and 93.23.

Sandoval, Zimmerman & Woo-Sam (1983) reported an IQ of 89.00 from an administration of the WISC-R on children with a mean age of 9.00y. The score was cited from a dissertation abstract of Astwood (1976) which was not available, so information about possible test score restrictions were not available. Corrected by -0.68 and -2.50 foe FE- and country resulted in 85.82.

The unweighted national IQ of the Bermuda Islands is **92.45** with a SD of 4.54, the weighted and final national IQs are **93.52**. School assessment data were not available.

2.3.12. Bolivia (BOL)

The SBIS was administered by Bautista et al. (1982, Table 1, 2) on two samples of school children in the small village of Tiquipaya. One was iodine-treated and one the control group, which obtained an uncor. IQ of on average 69.77 in the first run of the study. The second run was ignored as well as the treatment group, however, the treatment group gained a similar IQ as the control group in the second run, which showed an increase due to training effects of around 4.00 IQ-scores compared to the first run. 0.68 had to be added for FE-correction but 2.50 subtracted for country, so the cor. IQ is 67.95.

Virues-Ortega et al. (2011, Table 2) administered the sub-tests "Matrices", "Block Design", "Digit Span", "Coding" and "Symbol Search" of the WISC-IV on two samples of children and adolescents, one from the city of La Paz with a mean age of 11.10y and one from the city of El Alto with a mean age of 11.65y. "Coding" and "Symbol Search" were used to estimate the processing-speed IQs, which are uncorrected 94.90 in La Paz and 95.55 in El Alto, both corrected by -1.02 and -2.50 for FE- and country to 91.38 and 92.03.

No school assessment results are available for Bolivia. The unweighted national IQ is **83.79** with a SD of 13.72 and after weightings the final national IQ was **76.53**.

2.3.13. Bosnia and Herzegovina (BIH)

Djapo and Lynn (2010) published the only findable report of a psychometric IQ measurement from Bosnia and Herzegovina. Their total sample was split into two age groups. The one with a mean age of 12.50y gained a raw-score on SPM of 39.42, which is at the 35.52nd GBR-*P* and equivalent to an uncor. IQ of 94.43. The raw score of 47.15 the second sample gained on SPM was converted into 13.81 raw scores at the APM-scale and at the 32.23rd GBR-*P*, equivalent to an uncor. IQ of 96.02. Corrected by -2.94 or -5.67 for FE gave cor. IQs of 93.08 and 88.76.

The unweighted national IQ of Bosnia and Herzegovina was estimated as **90.92**. It participated only in TIMSS-2007 where it gained an IQ of **86.35**, therefore the final national IQ is **88.53**.

2.3.14. Botswana (BWA)

Maqsud (1997) reported a raw score on the SPM of 39.00 for a sample of high school pupils from the Batswana-tribe in northern South Africa, which was used for Botswana due to missing samples directly from this country (Lynn, 2010). These pupils were on average 18.50y of age, so the SPM-raw score had to be converted to an APM-raw score of 7.59, which is at the 6.01st GBR-*P* and equivalent to an uncor. IQ of 76.69, reduced by 0.63 for FE-correction to **76.06**. Botswana is one of the few states from sub-Saharan Africa that participated in an international school assessment study. It participated in TIMSS-2003 to 2015 and PIRLS-2016 where it obtained an SAS-IQ of **62.83**. The difference between the IQ from Maqsud (1997) and the SAS-IQ is around one standard deviation, but this could reflect the difference between high school students and the total population. The final national IQ of Botswana was estimated with **69.45**.

2.3.15. Brazil (BRA)

A sample of state school children from São Paulo with a mean age of 8.35 was tested by Bandeira et al. (2004, Table 3) on the CPM. It obtained a mean raw score of 21.40 at the 13.86th GBR-*P* and equivalent to an uncor. IQ of 83.70, corrected by 0.63 for FE to 84.33.

Three samples of children from Belo Horizonte were taken from Colom and Flores-Mendoza (2007, Table 2). Two were tested with CPM, 7.50y and 8.80y of mean age and obtained raw scores of 21.64 and 26.46 at the 15.01st and 30.06th GBR-*P*, equivalent to uncor. IQs of 84.46 and 92.16. Corrections were not necessary. The third sample scored 42.50 on SPM, equivalent to the 57.98 GBR-*P* and an uncor. IQ of 103.02, corrected by -5.88 for FE to 97.14.

Healthy children from São Paulo and Salvador with a mean age of 7.50y were tested by de Abreu et al. (2014, Table 5) on the CPM and scored 20.67, which is at the 17.33rd GBR-*P* and equivalent to an uncor. IQ of 85.88, from which 0.21 had to be subtracted for FE-correction. So, the cor. IQ is 85.67.

Fernandez (2001, Table 1) reported SPM-raw scores of 10.00y old children from Sao Paolo. The full sample was divided into four ethnical heterogeneous groups. Black children scored 15.80 which is at the 2.58th GBR-*P* and therefore equivalent to an uncor. IQ of 70.80, Asian children scored 38.50 which is at the 53.90th GBR-*P* and equivalent to an uncor. IQ of 101.47, Brown children scored 25.20 which is at the 11.73rd GBR-*P* and equivalent to an IQ of 82.17, and White children scored 35.50 which is at the 39.02 GBR-*P* and equivalent to an uncor. IQ of 95.82. All scores had to be corrected by -4.41 for FE to cor. IQs of 66.39, 97.06, 77.76 and 91.41.

Flores-Mendoza and Nascimento (2007, Table 1) compared intelligence of two sample of children, one from a rural and one from an urban region of Brazil. The mean ages of both samples were similar with 7.44y and 7.51y. CPM-raw scores were 12.92 for the rural sample, which is equivalent to the 1.05th GBR-*P* and an uncor. IQ of 65.38, and 22.95 for the urban sample, which is equivalent to the 28.23rd GBR-*P* and an uncor. IQ of 91.36. Corrections were not necessary.

A sample of 11.56y old children from Belo Horizonte, reported by Flores-Mendoza et al. (2010, Table 2), obtained a raw score on the CPM of 31.57 equivalent to the 37.47th GBR-*P* and an uncor. IQ of 95.21, reduced by 0.21 for FE-correction to 95.00.

Two further samples were tested at the Universidade Federal de Minas Gerais, Minas Gerais, one is a regional of children with a mean age of 13.70y and one is an urban sample of children with a mean age of 10.50y (Flores-Mendoza et al., 2013). Both were tested with the SPM where the regional scored 40.40 equivalent to the 23.64th GBR-*P* and an uncor. IQ of 89.23, the urban scored 35.30 equivalent to the 33.02nd GBR-*P* and an uncor. IQ of 93.41. The first one had to be reduced by 6.09 and the second one by 5.67 for FE-correction, which resulted in cor. IQs of 83.14 and 87.74.

Jardim-Botelho et al. (2008, Table 3) tested the effect of hookworm and *A. lumbricoides* infection on intelligence. Their total sample consisted of 196 children which were partly infected and scored 19.36 on the CPM, which is at the 5.86th GBR-*P* and equivalent to an uncor. IQ of 76.50. For our dataset we used the two non-infected sub-samples, which scored significantly higher. The one consisted of 54 which were not infected with hookworms and scored 27.52, and the second one consisted of 56 which were not infected with *A. lumbricoides* and scored 24.59. Both came from the same sample and could overlap each other. Therefore, we formed one single sample with a N of 55 (mean of 54 and 56), a mean age of 8.08y and a pooled raw score of 26.03, which is at the 38.51 GBR-*P* and equivalent to an uncor. IQ of 95.62. It had to be corrected by -0.21 for FE to 95.41.

Malloy-Diniz et al. (2008, Table 2) compared children from private and public schools, with similar mean ages of 25.45y and 25.48y. The pupils from the public schools scored lower with 16.75 at the 16.27th GBR-*P* and equivalent to an uncor. IQ of 85.25, and pupils from private schools scored higher with 20.63 at the 40.51st GBR-*P* and equivalent to an uncor. IQ of 96.40. Both had to be reduced by 0.21 for FE-correction to 85.04 and 96.19.

In the CPM-manual (Raven, Raven & Court; 2006, Table 17) a sample from São Paulo with a mean age of 8.25y were reported to obtain a mean of 18.86, which is at the 7.45th GBR-*P* and equivalent to an uncor. IQ of 78.35, on which 3.99 had to be added for FE-correction to 82.34.

Sisto et al. (2008, Table 1) reported CPM-raw scores from São Paulo for children with a mean age of 8.00y of 22.35. Because this sample was tested in groups, 4.00 raw scores had to be added, so the corrected raw score is 26.35 at the 41.40th GBR-*P* and equivalent to an uncor. IQ of 96.74. A reduction by 0.21 for FE-correction gave a cor. IQ of 96.53.

Tellegen and Laros (2004, Table 1) compared Dutch and Brazilian children with the SON-R. The Brazilian obtained IQs in

"Categories" of 94.80, in "Situations" of 95.00 and in "Stories" of 97.50, which were averaged to an uncor. IQ of 95.77. A reduction by 2.16 for FE-correction resulted in a cor. IQ of 94.01.

Wood et al. (2001, Table 5) reported APM-raw scores from a sample of 87 second graders from public schools with a mean age of 19.72y. The mean raw score was reported as 18.51, which is at the 41.19th GBR-*P* and equivalent to an uncor. IQ of 96.66, corrected by -1.89 to 94.77.

Bandeira, Costa and Arteche (2012, Table 3) compared performances on the CPM of two samples with mean ages of 8.94y and 8.87y, the first one tested in 1990 and the second one in 2000. The 1990th sample scored 24.69 which is at the 17.84th GBR-*P* and equivalent to an uncor. IQ of 86.18, to which 1.47 had to be added for FE-correction to a cor. IQ of 87.65. The sample from 2000 scores 24.76 which is at the 18.21st GBR-*P* and equivalent to an uncor. IQ of 86.39, on which 3.57 had to be added for FE-correction to a cor. IQ of 89.96.

The unweighted national IQ of Brazil is **87.87** with a standard deviation of 8.83. According to the population composition shown in Table 10 and weighted for sample size it is **85.23**. Brazil participated in all PISA-volumes from 2000 to 2015 where it scored a SAS-IQ of **81.54**. The final national IQ of Brazil is **83.38**.

2.3.16. Bulgaria (BGR)

One report of IQ in Bulgaria is once again from Buj (1981, Table 1) who reported an uncor. IQ of 96.30 on the CFT for a sample with a mean age of 20.00y. Corrected by -7.28 for FE and -2.50 for country, this score decreased to a cor. IQ of 86.52.

Lynn et al. (1998, Table 1) also used the CFT on a larger sample with a mean age of 14.00y and measured an uncor. IQ of 94.86, reduced by 5.20 and 2.50 for FE- and country-correction to a cor. IQ of 87.16.

The unweighted national IQ of Bulgaria is **87.87** or **87.10** after weightings. The SAS-IQ, measured from all school assessment studies except PISA-2003, was **81.54**, therefore the final national IQ is **83.38**.

2.3.17. Burkina Faso (BFA)

From the rural province of Nahouri in Burkina Faso, Bagby (2011, Table 2.1) reported a scaled score of a huge representative sample with a mean age of 9.41y on the WISC-R sub-test "Digit Span" of 7.58, rounded to 8.00. 8.00 is at the 25.25th DEU-*P* and equivalent to an uncor. IQ of 90.00, corrected by -15.00 for FE and -1.20 for country to 73.80. Burkina Faso’s unweighted and final national IQs are **73.80** because results from school assessment studies were not available.

2.3.18. Cambodia (KHM)

Fergusson, Bonshek and Le Masson (1995, Table 1) reported an uncor. IQ of 71.50 on the CFT for a sample with a mean age of 18.81y from Phnom Penh and Prey Veng. After a reduction by 10.92 and 2.50 for FE- and country-correction a cor. IQ of 58.08 remained.

A raw score of 45.04 at the SPM was reported for a sample with a mean age of 19.92y by Janssen and Geiser (2012, Table 1), which has to be converted to an APM-raw score of 11.84 at the 9.58th GBR-*P* and equivalent to an uncor. IQ of 80.41. A reduction by 0.21 for FE-correction resulted in a cor. IQ of 80.20. A report of this study is also given by Lynn (2014).

A new study from Bakhiet et al. (2018, Table 1) reported SPM+ results of a normative sample from Phnom Penh. The samples’ age ranged from 6.00y to 18.00y but was reduced by us to 7.00y to 18.00y due to missing British norms for 6.00y olds on the SPM+. The rest had a mean age of 12.50y and obtained a raw score of 32.68 at the 55.01st GBR-*P* and equivalent to an uncor. IQ of 101.89, from which 0.21 had to be subtracted. So, the cor. IQ is 101.68.

The unweighted national IQ of Cambodia is calculated as **79.99** but **99.75** if weighted for sample size and data quality. This is simultaneously the final national IQ because no school assessment study results were available for this country.

2.3.19. Canada (CAN)

Bouchard et al. (2011, Table 3) tested the effect of exposed to manganese from drinking water on intelligence using the WASI on a sample with a mean age of 9.50y. Manganese showed a significant negative effect, so we used only the IQ-scores reported for those children with lowest tap water manganese concentration, which was 106.00 and had to be corrected by -2.38 and -2.50 for FE and country to 101.12.

Boucher et al. (2009, Table 1) measured the IQ of a group of Inuit people with a mean age of 34.75y from Nunavik. A mean SPM-raw score of 35.25 was calculated which had to be converted to a mean APM-raw score of 5.73, which is at the 2.03rd GBR-*P* and equivalent to an uncor. IQ of 69.30 and a cor. IQ of 68.46 after reduced by 0.84 for FE-correction.

Dutton and Lynn (2014, Table 1) estimated an IQ from the Canadian standardization sample of the WAIS-IV with a mean age of 42.00y of 104.50. The mean age was not given in the source but because the sample was representative, the Canadian mean age of 42.00y was taken from CIA (2017; Index: Mean age). 2.50 had to be subtracted from this score for country-correction, so the cor. IQ is 102.00.

An older study from Flores and Evans (1972, Table 3) compared Canadian and Filipino students on the SPM. The Canadian sample had a mean age of 12.65y and obtained a mean raw score of 38.55, which is at the 24.72nd GBR-*P* and equivalent to an uncor. IQ of 89.75, corrected by 1.47 for FE to 91.22.

An uncor. IQ of 102.00 for a Canadian sample with a mean age of 11.00y on the WISC-III was reported by Georgas et al. (2003, Figure 19.6), from which remained a cor. IQ of 94.74 after a FE-correction of -4.76 and a country-correction of -2.50.

John, Krichev and Bauman (1976, Table 1) administered the WISC and the WAIS on two samples of Native Americans in

Ontario, one with a mean age of 20.98y and the other with 18.00y. Both samples scored similar with uncor. IQs of 88.38 and 84.97. On both, a country-correction of -2.50 was necessary. Additionally, for FE-correction, from the first one 9.86 had to be subtracted and 7.14 from the second one, which resulted in cor. IQs of 76.02 and 75.33.

Lange et al. (2005, Table 2) divided the Canadian standardization sample of the WAIS-III in two groups, one for controlling and the other to use regression algorithms for IQ calculations. The uncor. IQ of the developmental group was 103.20 and of the control group 102.40. On both, 0.40 had to be added for country correction, which resulted in cor. IQs of 103.60 and 102.80.

The last Canadian sample was taken from the SPM-manual (Raven, Raven & Court, 1999, Table 19). It was from British Columbia, had a mean age of 9.50y and obtained a mean raw score of 30.33, equivalent to the 40.00 GBR-*P* and an uncor. IQ of 96.20. Corrections were not necessary here.

Canada gained an unweighted national IQ of **91.15** with a standard deviation of 13.08 but after weighted for sample size and composition of the population (see tab. 10) it became **97.90**. A SAS-IQ of **100.91** was estimated from the results of all observed school assessment tests except TIMSS-2003, so the final national IQ is **99.40**.

2.3.20. Chile (CHL)

Galván et al. (2013, Table 1) did research on childhood obesity and its effects on intelligence. IQ-measurements on an obese-group with a mean age of 5.08y and on a non-obese group with a mean age of 5.16y were done with WPPSI-R and gave the obese an uncor. IQ of 91.69 and the non-obese an uncor. IQ of 92.00. Both IQs are close to each other and were therefore used in our dataset. They had to be corrected by -1.36 and -2.50 for FE and country to 87.83 and 88.14.

Marincovich et al. (2000, Tab. 5) showed Chilean percentiles of SPM raw-scores for 11.50y to 18.50y olds. The sample was split by us into one from 11.00y to 15.00y and one from 16.00y to 18.50y. The younger sample with a mean age of 13.25y obtained a raw score of 40.50, equivalent to the 31.42nd GBR-*P* and an uncor. IQ of 92.74. A reduction by 4.41 for FE-correction resulted in a cor. IQ of 88.33. The older sample scored 48.83. This score was converted to 18.30 on the APM-scale, equivalent to the 53.64th GBR-*P* and an uncor. IQ of 101.37. A reduction by 1.68 for FE-correction resulted in a cor. IQ of 99.69.

Seniors with a mean age of 71.00y were tested by Paz et al. (2012) by using the SPM. They obtained a score 26.71 which had to be converted to 2.59 on the APM-scale, which is at the 7.94th GBR-*P* and equivalent to an uncor. IQ of 78.86. A FE-correction of -3.36 was necessary and resulted in a cor. IQ of 75.50.

The unweighted national IQ of Chile is **87.90** with a standard deviation of 8.56 and increased to **89.85** after weightings. Chile participated in all PISA-volumes except the one from 2003, in all TIMSS-volumes except 1995 and 2007, and in PIRLS-2016. The SAS-IQ is **85.93** and the final national IQ **87.89**.

2.3.21. China (CHN)

Students from the Northwest University of China were tested by Liu et al. (2016, Table 2) with the SPM. They had a mean age of 19.41y and obtained a raw score of 51.59, converted to 18.96 on the APM-scale, which is at the 43.22nd GBR-*P* and equivalent to an uncor. IQ of 97.44, reduced by 3.36 for FE-correction to a cor. IQ of 94.08.

Lynn, Cheng and Wang (2016b, Table 1) collected IQ-data measured by the Ministry of Health of the People's Republic of China with the Combined Raven's Test for Children (CRT-C2). IQs were given for 31 Regions. We used 2015 population data for these regions from the National Bureau of Statistics of China (2014) to calculate a representative mean national IQ and got a score for the uncor. IQ of 103.53. This score had to be corrected by -1.89 for FE and 5.80 for country to 107.44.

Raven, Raven and Court (1998, Tab. APM26) gave Chinese APM-norms from 1984 and 1992. We used the sample of the newer standardization and split it into two groups. One with an age range from 10.00y to 13.50y with a mean age of 11.75y obtained a raw score of 16.38, converted to 49.66 on the SPM-scale, which is equivalent to 92.24th GBR-*P* and an uncor. IQ of 121.32, reduced by 2.73 for FE-correction to 118.59. The second group with an age range from 14.00y to 18.50y and with a mean age of 16.25y obtained a raw score of 22.80, which is equivalent to the 82.14th GBR-*P* and an uncor. IQ of 113.81, for which no corrections were necessary.

The SPM-manual (Raven, Raven & Court, 1999, Table 24) gave at first raw scores for children and adolescents from 6.50y to 15.50y with a mean age of 11.00y and a mean raw score of 37.05. This score is at the 53.27th GBR-*P* and equivalent to an uncor. IQ of 101.23, from which 1.47 had to be deducted for FE-correction, so the cor. IQ is 99.76. The age of the second group ranged from 16.00y to 75.00y with a mean of 38.39y and a mean raw score of 45.22. This is 13.02 on the APM-scale, equivalent to the 27.71 GBR-*P* and an uncor. IQ of 91.13. After adding 1.26 for FE-correction this resulted in a cor. IQ of 92.39.

China got an unweighted national IQ of **104.35** with a standard deviation of 10.69. The score remained stable at **104.97** during weightings. School assessment studies China participated in were PISA-2009 to -2015 and a SAS-IQ of **103.24** had been calculated. The final national IQ of China is **104.10**.

2.3.22. Colombia (COL)

Children with and without motor disorders were tested on IQ with the WISC by Leon et al. (1975). Those with motor disorders scored significantly lower than those without, which obtained an uncor. IQ of 77.70. Corrected by -7.48 and -2.50 for FE and country gave a cor. IQ of 67.72.

McKay et al. (1978, Fig. 3) gave mean IQs for six age-groups, all within the 8th life year, measured with the SBIS. Five out of six groups had low SES, one had a high SES. Four out of six groups had subnormal weight and height, one had normal weight and height, on was not reported. The group with low SES but normal weight and height scored 79.40, the group with high SES scored 109.20, all others scored between 82.00 to 92.40. Because the healthy group with low SES scored lower than the four underweighted and undergrown groups with low SES, we decided to ignore the differences in health and averaged all six scores to an uncor. IQ of 89.63, which had to be reduced by 4.42 for FE-correction and 2.50 for country-correction to 82.71.

IQ of an urban sample from Medellin was observed by Ortega (2011, Table 2) with the WISC-IV. We averaged the score for males of 89.77 and females of 92.64 with identical weighting and got an uncor. IQ of 91.21, which had to be reduced by -1.02 and -2.50 for FE- and country-correction to 87.69.

The unweighted national IQ of Columbia is **79.37** with a standard deviation of 10.39. This IQ increased strongly after weightings to **85.95**. The country participated in PISA-2006 to 2015, in TIMSS-1995 and 2007, and in PIRLS-2001 and 2011, where it obtained a SAS-IQ of **80.32**. The final national IQ of Columbia is **83.13**.

2.3.23. Congo, Democratic Republic of the (COD)

Boivin and Giordani (1993, Tab.1) gave four samples of children which were tested with the KABC, however three of them are treatment groups and/or have participated in a pre-test on the KABC. Therefore, only the non-treatment and non-pre-test group was included here. Its mean age was 7.70y and its uncor. IQ, calculated from the Mental Processing IQ, Sequential IQ, Simultaneous IQ and Nonverbal IQ, was 65.00, corrected by -6.24 and -2.50 for FE and country to 56.26.

Four samples were given by Boivin et al. (1993, Tab.1), split into positives and negatives for intestinal parasites and blood trophozoites. We used the two negative samples for our dataset. Mean age of both is 8.65y. The uncor. IQs of the two samples, calculated from the Mental Processing IQ, Sequential IQ, Simultaneous IQ and Nonverbal IQ, were 74.45 and 72.05, corrected by -6.24 for FE and -2.50 for country to 65.71 and 63.31.

Boivin et al. (1995, Tab. 4) gave four samples of younger and older children with and without improvement of ability by tactual performance tasks. We selected a younger and an older sample without improvement. Uncor. IQ of the two samples, calculated from the Mental Processing IQ, Sequential IQ, Simultaneous IQ and Nonverbal IQ, are 76.38 and 72.05, corrected by -6.24 for FE and -2.50 for country to 67.64 and 59.56.

Boivin et al. (2013, Tab.3) reported IQ on KABC on two samples, one with an irreversible upper-motor neuron disorder and a control sample, from which the second one was used in our dataset. Its mean age was 9.10y and its uncor. IQ, calculated from the Mental Processing IQ, Simultaneous IQ, Learning IQ, Delayed learning IQ, Planning IQ and Nonverbal IQ, 66.17, reduced by 7.28 and 2.50 for FE- and country-correction to 56.39.

Kashala et al. (2005, Table 2) gave CPM-raw scores for on average 8.00y old children with DSM-IV ADHD and a control sample. Both scored identical and were used for the dataset. The raw scores of 15.00 are at the 1.47th GBR-*P* and equivalent to an uncor. IQ of 67.32, corrected by 0.84 for FE to 68.16.

The Democratic Republic of the Congo did not participate in any school assessment studies. Its unweighted national IQ is **63.16** with a standard deviation of **5.11** and increased after weightings to a final national IQ of **64.92**.

2.3.24. Congo, Republic of the (COG)

Nkaya, Huteau & Bonnet (1994, Table 3) gave the only usable IQ-measurement from the Republic of Congo. It was done on the SPM on a sample with a mean age of 13.25y from the capital Brazzaville. Data were given from a self-paced and a timed measurement from which the first one recorded 29.60 raw scores. These are at the 0.68th GBR-*P* and equivalent to an uncor. IQ of 66.12, reduced by 3.15 for FE-correction to a cor. IQ of **62.97**, which is both the unweighted and final national IQ due to missing results from school assessment studies.

2.3.25. Costa Rica (CRI)

Rindermann, Stiegmaier and Meisenberg (2014, Table 1) reported results from three measurements on children from Costa Rica. They were separated into three age groups, one with a mean age of 10.50y and tested with the SPM, one with 16.40y and tested with the APM and one with 600y and tested with the CPM. The CPM sample scored 19.80 which is equivalent to the 51.59th GBR-*P* and to an uncor. IQ of 100.60, reduced by 0.21 for FE-correction to 100.39. The SPM sample scored 25.52, which is equivalent to the 9.79th GBR-*P* and an uncor. IQ of 80.60, reduced by 6.09 for FE-correction to 74.51. For the same reasons as described in the section about Austria, the reported APM-results were not used by us. This gives Costa Rica an unweighted national IQ of **87.45,** which increased to 88.34 after weightings. Costa Rica participated in PISA-2009 to 2015 where it obtained a SAS-IQ of **87.79** and its final national IQ is **88.34**.

2.3.26. Croatia (HRV)

Buj (1981, Table 1) gave an uncor. IQ of 105.70 for a sample with a mean age of 20.00y from Croatia on the CFT. After the subtraction of 7.28 and 2.50 for FE- and country-correction a cor. IQ of 95.92 remained.

One sample was provided by Žebec, Demetriou and Kotrla-Topić (2015, SM Tab.4), which was tested in two waves with the SPM. In the first wave, mean age was 11.57y and in the second 16.97y. Due to the long-time distance between wave 1 and 2 of 5.40y, a training effect seems to be unlikely and data from both waves could be used in our dataset. Wave 1 scored 38.68, which is at the 46.25 GBR-*P* and equivalent to an uncor. IQ of 98.59. We had to reduce this score by 6.09 for FE-correction to a cor. IQ of 92.50. Wave 2 scored 46.97 on SPM, which had to be converted to 13.63 on APM-scale. This score is at the 33.41st GBR-*P* and equivalent to an uncor. IQ of 93.57, corrected by -3.36 for FE to 90.21.

The unweighted national IQ of Croatia is **92.88** with a standard deviation of 2.87 and increased to 93.92 after weightings. Croatia participated in PISA-2006 to 2015, TIMSS-2011 and 2015, and in PIRLS-2011. The SAS-IQ is **97.58** which gives Croatia a final national IQ of **95.75**.

2.3.27. Cuba (CUB)

Alonso Garcia (1973, Tab.3) showed SPM-raw scores for a sample from Cuba, which had to be split into one with a mean age of 14.00y and one with a mean age of 18.50y. The younger sample scored 37.32 on the 16.92nd GBR-*P* and equivalent to an uncor. IQ of 85.64. We added 1.26 for FE-correction and got a cor. IQ of 86.90.

The raw scores of the older sample of 41.89 had to be converted to 9.40 on APM-scale, which is at the 9.68th GBR-P and equivalent to an uncor. IQ of 80.50. We added 3.99 for FE-correction and got a cor. IQ of 84.49.

Another sample was provided by Valcarcel et al. (2000, Tab.6). For the total sample with a mean age of 25.88 a raw score on the SPM of 44.00 was reported, which had to be converted to 10.98 on the APM-scale, equivalent to the 7.83rd GBR-*P* and an uncor. IQ of 78.75, reduced by 1.68 for FE-correction to 77.07.

This gives Cuba an unweighted national IQ of **82.82** with a standard deviation of 5.13, which increased to **83.90** after weightings. No school assessment results were traceable, and the weighted national IQ is **83.90**.

2.3.28. Cyprus (CYP)

Spanoudis, Natsopoulos and Lynn (2016, Table 1) gave results for a representative sample from Cyprus, which had to be split in a younger sample with a mean age of 13.00y and an older with a mean age of 17.00y. The younger sample scored 44.30 on SPM, equivalent to the 53.90th GBR-*P* and an uncor. IQ of 101.47, reduced by 2.94 for FE-correction gave a cor. IQ of 95.23. The older one scored 48.88 or 15.68 on the APM-scale, which is equivalent to the 45.15th GBR-*P* and an uncor. IQ of 98.17, reduced by 5.67 for FE-correction to 95.80. The mean of both corrected IQs is **95.51**. Cyprus got a SAS-IQ of **91.03** from PISA-2012 and -2015, the full TIMSS-Series except 2011, and PIRLS-2001 and 2016. So, the weighted national IQ is **93.39**.

2.3.29. Czechia (CZE)

The only source giving IQ-data for Czechia included in our dataset is from Buj (1981, Table 1). The sample was from Bratislava and had a mean age of 20.00y. The reported CFT-IQ was 100.40, reduced by 7.28 and 2.50 to **90.62**, which is also the unweighted national IQ. Czechia participated in all observed PISA-volumes, in all observed TIMSS-volumes except in 2003 and in all observed PIRLS-volumes except in 2006. The SAS-IQ is **99.21**, which gives Czechia a weighted IQ of **94.92**.

2.3.30. Denmark (DNK)

Two psychometric measurements were included for Denmark, one again from Buj (1981, Table 1), which gave this Country an uncor. IQ of 100.70 on the CFT, reduced by 7.28 and 2.50 for FE- and country-correction to 90.92.

An older study from Vejleskov (1968) reported a mean raw score on the SPM for a sample of 5.00y to 11.00y olds with a mean age of 11.89y of 39.02, which is at the 36.87th GBR-*P* and equivalent to an uncor. IQ of 94.97. 2.52 had to be added on this for FE-correction and resulted in a cor. IQ of 97.49.

Unweighted Denmark got a national IQ of **94.20** and weighted **96.68**. It obtained a SAS-IQ of **98.98**, estimated by results from the full observed PISA-series, TIMSS-1995, 2007, 2011 and 2015, and from PIRLS-2006 to 2016. The weighted national IQ is **97.83**.

2.3.31. Dominica (DMA)

From Meisenberg et al. (2005, Fig. 2, 3), two measurements, both done with SPM, were taken. The first measurement was on a sample with a mean age of 21.00y and the second on a sample with a mean age of 56.10y. Both mean ages were above the SPM-age scale and raw scores had to be converted to the APM-scale. The younger sample scored 36.15 or 6.13 on the APM-scale, which is at the 1.79th GBR-*P* and equivalent to an uncor. IQ of 68.52. The older samples scored 23.45 or 1.47 on the APM-scale, which is at the 1.94th GBR-*P* and equivalent to an uncor. IQ of 69.02. A correction 0f -2.73 for FE reduced these scores to 65.79 and 66.29. The unweighted mean of both cor. IQs is **66.04**. Dominica did not participate in any school assessment studies and the weighted and final national IQs are **66.03**.

2.3.32. Dominican Republic (DOM)

Imperato-McGinley et al. (1991, Table 1) compared cognitive abilities in androgen-insensitive subjects with a control sample measured with the Spanish version of the WAIS, where the control sample got an uncor. of 111.95, which is equivalent to the 78.72nd PRI%. After correcting the IQ by -22.80 for country the cor. IQ was **89.15**. A participation in PISA-2015 gave the Dominican Republic a SAS-IQ of **74.95** and the final national IQ is therefore **82.05**.

2.3.33. Ecuador (ECU)

Intelligence of Pb-exposed children from a rural Andean region in Ecuador with normal and abnormal neuro exams was measured with the CPM by Counter et al. (1998, Fig.4). Data were provided for two age groups with mean ages of 6.50y and 10.00y separately. The mean score of the younger group was 15.44, equivalent to the 12.84th GBR-*P* and an uncor. IQ of 82.99. The mean score of the older group was 19.38, equivalent to the 0.65th GBR-*P* and an uncor. IQ of 62.76. 1.89 had to be added to both scores for FE-correction, which resulted in cor. IQs of 84.88 and 64.65.

Harari et al. (2010, Table 3) presented CPM-raw scores from the Tabacundo region. Some individuals in the total sample were prenatal or currently exposed to pesticides, so we used only the sub-samples without exposure, from which one has a mean age of 6.90y and the other 7.20y. The first sample scored 15.70, which is at the 7.55th GBR-*P* and equivalent to an uncor. IQ of 78.46. The second sample scored 16.10, which is at the 8.48th GBR-*P* and equivalent to an uncor. IQ of 79.40. A minor correction of -0.21 for FE was necessary to both scores, resulted in cor. IQs of 78.25 and 79.19.

The unweighted national IQ of Ecuador is **76.74** with a standard deviation of 8.58. It increased to **78.26** after weightings. School assessment data were not available, so the final national IQ is also **78.26**.

2.3.34. Egypt (EGY)

The first report used for Egypt came from Abdel-Khalek, Nour-Eddin and Lynn (2014, Table 1). The SPM was administered on students with a mean age of 20.50y at the Ain-Shams University in Cairo. They scored 44.00 or 10.98 on the APM-scale, equivalent to the 7.83rd GBR-*P* and an uncor. IQ of 78.75, reduced by 1.68 for FE-correction to 77.07.

SPM-scores from a huge representative sample were reported by Bakhiet and Lynn (2015c, Table 1). This sample was split by us into a younger one with a mean age of 10.50y and an older one with a mean age of 18.59y. The younger sample scored 28.70, which is at the 22.96th GBR-*P* and equivalent to an uncor. IQ of 88.90, whereas the older sample scored 48.50 or 17.61 on APM-scale, which is at the 41.11st GBR-*P* and equivalent to an uncor. IQ of 96.63. 1.26 had to be added to the score of the younger sample and 1.47 deducted from the score of the older, so the cor. IQs are 97.89 and 87.43.

Bakhiet and Lynn (2015a, Table 1) gave CPM-raw scores for another very huge sample with a mean age of 8.00y, which scored 21.20 at the 16.89th GBR-*P* and equivalent to an uncor. IQ of 85.62, corrected by -0.21 for FE to 85.41.

Wachs et. al. (1995) reported from the village of Kalama CPM-raw scores of 15.01 for males and 13.44 for females. The mean age was 8.50y, therefore the mean of both scores is at the 0.51st GBR-*P* and equivalent to an uncor. IQ of 61.48. Adding 2.52 for FE-correction resulted in a cor. IQ of 64.00. The same sample was also tested with the WISC-R. The mean scaled score for verbal ability is 19.66 and 15.06 for performance ability, summed to a FS-scaled score of 34.72 at the 8.07th DEU-*P* and equivalent to an uncor. IQ of 79.00. From this, 7.20 had to be deducted for FE-correction and 1.20 for country correction, resulted in a cor. IQ of 70.60.

Yunis et al. (1995, Table 4) used CPM to measure intelligence on a group of children at around 10.00y of age from the region of Giza. They scored 21.70, equivalent to the 4.78th GBR-*P* and an IQ of 75.00, increased by 2.52 for FE-correction to 77.52.

An older study from Abdel-Khalek (1988, Table 1) reported APM-raw scores of undergraduate students from Alexandria with a mean age of 23.48y. They scored 42.34 on SPM but 9.72 on the APM-scale, which is equivalent to the 5.66th GBR-*P* and an uncor. IQ of 76.24, to which 0.84 had to be added for FE-correction to 77.08.

Ziada et al. (2017, Table 1) gave CPM-raw scores for children with a mean age of 8.00y from the rural region of Menoufia. They obtained a mean raw score of 22.26, which is at the 24.55th GBR-*P* and equivalent to an uncor. IQ of 89.67. A minor correction of -0.21 for FE resulted in 89.46.

The unweighted national IQ for Egypt is **80.72** and had a standard deviation of 10.35. This score increased strongly after weightings to **86.46**. Egypt participated in TIMSS-2003 and -2007 as well as in PIRLS-2016. It obtained a SAS-IQ of **66.19** and a final national IQ of **76.32**.

2.3.35. Eritrea (ERI)

Intelligence was measured in three samples of orphans on the SPM by Wolff and Fessada (1999, Tab.3) with mean ages of 10.50y, 10.50y and 11.00y. The first sample scored 20.60, which is at the 2.18th GBR-*P* and equivalent to an uncor. IQ of 69.74, the second sample scored 20.90, which is at the 2.34th GBR-*P* and equivalent to an uncor. IQ of 70.18, and the third sample scored 20.60, which is at the 1.93th GBR-*P* and equivalent to an uncor. IQ of 68.98. 3.57 had to be deducted for FE from the first and second value and 2.31 from the third, which resulted in cor. IQs of 66.17, 66.61 and 66.67.

Wolff et al. (1995, Tab. 2) measured a SPM-raw score of 13.30 on a sample of orphans with a mean age of 5.70y. This score is at the 16.57th GBR-*P* and equivalent to an uncor. IQ of 85.43, to which 2.52 had to be added for FE-correction to 87.95. An also-provided refugee sample was ignored by us because it scored significantly lower and negative effects of the refugee status are probably.

The four corrected IQs were averaged to an unweighted national IQ of **71.85** with a standard deviation of 10.73. School assessment results were not available. The final national IQ is **68.77** after weightings.

2.3.36. Estonia (EST)

Lynn, Pullmann and Allik (2003, Table 1) presented SPM-raw scores for children in Estonia. The sample was representative and had a mean age of 9.25y. It scored 32.70, which is at the 53.13 GBR-*P* and equivalent to an uncor. IQ of 101.18, reduced by 4.62 for FE-correction to 96.56.

Pullmann, Allik and Lynn (2004, Table 1) presented another representative sample, which had to be split into a younger one with a mean age of 11.25y and an older one with a mean age of 17.50y. The younger scored 38.85 on the SPM, which is at the 56.51st GBR-*P* and equivalent to an uncor. IQ of 102.46, from which 1.89 had to be subtracted for FE-correction to 103.05. The older scored 52.68 on SPM which had to be converted to 20.47 on the APM-scale, equivalent to the 62.90th GBR-*P* and an uncor. IQ of 104.94. After a correction for FE of -4.62 a cor. IQ of 97.84 remained.

The unweighted Estonian IQ is **99.15** with a standard deviation of 3.43 which remained stable at 98.58 after weightings. The country participated in all PISA-volumes from 2006 to later and in TIMSS-2003. It obtained a SAS-IQ if **102.86** and its final national IQ is **100.72**.

2.3.37. Ethiopia (ETH)

Dendir (2013, Table 1b) measured intelligence on three samples of Ethiopian children with mean ages of 8.00y, 12.00y and 15.00y. On the two older samples the Peabody Picture Vocabulary Test (PPVT) was administered, which is not include in our dataset so far. However, intelligence of the youngest sample was measured with the CPM. The sample obtained a mean raw score of 16.86, equivalent to the 2.66th GBR-*P* and an uncor. IQ of 70.99. 1.05 had to be added to this score for FE-correction, which resulted in a cor. IQ of 72.04.

Kaniel and Fisherman (1991, Table 1) and Lynn (1994) reported SPM-data of Ethiopian immigrants with a mean age of 14.70y, which scored 27.00 in raw scores, equivalent to the 2.20th GBR-*P* and an uncor. IQ of 69.78, corrected by -2.52 for FE to 67.26.

From Kozulin (1998, Table 1), SPM-raw scores were taken for a sample of 46 Ethiopian children in Israel. They had a mean age of 15.00y and obtained a mean score of 28.41, equivalent to the 4.51st GBR-*P* and an uncor. IQ of 74.59, corrected by -3.99 for FE to 70.60. The sample was tested once again after two weeks with the same test, where it reached a raw score of 33.11 at the 5.70th GBR-*P* and equivalent to an uncor. IQ of 76.30. This shows a significant training effect due to which the second measurement was not included here.

Two samples of children in Ethiopia were tested on SPM by Poppe (2012, Table 2.12). One was a control sample and the other in a school meals program. The control sample had a mean age of 9.91y and scored 12.88, equivalent to the 0.39th GBR-*P* and an uncor. IQ of 60.08, whereas the experimental sample scored 12.61, equivalent to the 0.35th GBR-*P* and an uncor. IQ of 59.61. From both 6.09 had to be deducted for FE-correction, which resulted in cor. IQs of 60.08 and 59.61. Because no significant differences were found between the samples, both were included in our dataset.

Tzuriel and Kaufman (1999, Tab.1) compared Israeli- and Ethiopian-born children in Israel on the CPM. The Ethiopian sample had a mean age of 6.75y and obtained a raw score of 15.65, which is at the 10.87th GBR-P and equivalent to an uncor. IQ of 81.50, to which 1.89 had to be added for FE-correction to 83.39.

The unweighted national IQ of Ethiopia is **68.83** with a standard deviation of 8.82. It increased after weightings to a final national IQ of **68.42**. No school assessment data were available.

2.3.38. Finland (FIN)

Buj (1981, Table 1) reported also data from Finland. Once again, these data were measured with the CFT and the sample had a mean age of 25.00y. The measured IQ was 98.10, which had to be corrected by -7.28 and -2.50 for FE and country to 88.32.

In Cronbach and Drenth (1972), Kyöstiö (1972, Table 1) reported SPM-raw scores of a national sample from Finland with a mean age of 7.00y. The sample obtained a mean raw score of 17.15, which is at the 43.83rd GBR-*P* and equivalent to an uncor. IQ of 97.67. After adding 1.89 for FE-correction this resulted in a cor. IQ of 99.56.

Dutton, te Nijenhuis and Roivainen (2014) estimated the IQ of the normative sample underlying the Finnish WAIS-IV on the scale of the US version of the WAIS-IV and get an uncor. IQ of 103. 2.50 had to be deducted for FE, so the cor. IQ is 100.50.

Finland obtained an unweighted national IQ of **96.13** with a standard deviation of 6.78. This score increased to **99.31** after weightings. School assessment data were available from all observed PISA-volumes, from TIMSS-1999, 2011 and 2015, and from PIRLS-2011 and 2016. The calculated SAS-IQ is **103.09** which gives Finland a final national IQ of **101.20**.

2.3.39. France (FRA)

The IQ for France reported by Buj (1981, Table 1) for an urban sample with a mean age of 20.00y was 96.10 on the CFT, corrected by -7.28 and -2.50 for FE and country to 86.32.

Georgas et al. (2003, Fig. 19.6) showed a FS-IQ on WISC-III for a sample of on average 11.00y old French of around 100.50, corrected by -4.76 and -2.50 for FE and country to 93.24.

Nkaya, Huteau and Bonnet (1994, Table 3) measured intelligence on an urban sample from Paris with a mean age of 12.50y with the SPM. They measured in three successive rounds from which only the first one was used due to training effects in the following rounds. The sample scored 46.90 from a measurement with self-paced time restriction, which is at the 76.79th GBR-*P* and equivalent to an uncor. IQ of 110.98.

From the CPM-manual (Raven, Raven & Court, 2006, Tab.22) raw scores were reported for an urban sample from Paris with a mean age of 7.50y. It obtained a raw score of 24.53, which is at the 53.45th GBR-P and equivalent to an uncor. IQ of 101.30. 3.15 had to be deducted from this score for FE-correction, so the cor. IQ is 107.83.

The performance IQ reported by Roivainen (2010, Table 3) on WAIS-III for France is 104.17. It was from a normative sample and representative for the normal French population, from which individuals with handicaps and disorders were excluded, therefore an overestimation is possible. The score had to be reduced by 0.68 and 2.50 for FE- and country-correction to 101.99.

The samples give France an unweighted national IQ of **98.51** with a standard deviation of 8.62, decreased to **97.02** after weightings. The SAS-IQ is **96.35**, estimated from all observed PISA- and PIRLS-volumes as well as from TIMSS-1995 and -2015. The final national IQ for France is **96.69**.

2.3.40. Gambia, The (GMB)

The SPM was administered by Alderman et al. (2014, Table 1) on two rural samples from The Gambia. One was a control sample with a mean age of 19.50y and the other was treated with nutritional supplements during pregnancy or lactation and had a mean age of 19.60y. Both samples scored closely to each other and were therefore both used for our dataset. The control sample scored 14.50, converted to -1.04 on the APM-scale and equivalent to the 0.04^{th} GBR-*P* and an uncor. IQ of 49.32. The experimental sample scored 14.65, converted to -0.94on the APM-scale and equivalent to the 0.04^{th} GBR-*P* and an uncor. IQ of 49.68. Both had to be corrected by -3.36 for FE, which resulted in cor. IQs of 45.96 and 46.32.

Jukes and Grigorenko (2010, Table 3) studied people from two ethnic groups in The Gambia, one from the Mandinka and one from the Wolof, and measured intelligence with the CPM. The two samples have mean ages of 16.98y and 17.90y. The Mandinka scored 8.34 and the Wolof 9.29. A maximum score of 18.00 was noted, which is half of the full CPM-item number of 36. But no information was provided which set(s) of the CPM was or were used. If we assume that, because of the difficulty for people from countries like The Gambia to absolve cognitive tests like Raven's matrices and because the difficulty of Raven's items increases with their number-ranks, that the reported raw scores were mostly achieved on Set-A, we were able to calculate full CPM-raw scores of 18.99 and 23.19, converted to -0.59 and 1.56 on the APM-scale, which are below the 0.05^{th} GBR-*P* and equivalent to an uncor. IQ of 48.95, and at the 0.28^{th} GBR-*P* and equivalent to an uncor. IQ of 58.51. Both had to be reduced by 2.94 for FE-correction to 46.01 and 55.57.

Jukes et al. (2006, Table 2) compared a group treated with anti-Malaria prophylaxis and a placebo group on the CPM. Both groups were on average 17.70y old and scored 9.06 and 9.02. These scores were similar to the scores from Jukes and Grigorenko (2010, Table 3), which used only 18 items from the CPM. Thus and because of the same first author, we assumed that also in this study only 18 items were used and applied the same method as before. The given CPM-raw scores of 9.02 and 9.06 were extrapolated to 21.98 and 22.16 on the full CPM and converted to 0.94 and 1.03 on the APM-scale. These scores are at the 0.19th GBR-*P* and equivalent to an uncor. IQ of 56.50 and at the 0.20th GBR-*P* and equivalent to an uncor. IQ of 56.86. Both had to be corrected by -1.89 for FE to 54.61 and 54.97.

Finally, the unweighted national IQ for The Gambia is **50.57** with a standard deviation of 4.92 and after weightings the final national IQ is **49.78**. No school assessment results were available.

2.3.41. Gaza Strip (PSE)

Bakhiet and Lynn (2014e, Table 1) reported CPM-scores for children living in the Gaza-Strip. One group has a mean age of 8.51y and was measured in smaller groups, the other group had a mean age of 8.94y and was measured individually. Within the group-administration, the raw score was 18.38 or 22.38 corrected for testing method, equivalent to the 17.57th GBR-*P* and an uncor. IQ of 86.02. The other group obtained a raw score of 24.43 which is at the 21.89th GBR-*P* and equivalent to an uncor. IQ of 88.36. Reducing both by 0.21 for FE-correction resulted in cor. IQs of 85.81 and 88.15.

Results from a SPM-administration in the Gaza-Strip were reported by Bakhiet and Lynn (2015f). The sample had an age range from 8.00y to 18.00y and was therefore split in one from 8.00y to 15.00y with a mean of 11.50y and one from 16.00y to 18.00y with a mean of 17.00y. The younger sample scored 29.72 which is at the 15.26th GBR-*P* and equivalent to an uncor. IQ of 84.62, reduced by 6.09 for FE-correction to 78.53. The older sample scored 38.64, converted to 7.40 at the APM-scale, which is at the 8.03rd GBR-P and equivalent to an uncor. IQ of 78.95, reduced by 3.36 for FE-correction to 75.59

An older measurement came from Lieblich and Kugelmas (1981, Table 1) and was done on the Israeli-Jewish WISC-R, where a sample with a mean age of 11.00y obtained an uncor. IQ of 86.02, corrected by 2.90 for FE and by -5.40 for country to a cor. IQ of 77.72.

The unweighted national IQ of the Gaza-Strip is **81.16** with a standard deviation of 5.48. It decreased to **79.66** after weightings. TIMSS-2003, 2007 and 2011 were also administered in the Gaza-Strip from which a SAS-IQ of **75.72** was calculated. The final national IQ is **77.69**.

2.3.42. Germany (DEU)

The uncor. IQ for Germany reported by Buj (1981, Table 1) on the CFT was 109.30 for a sample from Hamburg with a mean age of 20.00y. It had to be corrected by -7.28 and -2.50 for FE and country to 99.52.

Grob et al. (2008, Tab.2) compared Swiss and German children on the HAWIK-IV, the German language version of the WISC-IV. The German sample had a mean age of 11.00y and obtained an uncor. IQ of 100.48, which had to be reduced by 1.20 for country correction to 99.28.

Janssen and Geiser (2012, Table 1) compared children from Germany and Cambodia on the SPM. The German sample was from the county of Brandenburg and the capital Berlin and had a mean age of 18.50y. It scored 52.54, converted to 20.26 on the APM-scale. This score is at the 53.45th GBR-*P* and equivalent to an uncor. IQ of 101.30, reduced by 0.21 for FE-correction to 101.09.

Kalisch et al. (2012, Fig.3B) reported SPM-scores for older Germans in % of correct answers. The mean age of the sample was 67.69y and the shares of correct answers were 79.00%, 70.00%; 75.00% and 53.00%, in which the second and fourth numbers represent women. On average and by a full number of SPM-items of 60, these shares would be equivalent to a raw score of 41.55 or 9.17 on the APM-scale. This score is at the 27.83rd GBR-*P* and equivalent to an uncor. IQ of 90.98, from which 3.36 had to be subtracted for FE-correction to 87.62.

Korsch et al. (2013, Tab.13) used the WPPSI-III and estimated an uncor. FS-IQ of 104.08. The mean age was reported with 74.50 month and was therefore 6.28y. The score had to be corrected by -

1.20 for FE to 102.88. A group with ADHD obtained a much lower uncor. IQ of 90.93 and was therefore not used.

A national sample was used by Kratzmeier and Horn (1988, Tab.13) for the standardization of the SPM in Germany. The full sample had a mean age of 10.00y and scored 46.25, which is at the 67.79th GBR-*P* and equivalent to an uncor. IQ of 106.93, or 105.04 after a FE-correction of -1.89.

Lepach et al. (2015, Tab.2) tested a sample with a mean age of 36.60y on the WAIS-IV. The sample showed an overrepresentation of people graduated from high schools. An uncor. IQ of 104.10 was reported, which would be a cor. IQ of 102.90 after a country-correction of -1.20.

The APM-manual (Raven, Raven and Court, 1998) gave smoothed norms for Germany, divided into five age groups. However, the youngest group was named "Less than 20" and could not be used due to the missing exact or approximated age. The other groups together had a mean age of 35.00y and obtained a mean score of 23.75, which is at the 64.78th GBR-*P* and equivalent to an uncor. IQ of 105.69, reduced by 1.05 for FE-correction to 104.64.

Also, the SPM+-manual (Raven, Raven & Court, 1999, Tab.5) reported German norms. They were falsely described in the manual as SPM-norms in the head of the table but reported within the chapter of the SPM+-standardization. The sample ranged from below 13.00y to above 30.00y. We used only the age groups of 14.00y to 18.00y which are within the age range of the SPM+. The calculated mean raw score was 38.07m which is at the 64.08th GBR-*P* and equivalent to an uncor. IQ of 105.41, adding 1.68 for FE-correction and got a cor. IQ of 107.09.

The German norm sample for the CPM-standardization had a mean age of 7.25y and obtained a raw score of 24.79 (Raven, Raven & Court, 2006, Tab.9). This score is at the 60.77th GBR-*P* and equivalent to an uncor. IQ of 104.10. After adding 1.89 for FE-correction, this resulted in a cor. IQ of 105.99. The sample was from urban origin.

The German IQ of WISC-III reported by Georgas et al. (2003, Figure 19.6) was 102.00 for a sample with a mean age of 11.00y. It had to be reduced by 4.76 and 2.50 for FE- and country-correction to 94.74.

Goldbeck et al. (2010, Tab.1) compared intelligence of male and female individuals with a mean age of 11.50y on the WISC-IV. Females obtained an uncor. IQ of 99.49 and male of 100.52, which were averaged to 100.01 and corrected by -1.20 and -1.20 for FE and country to 97.61.

Germany's unweighted national IQ is **100.70** with a standard deviation of 5.50. The score increased to 102.33 after weightings. The country participated in all observed school assessment studies except in TIMSS-1999 and 2003 and achieved an SAS-IQ of **99.16**. The final national IQ is **100.74**.

2.3.43. Ghana (GHA)

Anum (2014, Tab.3) standardized the CPM in Ghana on a sample from the area of Greater Accra. It had a mean age of 8.50y and scored 15.50 at the 0.99th GBR-*P*, equivalent to an uncor. IQ of 65.05 and 64.84 after a FE-correction of -0.21.

Aslam and Lehrer (2012, Tab.1) reported SPM-scores from four cities in Ghana, namely Accra, Kumasi, Takoradi and Cape Coast. All participants were adolescent or adult household members and the mean age of the sample was 35.00y. A mean of 35.60 raw scores was calculated from the given percentages of correct answers on the full SPM, which had to be converted to 5.88 on the APM-scale, equivalent to the 1.96th GBR-*P* and an uncor. IQ of 69.08, reduced by 3.36 for FE-correction to 65.72.

The IQ on the CFT reported by Buj (1981, Table 1) was 82.20 for an urban sample from Akkra. However, no further information was provided how this score was measured and calculated. 7.28 had to be deducted for FE-correction and 2.50 for country-correction, which resulted in a cor. IQ of 72.42.

Glewwe and Jacoby (1992, Tab. A1) reported a mean score on the CPM of 18.66 for a national sample with a mean age of 15.00y. This score had to be converted to 18.08 on the SPM-scale, equivalent to the 0.51st GBR-*P* and an uncor. IQ of 61.48, reduced by 2.31 for FE-correction to 59.17.

Heady (2003) reported a mean raw score of 17.65, obtained by a representative national sample with a mean age of 13.10y on the CPM. This score had to be converted to 17.02 on the SPM-scale, which is at the 0.71st GBR-*P* and equivalent to an uncor. IQ of 63.24, reduced by 2.10 for FE-correction to 61.14.

Ghana got an unweighted national IQ of **64.66** with a standard deviation of 5.10 and a weighted national IQ of **61.**63. A SAS-IQ of **54.69** was achieved in TIMSS-2003 to 2011, so the final national IQ is **58.16**.

2.3.44. Greece (GRC)

Buj (1981, Table 1) reported an uncor. IQ on the CFT of 99.40 for a sample with a mean age of 20.00y from Athens. After a reduction by 7.28 and 2.50 for FE- and country-correction, a cor. IQ of 89.62 remained.

Fatouros (1972) tested children from Thessaloniki on the WISC. The sample had a mean age of 11.75y and obtained an uncor. IQ of 89.79, which had to be corrected by -4.76 and -2.50 for FE and country to 82.53.

Georgas et al. (2003, Fig.19.6) gave a uncor. IQ of 94.50 for a national sample with a mean age of 9.56y, which had to be corrected by -4.76 and -2.50 for FE and country to 87.24.

This gives Greece an unweighted national IQ of **86.46** with a standard deviation of 3.61, which remained stable after weightings at **86.45**. The country participated in all observed PISA-volumes and additionally in TIMSS-1995 and PIRLS-2001, where it obtained a SAS-IQ of **95.09**. The final national IQ is **90.77**.

2.3.45. Guatemala (GTM)

Calderon and Hoddinott (2010, Table1) researched the effects of maternal intelligence and education on children's cognitive development in Eastern Guatemala. The children's sample had a mean age of 8.63y and was tested with the CPM, where it scored

18.43, equivalent to the 2.02nd GBR-*P* and an uncor. IQ of 69.25. No corrections were necessary here. Mothers had a mean age of 35.36y and were tested on the SPM. They obtained a raw score of 16.17 on Sets A, B, and C of the SPM. This score had to be extrapolated to 19.82 and converted to -0.05 at the APM-scale, which is at the 0.03rd GBR-*P* and equivalent to an uncor. IQ of 49.13, reduced by 3.15 for FE-correction to 45.98.

Stein et al. (2005, Table 1) reported SPM-scores for two birth-cohorts, one born between 1962 and 1968, the other born between 1969 and 1977. The measurement took place in 2003, this gives the first cohort a mean test age of 38.00y and the second of 30.00y. The two cohorts scored 16.80 and 18.40 on the SPM-sets A, B and C. These scores are equivalent to 20.69 and 22.94 on the full SPM and 0.41 and 1.28 on the APM-scale. The score of the older cohort is at the 0.08th GBR-*P* and equivalent to an uncor. IQ of 52.46, and the score of the younger cohort is at the 0.17th GBR-P and equivalent to an uncor. IQ of 55.99. Both scores had to be corrected by -2.31 for FE to cor. IQs of 50.15 and 53.68.

Sets A, B and C of the SPM were administered by Choudhury and Gorman (1999, Table 1) on a national sample of children and young adults with a mean age of 17.00y. They scored 11.26 or 12.96 on the full SPM. Converted to the APM-scale the score is -3.73, below the 0.01st GBR-*P* and equivalent to an uncor. IQ of 32.66. 0.63 had to be added for FE-correction, which resulted in a cor. IQ of 33.29.

Two samples were tested on the SPM by Martorell et al. (2005, Tab.1), one born between 1962 and 1968 and one between 1969 and 1977. Measurement took place in 2003, therefore the samples had mean ages of 32.00y and 38.00y. The younger sample scored 18.32 or 1.20 on the APM-scale, equivalent to the 0.15th GBR-*P* and an uncor. IQ of 55.42. The older sample scored 16.65 or 0.25 on the APM-scale, which is at the 0.07th GBR-*P* and equivalent to an uncor. IQ of 51.85. Both had to be reduced by 2.31 for FE-correction to cor. IQs. of 53.11 and 49.54.

The unweighted national IQ of Guatemala is **50.71** with a standard deviation of 10.69 and the weighted national IQ is **47.72**.

Results from school assessment studies were not available and the final national IQ is **47.72**.

2.3.46. Haiti (HAI)

Cotten (1985, Tab.IV) administered the CPM on a national sample of Children with a mean age of 10.00y from Haiti. A rural and an urban sample scored on average 55.00, which is described as the "percentage of the mean score obtained by children of a given age in a reference population" (p.48). The used reference population was not named, however, the CPM-manual of 1965 (Raven, 1965) was cited, which refers to the British standardization in Dumfries of 1947 (Flynn, 2009), in which 10.00y olds obtained a mean raw score of 28.15 (Green & Ewert, 1955, Table 1). So, 55.00% would be equivalent to a raw score of 15.48. This is at the 0.81st GBR-*P* and equivalent to an uncor. IQ of 63.91, on which 5.46 had to be added for FE-correction to 69.37.

De Ronceray and Petit-Frere (1975, Tab.II) compared an experimental sample instructed in Creole compared to two control samples, one instructed in French and one which was independent from the study. No significant differences could be found between the three groups in SPM-performance, therefore all were used in this dataset. The mean age was 6.00y and the mean raw score was 15.02, therefore at the 38.97th GBR-*P* and equivalent to an uncor. IQ of 95.80. Adding 1.05 for FE-correction resulted in 96.85.

Both samples together gave Haiti an unweighted national IQ of **83.11** and a final national IQ of **82.10** after weightings. School assessment data were not available.

2.3.47. Hong Kong (HKG)

Chan and Vernon (1988) reported a mean SPM-raw score of 43.00 for the 50.00th HKG% for a sample from Hong Kong with a mean age of 10.50y. Such a score would be equivalent to the 73.93rd GBR-P and an uncor. IQ of 109.62, corrected by -0.63 for FE to 108.99.

Intelligence was measured by Chan, Eysenck and Lynn (1991, Tab.1) on Hong Kong children with the SPM. The sample had a mean age of 9.53y and scored 47.00, which is at the 95.76th GBR-P and equivalent to an uncor. IQ of 125.86, corrected by -2.52 for FE to 123.34.

Lynn and Chan (2003, Tab.1) administered the APM on a sample of adolescents with a mean age of 16.50y, which obtained a mean raw score of 22.06. This score is at the 77.62nd GBR-P and equivalent to an uncor. IQ of 111.39 and had to be deducted by 2.31 to a cor. IQ of 109.08.

An uncor. IQ on the CFT of 113.00 was reported by Lynn et al. (1988) for a sample with a mean age of 9.60y. 5.20 had to be subtracted for FE-correction and -2.50 for country correction, so the cor. IQ is 105.30.

Lynn, Pagliari and Chan (1988, Tab.1, 3) reported SPM-scores from two administrations in 1968 and 1982. The mean age of the first sample was 10.00y and of the second 11.00y. Raw scores were 34.33 for the 1968th and 41.47 for the 1982nd, which are at the 53.05th and 76.22nd GBR-P and equivalent to uncor. IQs of 101.15 and 110.70. Results for a third sample were reported as GBR-P, with 71.48 for boys and 68.44 for girls, averaged to 69.96, equivalent to an uncor. IQ of 105.23. Necessary FE-corrections were +2.31, -0.63 and -1.68, so the cor. IQs are 103.46, 110.07 and 103.55.

Poon, Yu and Chan (1986) measured a raw score of 55.63 on the SPM on a sample with a mean age of 16.25y. This score is equivalent to 25.06 on the APM-scale, to the 87.78th GBR-P and an uncor. IQ of 117.46. 1.26 had to be added for FE-correction, which gave a cor. IQ of 118.72.

An unweighted national IQ for Hong Kong of **110.31** with a standard deviation of 7.19 was calculated, which decreased after weightings to **106.06**. A SAS-IQ of **104.67** was calculated from all observed school assessment studies. So, the final national IQ is **105.36**.

2.3.48. Hungary (HUN)

For the CFT an uncor. IQ of 100.50 was reported for a sample from Budapest with a mean age of 20.00y by Buj (1981, Tabl 1), reduced by 7.28 and 2.50 for FE- and country-correction to 90.72.

Dobrean et al. (2008) reported a raw score for SPM+ of 37.00 at the 50.00th HUN% from a norm sample of an army conscript standardization in Hungary with a mean age of 18.00y. This score is at the 43.33rd GBR-*P* and equivalent to an uncor. IQ of 97.48, added with 1.89 for FE-correction to 99.37.

Both scores together will give Hungary an unweighted national IQ of **95.04** and a weighted national IQ of **99.21**. A SAS-IQ of **99.28** was calculated from all observed school assessment studies, which gives Hungary a final national IQ of **99.24**.

2.3.49. Iceland (ISL)

Norms for SPM for Icelandic children were reported by Pind, Gunnarsdóttir and Jóhannesson (2003, Table 2). The full sample had an age range from 6.00y to 16.00y and was split by us into a younger with a mean age of 11.00y and an older with a mean age of 16.00y. The younger sample obtained a raw score of 39.35, which is at the 62.98th GBR-*P* and equivalent to an uncor. IQ of 104.97, corrected by -1.68 for FE to 99.42. The 16.00y old sample scored 48.80, which is 15.55 at APM-scale and equivalent to the 52.92nd GBR-*P* and an uncor. IQ of 101.10, corrected by -4.41 for FE to 100.56.

Together, the whole sample gives Iceland an unweighted national IQ of **99.99,** a weighted national IQ of 100.50, and an SAS-IQ of **96.02** was calculated from all observed PISA-volumes, TIMSS-1995 and PIRLS-2001 and -2006. The final national IQ is **98.26**.

2.3.50. India (IND)

Afzal (1988, Table 2) researched the effect of inbreeding on intelligence in India. We used two of the presented samples, one from an urban and one from a rural area in Bhagalpur, where the sample were born of non-consanguineous marriages. They had mean ages of 10.50y and scored 92.30 and 77.20 on the WISC-R. The correction of both by -4.76 for FE and -2.50 for country resulted in 85.04 and 69.94. The inbred samples showed significantly lower uncor. IQs of 78.60 and 68.20 and had therefore been excluded.

Another study about inbreeding depression came from Agrawal, Sinha and Jensen (1984, Table 2), conducted on the Muslim population of Jaipur. The non-inbred sample scored 33.75 and the inbreed sample 28.62 on SPM. Both had similar mean ages of 13.70y and 13.60y. Once again, we excluded the inbred sample due to its significantly lower performance. The score of the non-inbred sample is at the 8.15th GBR-*P* and equivalent to an uncor. IQ of 79.07, reduced by 1.05 for FE-correction to 78.02.

Singh and Ray (1980) reported a mean raw score on SPM of 28.70 for a rural sample from Rohtak Block. The mean age was given with 37.47y, so the SPM-raw score had to be converted to 3.26 on the APM-scale, which is the 0.59th GBR-*P* and equivalent to an uncor. IQ of 62.22. 4.83 had to be added for FE-correction, which gave a cor. IQ of 67.05.

A sample of children from the Calicut district, reported by Bhakta, Hackett and Hackett (2002, Table 4), with a mean age of 10.61y obtained a raw score of 19.60 on the CPM. This score is at the 0.83rd GBR-*P* and equivalent to an uncor. IQ of 64.04, adding with 1.05 for FE-correction to 65.09.

Chiplonkar and Kawade (2014, Table 2) tested four sample of school girls from Pune with mean ages of 12.10y on the SPM. The samples were divided into 2x4 groups with different levels of plasma zinc and RBC zinc level. Performances on the SPM increased by quartiles of zinc concentration. Because children were not selected for specific levels of zinc concentrations and therefore represent the average zinc concentration of the whole local population, we used all samples in further analyses. The mean score of the two samples with lowest concentration was 23.50, equivalent to the 2.28th GBR-*P* and an uncor. IQ of 70.01, of the sample with the second lowest concentration it was 29.50, equivalent to the

6.66th GBR-*P* and an uncor. IQ of 77.48, of the sample with the second highest concentration it was 34.00, equivalent to the 15.80th GBR-*P* and an uncor. IQ of 84.96, and of the sample with the highest concentration it was 37.50, equivalent to the 29.14th GBR-*P* and an uncor. IQ of 91.76. A FE-correction of -5.25 was necessary for all four samples, resulted in cor. IQs of 79.71, 86.51, 72.23 and 64.76.

Gandhi-Kingdon (1996, Tab.2) compared national samples from government aided ("G"), private unaided ("PUA") and private aided ("PA") schools by using Raven's Progressive Matrices. No information was provided about the specific Raven's Test and a source that was referred to was unfortunately not available. But one sample scored higher than 36.00 raw scores and therefore we assume the use of the SPM, which would also be the adequate Raven's Test for the ages of the tested children, which were 14.30y, 14.21y and 14.19y on average. The raw score of the G-sample was 25.40, which is at the 1.81st GBR-*P* and equivalent to an uncor. IQ of 68.59, the PUA-sample scored 36.03, which is at the 10.93rd GBR-*P* and equivalent to an uncor. IQ of 81.55, and the PA-sample scored 28.15, which is at the 2.76th GBR-*P* and equivalent to an uncor. IQ of 71.23. Reduction by 3.15 for FE-correction resulted in cor. IQs of 65.44, 78.40 and 68.08.

Hackett, Hackett and Bhakta (1998, Table 1) reported CPM-scores for two samples of children from the rural Calicut District with mean ages of 10.70y and 10.50y. Children of the first sample had epilepsy and the second sample was for controlling. However, both samples scored identical with raw scores of 18.50, which are at the 0.27th GBR-*P* and equivalent to uncor. IQs of 58.30, corrected by +1.89 for FE to 60.19.

A comparison of healthy and diabetic children on CPM was conducted by Jyothi et al. (1993, Table 1) and Diabetes has been found to have a negative impact, so we used only the healthy sample for our dataset. This sample had a mean age of 10.40y and obtained a raw score of 24.10, which is at the 8.69th GBR-*P* and equivalent to an uncor. IQ of 79.60. 2.94 had to be added for FE-correction, which gave the sample a cor. IQ of 82.54.

The smoothed Indian norms from 1997, provided in the SPM-manual (Raven, Raven & Court, 1999, Tab.25), came from a sample from Pune and Mumbai and had a mean age of 11.50y. It scored 32.06, which is at the 22.01st GBR-*P* and equivalent to an uncor. IQ of 88.42, reduced by 3.78 for FE-correction to 84.64. Age groups of 16.00y to 18.00y were separated by us in a second sample with a mean age of 17.00y, which scored 44.67 or 11.53 converted to APM-scale. This score is at the 24.72nd GBR-*P* and equivalent to an uncor. IQ of 89.75, corrected by -1.05 for FE to 88.70. The manual also provides Indian norms from 1992 (Table 26) from Delhi. This sample had a mean age of 13.50y and scores 35.40, which is at the 12.99th GBR-*P* and equivalent to an uncor. IQ of 83.10, corrected by -2.73 for FE to 80.37.

A huge sample of teachers was tested by Tooley et al. (2010, Table 1.4) on SPM. The mean age was 27.62y and the mean raw score 41.89 or 9.40 on the APM-scale. This is at the 5.19th GBR-P and equivalent to an uncor. IQ of 75.60, corrected by -3.57 for FE to 72.03. Although the sample consisted of teachers and a better performance by them compared to the average population would have been suspected, their IQs are not much different from the other Indian samples. We assume that these teachers can be seen as normal Indian adults in terms of intelligence.

Uppu et al. (2015, Figure 1) measured intelligence with the WAIS-IV on a sample of university students with a mean age of 19.00y. IQs were given as seven grades with different IQ-ranges: Grade-I with 0.00 to 39.00, Grade-II with 40.00 to 69.0, Grade-III with 70.00 to 85.00, Grade IV with 85.00 to 115.00, Grade-V with 115.00 to 130.00, Grade VI with 130.00 to 145.00, Grade-VII with more than 145.00. With the help of the provided percentages of each grade in population, we calculated an uncor. IQ of 84.66, which had to be corrected by -2.50 for country to 82.16. As in the teacher sample above, the result is close to those from the other Indian samples and we assume only small differences in IQ between university students and normal young adults in India.

For India, an unweighted national IQ of **74.56** with a standard deviation of 9.11 was calculated. This score increased to 78.92 after weightings. The country participated in PISA-2009 and TIMSS-2003, where it obtained a SAS-IQ of **73.57**. Thus, the final national IQ is **76.24**.

2.3.51. Indonesia (IDN)

We took three samples from a study about iodine deficiency by Bleichrodt, Drenth and Querido (1980, Tab. 6-8) which gave CPM-scores. The two samples from Lonjong and from Ngampel were combined and have an age range from 5.50y to 20.00y, therefore had to be split into one sample with a mean age of 7.50y, one with a mean age of 13.50y and one with a mean age of 18.50y. The first one scored 18.31, which is at the 13.11st GBR-*P* and equivalent to an uncor. IQ of 83.18, corrected by 5.67 for FE to 88.85. The second one 22.88, converted to 23.30 on the SPM-scale, which is at the 2.03rd GBR-*P* and equivalent to an uncor. IQ of 69.30, corrected by -0.21 to FE to 69.09. The third sample scored 22.46, converted to 1.18 on the APM-scale, which is at the 0.23rd GBR-*P* and equivalent to an uncor. IQ of 57.48, corrected by 2.52 for FE to 60.00. A fourth sample from Gowok had a mean age of 16.50y and scored 17.50, converted to -1.37 on the APM-scale, which is at the 0.05th GBR-*P* and equivalent to an uncor. IQ of 44.91. Because this fourth sample performed significantly lower than those from Lonjong and Ngampel, we decided to not include it in the dataset.

Hadidjaja et al. (1996, Tab.1) tested four samples with the CPM. One was treated with Mebendazole against parasitic worm infestations, one received health education, one received both and one received a Mebendazole placebo. Mean age for all samples was 7.00y. The samples were tested before and after the interventions. The Mebendazole-sample scored 15.50, which is at the 7.11st GBR-*P* and equivalent to an uncor. IQ of 77.99. Both samples with health education scored 18.00, which is at the 14.14th GBR-*P* and equivalent to an uncor. IQ of 83.89. The placebo-sample scored 17.00, which is at the 10.09th GBR-*P* and equivalent to an uncor. IQ of 81.52. All samples were used by us because the test was administered before the interventions. After correcting them by 2.31 for FE, the cor. IQs were 80.30, 86.20, 86.20 and 83.83.

A similar study was done by Hadidjaja et al. (1998, Tab.4) which bigger samples. Here, the statistical population was split into five groups: one was treated with Mebendazole, one received health education, one received both, one received a Mebendazole placebo and one was negatively tested on worm eggs. Again, the mean age for all samples was 7.00y and the samples were tested before and after the interventions, from which the first results were taken. The Mebendazole-sample scored 14.00, which is at the 4.44th GBR-*P* and equivalent to an uncor. IQ of 74.48. The sample with health education scored 18.00, which is at the 14.14th GBR-*P* and equivalent to an uncor. IQ of 83.89. The sample with Mebendazole treatment and health education scored 17.00, which is at the 10.90th GBR-*P* and equivalent to an uncor. IQ of 81.52. Both, the placebo- and the egg-negative-sample scored 16.00, which is at the 8.24th GBR-*P* and equivalent to an uncor. IQ of 79.16. Correcting them by 1.89 for FE resulted in cor. IQs of 85.78, 81.05, 76.37, 81.05 and 83.41.

Heilmann (2013, Tab.17) compared in earlier childhood stunted and not stunted children in Indonesia with mean ages of 8.50y on the CPM. The source reported the use of 12 CPM-items but without specifying them. Because of the background of the sample we assume that they use Set-I. Results were given as % of correct solved tasks. On average 55.43% correct answers were given by the non- stunted sample, which makes a raw score of 6.65 on the Set-A of the CPM, extrapolated to 13.38 on the full CPM, which is at the 0.52nd GBR-*P* and equivalent to an uncor. IQ of 61.52. 1.47 had to be added for FE-correction, so the cor. IQ was 62.99. The sample with children which were stunted in earlier childhood scored lower and was therefore ignored.

In de Neubourg and de Neubourg (2011, Tab.2), SPM-results were given for three samples from Banda Aceh, from which two were affected by Post Traumatic Stress Disorder due to the tsunami catastrophe in December 2004. Scores decreased with increasing PTSD intensity, so we used only the healthy sample, however, it had to be underpinned that also these children were affected by the tsunami. The sample had a mean age of 11.00y and scored 31.58, which is at the 13.83rd GBR-*P* and equivalent to an uncor. IQ of 83.68, reduced by 6.09 for FE-correction to 77.59.

Rindermann and te Nijenhuis (2012, Tab.1) measured intelligence with the SPM on a sample from Bali with an age range from 7.00y to 49.00y, which had to be split by us into one with a mean age of 9.00y and one with 27.70y. The younger sample scored 22.72, which is at the 24.51st GBR-*P* and equivalent to an uncor. IQ of 89.65, reduced by 6.09 for FE-correction to 83.56. The older sample scored 35.33, converted to 6.07 on the APM-scale, which is at the 3.43rd GBR-*P* and equivalent to an uncor. IQ of 72.69, reduced by 3.36 for FE-correction to 69.33.

A comparison of anaemic and control children was done by Soemantri (1989, Tab.1). Four samples were tested with CPM on three timings, from which the first timing was used here. Results were given as IQs, which were weighted by sample size to a mean of 96.53. It hast to be noted that the Raven's Test-manual from 1938 was cited in the references and IQs were therefore most likely estimated by the 1938-norms. This would make a FE-correction of -10.71 necessary and would give a cor. IQ of 85.82.

Suwartono, Amiseso and Handoyo (2017, Tab.2) reported a SPM-raw score of 47.20 for a sample of mostly university students with a mean age of 17.27y. The score had to be converted to 13.86 on the APM-scale, which is at the 36.22 GBR-*P* and equivalent to an uncor. IQ of 94.71, corrected by -3.36 for FE to 91.35.

Indonesia got an unweighted national IQ of **79.60** with a standard deviation of 8.85, which slightly decreased after weightings to **78.49**. School achievement results were available for all observed PISA-volumes, for TIMSS-1999 to 2015 and from PIRS-2006 and 2011. The SAS-IQ is **78.51** and the final national IQ **78.49**.

2.3.52. Iran (IRN)

Baraheni (1974, Tab.1) administered the SPM on children and adolescents from Teheran. The full sample ranged from 9.00y to

18.00y and had to be split by us into one with a mean age of 12.00y and one with 17.00y. The younger sample scored 26.87, which is at the 6.70th GBR-*P* and equivalent to an uncor. IQ of 77.52, added with 1.05 for FE-correction to 78.57. The older scored 38.12, which had to be converted to 7.13 on APM-scale, equivalent to the 7.20th GBR-*P* and an uncor. IQ of 78.08, added with 3.78 for FE-correction to 81.86.

A newer study was done by Rajabi (2009) and reported a raw score for a sample with a mean age of 9.00y of 21.20, which is 7.10th GBR-*P* and equivalent to an uncor. IQ of 77.98, corrected by -0.21 for FE to 77.77.

Overall, the unweighted national IQ of Iran was calculated as **79.40** with a standard deviation of 2.17 and increased slightly to **80.01** after weightings. School assessment results were available for all observed TIMSS- and PIRLS-volumes and gave a SAS-IQ of **81.14**. The final national IQ is **80.01**.

2.3.53 Iraq (IRQ)

Abul-Hubb (1972, Tab.1) administered the SPM on an Iraqi sample with an age range from 14.00y to 35.00y. We split this sample into one with a mean age of 15.50y and one with a mean age of 27.00y. The younger scored 40.00, which is at the 15.78th GBR-*P* and equivalent to an uncor. IQ of 84.95, corrected by 1.47 for FE to 86.42. The older one scored 44.50, converted to 11.41 on the APM-scale, which is at the 9.37th GBR-**P** and equivalent to an uncor. IQ of 80.23, corrected by 4.20 for FE to 84.43.

Ghazi et al. (2012, Tab.2) reported CPM-scores for children with good or bad nutritional status from five districts of Baghdas. No age was given for the sample, but all children came from primary schools, which started in Iraq in the 6th and ended at the 12th life year, so the mean age should be 9.00y (IRFAD, 2014). Scored were given for six nutrition groups which were representative for the whole city population. Therefore, a *N*-weighted mean of 26.77 at the 31.75th GBR-*P* and equivalent to an uncor. IQ of 92.88 was estimated. A correction of -0.21 for FE resulted in a cor. IQ of 92.67.

Iraq obtained an unweighted national IQ of **87.84** with a standard deviation of 4.30. After weightings this score became **89.28**. School assessment results were not available. The final national IQ is **89.28**.

2.3.54. Ireland (IRL)

Lynn (2015) cited an unpublished thesis from Mylotte (1993), in which the WPPSI was administered on a sample from Galway with a mean age of 6.00y. According to Lynn, the sample obtained an uncor. FS-IQ of 99.90. A FE-correction of -8.84 and a country-correction of -2.50 were necessary and resulted in a cor. IQ of 88.56.

By Buj (1981, Table 1) an uncor. CFT-IQ of 99.20 was reported for a sample with a mean age of 20.00y, reduced by 7.28 and 2.50 for FE- and country-correction to 89.42.

Lynn and Wilson (1990, Table 1) gave SPM-raw scores for a national Irish sample with a mean age of 9.06y of 25.94. This score is at the 32.28th GBR-*P* and equivalent to an uncor. IQ of 93.10, reduced by 2.31 for FE-correction to 90.79.

The unweighted national IQ of Ireland is **89.59** and has a standard deviation of 1.13. It became **89.94** after weightings. The SAS-IQ is much higher with **100.31** and calculated from all observed PISA-volumes, from TIMSS-2011 and 2015, and from PIRLS-2011 and 2016. So, the final national IQ is **95.13**.

2.3.55 Israel (ISR)

Kaniel and Fisherman (1991, Table 1) reported SPM raw-scores of an Israeli sample with a mean age of 12.00y. This sample obtained a score of 37.00 at the 29.30th GBR-*P* and equivalent to an uncor. IQ of 91.83, reduced by 2.52 for FE-correction to 89.31.

Kozulin (1998, Tab.1) gave SPM-raw scores of four immigrant groups in Israel, measured before and after cognitive intervention. The source reported that only immigrant group I reached Israeli norms in the post-intervention administration of the test, so only this score finds its way into our dataset. A mean age of 15.00y was given. The raw score was 45.09, which is at the 42.96th GBR-*P* and equivalent to an uncor. IQ of 97.34, corrected by -3.99 for FE to 93.35.

The samples taken from Lancer and Rim (1984, Table 2) consisted of children from high, middle and low SES families and separately of children from families with different numbers of children. All samples were representative and of the same mean age of 10.50y. Scores of the low SES sample were 30.50 at the 15.83rd GBR-*P* and equivalent to an uncor. IQ of 84.98. The middle SES sample obtained a score of 32.93, which is at the 23.39th GBR-*P* and equivalent to an uncor. IQ of 89.11. The high SES sample scored 37.47, which is at the 43.64th GBR-*P* and equivalent to an uncor. IQ of 97.60. Different SES-levels corresponded with different IQs, however, the full sample is representative and low- and high-SES compensate each other. So, we used all three samples for our dataset. Corrections were not necessary.

CPM-scores of deaf and hearing children were reported by Tzuriel and Caspi (1992, Tab.1). The deaf sample scored lower than the hearing and was therefore excluded. The hearing sample had a mean age of 5.17y and scored 15.30, which is at the 38.44th GBR-*P* and equivalent to an uncor. IQ of 95.59. Adding 3.15 for FE-correction resulted in a cor. IQ of 98.74.

We calculated an unweighted national IQ for Israel of **92.18** with a standard deviation of 5.35 and decreased to **90.57** after weightings. A SAS-IQ of **94.30** was estimated from results of PISA-2000 and 2006 to 2015, all observed TIMSS-volumes and PIRLS-2006 to 2016. This gives Israel a final national IQ of **92.43**.

2.3.56. Italy (ITA)

A normative sample for the CPM was presented by Belacchi et al. (2008, Tab. 3-13). It had a mean age of 7.75y and scored 22.06, equivalent to the 26.72nd GBR-*P* and an uncor. IQ of 90.68, corrected by -0.21 for FE to 90.47.

Belacchi, Carretti and Cornoldibet (2010, Table 1) reported CPM-raw scores from a sample of healthy children with a mean age of 7.89y. It obtained a raw score of 21.99, which is at the 22.42nd GBR-*P* and equivalent to an uncor. IQ of 88.63, corrected by -0.21 for FE to 88.42.

The study of Buj (1981, Table 1) reported an uncor. IQ on CFT for a sample of 20.00y olds from Rome of 103.80, corrected by -7.28 and -2.50 for FE and country to 94.02.

Pruneti (1985, Tab.4) administered the CPM on a sample of 9.00y olds from the region around Pisa. The sample obtained a raw score of 25.93, which is at the 27.65th GBR-*P* and equivalent to an uncor. IQ of 91.10. 4.62 had to be added for FE-correction, so the cor. IQ is 95.72.

A later CPM-administration by Pruneti et al. (1996, Tab.2) on a sample from the region around Pisa with a mean age of 9.13y scored 25.58. This score is at the 25.83rd GBR-*P* and equivalent to an uncor. IQ of 90.27, to which 2.52 had to be added for FE-correction, so the cor. IQ is 92.79.

Italy's unweighted national IQ is **92.29**, has a standard deviation of 2.89 and remained stable after weightings at **91.66**, The SAS-IQ is **96.80** and was estimated from all observed PISA- and PIRLS-volumes and all TIMSS-volumes from 1999 to 2015. The final national IQ of Italy is **94.23.**

2.3.57. Jamaica (JAM)

Chambers et al. (2014, Tab.4) compared a case-study sample of children with epilepsy with a control sample on the CPM. Both samples had mean ages of 9.50y. The case-study sample scored 23.40, which is at the 12.14th GBR-*P* and equivalent to an uncor. IQ of 82.48. The control sample scored 23.70, which is at the 13.21st GBR-*P* and equivalent to an uncor. IQ of 83.25. Because of the close results, both samples were put into our dataset. After reduction by -.21 for FE-correction, their cor. IQs were 82.27 and 83.04.

Grantham-McGregor et al. (1997, Tab.4) compared five samples from Kingston, a control, three where interventions were carried out and one healthy, on the SPM. The control sample scored lower than the intervention samples and lower than the healthy sample. We decided to use only the healthy sample because it was free of stunted children. Its mean age was 13.60y and it scored 13.60, equivalent to the 10.65th GBR-*P* and an uncor. IQ of 81.32, corrected by -2.31 for FE to 79.01.

The same authors (1994, Table5) gave an uncor. IQ on the full WISC for a control sample from Kingston of on average 15.00y of 74.40. A FE-correction of -14.62 was necessary together with a country-correction of -2.50, which resulted in a cor. IQ of 57.28.

A sample with normal haemoglobin was compared with a sample with homozygous sickle cell disease by Knight et al. (1995, Tab.1). The ill sample scored significantly lower than the healthy and was therefore excluded. Intelligence of the healthy sample was measured with WISC-R on the group with a mean age of 15.50y and with WAIS-R on the group with a mean age of 17.50y. The uncor. IQs were 73.50 and 89.20. Corrections of -6.12 and -2.50 for FE and country were necessary to the first sample and gave this a cor. IQ of 64.88, and of -4.08 and -2.50 for the second sample and gave this a cor. IQ if 82.62.

Parasitic uninfected and infected children were compared by Nokes et al. (1992a, Tab.1) on the CPM. Both groups with infections scored significantly lower and were excluded by us. The healthy sample had a mean age of 10.10y and obtained a raw score of 21.00, which is at the 3.64th GBR-*P* and equivalent to an uncor. IQ of 73.08. A similar study was done by Nokes et al. (1992a, Tab.3) and gave a CPM-raw score of a control sample from Mandeville with a mean age of 10.10y of 21.00. This score is again at the 3.64th GBR-*P* and equivalent to an uncor. IQ of 73.08. As before, infected groups were excluded by us due to significantly lower test results. Correcting both by +3.15 for FE resulted in 76.23.

Persaud (1982, Table 2) studied the relationship between neuroticism and non-verbal intelligence, measured with the SPM.

The author reported no relationship between the two traits, therefore we used the provided raw score of 14.01 of the full sample with a mean age of 23.17y. However, only a few items from the SPM were used in this sample: 10 from Set-C, 8 from Set-D and 6 from Set-E. If 14.01 makes a percentage of 58.38% on 24 items, it would be equivalent to a raw score of 21.02 on the full sets C, D and E and 42.64 on the full SPM. This makes in turn 9.93 on the APM-scale, which is at the 7.62th GBR-*P* and equivalent to an uncor. IQ of 78.53, corrected by +2.10 for FE to 80.63.

Persaud (1987) did research on sex-differences on the SPM. He used a sample with a mean age of 29.63y and measured a raw score of 13.11. He used the same selection of items as in the 1982 study and we used the same calculation as above to get the uncor. IQ. If 13.11 makes a percentage of 54.64% on 24 items, it would be equivalent to a raw score of 19.67 on the full sets C, D and E and 40.66 on the full SPM. This makes in turn 8.58 on the APM-scale, which is at the 7.10th GBR-*P* and equivalent to an uncor. IQ of 73.90, corrected by +1.05 for FE to 74.95.

Richardson (1976, Table 1) used the WISC to do research on the effects of malnutrition. The malnourished sample scored significantly lower than the control sample and had therefore been excluded. For the control sample, which had a mean age of 8.00y, an uncor. IQ of 65.99 was reported. This score had to be corrected by -8.50 and -2.50 for FE and country to 54.99.

The CPM was administered by Samms-Vaughan (2005, Tab.13.1) on children from 0.00 to 10.00y. There are no CPM-norms for children younger than 4.50y of age, therefore we only used data from the two groups with mean ages of 5.50y and 9.00y. The sample used by us had a mean age of 8.00y and scored 14.65 on average, which is at the 1.31st GBR-*P* and equivalent to an uncor. IQ of 66.66, corrected by +0.84 for FE to 67.50.

Walker et al. (2000, Table 2) gave WISC-R results for treated and non-treated children with growth restriction from Kingston. Scores for these sample were below those from one healthy sample, therefore, only the last one was used by us. Its uncor. IQ was reported as 78.40 at a mean age of 11.50y, reduced by 8.84 and 2.50

for FE- and country-correction to 67.06. The sample also obtained a raw score of 22.00 on SPM, which is at the 4.22nd GBR-*P* and equivalent to an uncor. IQ of 74.11, corrected by -4.41 for FE to 69.70.

In a study by Walker et al. (2007, Tab.1) children were separated into four groups according to their quartile of head circumference at 14 weeks of age. Age-adjusted CPM-raw scores were provided which were higher in higher quartiles of head circumference. We used the mean raw score of all four quartiles, which is 17.08. Children had a mean age of 7.00y and their raw score is at the 11.11th GBR-*P* and equivalent to an uncor. IQ of 81.69. 1.05 had to be added for FE-correction and gave the sample a cor. IQ of 82.74.

Walker et al. (2010, Table 2) compared children with low-birthweight and normal birthweight on the WPPSI-III. Children with low-birthweight were additionally split in an intervention and a non-intervention sample. Only the non-intervention sample scored significantly lower than both other samples. Therefore, a negative effect of low-birthweight on IQ is probable and this sample had to be excluded. The intervention sample scored almost similar to the normal-birthweight sample. Their mean ages were 6.83y and their mean uncor. IQs 81.40. 1.02 had to be added for FE-correction but 2.50 subtracted for country-correction, which resulted in a cor. IQ of 79.92.

From all these results an unweighted national IQ of **73.69** for Jamaica was calculated, with a standard deviation of 9.12. This score slightly increased after weightings to **75.08**. No data for a SAS-IQ were available and the final national IQ is **75.08.**

2.3.58. Japan (JPN)

The KABC and the WISC-R were administered by Kaufman et al. (1989) on a sample of Japanese children with a mean age of 9.75y. On the three sub-scales of the KABC, IQs of 113.60, 113.40 and 109.70 were measured, averaged to an uncor. IQ on the full KABC of 112.23. After a reduction by 3.12 for FE-correction and 2.50 for country-correction a cor. IQ of 106.61 remained. On the

WISC-R, an uncor. IQ of 118.10 was measured, which had to be reduced by 4.42 for FE-correction and 2.50 for country-correction to 111.18.

Lynn and Hampson (1987) administered the WISC-R on a sample of Japanese children with a mean age of 5.00y and measured an uncor. IQ of 107.80. Only a country-correction of -2.50 was necessary, so the cor. IQ is 105.30.

Shigehisa and Lynn (1991, Tab.1) measured a mean SPM-raw score of 41.70 on a sample with a mean age of 9.45y from Tokyo, which is at the 79.65th GBR-P and equivalent to an uncor. IQ of 112.44, corrected by -2.52 for FE to 109.92.

Uno et al. (2005, Tab.1) gave CPM-raw scores for Japanese children with a mean age of 10.00y. They scored 31.62 at the 66.35th GBR-P and equivalent to an uncor. IQ of 106.33. 0.42 had to be added for FE-correction and resulted in a cor. IQ of 106.75.

The unweighted national IQ of Japan is **107.95** with a standard deviation of 2.48, which remained stable at **107.41** after weightings. From all observed PISA- and TIMSS-volumes Japan obtained a SAS-IQ of **105.55**. This gives Japan a final national IQ of **106.48**.

2.3.59. Jordan (JOR)

SPM-raw scores from Jordan were reported by Bakhiet and Lynn (2014b, c). The first sample was from the city of Amman and had a mean age of 11.25y. It obtained a score of 22.50 at the 4.18th GBR-*P* and equivalent to an uncor. IQ of 74.05. The second one was a national sample with a mean age of 14.00y. It scored 35.75, which is at the 13.42nd GBR-*P* and equivalent to an uncor. IQ of 83.40. Both had to be reduced by 6.09 for FE-correction to cor. IQs of 67.96 and 77.31.

Lynn and Abdel-Khalek (2009, Tab.1) reported APM-scores for a national sample with an age range from 11.00y to 30.00y. APM-norms start at the age of 14.00y, so the sample was split by us into one with a mean age of 12.00y and one with a mean age of 19.92y. The younger samples scored 6.87, which is 36.34 on the SPM-scale and equivalent to the 23.57th GBR-*P* and an uncor. IQ of 89.20.

After a reduction by 6.09 for FE-correction a cor. IQ of 83.11 remained. The older scored 12.15, which is at the 18.19th GBR-*P* and equivalent to an uncor. IQ of 86.38. After a reduction by 3.36 for FE-correction a cor. IQ of 83.02 remained.

Jordan got an unweighted national IQ of **77.85** with a standard deviation of 7.13 and a weighted national IQ of **77.97**. It participated in PISA-2006 to -2015 and in TIMSS-1999 to -2015. The SAS-IQ is **83.42** and the final national IQ **80.70**.

2.3.60. Kazakhstan (KAZ)

Grigoriev and Lynn (2014, Table 2) reported SPM+-raw scores for three ethnicities from Kazakhstan. The Kazakh-sample had a mean age of 12.00y and scored 23.88, which is at the 5.87th GBR-*P* and equivalent to an uncor. IQ of 76.52. The Uzbek-sample had a mean age of 12.50y and scored 29.27, which is at the 19.80th GBR-*P* and equivalent to an uncor. IQ of 87.27. The Russian-sample had a mean age of 11.63y and scored 34.13, which is at the 63.886h GBR-*P* and equivalent to an uncor. IQ of 105.32. After reductions by 0.21 for FE-correction, cor. IQs of 76.31, 87.06 and 105.11 remained. The unweighted IQ of Kazakhstan is **89.49** with a standard deviation of 14.55. The score decreased if samples were weighted for size and data quality and adjusted to the population of Kazakhstan to **84.27**. The country participated in PISA-2009 to 2015, in TIMSS-2011 and 2015, and in PIRLS-2016. It obtained a SAS-IQ of **93.51** and a final national IQ of **88.89**.

2.3.61. Kenya (KEN)

Gewa et al. (2009, Table 1) measured intelligence in the rural Embu District of the Eastern Province of Kenya on a sample with a mean age of 7.60y. It scored 17.37 on the CPM, which is at the 7.02nd GBR-*P* and equivalent to an uncor. IQ of 77.89, corrected by 1.68 for FE to 79.57.

Kitsao-Wekulo et al. (2013, Table 2) used a rural sample from the Kilifi District. The mean age of this sample was 8.92y and it obtained a CPM-raw score of 18.87, which is at the 2.46th GBR-*P* and equivalent to an uncor. IQ of 70.51, corrected by -0.21 for FE to 70.30.

Also, Boissiere, Knight and Sabot (1985, Table 3) used the CPM but on an urban sample from Nairobi with a mean age of 14.00y. The obtained raw score of 27.80 had to be converted to 31.57 on the SPM-scale, which is at the 4.97th GBR-*P* and equivalent to an uncor. IQ of 75.29, corrected by -0.21 for FE to 75.08.

Costenbader and Ngari (2001, Tab.1) standardized the CPM on children from the Municipality of Nakuru. Their sample had a mean age of 8.00y and obtained a mean raw score of 15.74, which is at the 2.75th GBR-*P* and equivalent to an uncor. IQ of 71.21. Adding 1.26 for FE-correction resulted in a cor. IQ of 72.47.

Two reports for CPM-scores of people from the Embu tribe with mean ages of 7.32y and 7.43y were taken from Daley et al. (2003, table 1). In 1984 a raw score of 12.82 was measured, which is at the 0.99th GBR-*P* and equivalent to an uncor. IQ of 65.06. In 1994 a raw score of 17.31 was measured, which is at the 6.88th GBR-*P* and equivalent to an uncor. IQ of 77.73. Adding 4.83 for FE-correction to the first value resulted in 69.89 and adding 1.89 for FE-correction to the second value resulted in 79.62.

Neumann et al. (2007, Fig.1) compared samples from the Embu tribe which received special meat supplements with a control sample on CPM. Improvements lead to increasing scores, so we used only the control sample. This sample had a mean age of 7.40y and obtained a raw score of 17.40, which is at the 7.09th GBR-*P* and equivalent to an uncor. IQ of 77.96. No corrections were necessary.

Another CPM-administration was done by Sternberg et al. (2001, Table 1) on people from the Ugingo Village in the rural Bondo District. The mean age of this sample was 13.50y. It scored 23.51, which is 24.17 on the SPM-scale and equivalent to the 2.36th GBR-*P* and an uncor. IQ of 70.24. After correction by -4.62 for FE a cor. IQ of 65.62 remained.

Kenya obtained an unweighted national IQ of **73.81** with a standard deviation of 5.10, which increased to **75.20** after weightings. School assessment results were not available, and the final national IQ is **75.20**.

2.3.62. Korea, South (KOR)

Frydman and Lynn (1989, Tab.1) measured intelligence in Korean children which were adopted by parents from Belgium and lived within this country. The sample had a mean age of 10.00y and obtained an uncor. IQ of 118.70 on French norms. A FE-correction of -12.76 and a country-correction of -1.90 were necessary, so the cor. IQ is 104.04.

From Georgas et al. (2003, Fig.19.6) an uncor. IQ of 103.00 was taken. This score was measured with the WISC-III on a sample with a mean age of 11.00y. After a reduction by 4.76 for FE-correction and 2.50 for country correction, this resulted in a cor. IQ of 95.74.

From the city of Pusan, a SPM-raw score of 41.30 was reported for a sample with a mean age of 9.75y by Lynn and Ja Song (1994, Table 1). This score is at the 74.13th GBR-P and equivalent to an uncor. IQ of 109.71, reduced by 2.10 for FE-correction to 107.61.

The WAIS-IV was administered by Lynn et al. (2016, Table 1, 2) on a normative sample with a mean age of 44.50y. According to the British Norms, the full sample obtained a mean IQ of 98.67, corrected by -2.10 for FE to 98.64.

South Korea gained an unweighted national IQ of **101.51** with a standard deviation of 5.33. This score decreased if samples were weighted by size and data quality to **97.37**. School assessment data were available for the country from all observed PISA- and TIMSS-volumes and result in a SAS-IQ of **107.33**, so the final national IQ is **102.35**.

2.3.63. Kuwait (KWT)

The SPM was administered on a national sample from Kuwait by Abdel-Khalek and Raven (2008, Table 13.1). It had an age range from 7.00y and 17.00y and was therefore split by us into one sample with a mean age of 11.18y and one with a mean age of 16.50y. The younger sample obtained a raw score of 32.21, which is at the 28.68th GBR-*P* and equivalent to an uncor. IQ of 91.56, corrected by -4.83 for FE to 86.73. The older sample scored 45.00 or 14.16

on the APM-scale, which is at the 41.45th GBR-*P* and equivalent to an uncor. IQ of 96.76, corrected by -2.10 for FE to 94.66.

For the CPM, scores from Kuwait were available from Bakhiet et al. (2015b, Table 1). They reported a raw score of 20.81 from a sample with a mean age of 8.50y. This score is at the 10.76th GBR-*P* and equivalent to an uncor. IQ of 81.41, to which 4.62 had to be added for FE-correction to 86.03.

Abdel-Khalek and Lynn (2006, Table 2) reported a raw score on SPM for a sample with a mean age of 11.35y. This score is 33.26th GBR-*P* and equivalent to an uncor. IQ of 93.51. After reduction by 4.83 for FE-correction a cor. IQ of 88.68 remained.

Finally, Kuwait obtained an unweighted national IQ of **89.03** with a standard deviation of 3.92. It remained stable after weightings at **88.07**. School assessment results were available from TIMSS-1995 and 2007 to 2015, and from all observed PIRLS-volumes. They result in a SAS-IQ of **69.21** and a final national IQ of **78.64**.

2.3.64. Kyrgyzstan (KGZ)

Zakharov et al. (2016, Table 1) measured intelligence with the SPM on a sample with a mean age of 13.17y. The sample consisted of one-third people from Russia, but the majority was from Kyrgyzstan. The sample obtained a raw score of 39.72, which is at the 32.11th GBR-*P* and equivalent to an uncor. IQ of 93.03, corrected by -6.09 for FE to **86.94**, which is both the unweighted and weighted national IQ. The country participated in PISA-2006 and 2009 and obtained a SAS-IQ of **71.25**, which results in a final national IQ of **79.09**.

2.3.65. Laos (LAO)

Boivin et al. (1996, Tab.4) report an administration of the KABC on urban and rural children from Vientiane in Laos. Results for the global scales "Sequential", "Simultaneous", "Nonverbal" and "Mental processing" were given and averaged to the uncor. IQ. It is 114.66 for the urban sample with a mean age of 8.33y and 94.24

for the rural sample with a mean age of 8.47. Both had to be corrected by -7.80 and -2.50 for FE and country to 104.36 and 83.94.

A full-scale IQ of 81.90 on the WISC-III was reported by Preston (1999, Table 1) for Hmong children with a mean age of 9.67y. This score had to be reduced by 3.40 and 2.50 for FE- and country-correction to 76.00.

Another WISC-III full-scale IQ was reported by Smith, Wessels and Riebel (1997) for Hmong children with a mean age of 9.50y. The sample scored 82.70, corrected by -2.72 and -2.50 for FE and country to a cor. IQ of 77.4.8.

The unweighted national IQ of Laos is estimated as **85.44** with a standard deviation of 13.07. After weightings, this score decreased to a final national IQ **80.99**. No data for SAS-IQ were available.

2.3.66. Latvia (LVA)

The IQ of Latvia is experimental and should be used conditionally. Saks (2013, Table 4) reported a SPM-raw scores for a group of Latvian-speaking children in Latvia with a mean age of 12.00y of 38.04. This score is at the 31.74th GBR-*P* and equivalent to an uncor. IQ of 92.88. This score would have to be reduced by 6.09 for FE-correction to a relatively low IQ of 86.79. In the same study, scores were provided for three sub-groups of Estonian speaking children with shares of 50.00%, 25.00% and 25.00% on the total sample (Table 3). The 50.00% obtained a score of 38.84 and the 25.00% 35.46 and 41.67, so the full sample obtained a mean score of 38.70. This score would be at the 35.17th GBR-*P* and equivalent to an uncor. IQ of 94.29 and a corrected IQ of 88.19. Furthermore, a raw score for Russian speaking children of 39.94 was reported, equivalent to the 41.99th GBR-*P* and an uncor. IQ of 96.97, corrected to 90.88. Both, the Estonian and the Russian cor. IQs are much lower than scores from these countries themselves. According to Estonian norms provided by Lynn, Pullmann and Allik (2003) 11.50y old Estonian children should score 40.29, which is at the 46.39th GBR-*P* and equivalent to an uncor. IQ of 98.64, 4.35 points above the scores of the sample from Saks (2013). So, we decided to add these 4.35 points to the Latvian IQ, which results in **91.14** after correction. However, this score is still far below the SAS-IQ of **98.43**, estimated from results from all observed PISA-volumes, TIMSS-1995 to 2007 and PIRLS-2001, 2006 and 2016. The final national IQ of Latvia is **94.79.** Measurements on representative samples from Latvia are necessary to validate this result, but so far could not be found.

2.3.67. Lebanon (LBN)

Saddik et al. (2005, Table 3) reported WISC-R-scores for three samples of children, two were working children from which one was exposed to solvent, and one sample consisted of school children. The digit-span sub-test was administered to all three and the working and exposed sample scored significantly lower than both others. So, it was excluded from our study. The remained working sample had a mean age of 14.70y and scored 12.36, which is equivalent to a scaled-score of 9.00, the 36.94th DEU-*P* or an uncor. IQ of 95.00. The school sample had a mean age of 14.00y and scored 12.90, which is equivalent to a scaled-score of 10.00, the 50.00th DEU-*P* and an uncor. IQ of 100.00. Both scores had to be reduced by 13.20 and 1.20 for FE- and country-correction. This results in cor. IQs of 80.60 and 85.60, with a mean of **83.10** or **83.30** if weighted. The country participated in PISA-2015 and TIMSS-2003 to 2015 and obtained a SAS-IQ of **80.11**, so the final national IQ is **81.70.**

2.3.68. Libya (LBY)

The mean raw score of science and arts students was 41.25, converted to 8.97 on the APM-scale, which is at the 5.96th GBR-*P* and equivalent to an uncor. IQ of 76.63, corrected by -3.36 for FE to 73.27.

Al-Shahomee and Lynn (2012, Table 1) reported standardization results for the SPM for older people. One sample was from the cities of Al-Beida and Shahat, and one sample is from the rural area around Shahat. Both samples had a mean age of 29.23y. The urban sample scored 40.45 or 8.45 on the APM-scale, which is at the 3.94th GBR-*P* and equivalent to an uncor. IQ of 73.63. The rural sample scored 37.14 or 6.61 on the APM-scale, which is at the 2.13th GBR-*P* and equivalent to an uncor. IQ of 69.60. From both scores 3.36 had to be subtracted for FE-correction, so the cor. IQs are 70.27 and 66.24.

A sample of 16.00y old secondary school children from public schools in Al-Beida and Shahat were tested by Al-Shahomee, Lynn and Abdalla (2013, Table 1) on the SPM. The sample obtained a raw score of 40.13, which is at the 16.19th GBR-*P* and equivalent to an uncor. IQ of″85.20, corrected by -3.36 for FE to 81.84.

Al-Shahomee, Furnham, and Lynn (2017, Tab.1) gave CPM-raw scores for a sample with a mean age of 8.50y, tested in 2017. This sample obtained a score of 23.76, which is at the 23.76th GBR-*P* and equivalent to an uncor. IQ of 89.29. A minor correction of -0.21 for FE was necessary, resulted in a cor. IQ of 89.08. A second sample, tested in 2006, was also named and is reported below at Lynn, Abdalla and Al-Shahomee (2008).

Bakhiet and Lynn (2015a, Table 1) measured intelligence in Tripoli via the CPM. The mean age of the sample was 10.17y, its raw scores 25.50, which is at the 11.60th GBR-*P* and equivalent to an uncor. IQ of 82.07, which had not to be corrected.

Bakhiet, Abdelrasheed and Lynn (2017, Table 1) presented new data from the city of Misratah. Their sample had a mean age of 8.50y and was tested with the CPM, where it obtained a raw score of 21.79, which is at the 14.31st GBR-*P* and equivalent to an uncor. IQ of 84.00, reduced by 0.21 for FE-correction to 83.79.

Lynn, Abdalla and Al-Shahomee (2008, Table 1) reported results from a CPM-administration from 2006, in which a sample with a mean age of 8.50y obtained a raw score of 22.66, which is at the 18.10th GBR-*P* and equivalent to an uncor. IQ of 86.33. Adding 0.21 for FE-correction resulted in a cor. IQ of 86.54.

Libya got an unweighted national IQ of **78.47** with a standard deviation of 7.93. This score increased after weightings to **80.92**.

The country did not participate in the school assessment studies observed by us. So, the final national IQ is also **80.92**.

2.3.69. Lithuania (LTU)

Georgas et al. (2003, Fig.19.6) reported a full-scale IQ on the WISC-III for a sample from Lithuania with a mean age of 11.00y of 96.00. Corrected by -4.76 and -2.50 for FE and country resulted in a cor. IQ of 88.74.

For a sample of 12.00y olds from Kaunas, Lynn and Kazlauskait (2002) reported a CPM-raw score of 28.90, which is at the 35.32nd GBR-*P* and equivalent to an uncor. IQ of 94.35, to which 1.68 had to be added for FE-correction to 96.03.

Gintilienë and Butkienë (2005, Tab.1) reported CPM-raw scores, which came from the standardization of this test in Lithuania. The normative sample had a mean age of 8.50y and obtained a score of 25.73, which is at the 36.89th GBR-*P* and equivalent to an uncor IQ of 94.98. After a minor correction for FE of 0.63 a cor. IQ of 95.61 was calculated.

This gives Lithuania an unweighted national IQ of **93.46** with a standard deviation of 4.09. After weightings, this score increases by around one score to **94.53**. PISA-2006 to 2015 and all observed TIMSS- and PIRLS-volumes gave an SAS-IQ of **97.24**, so the final national IQ is **95.89**.

2.3.70. Malawi (MWI)

From Van der Vijver and Brouwers (2009, Tab.3) the only intelligence study for Malawi was included. They measured intelligence via the CPM on a sample with a mean age of 10.50y from the rural Ntcheu District, which obtained a raw score of 5.91 on the CPM-sets A and Ab, equivalent to 18.41 on the full CPM and 17.97 on the SPM-scale. This score is at the 5.33rd GBR-*P* and equivalent to an uncor. IQ of 75.79 and **69.70** after a FE-correction of -6.09, which is both the unweighted and final national IQ due to missing school assessment results.

2.3.71. Mali (MLI)

From Mali's capital Bamako, Dramé and Ferguson (2017, Table 2) reported an uncor. IQ measured with the SPM of 65.85 for a sample with a mean age of 9.85y. Raw-scores were not given, so the score was directly accepted. Corrected by -6.09 for FE down to **59.76**, this score is both the unweighted and final national IQ, because the country did not participate in the school assessment studies observed by us.

2.3.72. Malaysia (MYS)

A representative sample from the Bachok District of Malaysia with a mean age of 8.10y was tested with CPM by Hamid et al. (2002, Table 3). A mean IQ of 84.55 was given for the full sample but haemoglobin and iron status showed significant effects on intelligence, therefore the mean score of both samples without nutricial deficiency was used as uncor. IQ, which is 86.26. After a minor correction of -0.21 for FE, this score is **86.05** and the unweighted national IQ. Malaysia participated in PISA-2009 to 2015 and TIMSS-1999 to 2015, where it obtained a SAS-IQ of **89.12**. The final national IQ is **87.58**.

2.3.73. Malta (MLT)

Martinelli and Lynn (2005, Tab.1) reported CPM-raw scores for a sample with a mean age of 5.20y from Malta. The sample obtained a raw score of 14.27, which is at the 28.84th GBR-*P* and equivalent to an uncor. IQ of 91.63, to which 2.73 had to be added for FE-correction to 94.36.

Martinelli and Schembri (2014, Tab.1) administered the SPM on a sample with dyslexic and one with non-dyslexic school children. Both samples had similar mean ages of 12.92y and 12.83y and scored identical 42.00 raw-scores, which are at the 41.58th GBR-*P* and equivalent to an uncor. IQ of 96.81, corrected by -6.09 for FE to 90.72.

This gives Malta an unweighted national IQ of **91.93** with a standard deviation of 2.10, which increased to 93.67 after weightings. In PISA-2009 and 2015, TIMSS-2007 to 2015, and PIRLS-2011 and 2016, it obtained a SAS-IQ of **88.87**, which gave the country a final national IQ of **91.27**.

2.3.74. Marshall Islands (MHL)

The only included measurement of intelligence at the Marshall Islands was reported by Jordheim and Olsen (1963). They gave a mean IQ for a sample with a mean age of 15.00y of 85.00 to 90.00, which was averaged by us to 87.50. After correction of -1.04 for FE and -2.50 for country a cor. IQ of **83.96** remained, which was used as the unweighted and final national IQ. However, the old age of the source and missing school assessment results requires an acceptance of this score only with reservation.

2.3.75. Mauritius (MUS)

Liu et al. (2003, Tab.1) compared a malnourished and a control group from Mauritius on the WISC, where the malnourished group scored significantly lower and was therefore excluded by us. The control group had a mean age of 11.00y and obtained an uncor. IQ of 100.92. Corrected by -11.56 and -2.50 for FE and country, an unweighted national IQ of **86.82** remained. In 2009 Mauritius participated in PISA and obtained a SAS-IQ of **86.30**. The final national IQ is **86.56.**

2.3.76. Mexico (MEX)

Lynn, Backhoff and Contreras (2005, Table 1) measured intelligence on three ethnic groups in Ensenada, Baja California, in Mexico: Whites, Mestizo and Native Mexican Americans ("Indian") with the SPM. The White sample had a mean age of 8.82y and obtained a score of 32.28, which is at the 52.15th GBR-*P* and equivalent to an uncor. IQ of 100.81. The Mestizo sample had a mean age of 8.91y and obtained a score of 29.13, which is at the 41.63rd GBR-*P* and equivalent to an uncor. IQ of 96.83. The Native American sample had a mean age of 9.17y and obtained a score of 20.30, which is at the 17.17th GBR-*P* and equivalent to an uncor.

IQ of 85.79. A FE-correction of -4.41 was necessary to all three samples and resulted in cor. IQs of 96.40, 92.42 and 81.38.

Soto, Ramírez and Tomasini (2014, table 2, 4) reported a CPM-raw score for a sample with a mean age of 9.18y of 26.32, which is at the 28.23rd GBR-*P* and equivalent to an uncor. IQ of 91.36, which had to be corrected by -0.21 for FE to 91.15.

This gives Mexico an unweighted national IQ of **90.34** with a standard deviation of 6.38 and a weighted national IQ of **90.44.** The country obtained a SAS-IQ of **85.02** from all observed PISA-values and the final national IQ is **87.73**.

2.3.77. Mongolia (MNG)

A national sample with a mean age of 8.50y was tested with the CPM by Odgerel and Maekawa (2003, Table 2) and obtained a raw score of 26.08, which is at the 46.07th GBR-*P* and equivalent to an uncor. IQ of **98.52**. After adding 0.84 this resulted in a cor. IQ of **99.36**. The country participated in TIMSS-2007 where it obtained a much lower SAS-IQ of **82.69**, which gives it a final national IQ of **91.03**.

2.3.78. Morocco (MAR)

For a sample with a mean age of 8.50y from the city of Kenitra, Aboussaleh et al. (2006, Table III) reported a SPM-raw score of 21.00, which is at the 18.23rd GBR-*P* and equivalent to an uncor. IQ of 86.40. 3.57 had to be subtracted from this score, so the cor. IQ is 82.83.

Díaz et al. (2012, Table 4) compared a Spanish and a Moroccan sample on the SPM. The Moroccan subjects came from the cities of Casablanca, Marrakesh, Meknes and Tangiers, had a mean age of 26.77y and obtained a raw score of 43.73, converted to 10.76 on the APM-scale, which is at the 7.42nd GBR-*P* and equivalent to an uncor. IQ of 78.32. This score had to be reduced by 3.36 for FE-correction to 74.96.

El Azmy et al. (2013, Table 20) reported a mean raw score of 34.29 on the SPM for a sample from the city of Mrirt with a mean age of 14.20y. This score is at the 8.04th GBR-*P* and equivalent to an uncor. IQ of 78.96, reduced by 6.09 for FE-correction to 72.87.

For a rural sample with a mean age of 14.46y, Latifi et al. (2009, Tab.9) reported a SPM-raw score of 29.22, which is at the 2.96th GBR-*P* and equivalent to an uncor. IQ of 71.69, which had to be reduced by 5.46 for FE-correction to 66.23. There is also a score for a inbreed sample reported, which was not included in our dataset due to significantly lower test results.

Sbaibi, Aboussaleh and Ahami (2014, Table 2) measured intelligence on a sample with an age range of 11.80y to 17.70y and a mean age of 14.75y, from a small rural community in Sidi El Kamel. The sample obtained a SPM-raw score of 29.38, converted to 21.65 on the SPM+-scale, which is at the 1.08th GBR-*P* and equivalent to an uncor. IQ of 65.53, corrected by -0.21 for FE to 65.32.

Two samples with mean ages of 26.57y were provided by Sellami et al. (2010, Table 2, 3), one consisted of people which have no degrees from or studied at a university, and one which are students or already head a university degree. The non-academic sample scored 42.63 on the SPM, converted to 9.93 on the APM-scale, which is at the 5.99th GBR-*P* and equivalent to an uncor. IQ of 76.67. The academic sample scored 46.17 on SPM, converted to 12.86 on the APM-scale, which is at the 11.97th GBR-*P* and equivalent to an uncor. IQ of 82.35. Both results had to be reduced by 3.36 for FE-correction to cor. IQs of 73.31 and 78.99.

Morocco obtained an unweighted national IQ of **73.50** with a standard deviation of 6.78, but a much lower weighted national IQ of 68.73. The country participated in TIMSS-2009 to 2015 and in all observed PIRLS-volumes. Its SAS-IQ is **65.32** and the final national IQ **67.03**.

2.3.79. Namibia (NAM)

Veii (2003, Table 5.6) reported CPM-raw scores for Herero-speaking children from Namibia with a mean age of 8.50y. The sample obtained a CPM-raw score of 15.30, which is at the 1.04th

GBR-*P* and equivalent to an uncor. IQ of 65.35, added with 0.84 for FE-correction to 66.19. It has to be noted that Herero make only around 7.00% (CIA, 2017, Index: Ethnic groups) of the total Namibian population and have to be rated as a minority, which has limited representativeness to the full Namibian population. Because this is the only suitable sample available from Namibia and no school assessment results are available, the corrected IQ of **66.19** is both the unweighted and final national IQ.

2.3.80. Nepal (NPL)

A study from Buckley et al. (2013, Table 2) measured a CPM-raw score of Nepalese Mothers of 17.78. No age for mothers was given. The testing of mothers took place 1994 to 1997 during early pregnancy. CIA (2017, Index: Mother's mean age at first birth) gives a mean age of mothers at first birth in Nepal of 20.80y, which was used by us at the mean age of the sample. The given raw score is equivalent to -1.39 on the APM-scale, which is at the 0.05th GBR-*P* and equivalent to an uncor. IQ of 47.72, corrected by -0.84 for FE to 46.88. Only the sample with Vitamin-A supplementation was used by us while the placebo sample was excluded due to lower test scores. However, the prevalence of Vitamin-A deficiency in this sample might cause an underestimation of IQ.

Four samples from the rural Sarlahi District consisting of mothers with different nutritional supplementation and a control were tested on SPM by Christian et al. (2010, Tab.1). The samples had mean ages of 31.60y, 32.00y, 31.20y and 32.00y. The raw scores obtained by these samples were similar to each other and therefore, all four samples were used by us. The first sample scored on SPM 15.90 the second 15.70, the third sample 16.60 and the fourth sample 13.45. Converted to the APM-scale, these scores are equivalent to -2.23, -2.33, -1.85 and -3.61, and were all below the 0.01st GBR-*P*. Uncor. IQs are 42.70, 42.26, 44.23 and 41.84. All had to be reduced by 3.36 for FE-correction to cor. IQs of 40.87, 39.34, 38.90 and 40.87.

Raven's-raw scores for heads of households from the districts of Bara and Rautahat were presented by Jamison and Lockheed (1985, Table 4). The full sample includes heads of households from villages with and without schools, but no differences in intelligence between both sub-samples were detected. The full sample had a mean age of 41.71y and scored 13.45. The source reported a maximum score of 36. No information about the specific used Raven's test was given but a source from the same first author reported an intelligence measurement on a similar population from the same country, named the CPM (Jamison and Moock, 1984). The score of 13.45 would be 13.14 on the SPM and -3.61 on the APM, far below the 0.01st GBR-*P* and equivalent to an uncor. IQ of 36.55, to which 2.94 had to be added for FE-correction to 39.49.

Three rural samples were separated by Jamison and Moock (1984, Table 2) according the kind of crops they grow. No significant differences in CPM-raw scores were reported. The three samples obtained raw scores of 12.98, 13.45 and 13.12, converted to -3.89, -3.61 and -3.80 on the APM-scale. These scored are also far below the 0.01st GBR-*P* and equivalent to uncor. IQs of 40.67, 48.26 and 41.02. Adding 2.94 to these scores for FE-correction resulted in cor. IQs of 43.61, 51.20 and 43.96.

All these samples scored extremely low, both in terms of global relations and to the geographical neighbourhood. At first there was a suspicion that not all sets of Raven's Matrices were used, but this was not stated in the sources. Indeed, Jamison and Moock (1984, Table 2) reported a range of scores which corresponded to the full CPM and these gave results which are not much different to the results from the other measurements in Nepal. Eventually, the rural origin of all samples may explain the results but an urban sample for comparison was not available.

The unweighted national IQ of Nepal is **42.79**, which is very implausible, but the standard deviation across the different studies is only 4.10. The score also remained stable after weightings at **42.99**. Data to calculate a SAS-IQ were not available, thus we can neither obtain confirmation nor rejection of the psychometric IQ. Even if all used samples are from rural areas we would expect a national IQ for Nepal not so far below the national IQ of its neighbourhood country India (76.24).

2.3.81 Netherlands (NLD)

For a sample with a mean age of 20.00y from Amsterdam, Buj (1981, Table 1) reported an uncor. IQ on CFT of 109.40, reduced by 7.28 and 2.50 for FE- and country-correction to 99.62.

Georgas et al. (2003, Fig.19.6) reported a full-scale IQ on the WISC-III for a national sample with a mean age of 10.96y of 102.00. 4.76 had to be subtracted for FE- and 2.50 for country-correction, which resulted in a cor. IQ of 94.74.

Hoekstra, Bartels and Boomsma (2007, Tab.1) conducted a longitudinal study on twins from the age of 5.00y to 18.00y. Intelligence was measured with WISC-R at 5.00y, 7.00y, 9.00y and 12.00y, whereas with WAIS-III on 18.00y. We decided to use only the first measurement at the age of 5.00y, when any training effects occurred, and the last measurement at the age of 18.00y, when the time distance to the previous testing was 6.00y and the used test was different. The 5.00y olds obtained a verbal IQ of 103.79 and a non-verbal IQ of 101.17, averaged to an uncor. IQ of 102.48 and corrected by 2.16 for FE and 0.40 for country to 105.04. The 18.00y olds obtained a verbal IQ of 101.02 and a non-verbal IQ of 107.12, averaged to 104.07 and corrected by -2.88 and 0.40 for FE and country to 101.59.

Six subsets of the WISC-R were administered by Polderman et al. (2006, Table 1) on a sample of twins with a mean age of 12.42y. Subtests were: Similarities, Vocabulary, Arithmetic, Digit Span, Block Design and Object Assembly, so four were subtests of the verbal- and two of the performance-scale. A total IQ of 99.45 was given by the source and used by us as the uncor. IQ. This score had to be reduced by 6.12 and added with 0.40 for FE- and country-corrections to 93.73.

The SPM-manual (Raven, Raven & Court, 1999, Table 27) reported a raw score of the Dutch normative sample from 1992 with a mean age of 9.25y of 34.00, which is at the 62.07th GBR-*P* and equivalent to an uncor. IQ of 104.61, reduced by 2.73 for FE-correction to 101.88.

The CPM-manual (Raven, Raven & Court, 2006, Table 16) reported a raw score of the Dutch normative sample from 1986 with a mean age of 7.00y of 20.69, which is at the 29.39th GBR-*P* and equivalent to an uncor. IQ of 91.87, to which 4.41 had to be added for FE-correction to 96.28.

A twin sample with a mean age of 16.13y was tested by Rijsdijk, Boomsma and Vernon (1995, Tab.1) on the SPM. It obtained a raw score of 49.30, converted to 16.12 on the APM-scale, which is at the 55.91st GBR-*P* and equivalent to an uncor. IQ of 102.23. The correction of 2.73 for FE resulted in a cor. IQ of 104.96.

Twins were also tested by Rijsdijk, Vernon and Boomsma (2002, Tab.1) on the WAIS. The FS-IQ for males of 113.5 and the FS-IQ for females of 114.00 were averaged to an uncor. IQ of 113.75, corrected by -2.52 for FE and 0.40 for country to 111.63. Additionally, a score of the same sample on the SPM was given with 4.95. This score was calculated as the number of correct solved items divided by ten, so the real SPM-raw score is 49.45, converted to 16.29 on the APM-scale, which is at the 48.30th GBR-*P* and equivalent to an uncor. IQ of 99.36, on which 1.65 had to be added for FE-correction to 101.01.

Sex-differences on the WISC-R were researched by van der Sluis et al. (2008, Table 1). On all sub-tests of the verbal-scale the sample obtained a scaled score sum of 61.03 and 51.42 on all sub-tests of the performance-scale, which is together 112.45 and equivalent to an uncor. IQ of 109.50, reduced by 9.00 and 1.20for FE- and country-correction to 99.30.

The unweighted national IQ of the Netherlands is **100.89** with a standard deviation of 5.15 and remained stable at **100.19** after weightings. The country participated on PISA-2003 to 2015 and all observed TIMSS- and PIRLS-volumes, where it obtained a SAS-IQ of **101.30**. The final national IQ is **100.74**.

2.3.82. Netherlands Antilles (ANT)

The only suitable IQ-measurement from the Netherlands Antilles was reported by Vedder, van de Vijfeijken and Kook (2000, Table III). It was done by using the SPM on a sample with a mean age of 10.00y. It obtained a raw score of 27.20, which is at the 14.95th GBR-*P* and equivalent to an uncor. IQ of 84.42. Corrected down for FE by 4.41 to **80.01**. Data to calculate a SAS-IQ are not available.

2.3.83. New Zealand (NZL)

Belsky et al. (2013, Tab.1) administered the WISC-R on three samples from Dunedin. One sample consisted of lean children, one of obese and one of severely obese. The samples obtained different FS-IQs, with highest value for lean children with 101.25, 97.01 for obese and 96.93 for several obese. Despite the negative effect of obesity on IQ we used all three samples, because the source reported a prevalence of obesity within the sample similar to the whole population of New Zealand. For all samples a FE-correction of 0.34 was necessary, which resulted in cor. IQs of 99.09, 94.25 and 94.85.

Gender difference in intelligence were researched by Fergusson and Horwood (1997, Table 2). They measured an FS-IQ of on average 101.85 for females and 104.10 for males, which gave a mean uncor. IQ of 102.98 for the whole sample with a mean age of 8.50y. 7.82 had to be subtracted from the score for FE-correction and 2.50 for country-correction. A cor. IQ of 92.66 remained.

The SPM-manual (Raven, Raven & Court, 1999, Table 21) reported a mean raw score of a normative sample with a mean age of 11.50y of 40.47, which is at the 54.75th GBR-*P*, equivalent to an uncor. IQ of 101.79 and reduced by 1.05 for FE-correction to 100.74.

These results gave New Zealand an unweighted national IQ of **96.32** with a standard deviation of 3.43, which increased to **99.01** after weightings. School assessment data were available from all observed PISA-, TIMSS- and PIRLS-volumes and resulted in a SAS-IQ of **98.13**. The final national IQ is **98.57**.

2.3.84. Nicaragua (NIC)

Rodríguez (2012, Fig.2) reported a median FS-IQ of 67.00 for a sample with a mean age of 8.00y on the WICV-IV. This score was taken by us as the uncor. IQ and corrected by -1.02 and -2.50 for FE and country to 63.48. Children lived under pesticide exposure and the IQ is therefore an underestimation.

Sandiford et al. (1997, Tab.3) reported a CPM-raw score of females which not completed primary school of 7.12 and for females which completed primary school of 8.24. Only the set Ab was used in measurement. On the full CPM raw scores would be 21.02 and 23.62, converted to 20.80 and 24.35 on the SPM-scale and 0.45 and 1.79 on the APM-scale. For samples with a mean age of 34.90y these scores are at the 0.05th and 0.16th GBR-*P* and equivalent to uncor. IQs of 50.80 and 55.91. Both scores had to be reduced by 1.05 for FE-correction to cor. IQs of 49.75 and 54.86.

Nicaragua got an unweighted national IQ of **56.03** with a standard deviation of 6.94, which even fell down to **52.69** after weightings. This national IQ would be untypically low for the geographical region but comparable to the IQ of Guatemala (47.72). Unfortunately, no school assessment data were available to validate Nicaragua's psychometric IQ.

2.3.85. Nigeria (NGA)

Hur and Lynn (2013, Table 4) compared intelligence between mono- and dizygotic twins from the Abuja Federal Capital Territory on the SPM+. The provided raw scores for twins and singletons where 22.03 and 25.70, averaged to 23.87. The mean age of the full sample was 15.35y, so the raw score is at the 1.60th GBR-*P* and equivalent to an uncor. IQ of 67.82. A minor correction of -0.21 for FE resulted in a cor. IQ of 67.61.

Iloh, Ubesie and Iloh (2017, Table 2) observed the influence of socio-demographic characteristics on SPM-test performance on a sample with a mean age of 10.00y from the city of Enugu. Males obtained a raw score of 31.80 and females of 33.70, averaged to 32.75, which is at the 28.52 GBR-*P* and equivalent to an uncor. IQ of 91.49, corrected by -6.09 for FE to85.40.

Rindermann, Falkenhayn and Baumeister (2014, Table 1) administered the APM-, a short version of the APM, on a sample of Nigerian university students with a mean age of 32.32y. The sample obtained a raw score of 3.55, which is, according to the source, at the 23.43rd DEU-*P* and equivalent to an uncor. IQ of 89.13. No FE-correction was necessary but for country of -1.20. Additionally, we had to reduce this score by 11.33 because it was compared within the source to a specific German score of 111.33, 11.33 above the 100. Due to the mostly low differences between samples for university students and normal populations in developing countries, we used this sample for our dataset.

Ani and Grantham-McGregor (1998, Tab.1) administered the similarities-subtest of the WISC-R on two samples, one of aggressive and one of prosocial boys from the city of Lagos with a mean age of 11.70y. The aggressives scored significantly lower than their counterparts and were therefore excluded by us. The prosocials gained 7.40 scored in the conducted subtest. It was not named by the source if these scores were raw or scaled. A raw score of 7.40 would be equivalent to 5.00 to 6.00 scaled scores and therefore equivalent to IQs of 75.00 to 80.00. A scaled score of 7.40 would be, however, equivalent to an IQ of 87.50. Because it is more usual to give results in Wechsler Test as scaled scores or IQ rather than raw scores, we used the 87.50 as the uncor. IQ, which decreases after corrections for FE and country by -8.16 and -2.50 to a cor. IQ of 76.84.

An administration of the SPM+ was done by Hur, Nijenhuis and Jeong (2017, Tab.1). They tested a representative sample with a mean age of 13.50y, which obtained a mean raw score of 20.88, which is at the 1.47th GBR-*P* and equivalent to an uncor. IQ of 67.34, corrected by -0.21 for FE to 67.50.

Two samples, one from private and one from public schools, were tested by Ijarotimi and Ijadunola (2007, Table 1) on the SPM.

Children from private schools had a mean age of 10.25y and obtained a raw score of 24.50, which is at the 7.57th GBR-*P* and equivalent to an uncor. IQ of 78.48. Children from public schools had a mean age of 12.40y and scored 23.30, which is at the 3.36th GBR-*P* and equivalent to an uncor. IQ of 72.54. Public school children showed a higher IQ than public school children, but more children in Nigeria seem to visit public schools. We decided to use both samples to capture both school groups in the dataset. They had to be corrected by -5.88 for FE to 72.60 and 66.66.

Jegede and Bamgboye (1981) tested children from the Oyo State with a mean age of 13.02y, which obtained a SPM-raw score of 28.49, which is at the 4.39th GBR-*P* and equivalent to an uncor. IQ of 74.40. It had to be corrected by -0.42 for FE to 73.98.

Maqsud (1980, Table 1) compared the performances of children learned in modern and traditional ways of education. The mean age of the modern sample was 12.20y and of the traditional sample 12.60y. They obtained SPM-raw scores of 20.85, which is at the 1.57th GBR-*P* and equivalent to an uncor. IQ of 67.71, and of 23.25, which is at the 3.33rd GBR-*P* and equivalent to an uncor. IQ of 72.49. Both ways of education are present in Nigeria, so we decided to integrate both samples in our dataset. Corrected by -0.21 for FE cor. IQs of 67.50 and 72.28 remained.

Nigeria obtained an unweighted national IQ of **72.66** with a standard deviation of 5.92, which decreased to **67.80** after weightings. School assessment results were not available.

2.3.86. Norway (NOR)

On a sample with a mean age of 20.00y from Oslo, the CFT was administered and measured an uncor. IQ of 101.80 (Buj, 1981, Table 1). This score had to be corrected by -7.28 and -2.50 for FE and country to 92.02.

Helland et al. (2008, Fig.2) presented IQs measured on the KABC on two selective samples from Norway. Both were from mothers which got nutrition supplementation during and after pregnancy, one with corn oil and one with cod-liver oil. Differences in intelligence between both samples were marginal with 109.00 vs. 110.00, so we used the mean of 109.50 as the uncor. IQ, reduced by 11.44 and 2.50 for FE- and country-correction to 95.56.

Høie et al. (2005, Fig.1) compared children from Hordaland County with and without epilepsy. Intelligence was measured with the SPM. From the given percentile distribution, we calculated a raw score of 43.92 for the control sample, which is at the 76.03rd GBR-*P* and equivalent to an uncor. IQ of 110.61, corrected by -4.41 for FE to 106.20. The epilepsy-sample scored significantly lower and had therefore been excluded.

This gives Norway an unweighted national IQ of **97.93** with a standard deviation of 7.38, and a weighted national IQ of **99.51**. The SAS-IQ, calculated from results from all observed school assessment studies except TIMSS-1999, is **94.76** and the final national IQ **97.13**.

2.3.87. Oman (OMN)

Al Said (2014, Table 5) administered the CPM in the Governorate of Muscat on a sample with a mean age of 9.00y, which obtained a raw score of 25.22, which is at the 21.07th GBR-*P* and equivalent to an uncor. IQ of 87.94, corrected by -0.21 for FE to 87.73.

Bakhiet and Lynn (2015d) reported APM-scores from a national sample with a mean age of 17.13y. This sample obtained a raw score of 12.20, which is at the 27.87th GBR-*P* and equivalent to an uncor. IQ of 91.20. After a necessary FE-correction of -3.36 a cor. IQ of 87.84 remained.

CPM-scores from the Governorate of Muscat and the northern Al Batinah region were reported by Kazem et al. (2007, Table 2; 2009, Table 3). Both samples had mean ages of 8.00y. They scored 20.75, which is at the 16.29th GBR-*P* and equivalent to an uncor. IQ of 85.26, and 21.67, which is at the 21.11th GBR-*P* and equivalent to an uncor. IQ of 87.96.

Abdel-Khalek and Lynn (2010, Tab.1) standardized the SPM on a normative sample with an age range from 9.10y to 21.30y. We split this sample into two with mean ages of 12.33y and 18.40y. The younger samples scored 30.24 at the 10.76th GBR-P and equivalent to an uncor. IQ of 81.41, the older sample scored 11.97 at the 19.42nd GBR-P and equivalent to an uncor. IQ of 87.06. On the first one, no corrections were necessary but for FE of -0.21 on the second one, resulted in a cor. IQ of 87.75.

We estimated an unweighted national IQ of **85.16**, which a standard deviation of 4.17, a weighted national IQ of 83.30and a SAS-IQ of **74.10**, based on results from TIMSS-2007 to 2015 and PIRLS-2011 and 2016. The final national IQ is **78.70**.

2.3.88. Pakistan (PAK)

Ahmad et al. (2009, Table 1) reported SPM-scores for a sample with an age range from 12.00y to 45.00y, which was split by us into two samples with mean ages of 14.00y and 22.17y. The younger sample obtained a raw score of 35.88, which is at the 13.15th GBR-*P* and equivalent to an uncr. IQ of 83.21, corrected by -5.46 for FE to 77.75. The older sample scored 42.51 on the SPM- and 13.95 on the APM-scale, which is at the 27.23rd GBR-*P* and equivalent to an uncor. IQ of 90.91, corrected by -2.73 for FE to 88.18.

Children from private and public schools were compared by Aslam (2009, Tab.5) on the SPM. The public-school sample had a mean age of 13.71y and scored 25.79, which is at the 2.82nd GBR-*P* and equivalent to an uncor. IQ of 71.39. The private-school sample had a mean age of 13.52y and scored 32.69, which is at the 6.95th GBR-*P* and equivalent to an uncor. IQ of 77.81. The private share of middle school enrolment was given with 52.00% by the source, therefore we used both samples for the dataset. They had both to be reduced by 4.83 for FE-correction to cor. IQs of 66.56 and 72.98.

Aziz and Farooqi (1991, Tab.1) reported raw scores on the CPM for a representative sample with a mean age of 7.00y. The mean raw score is 25.91, which would be at the 66.78th GBR-*P* and equivalent to an uncor. IQ of 106.51. Adding 3.36 for FE-correction resulted in 109.87.

CPM-IQs of 73.60 for boys and 75.22 for girls were reported Jamil and Khalid (2016, Tab.4), averaged to an uncor. IQ of 74.41m reduced by 0.21 for FE-correction to 74.20.

Shamama-tus-Sabah, Gilani and Wachs (2011, Table 2) tested children from the cities Rawalpindi, Lahore and Karachi on the SPM. Their sample had a mean age of 13.58y and obtained a raw score of 26.77, which is at the 14.20th GBR-*P* and equivalent to an uncor. IQ of 83.93, corrected by -6.09 for FE to 77.84.

IQs measured with the SPM were measured by Rahman, Maqbool and Zuberi (2002, Tab.3) in seven locations in the city of Karachi. A significant effect of lead on IQ was found, so we decided to use only the sub-sample with the lowest lead concentration, which obtained an uncor. IQ of 92.30, corrected by -4.83 for FE to 87.47. However, also this sample was not free from lead exposedness.

The unweighted national IQ of Pakistan is **81.86** with a standard deviation of 13.42, and the weighted national IQ is 80.00. School assessment results were not available, and the final national IQ is **80.00**. The relatively high IQ in the sample from Aziz and Farooqi (1991) compared to the national mean and all other samples is striking but the source reported the use of the total number of correctly solved items, so the given numbers did not represent an unusual scale.

2.3.89. Peru (PER)

Berkman et al. (2002, Tab.1) reported a WISC-R FS-IQ of 88.90 for a low-SES sample from Lima with a mean age of 9.36y. The uncor. IQ had to be reduced by 5.44 for FE- and -.50 for country-correction to 80.96. The source reported a negative effect of stunning and G lambia on IQ, with an amount of 10.00 of stunning and 4.10 per year of G lambia. There were no sufficient data to do an exact correction for these negative effects but the prevalences in the sample are nearly representative for the whole population of Peru and no further correction was necessary.

Blumen (2000, Table 8) gave CPM-raw scores for a highly able and a non-highly able sample with mean ages of 7.40y. The second sample obtained a raw score of 18.00, which is at the 8.54th GBR-*P* and equivalent to an uncor. IQ of 79.46, corrected by 1.89 for FE to 81.35. The highly able sample scored 26.00, which is at the 48.06th GBR-*P* and equivalent to an uncor. IQ of 99.27 but was excluded due to extremely less representativeness.

Table 32 from Escobal et al. (2003) gave percentages of correct answers on CPM-sets separated by location or wealth, and three grades (low: 0.00-4.00, medium: 5.00-8.00, high: 9.00-12.00) of test-set performance. From the provided numbers and by using percentages of individuals on test grades, scores for each CPM-set were calculated for an urban sample, a rural sample, three samples with low SES and one sample with normal SES. Their raw scores are 21.88, 17.75, 17.12, 19.16, 21.40, 23.88, the GBR-*P* of these scores are 12.70, 3.52, 2.88, 5.51, 10.97 and 22.44, and the equivalent uncor. IQs are 82.89, 72.86, 71.52, 76.04, 81.58, 88.64. All had to be corrected by 0.84 for FE, so the cor. IQs are: 83.73 for the urban sample, 73.70 for the rural sample, 72.36, 76.88 and 82.42 for the three samples with low SES and 89.48 for the sample with normal SES.

Millones, Flores-Mendoz and Millones Rivalles (2015, Table 3) administered the SPM on a sample from Lima with a mean age of 11.25y. It obtained a mean raw score of 40.00, which is at the 48.75th GBR-*P* and equivalent to an uncor. IQ of 99.53, reduced by 6.09 for FE-correction to 93.44.

This gives Peru an unweighted national IQ of **81.59** with a standard deviation of 6.87. It increased after weightings to **85.39**. The country participated in PISA-2000 and PISA-2009 to 2015, and TIMSS-1999 and 2003, from which a SAS-IQ of **77.49** was calculated. The final national IQ is **81.44**.

2.3.90. Philippines (PHL)

The Filipino student sample from Flores and Evans (1972, Table 3) had a mean age of 13.60y and scored on average 34.15 on the SPM, which is at the 12.64th GBR-*P* and equivalent to an uncor. IQ of 82.85. Adding 1.47 for FE-correction resulted in a cor. IQ of 84.32.

Effects of blood lead concentration and nutrition on intelligence was researched by Solon et al. (2007, Table 1) on a sample from the Visayas island group with a mean age of 3.96y. They used the WPPSI-III and measured a V-IQ of 91.70 and a P-IQ of 97.50, averaged to 94.60. 0.68 IQ-scores must be deducted for FE-correction and 2.50 for country-correction. The source reported a decrease in IQ due to an increase in lead concentration. Specific scores for children without or with only less lead exposedness were not reported but a decline of 2.47 IQ-scores in V-IQ, whereas no significant impact on P-IQ was found. To take this into account we added 1.24 (2.47 / 2), so the cor. IQ is 92.66.

Vista and Grantham (2010, Table 5) administered the NNAT on three samples from the regions Luzon, Visayas and Mindanao, consisted of children from elementary school with and without graduation, with high school graduation and with college graduation. We calculated a mean uncor. IQ for the full sample of 95.85, which had to be reduced by -2.50 for country-correction to a cor. IQ of 93.35.

Psychometric IQs gave the Philippines an unweighted national IQ of **90.11** with a standard deviation of 5.03., and a weighted national IQ of **92.47**. The SAS-IQ of **70.81**, calculated from results from TIMSS-1999 and -2003, is extremely lower, so the final national IQ is **81.64**.

2.3.91. Poland (POL)

Buj (1981, Table 1) reported an IQ measured with the CFT on a sample with a mean age of 20.00y from Warsaw of 108.30, reduced by 7.28 for FE-correction and 2.50 for country-correction to 98.52.

Chuderski (2015, Table 1) administered the APM on a sample with a mean age of 23.20y. Test time was restricted to half of the time in the standardization, so the raw score of 19.07 had to be multiplied with 1.13 to a corrected raw score of 21.55, which is at the 45.91st GBR-*P* and equivalent to an uncor. IQ of 98.46. Subtracting 3.36 for FE-correction resulted in 95.10.

Dobrean et al. (2008, Table 4.5) reported a raw score of 34.00 for 18.00y old army recruits in Poland on the SPM+. This score is at the 23.33rd GBR-*P* and equivalent to an uncor. IQ of 89.08, corrected by 0.84 for FE to 89.92. The source also reported a raw score of 17.74 for a sample with a mean age of 26.00y. This score is at the 49.94th GBR-*P* and equivalent to an uncor. IQ of 99.98, corrected by -1.68 for FE to 98.30.

An urban sample from Krakow with a mean age of 20.10y was tested on the APM by Gruszka and Owen (2015, Table 1). An "IQ" of 24.85 was reported. No information about how this score was calculated were given by the source, so we supposed that it is most likely the raw score and not IQ. An APM-raw score of 24.85 would be at the 50.50th GBR-*P* and equivalent to an uncor. IQ of 105.26, from which 101.90 remained after a FE-correction of -3.36.

A sample of randomly chosen children from schools in Warsaw were tested by Orylska et al. (2016) on the CPM. The sample had a mean age of 5.04y and scored 20.93, which is at the 83.51st GBR-*P* and equivalent to an uncor. IQ of 114.62, reduced by 0.21 for FE-correction to 114.41. The source named a "raw score ≥ 85" necessary for inclusion of individuals, which is probably a mistake and should mean the IQ. However, it was also reported that all 179 selected children met this criterion.

The APM-manual (Raven, Raven & Court, 1998, Tab.APM23, APM27) gave raw scores for two samples with a mean age of 16.00y. The samples scored on average 15.71, which is at the 51.81st GBR-*P* and equivalent to an uncor. IQ of 100.68. 0.21 had to be added for FE-correction to 100.89.

Witkowska (2014, Table 1, 2) reported SPM-raw scores of on average 42.45 from the Polish standardization sample from 2000 and of on average 48.46 from a national study of Polish adolescents from 2009. Both samples had mean ages of 17.50y, therefore the SPM-raw scores had to be converted to 9.82 and 16.25 on the APM-scale, which are at the 14.47th and 42.38th GBR-*P* and equivalent to uncor. IQs of 84.11 and 97.12. The sample from 2000 had to be reduced by 1.68 and the sample from 2009 by 3.35 for FE-correction, which resulted in cor. IQs of 82.43 and 93.76.

Overall, this gives Poland an unweighted national IQ of **97.25** with a standard deviation of 8.82, which decreased to **94.62** after weightings. A SAS-IQ of **98.09** was calculated by results from all observed PISA-volumes, TIMSS-2011 and 2015, and PIRLS-2006 to 2016. The final national IQ is **96.35**.

2.3.92. Portugal (PRT)

IQ on the CFT of an adult sample with a mean age of 20.00y from Lisbon was reported by Buj (1981, Table 1). The reported uncor. IQ is 102.60, reduced by 7.28 and 2.50 for FE- and country-correction to 92.82.

Garcia (2016, Table 7) reported SPM-raw scores for males and females with a mean age of 55.29y. The full sample scored 40.04 or 11.13 on the APM-scale, which is equivalent to a GBR-*P* of 20.92 and an uncor. IQ of 87.86, corrected by -2.94 for FE to 84.92.

The normative Portuguese sample for the CPM-standardization of 1994 obtained a mean raw score of 23.73 and had a mean age of 8.50y. (Raven, Raven & Court, 2006, Table 23). Such a raw score is at the 23.55th GBR-*P* and equivalent to an uncor. IQ of 89.19, to which 2.73 had to be added for FE-correction to 91.92.

The unweighted national IQ of Portugal is **89.89** with a standard deviation of 3.65, which remained stable with **89.71** after weightings. A SAS-IQ of **96.04** was calculated by results from all observed PISA-volumes, TIMSS-1995, 2011 and 2015, and PIRLS-2011 and 2016. The final national IQ is **92.87**.

2.3.93. Puerto Rico (PRI)

Fuertes de la Haba, Santiago and Bangdiwala (1976, Table II) researched the effect of oral contraceptives by mothers on offspring intelligence. Children whose mothers used oral contraceptives obtained an uncor. IQ of 85.08 and children whose mothers did not use oral contraceptives scored 85.54. The difference is non-significant and both samples were used by us. Correcting them by

-8.16 for FE and -2.50 for country resulted in cor. IQs of 74.42 and 74.88.

Matias, Carrelo and Zaidspiner (1990, Table 1) compared intelligence of two samples with mean ages of 8.83y, measured once with the WISC and once with the WISC-R. 109.74 was the uncor. IQ measured with the WISC and 104.65 the uncor. IQ measured with the WISC-R. Both results had to be reduced for FE-correction by 14.62 for WISC and 5.44 for WISC-R, and additionally corrected by -2.50 for country-correction, which resulted in cor. IQs of 92.62 and 96.71.

Andreu, Alvarez and Veray (1991, Table 2) compared the performances of university students from the city of Ponce on the WAIS, the WAIS-R and the APM. Mean ages of all samples were 19.30y. Uncor. IQs were 121.10 for WAIS, corrected by -22.80 for country to 98.30, 98.80 for WAIS-R, corrected by -3.40 and -2.50 for FE and country to 92.90, and 106.90 on the APM, corrected by -10.88 and -2.50 for FE and country to 93.10.

A FS-IQ on the WAIS-R of 88.50 was reported by Ortiz Colón et al. (1993, Table 5) for a control sample with a mean age of 43.13y, reduced by 4.42 and 2.50 for FE- and country-correction to 81.58. A FS-IQ on the WAIS-R of 81.08 was reported by the same source for a sample with toxic exposedness, which is significantly lower than 88.50. So, only the score of the first sample was included.

Performances on the WISC-R and KABC were compared by Vazquez (1989, Table 2, 3). 110.88 was the uncor. FS-IQ on the WISC-R and 102.28 the uncor. IQ on the KABC. Necessary FE- and country-corrections were -5.10 and -2.50 for the WISC-R, and -4.16 and -2.50 for the KABC, so the cor. IQs are 103.28 and 95.62.

Two samples from private schools in Ponce with mean ages of 12.00y were compared by Torres Díaz et al. (2009). On one sample the WISC-R was administered and the WISC-IV on the other sample. The measured FS-IQs were 106.48 and 92.43, corrected by -13.38 and -2.84 for FE and country to cor. IQs of 93.10 and 83.13.

Intelligence of five samples with different shares of white European ancestors were compared by Green (1972, Table 1) on the WAIS. IQs and mean ages were given for all five samples, which were averaged by us with respect to sample sizes, due to their representativeness for the whole national population. So, we calculated a mean age of 33.97y and a mean uncor. IQ of 98.85. The source named the Puerto Rican standardization (Green & Martínez, 1967, p.12), therefore, the score of 22.80 had to be deducted. This resulted in a cor. IQ of 76.05.

Kahn, Spears and Rivera (1977, Table XXII, XXIII) reported median SPM- and CPM-raw scores from Puerto Rico. The SPM-sample had a mean age of 12.25y and obtained a raw score of 31.69, which is at the 14.24th GBR-*P* and equivalent to an uncor. IQ of 83.96. The CPM-sample had a mean age of 8.25y and obtained a raw score of 17.64, which is at the 4.36th GBR-*P* and equivalent to an uncor. IQ of 74.34. FE-corrections were 0.42 and 6.30, so the cor. IQs are 84.38 and 80.64.

Pons et al. (2008, Table 7) measured a SPM-raw score of 44.30 on a sample with a mean age of 16.00y. The score is at the 34.88th GBR-*P* and equivalent to an uncor. IQ of 94.17, reduced by 6.09 for FE-correction to 88.08.

A WISC FS-IQ of 109.93 was measured by Prewitt Diaz and Munoz (1980, Table 5). This uncor. IQ had to be corrected by -11.22 for FE and -2.50 for country to a cor. IQ of 96.21.

A normal comparison group from Spain but with Puerto Rican origin obtained an uncor. IQ of 96.20 on the WISC-IV (San Miguel Montes et al., 2010, Table 2). A country-correction of -8.96 resulted in a cor. IQ of 87.24. A clinical group scored 90.06 and was therefore not used for the dataset.

The CPM-manual (Raven, Raven & Court, 2006, Table 20) reported mean CPM-raw scores for a sample with a mean age of 8.25y of 17.42, which are at the 4.08th GBR-*P* and equivalent to an uncor. IQ of 73.87, increased by 6.30 for FE-cor. to a cor. IQ of 80.17.

Roca (1955) reported a WISC-IQ of 87.94, which had to be reduced by 2.72 and 2.50 for FE- and country-correction to a cor. IQ of 82.72, and a SBIS-IQ of 95.29, which had to be reduced by 6.12 and 2.50 for FE- and country-correction to a cor. IQ of 86.67.

Roselló et al. (1988) measured an uncor. IQ on the WISC-R of 87.45, reduced by 4.08 and 2.50 for FE- and country-correction to 80.87.

An unweighted national IQ of **87.97** with a standard deviation of 9.01 was calculated for Puerto Rico, which is **81.99** after weighting and the final national IQ due to missing school assessment results.

2.3.94. Qatar (QAT)

Norms for the SPM from Qatar were reported by Khaleefa and Lynn (2008b, Table 1). The normative sample had a mean age of 8.80y and obtained a raw score of 24.44, which is at the 28.93rd GBR-*P* and equivalent to an uncor. IQ of 91.67. After a correction by -6.09 for FE a cor. IQ of **85.58** remained. Qatar participated in PISA-2006 to 2015, TIMSS-2007 to 2015 and PIRLS-2006 to 2016. Its SAS-IQ is **75.98** and **80.78** its final national IQ.

2.3.95. Romania (ROU)

Dobrean et al. (2008) presented SPM+-raw scores for a sample with a full range from 6.50y to 73.00y. We split this sample into three with mean ages of 6.75y, 13.00y and 47.33y. The youngest sample scored 15.50, which is equivalent to a score of 19.32 on the SPM-scale, the 60.85th GBR-*P* and an uncor. IQ of 104.13. The middle sample scored 18.35, which is at the 21.07th GBR-P and equivalent to an uncor. IQ of 87.94. The older sample scored 28.75, which is equivalent to 7.96 on the APM-scale, the 8.83rd GBR-P and an uncor. IQ of 79.73. Necessary FE-corrections are -5.04 for the youngest, 0.84 for the middle and -2.31 for the oldest sample, so thee cor. IQs are 99.09, 88.78 and 77.42.

Scores from the same sample were also reported by Iliescu et al. (2016, Table 3). Here, for children and adolescents with ages 7.00y to 16.50y and a mean age of 11.61y, a SPM+-raw score of 25.69 was measured, which is at the 16.65th GBR-P and equivalent to an uncor. IQ of 85.48. Adults with ages from 18.50y to 77.50y and with a mean age of 47.15y scored 27.93, converted to 7.15 on the

APM-scale and equivalent to the 7.81st GBR-P and an uncor. IQ of 78.73. Results from both samples had to be corrected by 0.84 and by -2.31 for FE to cor. IQs of 86.32 and 76.42. The source also reported scores for the WISC-IV but in IQs calculated on Romanian norms and not suitable for the dataset.

The results from both sources confirmed each other. Because the sample from Dobrean et al. (2008) had a bigger age range, which is moreover different to the age range of the sample from Iliescu et al. (2016), we decided to use only the first source. Otherwise we would put too much weight on the older ages.

The unweighted national IQ of Romania is **88.43** with a standard deviation of 10.84 and decreased to **83.11** after weightings. The country participated in PISA-2006 to 2015, TIMSS-1995 to 2011 and PIRLS-2001 to 2011, where it obtained a SAS-IQ of **90.65**, closer to the non-weighted than to the weighted IQ. The final national IQ is **86.88.**

2.3.96. Russia (RUS)

From the SPM-manual (Raven, Raven & Court, 1999, Table 29) we took a mean raw score of 47.00 for on average 14.50y olds from Briansk. This score is at the 47.29th GBR-*P* and equivalent to an uncor. IQ of 98.98, which had to be reduced by 3.78 for FE-correction to 95.20.

Shibaev and Lynn (2017, Table 1) compared Russian and Yakut secondary school students on the SPM. Both samples came from Yakutsk and had mean ages of 12.50y. Uncor. IQs are similar with 96.35 and 97.33 and both had to be reduced by 6.09 for FE-correction. The cor. IQs are 90.26 and 91.24.

Russia obtained an unweighted national IQ of **92.23** with a standard deviation of 2.61, which did not change significantly after weightings to **92.95**. School assessment results were available for all observed PISA-, TIMSS- and PIRLS-volumes and resulted in a SAS-IQ of 99.63. The final national IQ is **96.29**.

2.3.97. Saint Vincent and the Grenadines (VCT)

Children who failed in examinations for secondary school positions were compared by Durbrow, Schafer and Jimerson (2002, Table 3) with children who passed these examinations on the CPM. Children who failed scored significantly lower and had therefore been excluded by us. The other sample had a mean age of 9.50y and obtained a mean raw score of 16.49, which is at the 0.61st GBR-*P* and equivalent to an uncor. IQ of 62.37. Adding 1.05 for FE-correction resulted in a cor. IQ of **63.42**, which is both the unweighted and the final national IQ due to missing school assessment results.

2.3.98. Saudi Arabia (SAU)

A sample from Abdel-Khalek and Lynn (2009, Table 1) from the areas of Makka, Jedda and Al-Ta'ef with an age range from 8.00y to 24.00y was split by us into one sample with a mean age of 11.50y and one sample with a mean age of 18.40y. A SPM-raw score of 22.69 was reported for the younger sample, which is at the 4.80th GBR-*P* and equivalent to an uncor. IQ of 75.03, increased by 0.42 for FE-correction to a cor. IQ of 75.45. The older sample scored 37.43, which is 6.78 on the APM-scale and equivalent to the 4.60th GBR-*P* and an uncor. IQ of 74.73, increased by 3.15 for FE-correction to a cor. IQ of 77.88.

Bakhiet et al. (2016, Table 1, 2) did research on the relations between head circumferences, body height and intelligence and reported SPM-raw scores for two samples from Riyadh with mean ages of 9.00y and 9.50y. The two samples obtained raw scores of 18.49 and 25.75, which are at the 12.99th and 33.68th GBR-*P*, and equivalent to uncor. IQs of 83.10 and 93.68. For FE-correction, 6.09 had to be subtracted from the IQ of the first sample and 0.21 from the IQ of the second, resulted in cor. IQs of 77.01 and 93.47. Because the first sample consisted of boys with learning disabilities, we decided to not use it in the dataset.

Batterjee (2011, Table 3) administered the SPM on a sample with an age range from 8.000y to 18.00y. We split this sample at first into one with a mean age of 11.50y, which obtained a raw score of 28.02 at the 11.51st GBR-*P* and equivalent to an uncor. IQ of 82.00. A FE-correction of -6.09 was necessary, which resulted in a cor. IQ of 75.91. The second part of the sample scored 36.60, which is 6.35 on the APM-scale and equivalent to the 5.38th GBR-*P* and an uncor IQ of 75.86, corrected by -3.36 for FE to 72.50.

A sample with a mean age of 11.50y, presented by Batterjee et al. (2013, Table 1), obtained a raw score of 30.16 on the SPM, which is at the 15.99th GBR-*P* and equivalent to an uncor. IQ of 85.08, from which 6.09 had to be deducted for FE-correction to 78.99.

The effects of longer and shorter birth intervals on intelligence were researched by Bella et al. (2005, Table 2) on two samples from the Eastern Province of Saudi Arabia. Due to minor and non-significant differences in SPM-scores, both samples were combined into one. The combined sample had a mean age of 9.50y and obtained a mean raw score of 23.33, which is at the 17.17th GBR-*P* and equivalent to an uncor. IQ of 85.79. From this score, 4.62 had to be deducted for FE-correction, which resulted in a cor. IQ of 81.17.

Osman et al. (2016) reported raw scores on the SPM for a sample with a mean age of 14.70y from the city of Tabuk. Its mean raw score was 35.90, which is at the 8.39th GBR-*P* and equivalent to an uncor. IQ of 79.31. 6.09 scores had to be subtracted for FE-correction, which results in a cor. IQ of 73.22.

An unweighted national IQ of **78.57** with a standard deviation of 6.67 was calculated for Saudi Arabia, which remained stable at **78.48** after weightings. The country participated in TIMSS-2003 to 2015 and PIRLS-2011 to 2016, where it obtained a SAS-IQ of **74.24**. This gives the country a final national IQ of **76.36**.

2.3.99. Serbia (SRB)

Mean CPM-raw scores of a male sample with a mean age of 6.92y were reported by Bala and Kati (2009, Table 1). The sample scored 24.42, which is at the 50.45rd GBR-*P* and equivalent to an uncor. IQ of 100.17. After a FE-correction of -0.21 a cor. IQ of 99.96 remained.

Bala, Krneta and Drid (2013, Table 4) reported CPM-raw scores for a sample of preschool children from the city of Novi Sad with a mean age of 6.13y. This sample obtained a raw score of 21.65, which is at the 69.00th GBR-*P* and equivalent to an uncor. IQ of 107.44. 0.21 had to be deducted for FE-correction, so the cor. IQ is 107.23.

Čvorović and Lynn (2014, Table 1) gave SPM-raw scores for a sample of female Bosniaks with a mean age of 44.90y, female Serbs with a mean age of 47.20y, and female Roma with a mean age of 48.20y from Serbia. All were tested with the SPM, but scores had to be converted to the APM-scale due to the old ages. The Bosniak sample scored 48.60, which is 15.33 at the APM-scale, equivalent to the 31.23rd GBR-*P* and an uncor. IQ of 92.66. The Serbian sample scored 44.50, which is 11.39 on the APM-scale and equivalent to the 17.00th GBR-*P* and an uncor. IQ of 85.69. The Roma sample 24.10, which is 1.70 at the APM-scale and equivalent to the 0.92nd GBR-*P* and an uncor. IQ of 64.62. For FE-correction, 3.15 had to be deducted from the Bosniak and Serbian samples and 3.36 from the Roma sample. This results in cor. IQs of 89.51 for Bosniaks, 82.54 for Serbs and 61.26 for Roma.

Drid et al. (2013, Table 3) compared three groups of children with different body proportions and characteristics from Vojvodina. The groups scored nearly similar on the SPM, so we put all together into one sample. This combined sample had a mean age of 13.27y and obtained a mean raw score of 42.91, which is at the 42.78th GBR-*P* and equivalent to an uncor. IQ of 97.27. After reducing this score by 6.09 for FE-correction a cor. IQ of 91.18 remained.

Fajgelj, Bala and Katić (2010, Table 1) administered the CPM on a sample from Voivodina with a mean age of 7.50y. It obtained a raw score of 24.27, which is at the 50.05th GBR-*P* and equivalent to an uncor. IQ of 100.02. No corrections were necessary.

Rushton and Čvorović (2009, Table 1) compared Christians from Novi Pazar and Belgrade with Muslims from Novi Pazar and

Tutin on the SPM. The samples had mean ages of 41.00y, 33.50y, 43.50y and 38.50y, so the SPM-raw scores had to be converted to APM-raw scores. Christians from Novi Pazar obtained a raw score of 46.00, converted to 12.70, which is at the 18.60th GBR-*P* and equivalent to an uncor. IQ of 86.61. Christians from Belgrade obtained a raw score of 47.00, converted to 13.66 on the APM-scale, which is at the 17.12th GBR-*P* and equivalent to an uncor. IQ of 85.76. Muslims from Tutin obtained a raw score of 52.00, converted to 19.52 on the APM-scale, which is at the 47.10th GBR-*P* and equivalent to an uncor. IQ of 98.91. Muslims from Novi Pazar obtained a raw score of 44.00, converted to 10.98 on the APM-scale, which is at the 9.86th GBR-*P* and equivalent to an uncor. IQ of 80.66. All four results had to be reduced by 3.15 for FE-correction, so the cor. IQs are 83.46, 82.61. 95.76 and 77.51.

The relationship of lead exposure and intelligence was researched by Wasserman et al. (1997, Table 2). The sample originated from two areas: Kosovska Mitrovica and Pristina and had a mean age of 7.00y. A mean FS-IQ of 75.54 on the WISC-III was reported, also a negative effect of lead exposure in IQ. So, we corrected the IQ by -1.02 for FE, -2.50 for country but 4.30 for the named decrease of IQ, if lead exposure increased over age. This resulted in a cor. IQ of 76.32.

The unweighted national IQ of Serbia is **87.28** with a standard deviation of 12.67. It is stable at **87.82** after weightings and, combined with a SAS-IQ of **91.38** from PISA-2003 to 2012 and TIMSS-2003 to 2016, resulted in a final national IQ of **89.60**.

2.3.100. Seychelles (SYC)

Myers et al. (2003, Tab.2) studied the effect of prenatal methylmercury exposure on the cognitive development of their children. Their full samples had a mean age of 8.92y and obtained an FS-IQ on the WISC-III of 81.60. IQs were also given for five groups of children with different methylmercury concentration in the hair of their mothers. However, they reached from 79.40 to 81.70, not far above the mean, so we decided that 81.60 can be used as the uncor. IQ. This score had to be reduced by 0.34 for FE-correction and 2.50 for country-correction, which resulted in a cor. IQ of **78.76**, which is the unweighted and also the final national IQ.

2.3.101. Sierra Leone (SLE)

Berry (1966, Table 3) compared Temne and Eskimo children on the CPM. Samples came from Inverkeilor, Edinburgh, Pt. Loko, Mayola, Frobisher Bay and Pond Inlet. Only Pt. Loko and Mayola sample consisted of Temne, in which the Mayola sample lived under traditional circumstances and the Pt. Loko sample was from urban communities with westernized environment. An age range from 10.00y to above 40.00y was named, from which a mean age for both samples of 25.00y was calculated. The Mayola sample scored 13.10 and the Pt. Loko 13.90, converted to -3.82 and -3.35 on the APM-scale. Both scores are far below the 0.05th GBR-*P* and equivalent to uncor. IQs of 39.18 and 40.92. 5.46 had to be added for FE-correction, which results in cor. IQs of 44.64 and 46.38, averaged to an unweighted national IQ of **45.51** or after weightings and therefore a final national IQ of **45.07**. Sierra Leone never participated in school assessment studies, so these extremely low IQs could not be confirmed. Both came from the same study which was very old and used an ethnic minority. We therefore have to look on these results with reservations.

2.3.102. Singapore (SGP)

Chong et al. (2005) compared children with and without Myopia from Singapore. The Myopia sample had a mean age of 11.07y and the healthy sample 10.90y. Here, the Myopia sample scored higher on the SPM with a raw score of 40.80 then the healthy sample with 36.90. A share of 65.40% on the full and representative sample had Myopia, so we included both samples in our dataset. The raw scores are equivalent to the 55.46th GBR-*P* and an uncor. IQ of 102.06, and to the 33.50th GBR-*P* and equivalent to an uncor. IQ of 93.61. Both scores had to be corrected by -4.62 for FE, which resulted in cor. IQs of 97.44 and 88.99.

Lim (1994, Table 1) administered the APM on a sample of children with a mean age of 15.00y, which scored 24.21 at the 92.65th GBR-*P*, equivalent to an uncor. IQ of 121.75, on which 0.84 had to be added for FE-correction. The cor. IQ is 122.59.

Lynn (1977, Table 1) compared Chinese and Malay children in Singapore on the SPM. The samples had mean ages of 13.80y and 13.10y, and scored 47.90, which is at the 61.43rd GBR-*P* and equivalent to an uncor. IQ of 104.36, and 41.50, which is at the 38.87th GBR-*P* and equivalent to an uncor. IQ of 95.76. 0.42 had to be added to both for FE-correction, so the cor. IQs are 104.78 and 96.18.

The unweighted national IQ of **101.99**, which a standard deviation of 12.81, increased to **104.58** after weightings. A SAS-IQ of **107.20** could be calculated from results of PISA-2009 to 2015 and all observed TIMSS- and PIRLS-volumes, so the final national IQ is **105.89.**

2.3.103. Slovakia (SVK)

Smoothed Slovakian norms for the CPM were presented by the CPM-manual (Raven, Raven and Court, 2006, Table 13). The normative sample had a mean age of 8.50y and obtained a raw score of 23.83, which is at the 25.87th GBR-*P* and equivalent to an uncor. IQ of 90.28, to which 5.04 had to be added for FE-correction. The cor. IQ of this sample is **95.32**, which is both the unweighted and weighted national IQ for Slovakia. The country participated in PISA-2003 to 2015 and in all observed TIMSS- and PIRLS-volumes, from which it got a SAS-IQ of **97.32**. The final national IQ is **96.32**.

2.3.104. Slovenia (SVN)

Raven's scores for four samples from Slovenia were provided by Boben (2007). The first sample had a mean age of 8.06y and scored 25.96 on the CPM, which is at the 47.74th GBR-*P* and equivalent to an uncor. IQ of 99.15 or 101.04 after a FE-correction of 1.89. The second sample had a mean age of 12.00y and scored

38.71 on the SPM, which is at the 44.46th GBR-*P* and equivalent to an uncor. IQ of 97.91 or 93.92 after a FE-correction of -3.99. The third sample had a mean age of 14.00y and scored 33.79 on the SPM+, which is at the 41.50th GBR-*P* and equivalent to an uncor. IQ of 96.78 or 96.99 after a FE-correction of 0.21. The fourth sample had a mean age of 16.00y and scored 17.57 on the APM, which is at the 62.12th GBR-*P* and equivalent to an uncor. IQ of 104.63 or 103.37 after a FE-correction of -1.26.

Georgas et al. (2003, Fig. 19.6) reported a WISC-III FS-IQ of about 98.00 for Slovenia, which had to be reduced by 4.76 for FE-correction and 2.50 for country correction to a cor. IQ of 90.74.

The CPM-manual reported raw scores for a sample with an age range from 6.00y to 13.00y (Raven, Raven & Court, 2006, Table 25). We split this sample into one with a mean age of 8.50y and one with a mean age of 12.25y. The younger samples obtained a raw score of 26.55 at the 43.25th GBR-*P* and equivalent to an uncor. IQ of 97.45, to which 3.99 had to be added for FE-correction to 101.44. The older sample scored 31.75 on the CPM or 40.65 on the SPM, which is at the 42.94th GBR-*P* and equivalent to an uncor. IQ of 97.33. From this, 1.89 had to be deducted for FE-correction, so the cor. IQ is 95.44.

This gives Slovenia an unweighted national IQ of **97.56** with a standard deviation of 4.58, which increased by weightings to **98.60**. School assessment results were available from PISA-2006 to 2015 and from all observed TIMSS- and PIRLS-volumes. The SAS-IQ is **98.59** and the final national IQ **98.60**.

2.3.105. Somalia (SOM)

The only suitable source for intelligence for Somalia is a paper from Bakhiet et al. (2017a, Table 1). They used a sample of Somalian refugees in refugee camps in Kenya, on which the SPM+ was administered. The sample had a mean age of 13.00y and obtained a raw score of 20.36, which is at the 1.61st GBR-*P* and equivalent to an uncor. IQ of 67.88. After deducting 0.21 for FE-correction, the cor. IQ was **67.67**, which is both the unweighted and final national IQ due to missing school assessment results. It must be mentioned that the lack of comparative samples and the nature of the sample itself make it necessary to accept this result only with reservation.

2.3.106. South Africa (ZAF)

Bass (2000, Table 6) reported CPM-raw scores from Xhosa people from Grahamstown. The full sample had an age range from 6.50y to 20.50y and was split by us into three samples with mean ages of 8.75y, 13.50y and 17.50y. The youngest sample scored 15.67, which is at the 0.85th GBR-*P* and equivalent to an uncor. IQ of 64.23, corrected by 1.47 for FE to 65.70. The middle sample scored 22.81, converted to 23.22 on the SPM-scale, which is at the 1.95th GBR-*P* and equivalent to an uncor. IQ of 69.04, corrected by -4.41 for FE t0 64.63. The oldest sample scored 24.80, converted to 2.63 on the APM-scale, which is at the 0.48th GBR-*P* and equivalent to an uncor. IQ of 61.13, corrected by -1.68 for FE to 59.45.

Jinabhai et al. (2004, Table 4) administered the CPM to a rural primary school Zulu-children sample from the region of Kwa Zulu-Natal with a mean age of 9.00y. The sample scored 14.05, which is at the 0.19th GBR-*P* and equivalent to an uncor. IQ of 56.66. 1.47 had to be added for FE-correction, gave this sample a cor. IQ of 58.13.

SPM-raw scores of 42.32 and 44.54 were reported for two sample of 8- or 9-graders from the mostly urban province of Gauteng by Knowles (2008, Table 15). Mean ages were 14.05y and 14.83y, so the raw scores are at the 30.71st GBR-*P* and equivalent to an uncor. IQ of 92.44, and at the 40.51st GBR-*P* and equivalent to an uncor. IQ of 96.40. FE-corrections for both samples were similar with -6.09, result in cor. IQs of 86.35 and 90.31.

Three samples with mean ages of 9.37y from the city of Potchefstroom were compared by Malda, van der Vijver and Temaine (2010, Table 3) on the sets A, B and C of the SPM. A sample consisted of Afrikaans and scored 23.75, extrapolated to

31.26 on the full SPM, which is at the 36.97th GBR-*P* and equivalent to an uncor. IQ of 95.01. An urban sample of Tswana scored 13.88, extrapolated to 16.36 on the full SPM, which is at the 7.20th GBR-*P* and equivalent to an uncor. IQ of 78.09. A rural sample of Tswana scored 12.81, extrapolated to 14.84 on the full SPM, which is at the 5.58th GBR-*P* and equivalent to an uncor. IQ of 76.14. The necessary FE-correction for all three samples is -6.09, gave them cor. IQs of 88.92, 72.00 and 70.05.

Owen (1992, Table 1) compared intelligence of Coloureds, Indians, Blacks and Whites from South Africa. The four reported samples had mean ages of 15.00y and the administered test was the SPM. Coloureds scored 36.69, which is at the 15.64th GBR-*P* and equivalent to an uncor. IQ of 84.86, Indians scored 41.99, which is at the 30.50th GBR-*P* and equivalent to an uncor. IQ of 92.35, Blacks scored 27.65, which is at the 3.96th GBR-*P* and equivalent to an uncor. IQ of 73.67, and Whites scored 45.27, which is at the 43.75th GBR-*P* and equivalent to an uncor. IQ of 97.64. 2.73 had to be deducted from all four samples for FE-correction, resulted in cor. IQs of 82.13, 89.62, 70.94 and 94.91.

Skuy et al. (2001, Table 1, 3) administered the WISC-R on people from the Soweto township. Participants were black adolescents with a mean age of 17.17y from all over the area, and back adolescents with a mean age of 14.00y from more urban part of Soweto. The sub-scales Coding, Similarities, Picture Arrangement, Arithmetic and Digit Span were used to test the first sample. Scaled scores for these sub-scales were 6.12, 5.59, 6.38, 6.08 and 7.08, therefore equivalent to IQs between 75.00 and 85.00 according to German norms, or on average to an uncor. IQ of 80.00. To the second sample the full WISC-R was administered. A sum of 62.66 scaled scores was obtained, which is equivalent to an uncor. IQ of 75.50 according to German norms. Necessary corrections were -10.80 for FE and -1.20 for country, which resulted in cor. IQs of 69.00 and 63.50.

The unweighted national IQ of South Africa is **75.04**, which a standard deviation of 12.41. After weightings and adaptation to population composition, this value increased to **79.20**. However, the SAS-IQ from TIMSS-1995 to 2003 plus 2011 to 2015 and PIRLS-2006 to 2016 was much lower with **58.54**. This gave the country a final national IQ of **68.87**.

2.3.107. South Sudan (SSD)

The SPM was administered on South Sudanese refugees in the area around and in Khartoum by Ahmed et al. (2017, Table 1). The age range of the full sample was 6.00y to 18.00y, split by us into one sample with a mean age of 10.50y and one with a mean age of 17.00y. The younger sample obtained a raw score of 13.80, which is at the 1.24th GBR-*P* and equivalent to an uncor. IQ of 66.33, corrected by -6.09 for FE to 60.24. The older sample obtained a raw score of 22.27, converted to 1.01 on the APM-scale, which is at the 0.17th GBR-*P* and equivalent to an uncor. IQ of 56.19. 3.36 had to be deducted from this score for FE-correction, so the cor. IQ is 52.83.

Osman et al. (2017, Table 1) reported SPM raw scores for refugees on the SPM. The full sample ranged from 7.00y to 18.00y and had to be split by us into one sample with a mean age of 11.00y and one with 17.00y. The younger sample obtained a raw score of 13.17, which is at the 1.10th GBR-*P* and equivalent to an uncor. IQ of 65.66, reduced by 6.09 to a cor. IQ of 59.57. The older sample obtained a raw score of 22.27, converted to 1.01 on the APM-scale, which is at the 0.17th GBR-*P* and equivalent to an uncor. IQ of 56.19. After a reduction by 3.36 for FE-correction, this resulted in a cor. IQ of 52.83.

A further refugee sample was tested by Osman et al. (2018, Table 1) on the CPM. The full sample had an age range from 6.00y to 12.00y, however, only 6.00y to 7.00y olds were tested individually, whereas the rest were tested in groups and scored significantly lower. Because the sample consisted of refugees and were therefore already handicapped, we decided to include only the results from the individual testing. They reported a raw score of 13.79, which is at the 7.75th GBR-*P* and equivalent to an uncor. IQ of 78.67, from which 3.36 had to be reduced for FE-correction to 75.31.

An unweighted national IQ for South Sudan of **59.62** with a standard deviation of 9.77 was calculated, which slightly decreased to **58.61** by weightings. School assessment results were not available for South Sudan. It must be stressed that all samples for South Sudan consisted of refugee children, with possible cognitive developmental deficit due to traumatic experiences and inadequate care.

2.3.108. Spain (ESP)

Buj (1981, Table 1) reported an uncor. IQ on the CFT for a sample of 20.00y olds from Madrid of 100.30, reduced by 7.28 for FE-correction and 2.50 for country correction to a cor. IQ of 90.52.

A male sample with a mean age of 23.98y and a female sample with a mean age of 27.01y from Valencia were tested by Diaz et al. (2010, Table 2) on the SPM. The females scored 51.31, converted to 18.59 on the APM-scale, which is at the 31.70th GBR-*P* and equivalent to an uncor. IQ of 92.86. The males scored 52.64, converted to 20.41 on the APM-scale, which is at the 40.15th GBR-*P* and equivalent to an uncor. IQ of 96.26. 3.36 had to be deducted from both results for FE-correction, so the cor. IQs are 92.90 and 89.50.

Scores for a normative sample with a mean age of 7.00y were presented by the CPM-manual (Raven, Raven & Court, 2006, Table 15). The sample scored 19.50, which is at the 22.34th GBR-*P* and equivalent to an uncor. IQ of 88.59, on which 2.73 had to be added for FE-correction to 91.32.

The mean P-IQ of the Spanish sample measured with the WAIS-III and reported by Roivainen (2010, Table 2) was averaged to 97.60. From this score, 0.68 had to be subtracted for FE-correction and 2.50 for country correction, which resulted in a cor. IQ of 94.42.

Estrada et al. (2015, Appendix 2) reported six measurements of intelligence on the APM for adolescents and young adults from

Madrid. The three results from re-testing were significantly higher than those from the first testing and were therefore excluded by us. The three results from the first testing were averaged to 10.48, extrapolated to 22.31 on the full APM, which is at the 49.92nd GBR-*P* and equivalent to an uncor. IQ of 99.97. This score had to be reduced by 3.36 for FE-correction to 96.61.

This gives Spain an unweighted national IQ of **92.29** with a standard deviation of 2.51. The score remained stable by weightings with **92.32**. The SAS-IQ, calculated from results of all observed PISA-volumes, TIMSS-1995, 2011 and 2015 and PIRLS-2006 to 2016, is a bit higher with **95.47**. This gives Spain a final national IQ of **93.90**.

2.3.109. Sri Lanka (LKA)

SPM+-scores from Sri Lanka were reported by Omanbayev, Tosheva and Lynn (2018, Table 1). A sample with a mean age of 13.50y scored 29.17, which is at the 17.97th GBR-*P* and equivalent to an uncor. IQ of 86.25, from which 0.21 had to be deducted for FE-correction, so the cor. IQ is 86.04.

Haraldsson, Fowler and Periyannanpillai (2000, Table 1) compared children which claimed and which did not claim previous-life memories. Both samples scored nearly similar and therefore both were included. Mean ages of both were 6.20y. They scored 16.92 and 16.08 in the CPM, which are at the 33.97th and 27.78th GBR-*P* and equivalent to uncor. IQs of 93.80 and 91.16. Both had to be corrected by 1.47 for FE, which gave them cor. IQs of 95.27 and 92.63.

The unweighted national IQ of Sri Lanka is **91.31** with a standard deviation of 4.76. This score decreased to **86.62** if samples were weighted. Due to missing school assessment results, this score is at the same time the final national IQ.

2.3.110. Sudan (SDN)

Bakhiet and Lynn (2015g, Table 1) reported a mean WISC-III FS-IQ of 77.40 for a representative sample with a mean age of

11.50y. IQs were given for British norms, so -1.87 for FE is the only necessary correction, which resulted in a cor. IQ of 75.53.

Bakhiet (2008) reported results from several intelligence measurements in Sudan. A random national sample with a mean age of 12.00y obtained a SPM-raw score of 31.71, which is at the 15.24th GBR-*P* and equivalent to an uncor. IQ of 84.61, corrected by -4.62 for FE to 79.99. A random urban sample with a mean age of 7.50y obtained a CPM-raw score of 14.00, which is at the 2.37th GBR-*P* and equivalent to an uncor IQ of 70.25, corrected by 0.21 for FE to 70.46. A random national sample with a mean age of 8.60y obtained a SPM-raw score of 23.00, which is at the 23.31st GBR-*P* and equivalent to an uncor. IQ of 89.07, corrected by -5.04 for FE to 84.03. An urban sample with a mean age of 10.00y obtained a SPM-raw score of 21.00, which is at the 7.28th GBR-P and equivalent to an uncor. IQ of 78.17, corrected by -5.88 for FE to 72.29. Finally, a national sample with a mean age of 18.50y obtained a raw score on the SPM of 44.40, which had to be converted to 11.32 on the APM-scale, which is at the 17.62nd GBR-*P* and equivalent to an uncor. IQ of 86.05, corrected by -1.89 for FE to 84.16.

Bakhiet et al. (2017, Table 1) measured a CPM-raw score of 14.84 on a sample with a mean age of 8.00y, which is at the 17.62nd GBR-*P* and equivalent to an uncor. IQ of 66.91. 0.63 had to be added for FE-correction, so the cor. IQ is 67.54.

Batterjee and Ashria (2015, Table 1) compared intelligence of two samples, one with private and one with public education. The public sample had a mean age of 9.00y to 26.00y and had therefore been split by us into one sample with a mean age of 12.00y and one with 18.83y. The private and the younger public sample scored 38.98 and 34.21 on the SPM, which are at the 38.00th and 21.16th GBR-*P* and equivalent to uncor. IQs of 95.42 and 87.99. 6.09 had to be subtracted for FE-correction from both scores, so the cor. IQs are 89.33 and 81.90. The older public sample obtained a SPM-raw score of 39.74, converted to 8.03 on the APM-scale, which is at the 7.85th GBR-*P* and equivalent to an uncor. IQ of 78.77, from which 3.36 had to be subtracted for FE-correction, so the cor. IQ is 75.41.

The SPM was administered on two samples from Karthoum by Dutton et al. (2017, Table 1). Age ranges were from 9.00y to 25.00y, so we had to split each of both samples into two samples. Two of these four samples had mean ages of 12.00y and scored 30.79 and 27.04, which are at the 12.87th and 6.42nd GBR-*P* and equivalent to uncor. IQs of 83.01 and 77.19, reduced by 4.20 and 6.09 for FE-correction to cor. IQs of 78.81 and 71.10. Both other samples had mean ages of 18.50y. Their SPM-raw scores of 42.01 and 38.62 had first to be converted to 9.52 and 7.65 on the APM-scale, which are at the 11.52nd and 5.77th GBR-*P* and equivalent to uncor. IQs of 82.01 and 76.39, and second corrected by -1.47 and -3.36 for FE to cor. IQs of 80.54 and 73.03.

The effects of abacus training on intelligence were researched by Irwing et al. (2008, Table 2) on two samples with mean ages of 9.00y from Khartoum. The SPM was administered on both samples before and after training and the scores of both, 17.54 and 17.14, were similar. Therefore, we averaged both to 17.34, which is at the 10.17th GBR-*P* and equivalent to an uncor. IQ of 80.92. Deducted by 6.09 for FE-correction, this result in a cor. IQ of 74.83.

Khaleefa et al. (2008, Table 1) administered the SPM on a sample from Karthoum with an age range from 9.00y to 25.00y, which had to be split by us into one with a mean age of 12.00y and one with 18.50y. The younger sample obtained a raw score of 30.73 at the 12.77th GBR-*P* and equivalent to an uncor. IQ of 82.94, which had to be corrected by -4.20 for FE to 78.74. The raw score of 42.20 of the older sample had to be converted to 9.65 on the APM-scale, which is ath the 11.94th GBR-*P* and equivalent to an uncor. IQ of 82.33. After correcting for FE by -1.47 a cor. IQ of 80.86 remained. Khaleefa, Amer and Lynn (2014, Table 2) compared university students from Karthoum according to their studied discipline. The mean age of these students was 17.50y and they obtained a SPM-raw score of 44.20, which had to be converted to 11.14 on the APM-scale. This score is at the 20.48th GBR-*P* and equivalent to an uncor. IQ of 87.63, from which 3.36 had to be subtracted for FE-correction, which resulted in a cor. IQ of 84.27.

Across all samples we calculated an unweighted national IQ of **77.30** with a standard deviation of 6.27. This score increased slightly to a final national IQ of **78.87** by weightings. School assessment results for Sudan were not available.

2.3.111. Sweden (SWE)

An IQ-measurement in Stockholm on a sample with a mean age of 20.00y was reported by Buj (1981, Table 1). The used test was the CFT and the uncor. IQ 105.80. After a reduction by 7.28 for FE-correction and by 2.50 for country-correction this resulted in a cor. IQ of 96.02.

Georgas et al. (2003, Figure 19.6) gave an IQ measured in the areas of Stockholm and Uppsala of 102.00. After a reduction by 4.76 for FE-correction and 2.50 for country-correction this resulted in a cor. IQ of 94.74.

An unweighted national IQ of **95.38** and a weighted national IQ of **94.96** were calculated. Additionally, a SAS-IQ of 99.03 could be calculated by results from all observed school assessment studies except TIMSS-1999.This resulted in a final national IQ of **97.00**.

2.3.112. Switzerland (CHE)

The CFT-IQ reported by Buj (1981, Table 1) for a sample with a mean age of 20.00y from Zurich was 102.80, reduced by 7.28 and 2.50 for FE- and country-correction to a cor. IQ of 93.02.

Grob et al. (2008, Table 2) estimated an uncor. IQ of 102.21 for the full-scale of the WISC-IV by the use of German norms. No correction for FE was necessary but for country of -1.20. The cor. IQ is 101.01.

Heiz and Barisnikov (2016, Table 1) showed CPM-raw scores for typically developed children with a mean age of 8.05y and children with Williams syndrome and a mean age of 21.00y. The typical developed sample obtained a raw score of 25.25, which is at the 51.99th GBR-*P* and equivalent to an uncor. IQ of 100.75, reduced by 0.21 for FE-correction to 100.54. The sample with

Williams syndrome scored significantly lower and had therefore been excluded by us.

The CPM-manual (Raven, Raven & Court, 2006, Table 14) reported raw scores from two normative samples, one tested in 1970 and one in 1989. Both samples were from Fribourg and had mean ages of 8.00y. The 1970-sample obtained a raw score of 22.22, which is at the 21.69th GBR-*P* and equivalent to an uncor. IQ of 88.26, on which 7.77 had to be added for FE-correction, which increased the cor. IQ to 96.03. The 1989-sample obtained a raw score of 25.22, which is at the 43.33rd GBR-*P* and equivalent to an uncor. IQ of 97.48, increased by 3.78 for FE-correction to 101.26.

We calculated an unweighted national IQ for Switzerland of **98.37** with a standard deviation of 3.68, decreased to **97.26** by weightings. The country participated in all observed PISA-volumes and in TIMSS-1995, from which results a SAS-IQ of **101.22** was calculated. So, the final national IQ is **99.24**.

2.3.113. Syria (SYR)

In Dutton et al. (2018, Table 1), SPM-raw scores were given for two samples from Damascus, one tested in 2004 and one around 2014, both with age ranges from 13.00y to 18.00y. We split both samples each into one with a mean age of 14.00y and one with a mean age of 17.00y. The 14.00y-2004-sample obtained a raw score of 31.92 at the 6.87th GBR-*P* and equivalent to an uncor. IQ of 77.72, which had to be reduced by 5.25 for FE-correction to 2.47. The 14.00y-2014-samples obtained a raw score of 32.12 at the 7.14th GBR-*P* and equivalent to an uncor. IQ of 78.02, which had to be reduced by 6.09 for FE-correction to 71.93. Raw scores of both 17.00y old samples had to be converted to the APM-scale before calculating the GBR-*P*. The obtained raw score of 36.65 of the 17.00y-2014-sample were converted to 6.39, which is at the 5.46th GBR-*P* and equivalent to an uncor. IQ of 75.98, reduced by 2.52 to 73.46. The obtained raw score of 36.61 of the 17.00y-2014-

sample of were converted to 6.38, which is at the 5.44th GBR-*P* and equivalent to an uncor. IQ of 75.95, reduced by 3.36 to 72.59.

Further SPM-raw scores from Damascus were reported by Khaleefa and Lynn (2008d, Table 1) for a sample with an age range from 7.00y to 18.00y, which had to be split by us into one with a mean age of 11.00y and one with a mean age of 17.00y. The younger sample scored 23.56, which is at the 7.61st GBR-*P* and equivalent to an uncor. IQ of 78.52, from which 5.25 had to be deducted for FE-correction, so the cor. IQ is 73.27. The older sample scored 36.62, which is 6.38 on the APM-scale and equivalent to the 5.43rd GBR-*P*. This gives this sample an uncor. IQ of 75.93, which had to be reduced by 2.52 for FE-correction to 73.41.

An unweighted national IQ of **72.85** with standard deviation of 0.62 was calculated. This score remained nearly unchanged at **72.99** after weightings. Syria participated in TIMSS-2003 to 2011 and obtained a SAS-IQ of **75.83**, averaged with the weighted national IQ to **74.41**.

2.3.114. Taiwan (TWN)

Lai et al. (2001) compared the intelligence of children whose mothers were or were not exposed to polychlorinated biphenyls. A control sample with a mean age of 12.00y obtained a SPM-raw score of 45.57, which is at the 75.24th GBR-*P* and equivalent to an uncor. IQ of 110.23, corrected by -1.26 for FE to 108.97. A second control sample with a mean age of 6.46y was tested with the CPM, on which it obtained a raw score of 19.50. This score is at the 25.51st GBR-*P* and equivalent to an uncor. IQ of 90.12, on which 4.62 had to be added for FE-correction, which gave him a cor. IQ of 94.74. Samples with exposed mothers scored significantly lower and where therefore ignored.

Further SPM-raw scores for Taiwanese children were reported by Lynn (1997, Table 1). The children had a mean age of 11.00y and scored 42.57, which is at the 67.48th GBR-*P* and equivalent to an uncor. IQ of 106.80, corrected by -2.10 for FE to 104.70.

Rabinowitz, Wang and Soong (1991, Table 4) researched the effect of dentine lead on children's intelligence by using the CPM. They reported a median raw score of 25.00, which is at the 72.39th GBR-P and equivalent to an uncor IQ of 108.92, to which 3.36 had to be added for FE-correction, so the cor. IQ is 112.28.

Scores for CPM, SPM and SPM+ for a huge sample from Taiwan were reported by Lynn, Chen and Chen (2011). The CPM-tested sample had a mean age of 7.74y and scored 28.55, which is at the 67.70th GBR-*P* and equivalent to an uncor. IQ of 106.89. After a reduction by 0.21 for FE-correction this resulted in a cor. IQ of 107.10. The SPM-tested sample had a mean age of 10.49y and scored 43.48, which is at the 76.34th GBR-*P* and equivalent to an uncor. IQ of 110.76. After a reduction by 5.67 for FE-correction this resulted in a cor. IQ of 105.09. The SPM+-tested sample had a mean age of 15.07y and scored 40.65, which is at the 84.91st GBR-*P* and equivalent to an uncor. IQ of 115.49. Increased by 0.21 for FE-correction, this resulted in a cor. IQ of 115.70.

For Taiwan, an unweighted national IQ of **106.94** with a standard deviation of 6.67 was calculated. This score increased to **108.69** if samples were weighted for size and data quality. A SAS-IQ of **104.26** was calculated from results of PISA-2006 to -2015, TIMSS-1999 to -2015, and PIRLS-2006 to 2011. So, the final national IQ if **106.47.**

2.3.115. Tajikistan (TJK)

The SPM+ was administered in Tajikistan on a sample of school children with a mean age of 14.50y by Khosimov and Lynn (2017, Table 1). The sample scored 31.00 at the 21.03rd GBR-*P*, which gave this sample an uncor. IQ of 87.92, reduced by 0.21 for FE-correction to a cor. IQ of **87.71.** Because it is the only reported measurement for this country and no school assessment results were available, this score is also the unweighted, weighted and final national IQ.

2.3.116. Tanzania (TZA)

APM-raw scores for Tanzania were reported by Rindermann (2013S, Table S.1) for a sample with a mean age of 16.50y from public schools within the area of Moshi. Raw scores were given for the sets I+II of the APM. This score could not be converted by us to IQ, so we took the IQs reported by the source. These were, on average, 77.35 and based on the German norms from 1979. This makes a FE-correction of -13.00 necessary, together with -1.20 for country-correction, which resulted in a cor. IQ of 63.15.

Klingelhofer (1967) gave SPM-raw scores for a sample from the city of Dar es Salaam, which had an age range of 13.00y to 21.00y, split by us into one with a mean age of 14.50y and one with 19.00y. The younger sample obtained a raw score of 36.55, which is at the 13.21st GBR-*P* and equivalent to an uncor. IQ of 83.25. Added 2.73 for FE-correction resulted in a cor. IQ of 85.98. The older sample scored 32.52, which is 4.63 on the APM-scale, equivalent to the 1.55th GBR-*P* and an uncor. IQ of 67.64. Adding 5.46 for FE-correction gives this sample a cor. IQ of 73.10.

Boissiere, Knight and Sabot (1985) reported 26.40 as the mean CPM-raw score of a sample from Dar es Salaam with a mean age of 14.00y. This score had to be converted to 28.91 on the SPM-scale, which is at the 72.08th GBR-*P* and equivalent to an uncor IQ of 72.08. Corrected by -0.21 for FE, this gave a cor. IQ of 71.87.

Children from poorer areas in Dar es Salaam were tested by Humble, Dixon and Schagen (2016) on the SPM+. The sample had a mean age of 14.00y and scored 16.65, which is at the 0.56th GBR-*P* and equivalent to an uncor. IQ of 62.77, on which a correction for FE of -0.21was necessary, so the cor. IQ is 62.56.

Unweighted, the national IQ of Tanzania is **71.33** and had a standard deviation of 9.51. After weighting it increased to **74.95**, which is also the final national IQ due to missing data to calculate a SAS-IQ.

2.3.117. Thailand (THA)

Chou and Lau (1987, p.49) measured intelligence of heads of farming households in the Chiangmai Valley on the CPM. The sample with a mean age of 38.50 scored 19.62, which is -0.26 on the APM-scale and below the 0.05th GBR-*P*. This makes an uncor. IQ of 49.90, on which 2.94 had to be added for FE-correction to 52.84.

For a sample with a mean age of 9.33y reported Malakul (1957, Table 3) a mean CPM-raw score of 17.93, which is at the 1.41st GBR-*P* and equivalent to an uncor. IQ of 67.07. 10.50 had to be added for FE-correction, so the cor. IQ is 77.57.

Adult, middle-age and old individuals from the rural midwestern part of Thailand were tested by Panek and Stoner (1980) with the CPM. The full sample had a mean age of 51.39y and scored 29.65, which is 7.08 at the APM-scale and at the 8.51st GBR-*P*, equivalent to an uncor. IQ of 79.43, corrected by 2.52 for FE to 81.95.

A normative sample with a mean age of 35.00y was tested by Phattharayuttawat et al. (2000, Table 1) on the SPM. The mean raw score of 49.16 had to be converted to 15.96 on the APM-scale, which is at the 26.76th GBR-*P* and equivalent to an uncor. IQ of 90.70. After a reduction by 1.68 for FE-correction this resulted in a cor. IQ of 89.02.

Another normative sample was tested with the CPM by Phatthrayuttawat et al. (2003). It had a mean age of 8.00y and obtained a mean raw score of 28.59, which is at the 63.41st GBR-*P* and equivalent to an uncor. IQ of 105.14, to which a FE-correction of 0.84 had to be added, resulted in a cor. IQ of 105.98.

The effect of iron deficiency on intelligence was researched by Pollitt et al. (1989a, Figure 2) in the rural Province of Chon Buri on a sample ith a mean age of 10.00y. An average IQ of 92.47 was reported, based on British norms from 1938. Therefore, a FE-correction of -10.71 was necessary, which gave a cor. IQ of 81.76.

Pongcharoen et al. (2011, Table 4) did research in the long-term effects of iron and zinc supplementation on intelligence of children with a mean age of 9.30y from the Khon Kaen Province. The children obtained a CPM-raw score of 21.74, which is at the 7.16th GBR-*P* and equivalent to an uncor. IQ of 78.04. After a FE-correction of -0.21a cor. IQ of 84.48 remained. On the same sample, the WISC-III was administered by Pongcharoen (2012, Table 2).

The full sample obtained a FS-IQ of 93.10, which was used by us as the uncor. IQ due to only small differences between children with and without nutritional supplementation (range: 92.90 to 93.40). We had to subtract 5.78 and 2.50 for FE- and country-correction and got a cor. IQ of 84.82, similar to the CPM-score.

Rajatasilpin, Suepsaman and Yamarat (1970, Table 1) administered the WISC on children with low SES from Bangkok and a mean age of 9.00y. They obtained a mean FS-IQ of 94.30, corrected by -7.82 for FE and -2.50 for country to 83.98. The source reported significant differences between children by gender and school grade.

Siripitayakunkit et al. (1999, Table 2) administered the WISC on children from the Ronpiboun and Soa Thong Districts. The sample had a mean age of 7.50y and obtained a FS-IQ of 90.44. The use of a very old version of the WISC made a FE-correction of -16.32 together with a country-correction of -2.50 necessary, which resulted in a cor. IQ of 71.62.

Sroythong (2008, Table 8) compared TONI-3 and CPM-results of a children sample with a mean age of 9.94y from Bangkok. The reported CPM-raw score was 30.52, which is at the 50.42nd GBR-*P* and equivalent to an uncor. IQ of 100.16, on which 0.21 had to be added for FE-correction. So, the cor. IQ is 100.37.

Sukhatunga et al. (2006a) standardized the CPM on a normative national sample with a mean age of 8.50y. A mean for the full sample of 27.35 was reported, which is at the 42.91st GBR-*P* and equivalent to an uncor. IQ of 97.32. We added 0.21 for FE-correction and got a cor. IQ of 97.53. The same authors also standardized the APM (Sukhatunga et al., 2006b, Table 3) on a national representative sample with an age range from 12.00y to 18.00y, which had to be split by us into a younger with a mean age of 12.50y and an older with a mean age of 16.00y. The older sample obtained a raw score of 19.04, which is at the 60.80th GBR-*P* and equivalent to an uncor. IQ of 107.78, corrected by -2.94 for FE to 104.84. The raw score of14.97 of the younger sample had to be converted to 48.60 on the SPM-scale, which is at the 84.79th GBR-

P and equivalent to an uncor. IQ of 115.41, from which 5.67 had to be deducted for FE-correction to a cor. IQ of 109.74.

Talapat and Suwannalert (1966, Figures) measured CPM-raw scores in Bangkok. We merged the results into two samples with mean ages of 9.00y and 13.00y. The 9.00y old sample scored 17.58 at the 2.00th GBR-*P* and equivalent to an uncor. IQ of 69.21, on which 8.61 for FE-correction had to be added to 77.82. The raw score of 26.33 of the older sample was converted to 28.83 on the SPM-scale, which is at the 4.35th GBR-*P* and equivalent to an uncor. IQ of 74.33. Adding 2.73 for FE-correction resulted in a cor. IQ of 77.06.

Primary school students from the Cholburi Province were tested on the CPM by Thavornsuwanchai (2008, Table 6). They had a mean age of 9.25y and obtained a raw score of 28.05, which is at the 40.26th GBR-*P* and equivalent to an uncor. IQ of 96.30, on which 0.21 had to be added for FE-correction, resulted in a cor. IQ of 96.51.

From all named samples Thailand got an unweighted national IQ of **86.93** with a standard deviation of 14.42, which increased by weightings to **89.78**. The country participated in all observed PISA-volumes and all observed TIMSS-volumes except 2003. The calculated SAS-IQ is **87.97** and the final national IQ **88.87**.

2.3.118. Turkey (TUR)

The Turkish SPM-data provided by Duzen et al. (2008, Table 12.5) were averaged by us to a mean raw score of 29.71. The sample had a mean age of 10.50y, so the score is at the 24.40th GBR-*P* and equivalent to an uncor. IQ of 89.60, reduced by 2.94 for FE-correction to a cor. IQ of **86.66**. Results from PISA-2003 to 2015, TIMSS-1999, 2007, 2011 and 2015, and PIRLS-2001 were converted into a SAS-IQ of **86.94**. The final national IQ is **86.80**.

2.3.119. Uganda (UGA)

From the rural area of Mulanda Nankabirwa et al. (2013, Table 3) reported a CPM-raw score of 8.50 for a sample with a mean age of 8.00y. This mean score was given on a scale from"1–20", on which 8.50 would be 39.47% of the total score. Used on the full CPM-scale, the equivalent raw score would be 12.13 on the 0.59th GBR-*P* and equivalent to an uncor. IQ of 62.21. After deducting 0.21 for FE-correction the cor. IQ became 62.00. A sample with a mean age of 12.50y scored 9.40. According to the same calculations used for the younger sample, this would be an SPM-raw score of 15.34 at the 1.22nd GBR-*P* and equivalent to an uncor. IQ of 66.23. After reducing this score for FE-correction by 6.09 the cor. IQ became 60.14.

Heyneman and Jamison (1980, Table 1) gave CPM-raw scores for a sample with a mean age of 11.00y of 24.07, which is at the 3.98th GBR-*P* and equivalent to an uncor IQ of 73.71. On this score 7.35 had to be added for FE-correction, resulted in a cor. IQ of 81.06.

The unweighted national IQ of Uganda is **67.73** with a standard deviation of 11.58, which increased to a final national IQ of **76.42** after weightings. The country did not participate in any of the observed school assessment tests.

2.3.120. Ukraine (UKR)

A single suitable IQ-measurement from the Ukraine was reported by Prozorovskaya, Grigoriev and Lynn (2010). It was conducted on a sample from the cities of Kiev, Belaya and Tserkov and had a mean age of 15.25y. Its mean raw score was 44.10, which is at the 36.19th GBR-*P* and equivalent to an uncor. IQ of 94.70, reduced by 6.09 for FE-correction to **88.61**. Results from TIMSS-2007 and 2011 were converted into a SAS-IQ of **91.54**, giving the Ukraine a final national IQ of **90.07**.

2.3.121. United Arab Emirates (ARE)

In a standardization of the CPM in the United Arab Emirates on a sample with a mean age of 8.75y, reported by Khaleefa and Lynn (2008a, Table 1), a mean raw score of 19.97 was obtained, which is at the 6.58th GBR-*P* and equivalent to an uncor. IQ of 77.38. We had to add 2.10 for FE-correction and got a cor. IQ for this sample of **79.48**. Data from PISA-2009 to 2015, TIMSS-2007 to 2015, and PIRLS-2011 and 2016 gave a higher SAS-IQ of **84.63**, so the final national IQ is **82.05**.

2.3.122. United Kingdom (GBR)

Al Said (2014, Table 5) measured intelligence on a sample of Welsh children with a mean age of 9.00y on the CPM. They obtained a raw score of 26.69, which is at the 31.09th GBR-P and equivalent to an uncor. IQ of 92.60, reduced by 0.21 for FE-correction to a cor. IQ of 92.39.

The CFT-IQ reported by Buj (1981, Table 1) was 102.00 for a sample from London with a mean age of 20.00y, deducted by 7.28 and 2.50 for country correction to 92.22.

We applied our methods on the two standardization samples of the APM and SPM from UK to test their suitability. The results should be close to 100.00. The sample for the APM-standardization from Dumfries in Scotland obtained a raw score of 18.64 (Raven, 2000, Table 10). The sample had a mean age of 45.00y, so the score is at the 48.38th GBR-*P* and equivalent to an uncor. and cor. IQ of 99.39. The SPM-manual from Raven, Raven and Court (1999) reported for a sample with a mean age of 11.00y a mean score of 36.58, equivalent to the 49.57th GBR-*P* and an uncor. and cor. IQ of 99.84. The CPM-manual (Raven, Raven & Court, 2006) reported raw scores from the Dumfries sample. The sample with a mean age of 8.50y obtained a raw score of 23.85, which is at the 27.24th GBR-*P* and equivalent to an uncor. IQ of 90.87, on which 5.25 had to be added for FE-correction, so the result is a cor. IQ of 96.12. Using the British CPM-norms from 2007 (Raven, J., 2008a, Table A.1) from a standardization sample with a mean age of 7.45y, we calculated a mean raw score of 24.36, which is at the 54.56th GBR-P and equivalent to an uncor. and cor. IQ of 101.72.

Altogether, the unweighted national IQ for the United Kingdom is **96.95** with a standard deviation of 4.02. This score increased by weightings to **98.23** and averaged with a SAS-IQ of **100.00** (see methods) to a final national IQ of **99.12**.

2.3.123. United States (USA)

The huge representative sample of The Louisville Twin Study, conducted in Louisville, Kentucky, was tested with the WPPSI and WISC-R by Beam et al. (2015, Table 1). 4.00y to 6.00y olds obtained an IQ of 95.87 on the WPPSI, corrected by 3.06 for FE and -2.50 for country to 96.43. 7.00y to 15.00y olds were tested with the WISC-R and obtained an IQ of 100.14, corrected by 4.76 for FE and -2.50 for country to 102.40.

Beaver et al. (2013, Table 1) reported an IQ measured with the SBIS on a sample with a mean age of 4.00y of 96.73, corrected by -1.02 and -2.50 for FE and country to 96.36. A sample with a mean age of 7.00y obtained an IQ of 95.05 on the WISC, corrected by -6.46 and -2.50 for FE and country to 89.24.

Petrill et al. (2004, Table 1) measured intelligence development on a sample of adopted children at three ages: 3.50y, 9.54y and 16.00y. Due to the big time differences a training effect could be excluded, which allowed us to use the results of all three measurements. At 3.50y the sample obtained an IQ on the SBIS of 107.14, corrected by -2.72 and -2.50 for FE and country to 101.92. At the age of 9.54y the sample obtained an IQ on the WISC-R of 112.09, corrected by -4.42 and -2.50 for FE and country to 105.17. At the age of 16.00y the sample obtained an IQ on the WAIS-R of 105.94, corrected by -4.42 and -2.50 for FE and country to 99.02.

Bishop et al. (2003) compared intelligence of children from the Colorado Adoption Project and from the Longitudinal Twin Study, measured with the SBIS at the ages of 3.00y and 4.00y and the WISC-R on the ages of 7.00y and 12.00y. Both samples were measured at the same times in 1995-1996 and 1999 and therefore merged together. At the mean age of 3.50y the samples scored 103.33 and 103.82, averaged to 103.57 and corrected by -8.16 and -2.50 for FE and country to 92.91. At the mean age of 7.00y both samples obtained mean IQs of 106.56, from which 8.50 and 2.50

hat to be deducted for FE- and country-correction, so the cor. IQ is 95.56.

On two samples of Whites and Blacks the SBIS and WPPSI-R were administered by Brooks-Gunn, Klebanov and Duncan (1996, Table 1). The SBIS was used at the age of 3.00y and the WPPSI-R at the age of 5.00y. Results will be compared by ethnicity and age. Whites obtained an IQ of 98.04 at the age of 3.00y, corrected by -5.10 and -2.50 for FE and country to 90.44, and 103.13 at the age of 5.00y, corrected by -2.50 for country to 100.63. Blacks obtained an IQ of 78.10 at the age of 3.00y, corrected by -5.10 and -2.50 for FE and country to 70.50, and 85.04 at the age of 5.00y, corrected by -2.50 for country to 82.54.

Black and white children and mothers from low-SES-areas of New York were compared by Canfield et al. (2003, Table 1). The SBIS was used for all samples, children had a mean age of 5.01y and mothers of 25.00. The white children obtained an uncor. IQ of 93.80 and the black children of 85.80, both corrected by -5.10 for FE and -2.50 for country to cor. IQs of 86.20 and 78.20. White mothers obtained an uncor. IQ of 96.10 and black mothers of 87.50, both corrected by -5.10 for FE and -2.50 for country to cor. IQs of 88.50 and 79.90.

Intelligence of Anglo-Americans and Anglo-Spanish in the USA was measured by Christiansen and Livermore (1970, p.9-14) with the KABC. Both samples had mean ages of 13.50y. The Anglo-Americans scored 107.50 and the Anglos-Spanish 101.00, both reduced by 7.82 for FE-correction and 2.50 for country-correction to 97.18 and 90.68.

From a rural area in Southeast Alaska a low-SES sample of Tlingit, mostly with learning difficulties, was reported by Connelly (1983, Table 1). WISC-R FS-IQs for younger participants of 86.89 and older participants of 83.88 were averaged to an uncor. IQ of 85.39, to which 0.68 had to be added for FE-correction but 2.50 had to be subtracted for country correction, which resulted in a cor. IQ of 83.57.

Intelligence of monoglots and bilinguals from New York was measured by Darcy (1946, Table I) with the SBIS. The two samples scored 98.65 and 90.96, corrected by -2.72 and -2.50 for FE and country to cor. IQs of 93.43 and 85.74.

Engelhardt (2016, Table 1) used children from the Texas Twin Project to research the genetic overlap of executive functions and intelligence measured with the WASI-II. The sample with a mean age of 10.90y gained an uncor. IQ of 103.65, which had to be reduced by 2.50 for country correction to a cor. IQ of 101.15.

The WAIS-III was administered by Friedman et al. (2008) on a twin sample recruited from the Colorado Longitudinal Twin Study. The sample with a mean age of 16.60y obtained an uncor. IQ of 102.00, reduced by 2.72 and 2.50 for FE- and country-correction to a cor. IQ of 96.78.

By Georgas et al. (2003, Figure 19.6) a FS-IQ on the WISC-III of 98.00 was named, which had to be reduced by 4.76 and 2.50 for FE- and country-correction to 90.74.

From Hambleton, Merenda and Spielberger (2005, Table 9.2) an uncor. IQ of 93.80 was included for a sample of New Yorkers with a mean age of 31.90y tested with the WAIS-R. After reducing the score by 2.72 and 2.50 for FE- and country-correction a cor. IQ of 88.58 remained.

Hertzig et al. (1968) named an FS-IQ of white middleclass children from New York of 122.40. The IQ was measured with the Form L of the SBIS. A FE-correction of -10.54 was necessary together with a country correction of -2.50, which resulted in a cor. IQ of 109.36.

Nichols and Anderson (1973) measured intelligence of Whites and Blacks from the cities of Boston, Baltimore and Philadelphia with the SBIS and the WISC. On the SBIS Whites scored 106.58 and Blacks 93.51, both corrected by -0.34 and -2.50 for FE and country to 103.74 and 90.67. On the WISC Whites scored 103.29 and Blacks 92.14, both corrected by -8.84 and -2.50 for FE and country to 91.95 and 80.80.

Horn, Loehlin and Willerman (1979, Table E) white adults and children from the Texas Adoption Project. Five samples were named, consisted of adoptive parents, unwed mothers, and three samples of adopted children. On the two adult samples the WAIS was administered and uncor. IQs of 113.70 and 105.30 measured. Both had to be reduced by 6.46 and 2.50 for FE- and country-correction to cor. IQs of 104.74 and 96.34. The WISC was administered on adopted children with a mean age of 7.55y, which scored 111.74, reduced by 9.18 and 2.50 for FE- and country-correction to 100.06. The WAIS was administered on a sample of adopted 16.00y olds which obtained an uncor. IQ of 112.55, reduced by 6.46 and 2.50 for FE- and country correction to 103.59. At last the SBIS was administered on 16.00y old adopted children and an uncor. IQ of 110.32 was measured, which had to be corrected by -4.76 and -2.50 for FE and country to 103.06.

Marmorale and Brown (1975, Table 2) administered the WISC on Whites and Blacks from New York, measured uncor. IQs of 108.03 and 94.10, both reduced by 9.52 and 2.50 for FE- and country-correction to cor. IQs of 96.01 and 82.08. The same authors made a similar measurement with the WISC in 1981 and measured uncor. IQs of white New Yorkers of 109.04 and of black New Yorkers of 94.58, both corrected by -11.56 and -2.50 for FE and country to 94.98 and 80.52.

Nakano and Watkins (2013, Table 1) did research on the factor structure in the WISC-IV-results of Native Americans from Arizona. They measured an uncor. FS-IQ of 82.40, which had to be reduced by 1.02 and 2.50 for FE- and country-correction to 78.88.

In a seminar paper by Orsini (1974, Table 1) a FS-IQ of 93.88 measured with the WISC on a sample of Blacks from New York with low SES was reported. This score had to be corrected by -9.18 and -2.50 for FE and country to 82.20.

Ratner et al. (2006, Table 2) measured intelligence of Blacks from Detroit, on average 6.90y olds with the WPPSI-R and on average 32.70y olds with the WAIS-R. The younger sample obtained an uncor. IQ of 80.60, corrected by -2.72 and -2.50 for FE and country to 75.38. The older sample obtained an uncor. IQ of 84.30, corrected by -5.78 and -2.50 to 76.02.

From Raven (2000, Table 4) reported SPM-raw scored for Whites, Asian, Hispanics and Blacks in the USA. All samples had mean ages of 14.00y. Whites obtained a raw score of 44.71, which is at the 46.01st GBR-P and equivalent to an uncor. IQ of 98.50. Asians obtained a raw score of 43.71, which is at the 40.57th GBR-P and equivalent to an uncor. IQ of 96.42. Hispanics obtained a raw score of 40.00, which is at the 23.64th GBR and equivalent to an uncor. IQ of 89.23, and Blacks obtained a raw score of 38.14, which is at the 17.58th GBR-*P* and equivalent to an uncor. IQ of 86.03. All scores had to be corrected by -1.47 for FE, so the cor. IQs are 97.03, 94.95, 87.76 and 84.56. The source also reported the APM-raw score of the APM-standardization sample from Des Moines, Iowa (Table 10). This sample had a mean age of 45.00y and scored 17.82, which is at the 44.33rd GBR-*P* and equivalent to an uncor. IQ of 97.86, reduced by 0.21 for FE-correction to 97.65.

The SPM-manual (Raven, Raven & Court, 1999, Table 20) reported raw scores for a sample with an age range from 6.50y to 16.50y, which had to be split by us to one with a mean age of 11.00y and one with 16.25y. The younger sample obtained a raw score of 34.00, which is at the 37.22nd GBR-*P* and equivalent to an uncor. IQ of 95.11, reduced by 1.47 for FE-correction to a cor. IQ of 93.64. The SPM-raw score of the older sample of 48.50had to be converted to 15.23 on the APM-scale, which is at the 49.07th GBR-*P* and equivalent to an uncor. IQ of 99.65. Adding 1.26 for FE-correction resulted in a cor. IQ of 100.91.

Scarr and Weinberg (1976, Table 6 and 7) reported results from various intelligence measurements in Minnesota. At first, a WAIS-IQ for adoptive parents of 119.50, reduced by 7.14 and 2.50 for FE- and country correction to 109.86. At second, the WAIS was administered on the natural children of the adoptive parents and an uncor. IQ of 118.90 was measured, corrected by -7.14 and -2.50 for FE and country to 109.26. Also, the WISC was administered on the natural children of the adoptive parents and an uncor. IQ of 117.90 was measured, corrected by -9.86 and -2.50 for FE and country to 105.54. Finally, the SBIS was administered on the natural children of the adoptive parents and an uncor. IQ of 113.80 was measured, which had to be reduced by 1.36 and 2.50 for FE- and country-correction to 109.94. For all samples a SES above average was reported. IQs for adopted children were also provided by the source but were excluded by us due to significant lower scores.

By Teeter, Moore and Petersen (1982, Table 1) the WISC-R was administered on children from the Navajo-Tribe in Arizona. An uncor. IQ of 79.06 was measured, which had to be corrected by -1.70 and -2.50 for FE and country to 74.86.

Valencia, Rankin and Livingston (1995, Table 3.7) reported KABC-IQs for Whites and Mexican Americans with low SES and mean ages of 10.50y. Whites scored 99.95 and Mexican Americans 98.23. Both scores had to be corrected by -7.28 for FE and -2.50 for country to cor. IQs of 90.17 and 88.45.

We calculated an unweighted national IQ for the USA of **92.74** with a standard deviation of 9.83. Weighted by sample size, data quality and adjusted for ethnic composition, this score increased to **95.86.** The USA participated in all observed school assessment studies and obtained a SAS-IQ of **99.00**, so the final national IQ is **97.43**.

2.3.124. Uzbekistan (UZB)

The IQ of Uzbekistan was indirectly estimated from Uzbeks but with Kazakhstan as their correct home. The sample, reported by Grigoriev and Lynn (2014, Table 3) had a mean age of 12.50y and obtained a SPM+-raw score of 29.27, equivalent to the 23.62th GBR-*P* and an uncor. IQ of 89.22, from which 0.21 had to be subtracted for FE-correction. This gave the sample a cor. IQ of **89.01**. School assessment results were not available.

2.3.125. Venezuela (VEN)

Montiel-Naval et al. (2008, Table 2) researched Attention Deficit/Hyperactivity Disorder in children from the Maracaibo County in Venezuela and administered the vocabulary and block design from the WISC-III on children between 6.00y to 12.00y, and similarities and information of the WPPSI-R on children between 4.00y and 5.00y. The report named a mean IQ for the non-ADHD sample of 80.03 but did not differentiate between results from the

WISC-III and WPPSI-R. However, both tests where standardized in the USA in 1989 and measured FS-IQ, therefore the FE- and country-corrections would be the same. So, we decided to use the WISC-III as the listed test on the both samples. This reduced the uncor. IQ of 80.03 by 5.78 and 2.50 to a cor. IQ of 71.75.

Montiel-Naval, Peña and Montiel-Barbero (2003, Table 5) gave a WISC-III result of 86.57 for a control sample, which had to be reduced by 4.76 and 2.50 for FE- and country-correction to a cor. IQ of 79.31.

Montiel-Naval, Montiel-Barbero and Peña (2005, Table 1) gave an IQ of 99.00 for a further control sample, corrected by -4.42 for FE and -2.50 for country to 92.08. It has to be noted here that in the first two studies, ADHD-samples scored higher than the control but lower in the third, but we did not include ADHD-samples due to low representativeness.

The unweighted national IQ of Venezuela is **81.05** and increased slightly to **82.23** by weightings. The country participated in PISA-2009, from which results a SAS-IQ of **83.74** was calculated, which gave Venezuela a final national IQ of **82.99**.

2.3.126. Vietnam (VNM)

Nga et al. (2011, Table 4) administered the CPM on four samples from the mostly rural Province of Hung Yen. Three of the samples were treated with deworming and micronutrient supplementation whereas one only got placebos. CPM-scores were reported only as "Baseline" and "End point" for each sample. Calculating the means from both scores resulted in 17.80, 18.30, 17.80 and 17.95. Differences are marginal, so the mean from all four samples of 17.96 was used for the full sample with a mean age of 7.60y. This score is at the 8.44th GBR-*P* and equivalent to an uncor. IQ of 79.36, corrected by -0.21 for FE to 79.15.

Children living in families with different SES in urban and rural areas were compared by Tuan et al. (2003, Table 33) on the CPM. Test results were given as percentages of participants in score ranges of 0.00 to 4.00, 5.00 to 8.00 and 9.00 to 12.00, which were transformed by us into the three score-grades 2.00, 6.50 and 10.50, hereafter multiplied with the given percentages. For the total sample with a mean age of 8.00y a mean raw score of 18.25 was calculated, which is at the 5.84th GBR-*P* and equivalent to an uncor. IQ of 76.47, deducted by 0.21 for FE-correction to a cor. IQ of 76.26.

Watanabe et al. (2005) compared stunted children with healthy controls on the CPM. A half of them got nutritional and early childhood development intervention, the other half only nutritional intervention. Stunted children scored significantly lower. The controls scored, differentiated according to intervention, 16.70 and 17.00. We averaged this score to 16.85, which is at the 5.91st GBR-*P* and equivalent to an uncor. IQ of 76.56. 1.47 had to be added for FE-correction, so the cor. IQ is 78.03.

This gave Vietnam an unweighted national IQ of **77.39** with a standard deviation of 2.15, which remained stable after weightings at **77.85**. The country participated in PISA-2012 and 2015 from which results a SAS-IQ of **101.21** was calculated. This is dramatically above the IQ from psychometric measurements. But all three included studies used similar methods and measured similar results. Unreported limitations of CPM (e.g., using only one or two of the three sets) seem unlikely. Both Nga et al. (2011) and Watanabe et al. (2005) did not report the number of used CPM-items but Tuan et al. (2003) used the full CPM without reporting a significantly higher number of raw scores. So, we had to accept the result for the moment. The final national IQ of Vietnam is **89.53**.

2.3.127. Yemen (YEM)

Bakhiet, Al-Khadher and Lynn (2015, Table 1) administered the SPM+ on a sample from the city of Dhamar with a mean age of 10.00y and a mean raw score of 16.43. This score is at the 2.38th GBR-*P* and equivalent to an uncor. IQ of 70.29, reduced by 0.21 for FE-correction to 70.08.

Khaleefa and Lynn (2008d, Table 1) reported results from a CPM-standardization on a national sample with a mean age of

8.50y. A mean raw score of 19.00 was reported, which is at the 5.84th GBR-*P* and equivalent to an uncor. IQ of 76.47, corrected by -0.21 for FE to 76.26.

This gave Yemen an unweighted national IQ of **73.17** which remained stable after weightings at **72.32**. The country participated in TIMSS-2003 to 2011 and obtained a SAS-IQ of **53.50**, so the final national IQ is **62.86**.

2.3.128. Zimbabwe (ZWE)

The only suitable measurement of intelligence in Zimbabwe came from an old study from Irvine (1969) and was done with the SPM on a sample of Shona-people with a mean age of 14.50y. They obtained a mean raw score of 27.80, which is at the 2.44th GBR-*P* and equivalent to an uncor. IQ of 70.44, corrected by 3.57 for FE to **74.01**, which is the unweighted, weighted and final national IQ of Zimbabwe due to missing school assessment results.

2.4. International School Assessment Data per Nation

The following three tables SAS 1, 2 and 3 show school assessment results for PISA, TIMSS and PIRLS in IQs calculated as described in part 2.2.6. The school assessment scores of each volume were first converted into IQs for each volume, averaged to the IQ-scores in the last column, which were finally averaged for each country to the [SAS-IQ] named in part 2.3. For sources please see also part 2.2.6, Table 13.

Table SAS 1. *PISA results in IQ-scores.*

ISO 3166-1 ALPHA-3	PISA 2000 IQ	PISA 2003 IQ	PISA 2006 IQ	PISA 2009 IQ	PISA 2012 IQ	PISA 2015 IQ	PISA 2000-2015 IQ
ALB	75.29	-	-	81.45	83.44	86.82	81.75
ARE	-	-	-	88.75	90.56	89.52	89.61
ARG	80.25	-	81.98	83.26	83.66	87.90	83.41
AUS	100.26	101.71	102.76	102.93	101.55	100.37	101.60
AUT	97.78	97.51	100.05	97.82	99.67	98.81	98.60
AZE	-	-	85.24	82.14	-	-	83.69
BEL	96.85	100.41	101.30	101.44	101.06	100.41	100.24
BGR	85.73	-	87.15	89.07	90.42	90.61	88.60

ISO 3166-1 ALPHA-3	PISA 2000 IQ	PISA 2003 IQ	PISA 2006 IQ	PISA 2009 IQ	PISA 2012 IQ	PISA 2015 IQ	PISA 2000-2015 IQ
BRA	75.24	79.40	82.33	84.12	84.50	83.67	81.54
CAN	100.62	101.86	104.17	104.21	103.05	103.65	102.93
CHE	96.64	100.03	101.81	102.72	102.47	101.00	100.78
CHL	80.62	-	89.26	90.19	89.79	91.10	88.19
CHN	-	-	-	103.15	104.32	102.25	103.24
COL	-	-	81.83	83.74	83.07	86.02	83.67
CRI	-	-	-	88.33	88.13	86.90	87.79
CYP	-	-	-	-	90.68	90.29	90.48
CZE	95.71	99.41	100.05	98.40	99.63	98.58	98.63
DEU	93.64	98.08	100.50	101.55	101.95	101.27	99.50
DNK	95.24	97.66	99.90	99.79	99.34	100.68	98.77
DOM	-	-	-	-	-	74.95	74.95
DZA	-	-	-	-	-	78.49	78.49
ESP	93.59	95.25	96.19	97.39	98.01	98.68	96.52
EST	-	-	102.11	102.13	103.65	103.80	102.92
FIN	101.86	104.72	107.68	106.93	104.16	103.55	104.82
FRA	96.80	99.15	98.69	99.47	99.59	99.35	98.84
GBR	100.00	-	100.00	100.00	100.00	100.00	100.00
GEO	-	-	-	80.01	-	85.28	82.65
GRC	89.56	91.85	94.33	95.63	94.31	93.56	93.21
HKG	102.17	103.35	106.02	107.25	107.90	105.10	105.30
HRV	-	-	96.59	95.79	96.89	96.19	96.37
HUN	93.80	96.82	98.59	99.25	97.55	96.03	97.01
IDN	76.58	78.56	83.54	81.61	81.76	83.75	80.97
IND	-	-	-	72.12	-	-	72.12
IRL	97.88	98.57	101.05	99.47	102.02	101.42	100.07
ISL	96.54	98.00	98.79	100.11	97.22	97.05	97.95
ISR	86.30	-	91.47	93.34	95.62	95.62	92.47
ITA	91.63	93.80	95.03	97.71	98.00	97.68	95.64
JOR	-	-	85.04	84.33	83.87	84.29	84.38
JPN	102.33	102.58	102.36	104.64	105.86	104.52	103.71
KAZ	-	-	-	83.69	86.71	91.89	87.43
KGZ	-	-	70.54	71.96	-	-	71.25
KOR	102.07	104.00	106.02	106.50	106.18	102.99	104.63
LBN	-	-	-	-	-	80.78	80.78
LIE	94.26	102.13	102.61	102.88	103.49	-	101.07
LTU	-	-	96.94	96.54	97.14	96.19	96.70
LUX	86.87	95.79	97.49	97.02	98.02	97.42	95.43
LVA	89.51	95.67	97.49	97.82	98.67	97.96	96.18
MAC	-	100.87	101.15	101.17	103.10	104.22	102.10
MDA	-	-	-	83.85	-	87.76	85.81
MEX	81.75	81.47	86.00	87.15	86.84	86.89	85.02
MKD	77.82	-	-	-	-	79.61	78.72
MLT	-	-	-	92.80	-	94.31	93.56
MNE	-	-	84.84	84.60	86.33	87.36	85.78
MUS	-	-	-	86.30	-	-	86.30
MYS	-	-	-	86.09	86.14	90.66	87.63
NLD	-	101.36	102.91	102.93	102.52	101.25	102.19
NOR	95.86	96.55	97.79	100.00	98.99	100.71	98.32
NZL	100.52	101.52	103.41	103.79	101.04	100.94	101.87
PAN	-	-	-	79.00	-	-	79.00

ISO 3166-1 ALPHA-3	PISA 2000 IQ	PISA 2003 IQ	PISA 2006 IQ	PISA 2009 IQ	PISA 2012 IQ	PISA 2015 IQ	PISA 2000-2015 IQ
PER	67.33	-	-	78.84	80.33	83.45	77.49
POL	92.14	96.67	99.80	100.11	102.79	100.62	98.69
PRT	89.61	93.23	95.33	98.29	97.77	99.54	95.63
QAT	-	-	73.60	79.64	81.48	85.58	80.07
ROU	-	-	86.15	88.17	90.40	90.28	88.75
RUS	90.49	93.08	94.48	94.88	96.72	98.74	94.73
SGP	-	-	-	106.88	108.23	108.05	107.72
SRB	-	86.47	88.31	90.73	91.37	-	89.22
SVK	-	95.98	97.04	98.03	95.28	94.23	96.11
SVN	-	-	100.60	99.73	99.44	101.47	100.31
SWE	97.62	99.19	100.35	99.20	96.86	99.37	98.76
THA	85.27	85.93	87.45	87.42	89.94	86.83	87.14
TTO	-	-	-	86.09	-	88.03	87.06
TUN	-	77.26	81.23	82.68	83.66	80.00	80.96
TUR	-	86.51	89.46	92.64	93.80	88.30	90.14
TWN	-	-	103.61	103.04	105.09	103.74	103.87
URY	-	86.47	88.10	88.22	86.05	89.11	87.59
USA	95.45	95.67	96.96	99.36	98.40	98.09	97.32
VEN	-	-	-	83.74	-	-	83.74
VNM	-	-	-	-	102.09	100.33	101.21

Table SAS 2. *TIMSS results in IQ-scores.*

ISO 3166-1 ALPHA-3	TIMSS 1995 IQ	TIMSSIQ 1999 IQ*	TIMSS 2003 IQ	TIMSS 2007 IQ	TIMSS 2011 IQ	TIMSS 2015 IQ	TIMSS 1995-2015 IQ
ARE	-	-	-	82.76	86.03	86.10	84.96
ARG	-	-	-	-	-	75.95	75.95
ARM	-	-	88.05	92.96	85.44	-	88.82
AUS	103.33	102.67	97.48	96.47	97.83	96.24	99.00
AUT	104.84	-	-	96.74	98.27	-	99.95
AZE	-	-	-	-	87.22	-	87.22
BEL	100.85	-	-	-	95.09	99.00	98.31
BGR	104.71	99.57	90.23	87.56	-	99.19	96.25
BHR	-	-	78.85	80.65	84.01	85.38	82.22
BIH	-	-	-	86.35	-	-	86.35
BWA	-	-	68.25	66.04	65.30	72.81	68.10
CAN	101.61	102.58	-	97.82	99.50	97.71	99.85
CHE	101.66	-	-	-	-	-	101.66
CHL	-	80.88	75.02	-	87.06	84.81	81.94
COL	79.89	-	-	74.50	-	-	77.20
CYP	92.73	91.56	89.86	85.85	-	93.86	90.77
CZE	106.48	102.15	-	96.43	98.82	99.38	100.65
DEU	99.49	-	-	98.46	99.54	98.24	98.93
DNK	94.67	-	-	97.44	100.25	99.76	98.03
DZA	-	-	-	73.51	-	-	73.51
EGY	-	-	77.67	74.04	-	-	75.86
ESP	96.60	-	-	-	94.06	95.67	95.44
EST	-	-	102.79	-	-	-	102.79
FIN	-	101.81	-	-	103.19	101.95	102.32

ISO 3166-1 ALPHA-3	TIMSS 1995 IQ	TIMSSIQ 1999 IQ*	TIMSS 2003 IQ	TIMSS 2007 IQ	TIMSS 2011 IQ	TIMSS 2015 IQ	TIMSS 1995-2015 IQ
FRA	99.17	-	-	-	-	91.10	95.13
GBR	100.00	100.00	100.00	100.00	100.00	100.00	100.00
GEO	-	-	-	80.15	84.31	84.43	82.96
GHA	-	-	48.62	55.33	60.11	-	54.69
GRC	94.96	-	-	-	-	-	94.96
HKG	105.20	106.72	106.59	105.63	106.76	108.33	106.54
HND	-	-	-	-	62.37	-	62.37
HRV	-	-	-	-	95.56	96.81	96.19
HUN	102.89	104.31	100.94	98.84	98.66	98.81	100.74
IDN	-	83.12	78.06	76.55	75.30	73.86	77.38
IND	-	-	75.02	-	-	-	75.02
IRL	102.20	-	-	-	98.50	99.62	100.11
IRN	86.06	85.88	80.93	81.00	85.34	81.29	83.41
ISL	94.57	-	-	-	-	-	94.57
ISR	99.39	91.39	93.08	87.26	98.82	95.19	94.19
ITA	-	94.66	94.65	94.63	96.61	94.24	94.96
JOR	-	86.57	84.74	85.05	81.48	74.43	82.45
JPN	109.83	108.18	105.27	104.98	107.38	108.67	107.38
KAZ	-	-	-	-	94.10	100.86	97.48
KOR	111.10	108.78	109.07	109.17	111.49	110.57	110.03
KWT	81.30	-	-	69.70	70.38	69.33	72.68
LBN	-	-	77.57	80.45	81.48	78.24	79.43
LTU	92.50	94.49	97.94	97.21	98.12	97.90	96.36
LVA	96.69	97.76	98.73	100.49	-	-	98.42
MAR	-	67.79	71.13	69.23	67.06	69.95	69.03
MDA	-	90.87	91.81	-	-	-	91.34
MKD	-	88.89	83.26	-	79.32	-	83.82
MLT	-	-	-	88.66	90.48	91.10	90.08
MNG	-	-	-	82.69	-	-	82.69
MYS	-	98.02	96.41	88.66	82.55	87.38	90.60
NLD	105.38	104.39	101.17	98.85	100.73	97.95	101.41
NOR	98.59	-	89.76	90.08	93.43	95.14	93.40
NZL	98.63	97.16	96.33	94.00	94.71	93.62	95.74
OMN	-	-	-	73.64	75.45	79.86	76.32
PHL	-	70.38	71.25	-	-	-	70.81
POL	-	-	-	-	93.98	101.29	97.63
PRT	91.76	-	-	-	99.38	98.14	96.43
PSE	-	-	77.47	71.24	78.44	-	75.72
QAT	-	-	-	59.50	79.34	82.48	73.77
ROU	93.71	92.25	89.25	86.45	91.10	-	90.55
RUS	102.14	101.81	98.45	99.86	103.09	103.62	101.49
SAU	-	-	68.15	67.34	80.66	71.43	71.90
SGP	112.84	111.88	110.21	109.51	112.74	113.76	111.83
SLV	-	-	-	69.63	-	-	69.63
SRB	-	-	89.25	89.76	97.63	97.57	93.55
SVK	103.59	103.01	97.10	96.03	98.19	95.19	98.85
SVN	103.99	102.50	94.60	96.97	99.05	99.67	99.46
SWE	100.61	-	96.90	95.43	96.51	97.38	97.37
SYR	-	-	71.98	78.85	76.67	-	75.83
THA	96.60	92.68	-	85.35	86.63	82.71	88.80

ISO 3166-1 ALPHA-3	TIMSS 1995 IQ	TIMSSIQ 1999 IQ*	TIMSS 2003 IQ	TIMSS 2007 IQ	TIMSS 2011 IQ	TIMSS 2015 IQ	TIMSS 1995-2015 IQ
TUN	-	86.57	72.73	73.61	77.00	-	77.48
TUR	-	85.19	-	82.75	89.50	89.52	86.74
TWN	-	110.33	107.20	107.39	109.54	108.71	108.64
UKR	-	-	-	89.36	93.73	-	91.54
USA	101.76	98.54	98.73	98.30	100.43	99.81	99.60
YEM	-	-	59.49	49.06	51.95	-	53.50
ZAF	70.57	55.56	46.37	-	58.06	68.46	59.80

Table SAS 3. *PIRLS results in IQ-scores.*

ISO 3166-1 ALPHA-3	PIRLS 2001 IQ	PIRLS 2006 IQ	PIRLS 2011 IQ	PIRLS 2016 IQ	PIRLS 2001-2016 IQ
ARE	-	-	79.33	79.30	79.32
ARG	78.86	-	-	-	78.86
AUS	-	-	95.43	97.15	96.29
AUT	-	100.90	95.79	96.58	97.76
AZE	-	-	83.54	83.48	83.51
BEL	-	98.29	95.88	91.42	95.20
BGR	101.67	102.51	96.34	98.67	99.80
BHR	-	-	-	78.54	78.54
BLZ	62.55	-	-	-	62.55
BWA	-	-	57.56	-	57.56
CAN	100.61	102.98	99.27	96.96	99.96
CHL	-	-	-	87.66	87.66
COL	79.21	-	80.98	-	80.09
CYP	91.84	-	-	-	91.84
CZE	99.39	-	98.72	96.96	98.36
DEU	99.74	102.69	97.99	95.82	99.06
DNK	-	102.33	100.37	97.72	100.14
EGY	-	-	-	56.52	56.52
ESP	-	96.41	92.87	94.11	94.46
FIN	-	-	102.93	101.33	102.13
FRA	97.28	98.03	94.15	90.89	95.08
GBR	100.00	100.00	100.00	100.00	100.00
GEO	-	88.87	88.29	86.52	87.89
GRC	97.11	-	-	-	97.11
HKG	97.81	105.56	103.48	101.90	102.19
HND	-	-	61.95	-	61.95
HRV	-	-	100.18	-	100.18
HUN	100.44	103.23	97.62	99.05	100.09
IDN	-	77.03	77.32	-	77.17
IRL	-	-	100.00	101.52	100.76
IRN	77.81	79.90	82.62	75.13	78.86
ISL	95.00	96.05	-	-	95.53
ISR	-	96.23	97.99	94.49	96.24

ISO 3166-1 ALPHA-3	PIRLS 2001 IQ	PIRLS 2006 IQ	PIRLS 2011 IQ	PIRLS 2016 IQ	PIRLS 2001-2016 IQ
ITA	100.09	103.23	97.99	97.91	99.80
KAZ	-	-	-	95.63	95.63
KWT	74.65	63.56	56.28	68.48	65.74
LTU	100.44	100.72	95.61	97.91	98.67
LUX	-	104.31	-	-	104.31
LVA	100.79	101.44	-	99.81	100.68
MAC	-	-	-	97.53	97.53
MAR	66.58	62.31	55.73	61.84	61.61
MDA	91.49	94.08	-	-	92.78
MKD	82.72	83.67	-	-	83.19
MLT	-	-	86.28	79.68	82.98
NLD	102.37	102.51	98.90	97.34	100.28
NOR	92.72	93.72	91.77	92.03	92.56
NZL	97.98	99.82	96.16	93.16	96.78
OMN	-	-	70.55	73.23	71.89
POL	-	97.49	95.24	101.14	97.96
PRT	-	-	97.99	94.11	96.05
QAT	-	67.69	76.77	77.78	74.08
ROU	95.00	92.10	90.85	-	92.65
RUS	97.81	105.74	102.93	104.18	102.66
SAU	-	-	77.68	75.51	76.59
SGP	97.81	104.49	102.74	103.23	102.07
SVK	96.05	99.64	96.89	95.44	97.01
SVN	93.25	98.03	95.98	96.77	96.00
SWE	103.60	102.87	98.17	99.24	100.97
TTO	-	82.59	85.18	84.81	84.19
TUR	83.95	-	-	-	83.95
TWN	-	100.36	100.18	-	100.27
USA	100.26	101.26	100.73	98.10	100.09
ZAF	-	58.54	58.66	54.62	57.27

2.5. National IQs – Primary Results

Table 16 summarizes the final results for each country by combining the different approaches. Column [Re-est?] gives a 'Y/N' if a country's IQ was calculated from psychometric data or from school assessment data and/or its geographic neighbourhood, or an 'EW' if a re-estimation was conducted with respect to the ethnic composition (see: 2.2.5.). Column [Full rating (cml.)] gives the cumulative [Full ratings] of all samples of a country, and column [*N* (spl.)] gives the number of samples employed which were psychometrically tested. [UW] presents the unweighted mean

IQs from all samples, [Lowest] and [Highest] the external limits across all samples for a country. [QNW] is the mean IQ weighted by the [QN-Factor], [SAS] the IQs from school assessment study results and [QNW+SAS+GEO] the combined and final IQs. In the last column [*Dif.* to L&V12] provides the differences between [QNW+SAS+GEO] and those from Lynn and Vanhanen (2012), in which negative scores represent higher scores in the NIQ-dataset. Fig. 1 to 5 provide visual surveys about the most important variables of Table 16. More detailed statistics will follow in 2.6 and 2.7.

The global pattern of IQ-distribution is nearly the same as it was found by Lynn and Vanhanen (2002; 2012) with a mean deviation from that of 2012 of 2.44 (*Range*=-15.10↔35.01; *SD*=7.12; *N*=197), which resulted in a *t*-value of 1.994 (*p*=.977). However, the mean difference is twice as big if absolute differences are used, which increased the mean deviation from that of 2012 to 4.98 (*Range*=0.02↔35.01; *SD*=5.67; *N*=197).

By focussing on [QNW+SAS+GEO], the countries with the highest IQ-scores are all located in East or Northeast Asia, followed by North East and Central Europe, then the rest of Europe with a North West to South East gradient, other non-European but Western countries, and parts of Southeast Asia. Countries from South America occupy the next ranks, followed by the Middle East and Central Asia (hereafter: South Asia) and finally Africa also with a gradient from its coasts to its centre. Japan (106.48), Taiwan (106.47) and Singapore (105.89) are the top-three countries in IQ, whereas Liberia (45.07), Sierra Leone (45.07) and Nepal (42.99) are on the last ranks. The country closest to the mean of 81.85 is Macedonia (81.91) and the country at the median is Venezuela (82.99).

Table 16. *Final country results of national IQ-estimations.*

ID	Method			NIQ						
ISO 3166-1 ALPHA -3	Re-est. ?	Full rating (cml.)	*N* (Spl.)	UW	*Lowest*	*Highest*	QNW	SAS	QNW+ 5 AS+GEO	*Dif.* to L&V12
AFG	N	-	-	-	-	-	-	-	82.12*	-7.12
ALB	N	-	-	-	-	-	-	81.75	81.75*	0.25

ID	Method			NIQ						
ISO 3166-1 ALPHA -3	Re-est. ?	Full rating (cml.)	*N* (Spl.)	UW	*Lowest*	*Highest*	QNW	SAS	QNW+ 5 AS+GEO	*Dif.* to L&V12
DZA	N	-	-	-	-	-	-	76.00	76.00*	8.20
AND	N	-	-	-	-	-	-	-	95.20*	1.80
AGO	Y	0.47	1	75.10	75.10	75.10	75.10	-	75.10	-4.10
ATG	N	-	-	-	-	-	-	-	70.48*	3.52
ARG	Y	4.03	5	94.96	86.22	104.52	93.85	79.41	86.63	6.17
ARM	N	-	-	-	-	-	-	88.82	88.82*	4.38
AUS	Y	4.82	6	98.74	93.60	105.83	99.52	98.96	99.24	-0.04
AUT	Y	2.73	4	100.10	88.58	119.23	98.00	98.77	98.38	0.62
AZE	N	-	-	-	-	-	-	84.81	84.81*	0.09
BHS	Y	1.01	2	84.22	81.15	87.29	86.99	-	86.99	-2.99
BHR	Y	0.68	1	86.82	86.82	86.82	86.82	80.38	83.60	2.30
BGD	Y	2.48	5	76.81	71.92	88.46	74.33	-	74.33	6.67
BRB	Y	0.89	2	91.37	88.58	94.15	91.60	-	91.60	-11.60
BLR	Y	1.07	2	101.60	97.70	105.50	101.60	-	101.60	-6.60
BEL	Y	1.63	3	95.12	89.92	98.80	97.07	97.92	97.49	1.81
BLZ	N	-	-	-	-	-	-	62.55	62.55*	16.25
BEN	N	-	-	-	-	-	-	-	69.71*	1.26
BMU	Y	1.87	4	92.45	85.82	95.58	93.48	-	93.48	-3.48
BTN	N	-	-	-	-	-	-	-	87.94*	-9.94
BOL	Y	1.33	3	83.79	91.38	92.03	76.53	-	76.53	10.47
BIH	Y	1.52	2	90.92	88.76	93.08	90.73	86.35	88.54	-5.34
BWA	Y	0.76	1	76.06	76.06	76.06	76.06	62.83	69.45	7.45
BRA	EW	18.37	23	87.87	65.38	97.14	85.22	81.54	83.38	2.22
BRN	N	-	-	-	-	-	-	-	87.58*	1.42
BGR	Y	1.24	2	86.84	86.52	87.16	87.10	94.88	90.99	2.31
BFA	Y	0.60	1	73.80	73.80	73.80	73.80	-	73.80	-3.80
BDI	N	-	-	-	-	-	-	-	72.09*	-0.09
CPV	N	-	-	-	-	-	-	-	52.50*	24.46
KHM	Y	2.08	3	79.99	58.08	101.68	99.75	-	99.75	-7.75
CMR	N	-	-	-	-	-	-	-	67.76*	-3.80
CAN	EW	5.74	10	91.15	68.46	103.60	98.12	100.91	99.52	0.88
CYM	N	-	-	-	-	-	-	-	82.24*	
CAF	N	-	-	-	-	-	-	-	62.55*	1.45
TCD	N	-	-	-	-	-	-	-	78.87*	-12.87
CHL	Y	2.99	5	87.90	75.50	99.69	89.85	85.93	87.89	1.91
CHN	Y	4.67	6	104.35	92.39	118.59	104.97	103.24	104.10	1.70
COL	Y	1.10	3	79.37	67.72	87.69	85.95	80.32	83.13	-0.03
COM	N	-	-	-	-	-	-	-	77.07*	-0.07
COD	Y	4.14	8	63.15	56.26	68.16	64.92	-	64.92	3.08
COG	Y	0.84	1	62.97	62.97	62.97	62.97	-	62.97	10.03
COK	N	-	-	-	-	-	-	-	83.96*	5.04
CRI	Y	1.69	2	87.45	74.51	100.39	88.89	87.79	88.34	-2.34
CIV	N	-	-	-	-	-	-	-	58.16*	12.84
HRV	Y	1.71	3	92.88	90.21	95.92	93.92	97.58	95.75	2.05
CUB	Y	2.39	3	82.82	77.07	86.90	83.90	-	83.90	1.10
CYP	Y	1.62	2	95.51	95.23	95.80	95.75	91.03	93.39	-1.59
CZE	Y	0.51	1	90.62	90.62	90.62	90.62	99.21	94.92	3.98
DNK	Y	1.22	2	94.20	90.92	97.49	96.68	98.98	97.83	-0.63
DJI	N	-	-	-	-	-	-	-	68.41*	6.59
DMA	Y	1.50	2	66.04	65.79	66.29	66.03	-	66.03	0.97
DOM	Y	0.44	1	89.15	89.15	89.15	89.15	74.95	82.05	-0.05
ECU	Y	3.30	4	76.74	64.65	84.88	78.26	-	78.26	9.74
EGY	Y	7.42	9	80.72	64.00	97.89	86.46	66.19	76.32	6.38
SLV	N	-	-	-	-	-	-	69.63	69.63*	8.37
GNQ	N	-	-	-	-	-	-	-	-	
ERI	Y	3.01	4	71.85	66.17	87.95	68.77	-	68.77	6.73
EST	Y	2.47	3	99.15	96.56	103.05	98.58	102.86	100.72	-1.02
ETH	Y	4.97	6	68.83	59.61	83.39	68.42	-	68.42	0.08
FJI	N	-	-	-	-	-	-	-	83.96*	1.04
FIN	Y	2.08	3	96.13	88.32	100.50	99.31	103.09	101.20	-0.30
FRA	Y	3.29	5	98.51	86.32	107.83	97.02	96.35	96.69	1.41

ID	Method			NIQ						
ISO 3166-1 ALPHA-3	**Re-est. ?**	**Full rating (cml.)**	***N* (Spl.)**	**UW**	***Lowest***	***Highest***	**QNW**	**SAS**	**QNW+5 AS+GEO**	***Dif.* to L&V12**
GAB	N	-	-	-	-	-	-	-	62.97*	6.03
GMB	Y	3.87	6	55.44	45.96	65.25	52.68	-	52.68	12.22
PSE	Y	4.02	5	81.16	75.59	88.15	79.66	75.72	77.69	6.81
DEU	Y	8.07	12	100.70	87.62	107.09	102.33	99.16	100.74	-1.94
GEO	N	-	-	-	-	-	-	84.50	84.50*	2.20
GHA	Y	3.83	5	64.66	59.17	72.42	61.63	54.69	58.16	11.54
GRC	Y	1.50	3	86.46	82.53	89.62	86.45	95.09	90.77	2.43
GRL	N	-	-	-	-	-	-	-	98.89	-7.89
GRD	N	-	-	-	-	-	-	-	79.34*	-5.34
GTM	Y	5.13	7	50.71	33.29	69.25	47.72	-	47.72	31.28
GIN	N	-	-	-	-	-	-	-	53.48*	13.02
GNB	N	-	-	-	-	-	-	-	-	
GUY	N	-	-	-	-	-	-	-	83.23*	-2.23
HTI	Y	1.76	2	83.11	69.37	96.85	82.10	-	82.10	-15.10
HND	N	-	-	-	-	-	-	62.16	62.16*	18.84
HKG	Y	6.41	8	110.31	103.46	123.34	106.06	104.67	105.37	0.33
HUN	Y	1.34	2	95.04	90.72	99.37	99.21	99.28	99.24	-1.14
ISL	Y	1.64	2	99.99	99.42	100.56	100.50	96.02	98.26	0.34
IND	Y	14.64	20	74.56	60.19	88.70	78.92	73.57	76.24	5.96
IDN	Y	12.70	18	79.60	60.00	91.35	78.47	78.51	78.49	7.31
IRN	Y	2.63	3	79.40	77.77	81.86	78.88	81.14	80.01	5.59
IRQ	Y	2.61	3	87.84	84.43	92.67	89.28	-	89.28	-2.28
IRL	Y	1.81	3	89.59	88.56	90.79	89.94	100.31	95.13	-0.23
ISR	Y	4.97	6	92.18	84.98	98.74	90.57	94.30	92.43	2.17
ITA	Y	3.71	5	92.29	88.42	95.72	91.66	96.80	94.23	1.87
JAM	Y	10.60	16	73.69	54.99	83.04	75.08	-	75.08	-4.08
JPN	Y	3.26	5	107.95	105.30	111.18	107.41	105.55	106.48	-2.28
JOR	Y	3.40	4	77.85	67.96	83.11	77.97	83.42	80.70	6.90
KAZ	EW	2.60	3	89.49	76.31	105.11	84.27	93.51	88.89	-3.89
KEN	Y	6.72	8	73.81	65.62	79.62	75.20	-	75.20	-0.70
KIR	N	-	-	-	-	-	-	-	83.96*	1.04
PRK	N	-	-	-	-	-	-	-	98.82*	5.78
KOR	Y	2.36	4	101.51	95.74	107.61	97.37	107.33	102.35	2.25
KWT	Y	3.23	4	89.03	86.03	94.66	88.07	69.21	78.64	6.96
KGZ	Y	0.76	1	86.94	86.94	86.94	86.94	71.25	79.09	-4.29
LAO	Y	1.68	4	85.44	76.00	104.36	80.99	-	80.99	8.01
LVA	Y	0.54	1	91.14	91.14	91.14	91.14	98.43	94.79	1.11
LBN	Y	0.84	2	83.10	80.60	85.60	83.30	80.11	81.70	2.90
LSO	N	-	-	-	-	-	-	-	68.87*	-2.37
LBR	N	-	-	-	-	-	-	-	45.07*	22.93
LBY	Y	7.54	9	78.47	66.24	89.08	80.92	-	80.92	4.08
LIE	N	-	-	-	-	-	-	101.07	101.07*	-0.77
LTU	Y	2.38	3	93.46	88.74	96.03	94.53	97.24	95.89	-1.59
LUX	N	-	-	-	-	-	-	99.87	99.87*	-4.87
MAC	N	-	-	-	-	-	-	99.82	99.82*	0.08
MKD	N	-	-	-	-	-	-	81.91	81.91*	8.59
MDG	N	-	-	-	-	-	-	-	76.79*	5.21
MWI	Y	0.68	1	69.70	69.70	69.70	69.70	-	69.70	-9.60
MYS	Y	0.68	1	86.05	86.05	86.05	86.05	89.12	87.58	4.12
MDV	N	-	-	-	-	-	-	-	80.54*	0.46
MLI	Y	0.57	1	59.76	59.76	59.76	59.76	-	59.76	9.74
MLT	Y	2.26	3	91.93	90.72	94.36	93.67	88.87	91.27	4.03
MNP	N	-	-	-	-	-	-	-	81.36*	-0.36
MHL	Y	0.67	1	83.96	83.96	83.96	83.96	-	83.96	0.04
MRT	N	-	-	-	-	-	-	-	59.76*	14.24
MUS	Y	0.42	1	86.82	86.82	86.82	86.82	86.30	86.56	1.44
MEX	EW	3.13	4	90.34	81.38	96.40	90.44	85.02	87.73	0.07
FSM	N	-	-	-	-	-	-	-	83.96*	0.04
MDA	N	-	-	-	-	-	-	89.98	89.98*	2.02
MNG	Y	0.97	1	99.36	99.36	99.36	99.36	82.69	91.03	8.97
MNE	N	-	-	-	-	-	-	85.78	85.78*	0.12

ID	Method			NIQ						
ISO 3166-1 ALPHA -3	Re-est. ?	Full rating (cml.)	*N* (Spl.)	UW	*Lowest*	*Highest*	QNW	SAS	QNW+ 5 AS+GEO	*Dif.* to L&V12
MAR	Y	5.36	7	73.50	65.32	82.83	68.73	65.32	67.03	15.37
MOZ	N	-	-	-	-	-	-	-	72.50*	-3.00
MMR	N	-	-	-	-	-	-	-	91.18*	-6.18
NAM	Y	0.90	1	66.19	66.19	66.19	66.19	-	66.19	4.21
NPL	Y	6.22	9	42.79	38.90	51.20	42.99	-	42.99	35.01
NLD	Y	6.76	11	100.89	93.73	111.63	100.19	101.30	100.74	-0.34
ANT	Y	0.72	1	80.01	80.01	80.01	80.01	-	80.01	6.99
NCL	N	-	-	-	-	-	-	-	93.92*	-8.92
NZL	Y	2.82	5	96.32	92.66	100.74	99.01	98.13	98.57	0.33
NIC	Y	2.08	3	56.03	49.75	63.48	52.69	-	52.69	31.31
NER	N	-	-	-	-	-	-	-	70.82*	-0.85
NGA	Y	7.96	10	71.91	66.66	85.40	67.76	-	67.76	3.40
NOR	Y	1.62	3	97.93	92.02	106.20	99.51	94.76	97.13	0.07
OMN	Y	5.36	6	85.16	77.00	87.84	83.30	74.10	78.70	5.80
PAK	Y	6.01	8	81.86	66.56	109.87	80.00	-	80.00	4.00
PAN	N	-	-	-	-	-	-	79.00	79.00*	1.00
PNG	N	-	-	-	-	-	-	-	78.49*	4.91
PRY	N	-	-	-	-	-	-	-	84.04*	-0.04
PER	Y	7.40	9	81.59	72.36	93.44	85.39	77.49	81.44	2.76
PHL	Y	2.02	3	90.11	84.32	93.35	92.47	70.81	81.64	4.46
POL	Y	6.90	9	97.25	82.43	114.41	94.62	98.09	96.35	-0.25
PRT	Y	2.16	3	89.02	84.92	91.92	89.50	96.04	92.77	1.53
PRI	Y	11.09	22	87.97	74.42	105.85	81.99	-	81.99	1.51
QAT	Y	0.76	1	85.58	85.58	85.58	85.58	75.98	80.78	-0.68
ROU	Y	2.48	3	88.43	77.42	99.09	83.11	90.65	86.88	4.12
RUS	Y	1.81	3	92.23	90.26	95.20	92.95	99.63	96.29	0.31
RWA	N	-	-	-	-	-	-	-	69.95*	6.05
SHN	N	-	-	-	-	-	-	-	68.74	17.26
KNA.	N	-	-	-	-	-	-	-	70.48*	3.52
LCA	N	-	-	-	-	-	-	-	73.68*	-11.68
VCT	Y	0.87	1	63.42	63.42	63.42	63.42	-	63.42	7.58
WSM	N	-	-	-	-	-	-	-	83.96*	4.04
STP	N	-	-	-	-	-	-	-	65.22*	1.77
SAU	Y	6.40	8	78.57	72.50	93.47	78.48	74.24	76.36	3.24
SEN	N	-	-	-	-	-	-	-	77.37*	-6.87
SRB	EW	8.64	12	87.28	61.26	107.23	87.82	91.38	89.60	0.70
SYC	Y	0.47	1	78.76	78.76	78.76	78.76	-	78.76	5.64
SLE	Y	1.29	2	45.51	44.64	46.38	45.07	-	45.07	18.93
SGP	Y	4.24	5	101.99	88.99	122.59	104.58	107.20	105.89	1.21
SVK	Y	0.82	1	95.32	95.32	95.32	95.32	97.32	96.32	1.68
SVN	Y	5.79	7	97.56	93.92	103.37	98.60	98.59	98.60	-1.00
SLB	N	-	-	-	-	-	-	-	83.96*	-0.96
SOM	Y	0.77	1	67.67	67.67	67.67	67.67	-	67.67	4.33
ZAF	EW	10.82	15	75.04	58.13	94.91	79.20	58.54	68.87	2.73
SSD	Y	3.28	5	59.62	50.16	75.31	58.61	-	58.61	
ESP	Y	4.46	7	92.29	89.50	96.61	92.32	95.47	93.90	2.70
LKA	Y	2.71	3	91.31	86.04	95.27	86.62	-	86.62	-7.62
SDN	Y	15.49	19	77.30	65.90	89.33	78.87	-	78.87	-1.37
SUR	N	-	-	-	-	-	-	-	90.29*	-1.29
SWZ	N	-	-	-	-	-	-	-	68.87*	6.53
SWE	Y	0.99	2	95.38	94.74	96.02	94.96	99.03	97.00	1.60
CHE	Y	3.50	5	98.37	93.02	101.26	97.26	101.22	99.24	0.96
SYR	Y	4.61	6	72.85	71.93	73.46	72.99	75.83	74.41	7.59
TWN	Y	5.90	7	106.94	94.74	115.70	108.69	104.26	106.47	-1.87
TJK	Y	0.97	1	87.71	87.71	87.71	87.71	-	87.71	-7.71
TZA	Y	3.52	5	71.33	62.56	85.98	74.95	-	74.95	-1.95
THA	Y	11.84	17	86.93	52.84	109.74	89.78	87.97	88.87	1.03
TLS	N	-	-	-	-	-	-	-	78.49*	6.51
TGO	N	-	-	-	-	-	-	-	59.83*	10.17
TON	N	-	-	-	-	-	-	-	83.96*	2.04
TTO	N	-	-	-	-	-	-	85.63	85.63*	0.77

ID	Method			NIQ						
ISO 3166-1 ALPHA -3	**Re-est. ?**	**Full rating (cml.)**	***N* (Spl.)**	**UW**	***Lowest***	***Highest***	**QNW**	**SAS**	**QNW+ 5 AS+GEO**	***Dif.* to L&V12**
TUN	N	-	-	-	-	-	-	79.22	79.22*	6.18
TUR	Y	0.84	1	86.66	86.66	86.66	86.66	86.94	86.80	2.60
TKM	N	-	-	-	-	-	-	-	85.86*	-5.49
TCA	N	-	-	-	-	-	-	-	84.29*	
UGA	Y	2.36	3	67.73	60.14	81.06	76.42	-	76.42	-4.72
UKR	Y	0.79	1	88.61	88.61	88.61	88.61	91.54	90.07	4.23
ARE	Y	0.88	1	79.48	79.48	79.48	79.48	84.63	82.05	5.05
GBR	Y	4.33	6	96.95	92.22	101.72	98.23	100.00	99.12	-0.02
USA	EW	27.66	58	92.74	70.50	109.94	95.86	99.00	97.43	0.07
URY	N	-	-	-	-	-	-	87.59	87.59*	3.01
UZB	Y	0.89	1	89.01	89.01	89.01	89.01	-	89.01	-9.01
VUT	N	-	-	-	-	-	-	-	93.92*	-9.92
VEN	Y	1.22	3	81.05	71.75	92.08	82.23	83.74	82.99	0.51
VNM	Y	2.47	3	77.39	75.00	79.15	77.85	101.21	89.53	4.47
VGB	N	-	-	-	-	-	-	-	76.69*	
YEM	Y	1.90	2	73.17	70.08	76.26	72.23	53.50	62.86	17.64
ZMB	N	-	-	-	-	-	-	-	68.43*	5.57
ZWE	Y	0.78	1	74.01	74.01	74.01	74.01	-	74.01	-1.91
M	**-**	**3.62**	**5.21**	**84.21**	**77.89**	**90.86**	**84.46**	**87.91**	**81.94**	**2.44**
Lowest	**-**	**0.42**	**1**	**42.79**	**33.29**	**46.38**	**42.99**	**53.50**	**42.99**	**-15.10**
Highest	**-**	**27.66**	**58**	**110.31**	**105.30**	**123.34**	**108.69**	**107.33**	**106.48**	**35.01**
SD	**-**	**3.92**	**6.50**	**12.88**	**14.20**	**14.33**	**13.24**	**12.58**	**13.32**	**7.14**
N	**-**	**128**	**128**	**128**	**128**	**128**	**128**	**100**	**201**	**197**
Σ	**-**	**462.94**	**667**	**10778.37**	**9970.39**	**11629.51**	**10810.69**	**8790.81**	**16469.03**	**480.90**
***N* (tot. pop.) wghtd. mean**	**-**	**7.54**	**11.13**	**80.88**	**70.30**	**91.63**	**81.85**	**68.31**	**86.02**	**2.96**

Notes: Table header: [Re-est.?] = re-estimated by using psychometric data (‘Y’), by school assessment results and/or geographic means only (‘N’), with re-estimation according to ethnical composition (‘EW’); [Full rating (cml.)] = cumulated full ratings of all samples for a nation; [*N* (spl.)] = number of samples with psychometric measurements for a nation; [NIQ (UW)] = unweighted national IQ (simply mean across all samples of a nation); [NIQ (Lowest/Highest)] = lowest or highest psychometric IQ estimate across all samples for a nation; [NIQ (QNW)] = national IQ of a nation weighted by [QN-Factor]; [SAS-IQ] = mean national IQ estimated by results from international school assessment studies standardized to GBR. [NIQ (QNW+SAS+GEO)] = national IQ of a nation weighted by [QN-Factor], averaged with [SAS-IQ] and completed by geographic means ([GEO)] (*); [*Dif.* to L&V12] = Difference between national IQs estimated by Lynn and Vanhanen (2012) and the current study (negative differences represent lower scores from L&V12). Bottom lines: *M* = means score of a column across all nations; *Lowest/Highest* = lowest/highest value of a column; *SD* = standard deviation within a column, *Σ* = cumulated values within a column; *N* (tot. pop.) wghtd. mean = means score of a column across all nations weighted by the total current population of each nation given by CIA (2017, Index: “Population”).

Fig. 1. *Map of national IQs estimated by psychometric data only and without weightings [NIQ (UW)].*
(M=84.21; Range=42.79↔110.31; SD=12.88; N=128)

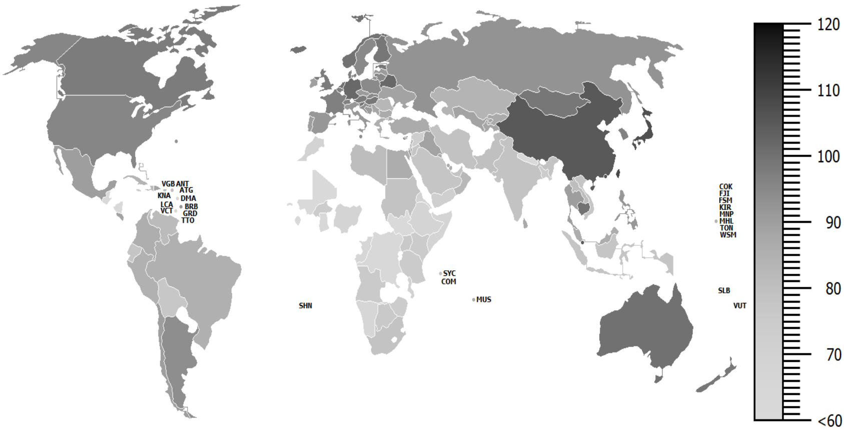


Fig. 2. *Map of national IQs calculated from results of international school assessment studies [(SAS-IQ)].*
(M=87.91; Range=53.49↔107.32; SD=12.58; N=100)

Fig. 3. *Map of national IQs estimated by psychometric data, weighted by data quality and sample size, averaged with results of international school assessment studies and completed by geographical means [NIQ (QNW+SAS+GEO)].*
(M=81.94; Range=42.99↔106.48; SD=13.32; N=201)

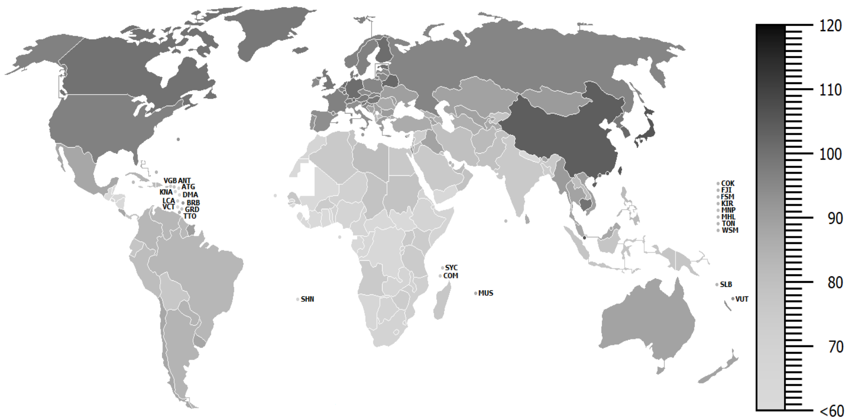


Fig. 4. *Map of absolute differences in national IQ estimates from Lynn and Vanhanen (2012) and the NIQ-Dataset ([QNW+SAS+GEO]).*
(M=4.98; Range= 0.02↔35.01; SD=5.67; N=197)

Fig. 5. *Map of cumulated [Full Ratings] of all samples for each country (M=3.62; Range=0.42↔27.66; SD=3.92; N=128)*

Lynn (2006) studied the IQs of human races. Since the data and methods presented here focus on the cross-national level, therefore samples used are mostly representative for total populations and only partially for single ethnicities, an adequate comparison between the new and the 2006th data would not be possible. However, grouping countries according to specific criteria related to races can give approximate values. Lynn (2006) reported the following IQs for races: Arctic People=91; East Asians=105; Europeans=99; Native Americans=86; S. Asian & N. Africans=84; Bushmen=54; Africans=67; (Native) Australians=62; Southeast Asians=87; Pacific Islanders=85. Not all of them can be checked against NIQ-dataset. Those where it is possible are mentioned hereinafter and based on the variable [QNW+SAS+GEO]. National IQs from China (including Hong Kong and Macao), Japan, the Koreas, Mongolia, Singapore and Taiwan were averaged to a mean East Asian IQ of 104.29 (*SD*=4.69; *N*=9). The mean European IQ, calculated from all countries from Portugal to Russia and from Island to Greece, is 96.13 (*SD*=3.77; *N*=29), but variations occur between countries in Western or Central Europe (*M*=98.94; *SD*=2.05; *N*=11), Northern Europe (Scandinavia and Estonia) (*M*=98.20; *SD*=1.66; *N*=6); Eastern Europe (*M*=94.73; *SD*=4.03; *N*=13) and Southern Europe (*M*=93.71; *SD*=1.38; *N*=5). If the

Arabian-Muslim world was defined by all countries with a share of >50% of Muslims on their total populations, a mean Muslim IQ of 76.89 (*SD*=10.16; *N*=47). The mean IQ of Blacks can be calculated in two ways. At first by averaging all countries south of or at the Sahel (also include Mauretania, Mali, Niger, Chad, Sudan, Eritrea and small island states around) to a mean sub-Sahara African IQ of 68.92 (*SD*=8.93; *N*=46). Additionally, all countries with an index for skin color (see chapter 3 "Morphology and Physiology" for details) of at least VI on a scale from I (brightest) to VIII (darkest) can be averaged. This would result in a mean Black IQ of 69.62 (*SD*=10.27; *N*=61). Latin America can be defined as all American countries south of the USA (except The Bahamas). If these were averaged, it results in a mean Latin American IQ of 82.60 (*SD*=10.51; *N*=34). We abstain from calculating a mean IQ for Oceanic people due to small amount of available data.

2.6. Statistics – Sample Level

Table 17 provides the descriptive statistics at the sample level, including 20 metric variables from psychometric data shown in part 2.2. The 665 samples that were used had overall a mean age of 14.57y and ranged mostly between 10.44y and 18.88y, therefore mostly represent older children and young adolescents. On average they had a size of 926 individuals but these number varied strongly, from 11 up to 37,238 (*SD*=2058). The tests were administered on average in the year 1996 with a standard deviation of 14.00y, so 67.17% of all included samples were tested between 1982 and 2010. The mean year of test standardizations is 1987, so norms used for IQ-calculation were on average around 10.00y old. The mean uncor. IQ is 87.82 (*SD*=15.71) and had to be corrected by on average -2.39 for FE and -0.78 for country, which resulted in a mean corrected IQ of 84.64 (*SD*=14.98). This is very close to the mean IQ of 84.50, estimated within the working material of Lynn. The mean differences between Lynn's estimates and those from the NIQ-dataset are 2.05 (*SD*=7.23) if positive and negative operators are used or 5.57 (*SD*=5.04) if absolute differences are used. The difference between the mean ages of the used samples and the median ages of their countries' total population is 19.53y with a big range from 0.20y to 52.00y and a standard deviation of 19.41y. 22.33% of all samples were less than 10.00y older or younger than their countries' populations and 79.95% less than 20.00y. All ratings, for sample, testing and method, show means above .50. The mean full rating is .69 and 50% of the samples scored .73 or above.

Table 17. *Descriptive statistics for 20 variables the sample level.*

Variables	*M*	Lowest	Highest	*SD*	*N*
Lowest age (y)	10.44	1.00	51.00	6.26	632
Highest age (y)	18.88	1.00	94.00	15.80	632
Mean age (y)	14.57	3.00	71.00	9.95	665
N (ind.)	926	11	37,238	2058	667
Year (meas.)	1996	1945	2017	14	667
Year (std.)	1987	1937	2012	16	667
IQ (uncor.)	87.82	32.66	125.86	15.71	667
Test time adjust.	-2.39	-16.32	10.50	3.81	667
Country cor.	-0.78	-22.80	5.80	1.87	667
IQ (cor.)	84.64	33.29	123.34	14.98	667
IQ (L&V)	84.50	57.00	122.00	12.43	459
IQ(cor.)-IQ(L&V)	2.05	-21.36	29.74	7.23	459
|IQ(cor.)-IQ(L&V)|	5.57	0.00	29.74	5.04	459
Age dev.	19.53	0.20	52.00	10.41	667
Sample rating	.62	.00	1.00	.19	667
Time dev.	13.92	0.00	51.00	9.94	667
Testing rating	.74	.00	1.00	.23	667
Method rating	.72	.00	1.00	.30	667
Full rating	.69	.24	1.00	.18	667
QN-factor	691.31	4.04	22342.80	1459.02	667

Table 18. *Correlation matrix for 20x20 variables at the sample level.*

Variables	1	2	3	4	5	6	7	8	9	10
1. Low. age (y)		.67	.77	-.07	.04	-.04	-.18	-.05	.00	-.21
2. High. age (y)	.000		.88	-.04	-.01	-.02	-.05	-.01	-.12	-.07
3. Mean age (y)	.000	.000		-.06	.04	.00	-.16	-.01	-.03	-.17
4. N (ind.)	.099	.287	.097		-.01	.02	.07	.06	.14	.11
5. Year (meas.)	.375	.812	.295	.728		.56	-.13	-.11	.28	-.13

Variables	1	2	3	4	5	6	7	8	9	10
6. Year (std.)	.304	.682	.984	.606	.000		-.26	.70	.36	-.05
7. IQ (uncor.)	.000	.183	.000	.063	.001	.000		-.24	-.26	.95
8. Test time adjust.	.191	.881	.837	.099	.005	.000	.000		.23	.03
9. Country. cor.	.940	.003	.446	.000	.000	.000	.000	.000		-.08
10. IQ (cor.)	.000	.061	.000	.004	.001	.157	.000	.400	.031	
11. IQ (L&V)	.119	.038	.385	.021	.000	.003	.000	.686	.001	.000
12. IQ(cor.)-IQ(L&V)	.000	.000	.000	.052	.007	.001	.000	.057	.366	.000
13.| IQ(cor.)-IQ(L&V)|	.000	.000	.000	.000	.819	.985	.000	.665	.259	.000
14. Age dev.	.000	.000	.000	.493	.000	.012	.000	.756	.003	.000
15. Samp. rating	.000	.000	.000	.000	.033	.000	.887	.000	.000	.177
16. Time dev.	.597	.176	.447	.194	.396	.000	.563	.000	.984	.000
17. Testing rating	.519	.446	.811	.153	.000	.000	.000	.000	.000	.612
18. Method rating	.001	.000	.000	.427	.000	.000	.000	.000	.000	.217
19. Full rating	.731	.264	.288	.001	.000	.000	.000	.000	.000	.670
20. QN-factor	.100	.308	.112	.000	.713	.105	.165	.008	.000	.006

Notes: Pearson's *r* above the diagonal, *p*-values below the diagonal (.000 is <.001); *N* varies (433 – 667).

Table 18 (continued)

Variables	11	12	13	14	15	16	17	18	19	20
1. Low. age (y)	-.07	.32	.27	-.41	.14	.02	.03	-.14	-.01	-.07
2. High. age (y)	.10	.25	.18	-.41	.22	-.05	-.03	-.19	-.04	-.04
3. Mean age (y)	-.04	.28	.23	-.40	.14	-.03	.01	-.17	-.04	-.06
4. N (ind.)	.11	-.09	-.18	.03	.26	-.05	.06	.03	.13	.97
5. Year (meas.)	-.26	-.13	-.01	-.23	.08	.03	.21	.29	.27	.01
6. Year (std.)	-.14	-.15	.00	-.10	.14	-.46	.58	.42	.52	.06
7. IQ (uncor.)	.85	-.50	-.37	.53	-.01	-.02	-.23	-.20	-.21	.05
8. Test time adjust.	.02	-.09	-.02	.01	.14	-.51	.65	.36	.52	.10
9. Country. cor.	-.15	-.04	.05	-.12	.16	.00	.47	.53	.54	.17
10. IQ (cor.)	.87	-.55	-.39	.54	.05	-.15	-.02	-.05	-.02	.11
11. IQ (L&V)		-.07	-.18	.59	.07	-.10	-.08	-.11	-.07	.10
12. IQ(cor.)-IQ(L&V)	.117		.49	-.17	-.07	.15	-.13	-.22	-.21	-.10
13. |IQ(cor.)-IQ(L&V)|	.000	.000		-.19	-.10	.08	-.02	-.09	-.10	-.19
14. Age dev.	.000	.000	.000		-.27	-.06	-.12	-.13	-.21	-.01
15. Samp. rating	.129	.120	.028	.000		-.08	.20	.21	.54	.32
16. Time dev.	.028	.001	.095	.132	.052		-.52	.01	-.24	-.06
17. Testing rating	.079	.007	.722	.001	.000	.000		.58	.81	.12
18. Method rating	.023	.000	.051	.001	.000	.816	.000		.86	.13
19. Full rating	.124	.000	.039	.000	.000	.000	.000	.000		.23
20. QN-factor	.038	.032	.000	.831	.000	.098	.001	.001	.000	

The correlation matrix in Table 18 should be used to find statistically significant correlations which could be indications of distorting effects of some non-IQ variables on the uncor. or cor.

sample IQs. Variables which show significant correlations to the uncor. IQs are the lower age ($r=-.18$; $N=632$; $p<.001$) and mean ages ($r=-.16$; $N=665$; $p<.001$) of the samples, the years a test was administered ($r=-.13$; $N=667$; $p=.001$) and the year the norms were standardized ($r=-.26$; $N=667$; $p<.001$). This means that samples had on average lower IQs if they had younger ages, were tested earlier in time and older test norms were used. Similar values can be found if, instead of the uncor., the cor. IQ was correlated with the lower age ($r=-.21$; $N=632$; $p<.001$) and mean ages ($r=-.17$; $N=665$; $p<.001$) of the samples, the years a test was administered ($r=-.13$; $N=667$; $p=.001$), but not for the year the norms were standardized ($r=-.05$; $N=667$; $p<.157$).

Further significant correlations were found between uncor. IQs and the amount of necessary test time adjustment ($r=-.24$; $N=667$; $p<.001$) and of necessary correction for country ($r=-.26$; $N=667$; $p<.001$), but both lost most of their significance if correlated to the cor. IQs, with $r=.03$ ($N=667$; $p=.400$) for test time adjustment and $r=-.08$ ($N=667$; $p=.031$) for country-correction.

Between uncor. and cor. IQs a very strong correlation of $r=.95$ ($N=667$; $p<.001$; Fig. 6) was found and the correlation to the IQs estimated by Lynn and Vanhanen increased from $r=.85$ ($N=459$; $p<.001$) to .87 ($N=459$; $p<.001$; Fig. 7) after corrections. It is noticeable that lower cor. IQs of samples deviated more strongly than those from Lynn and Vanhanen, regardless of whether real differences ($r=-.55$; $N=459$; $p<.001$) or absolute differences ($r=-.39$; $N=459$; $p<.001$; Fig. 8) were calculated.

A look at the three individual quality indices and the full rating disclosed no signs of possible effects, however a strong positive correlation between cor. IQs and age deviation ($r=.54$; $N=667$; $p<.001$; Fig. 9) and a moderate negative correlation between cor. IQs and time deviation ($r=-.15$; $N=667$; $p<.001$) has been found. This means that samples which obtained higher IQs have, on average, mean ages more distant to the median age of their countries' populations, and test administrations on samples with lower IQs used, on average, test norms more up to date regarding the time the test was administered. Overall, the QN-Factor shows a significant but only weak correlation of *r*=.11 (*N*=667; *p*=.006) to the cor. IQ, which implies that data quality and sample sizes are not related to the sample IQs used to calculate national IQs.

Fig. 6. *Scatterplot between the variables [IQ (uncor.)] and [IQ (cor.)] at the sample level (r=.95; N=667; p<.001).*

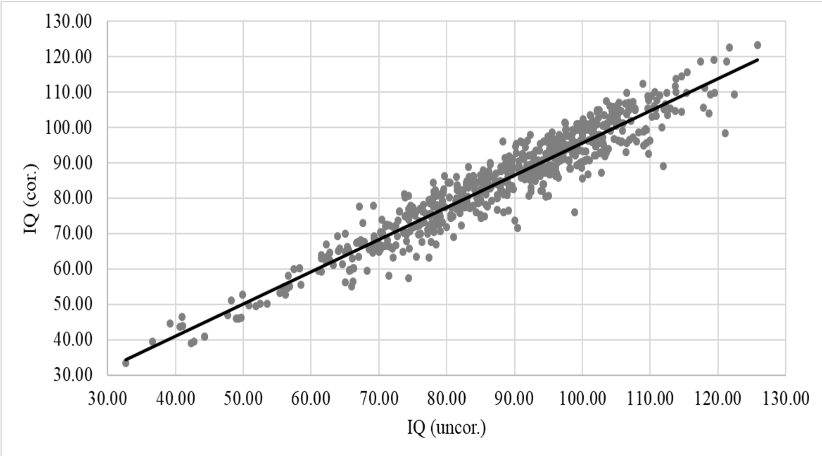


Fig. 7. *Scatterplot between the variables [IQ (L&V)] and [IQ (cor.)] at the sample level (r=.87; N=459; p<.001).*

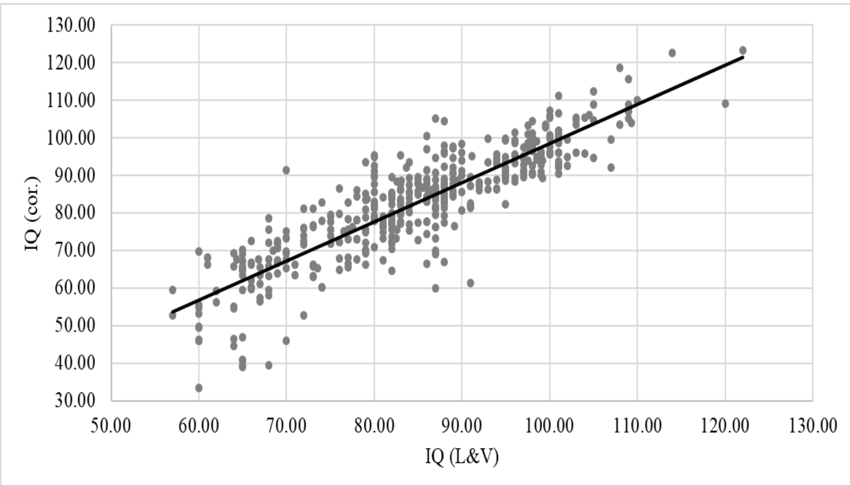


Fig. 8. *Scatterplot between the variables [|IQ (cor.)-IQ (L&V)|] and [IQ (cor.)] at the sample level (r=-.39; N=459; p<.001).*

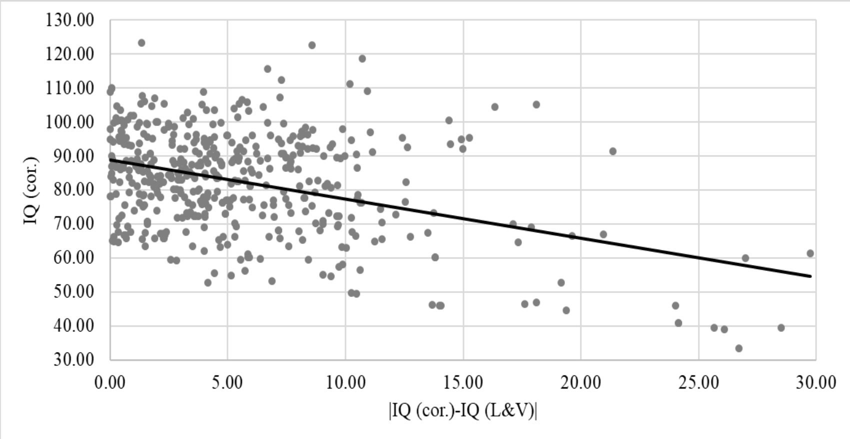
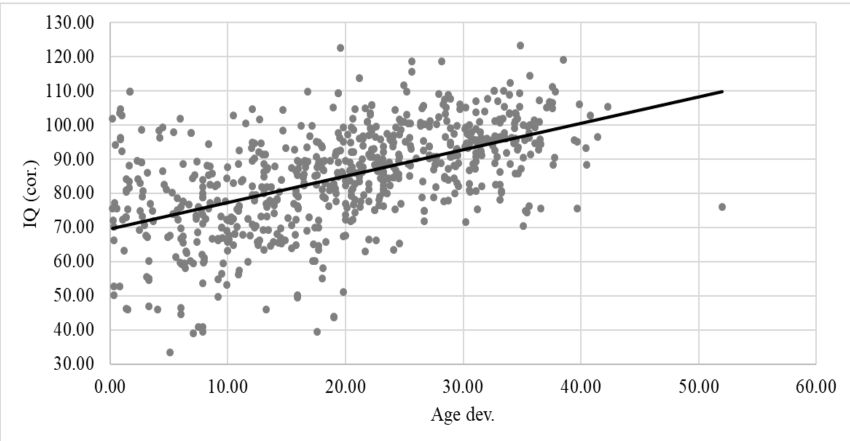


Fig. 9. *Scatterplot between the variables [Age dev.] and [IQ (cor.)] at the sample level (r=.54; N=667; p<.001).*



A regression analysis based on the correlations in Table 18, with cor. IQ at the dependent variable and with the exclusions of variables 10 (since only intermediate result of the dependent variable), 11, 12, 13 (since not used for the IQ calculations), and 19 (since only the mean of variables 15, 17 and 18) showed standardized regression coefficients (β) in Table 19. This analysis remained 59.00% of the variance in cor. IQ unexplained. The removal of the quality indices and the QN-Factor from the analysis increased this percentage to 61.90%, whereas 99.40% remained unexplained if the three individual indices of data quality were used only.

Table 19. *Regression analysis including 14 independent variables and [IQ (cor.)] as the dependent variable.*

Variables	β	***S.E.***	***p***
1. Low. age (y)	-.03	0.06	.599
2. High. age (y)	.42	0.08	>.001
3. Mean age (y)	-.27	0.09	.003
4. N (ind.)	-.06	0.17	.709
5. Year (meas.)	.29	0.10	.006
6. Year (std.)	-.43	0.14	.002
8. Test time adjust.	.26	0.13	.040
9. Country. cor.	.03	0.05	.616
14. Age dev.	.64	0.04	>.001
15. Samp. rating	.14	0.04	.001
16. Time dev.	-.22	0.06	>.001
17. Testing rating	-.12	0.08	.129
18. Method rating	.09	0.06	.141
20. QN-factor	.11	0.18	.537
Residual variances of 10.IQ (cor.)	.59	0.04	>.001

Notes: β = standardized regression coefficients; *N* varies (433 – 667).

Descriptive and t-statistics in Table 20 were used to analyse if different characteristics of samples, testing or methods act differently on samples with IQs below or above the average. The group of samples from a national origin scored on average 3.83 IQ-points higher than the total of samples with insignificant *d* but highly significant *t* (d=-0.26; t=-3.282; p<.001). Rural samples are far above the total of samples with a difference of 17.89, moderate effect size (d=1.19) and also highly significant *t* (t=9.401; p<.001). All other groupings by type of origin are not significantly different to the total of samples. A gradual increase of IQs if samples were grouped according to their SES has been found. Samples with low SES scored significant 8.92 IQ-scores lower than the total of samples (*d*=0.60; *t*=3.706; *p*<.001), samples with normal SES scored insignificant 0.36 above the total of samples (*d*=-0.02; *t*=0.212; *p*=.667) and samples with high SES scored significant 16.78 IQ-scores above the total of samples (*d*=-1.12; *t*=3.157; *p*<.001). Samples with different compositions scored significantly different from the total of all samples, with a plus of 2.51 (*d*=-0.18; *t*=-2.708; *p*<.001) for samples of normal character and a minus of 3.12 (*d*=0.20; *t*=2.889; *p*<.001) for samples of abnormal character. The character of samples also changed the mean IQ significantly. Here, the biggest difference to the total of samples was shown by normative samples with a plus of 8.17 IQ-scores (*d*=-0.55; *t*=3.227; *p*<.001), followed by selective samples with a minus of 4.98 IQ-scores (*d*=-0.55; *t*=3.227; *p*<.001). At rank three there are samples with representative character with a plus of 4.53 (*d*=-0.31; *t*=-4.172; *p*<.001) and at last samples with a random character with a minus of 3.20 (*d*=0.21; *t*=2.979; *p*<.001).

Grouping the samples according to the tests used in calculation shows significant differences in 3 to 6 cases. High significant differences with a minus of 7.31 were shown by APM-samples (*d*=0.46; *t*=4.686; *p*<.001), with a plus of 3.93 by samples tested with a Wechsler-Scale (*d*=-0.27; *t*=-2.875; *p*<.001) and with a plus of 12.79 by WAIS-samples (*d*=-0.85; *t*=-2.680; *p*<.001). Additionally, samples tested with the WAIS-III scored 11.97 higher than the total of samples (*d*=-0.80; *t*=-2.107; *p*=.035), samples tested with the WASI scored 14.08 higher (*d*=-1.00; *t*=-1.997; *p*=.046) and samples tested with the SBIS 6.37 higher (*d*=-0.43; *t*=-1.975; *p*<.049). Consequently, an IQ-score 4.33 above the total of samples was also obtained by samples on which FS-IQ was measured (*d*=-0.30; *t*=-3.436; *p*<.001), since FS-IQ was the intelligence domain measured with Wechsler Scales. No significant differences occurred if samples were grouped if tested with full tests or not, and tested individually or in groups.

It makes no significant difference if norms used were standardized in GBR or DEU but if samples on which norms were used which had been standardized in the USA were grouped separately, they scored 3.50 higher ($d=-0.24$; $t=-2.853$; $p<.001$). Samples on which no score recalculations were done scored on average 4.18 higher ($d=-0.29$; $t=-3.647$; $p<.001$) than the total of samples and also samples on which the same tests were used for measurement and calculations scored higher with a difference of 2.38 ($d=-0.17$; $t=-2.932$; $p<.001$) whereas samples on which different tests were used for measurement and calculations scored lower with a difference of 10.86 ($d=0.69$; $t=6.999$; $p<.001$).

These differences are mostly explicable. In many poorer countries, rural areas are less developed than urban areas or the country on average, which also explained the parallel increase of mean IQ-scores and SES. Samples which are declared as abnormal derived partly from minorities and/or were affected by factors with negative impact on intelligence and cognitive development. This also applies to samples which were selectively collected. The much higher scores of normative and representative compared to random samples lets us assume that they did not represent individuals with delayed cognitive development to an adequate amount. However, it cannot be ruled out that these differences appear only because different tests, which were made for different purposes, were administered primarily in countries with higher or lower IQs. That would also explain why Wechsler Scales were associated with IQ-scores above average. Norms and Manuals for these tests were mostly available in European languages and therefore had little suitability for developing countries, whereas the Raven's Matrices are viewed as culturally fair and therefore suitable for administration on less developed populations. This in turn explains the negative effects of recalculations and test conversions, which were often done for Raven's tests but less for Wechsler Scales, similar to the positive effects of the FS-IQ domain, which is measured with Wechsler Scales but not Raven's Matrices.

Table 20. *Descriptive and t-statistics for 667 samples grouped by 51 characteristics.*

Groups		*N* (Spl.)	*M* (IQ (cor.))	*SD* (IQ (cor.))	*Dif.*	*d*	*S.E.*	*t*
Total	-	667	84.64	14.99	0.00	0.00	0.58	0.000
Origin (type)	nat.	217	88.47	14.72	-3.83	-0.26	1.00	-3.284***
	urb.	195	85.69	11.62	-1.05	-0.07	0.83	-0.902
	rur.	69	66.75	15.60	17.89	1.19	1.88	9.401***
	reg.	114	84.96	14.56	-0.33	-0.02	1.36	-0.212
	for.	9	80.33	11.96	4.31	0.29	3.99	0.859
SES	low	40	75.72	10.74	8.92	0.60	1.70	3.706***
	normal	619	85.00	14.99	-0.36	-0.02	0.60	-0.430
	high	8	101.42	9.58	-16.78	-1.12	3.39	-3.157***
Samp. comp	normal	370	87.15	12.96	-2.51	-0.18	0.67	-2.708***
	not normal	297	81.51	16.69	3.12	0.20	0.97	2.889***
Samp. char.	ran.	285	81.44	15.62	3.20	0.21	0.93	2.979***
	rep.	243	89.17	13.02	-4.53	-0.31	0.84	-4.172***
	normat.	36	92.81	10.40	-8.17	-0.55	1.73	-3.227***
	sel.	94	79.66	15.12	4.98	0.33	1.56	3.012***
Test (cal)	RPM	463	82.89	15.76	1.75	0.11	0.73	1.890
	SPM	174	84.48	13.42	0.16	0.01	1.02	0.128
	SPM+	20	86.23	15.70	-1.59	-0.11	3.51	-0.467
	CPM	144	85.33	12.52	-0.69	-0.05	1.04	-0.515
	APM	124	77.33	20.39	7.31	0.46	1.83	4.686***
	WIS	136	88.57	11.99	-3.93	-0.27	1.03	-2.875***
	WPPSI	3	96.76	8.37	-12.12	-0.81	4.84	-1.399
	WPPSI-R	5	86.90	9.26	-2.26	-0.15	4.14	-0.336
	WPPSI-III	5	83.95	13.50	0.69	0.05	6.04	0.103
	WISC	26	84.50	12.91	0.14	0.01	2.53	0.047
	WISC-R	34	87.09	13.07	-2.45	-0.16	2.24	-0.935
	WISC-III	21	85.97	7.89	-1.33	-0.09	1.72	-0.405
	WISC-IV	10	88.17	11.18	-3.53	-0.24	3.54	-0.741
	WAIS	10	97.42	13.35	-12.79	-0.85	4.22	-2.680***
	WAIS-R	6	86.79	8.37	-2.15	-0.14	3.42	-0.351
	WAIS-III	7	96.61	10.07	-11.97	-0.80	3.81	-2.107*
	WAIS-IV	5	97.24	8.58	-12.60	-0.84	3.84	-1.876
	WASI	4	99.62	4.85	-14.98	-1.00	2.42	-1.997*
	CFT	26	90.28	8.99	-5.64	-0.38	1.76	-1.904
	KABC	13	79.51	18.60	5.13	0.34	5.16	1.216
	SBIS	22	91.01	11.10	-6.37	-0.43	2.37	-1.975*
Part	full	638	84.80	14.94	-0.16	-0.01	0.59	-0.193
	not full	29	81.13	15.95	3.51	0.23	2.96	1.231
Dom.	FL	504	83.24	15.64	1.40	0.09	0.70	1.553
	FS	163	88.97	11.81	-4.33	-0.30	0.92	-3.436***
Proc.	ind.	547	84.90	14.89	-0.26	-0.02	0.64	-0.302
	grp.	7	84.67	13.65	-0.03	0.00	5.16	-0.005
Ctr. of std.	DEU	17	84.76	14.54	-0.12	-0.01	3.53	-0.033
	GBR	463	82.96	15.75	1.67	0.11	0.73	1.815
	USA	174	88.14	11.93	-3.50	-0.24	0.90	-2.853***
Recalc.?	Y	460	82.76	15.75	1.88	0.12	0.73	2.027*
	N	207	88.81	12.16	-4.18	-0.29	0.84	-3.647***
Special calc.?	Y	255	86.70	13.58	-2.06	-0.14	0.85	-1.915
	N	412	83.36	15.68	1.28	0.08	0.77	1.339
Test-conv.?	Y	120	73.78	18.91	10.86	0.69	1.73	6.999***
	N	546	87.02	12.84	-2.38	-0.17	0.55	-2.932***

Notes. Comparative statistics use all cases ("Total" in first line) as reference; *d* = Cohen's d with pooled *SD* and $d \geq 0.41$ for recommended minimum effect sizes, $d \geq 1.15$ for moderate effects and $d \geq 2.7$ for strong effect sizes (see: Ferguson, 2009); for t-values: $*p \leq .05$, $** \ p \leq .01$, $*** \ p \leq .001$.

2.7. Statistics – Cross-National Level

The mean IQ of all countries varies between the different estimates (Table 21). It is 84.21 (*Range*=42.79↔110.31; *SD*=14.20; *N*=128) if the pure and unweighted psychometric data were used but 81.94 (*Range*=42.99↔108.69; *SD*=13.24; *N*=128) after weightings and 81.94 (*Range*=42.99↔106.48; *SD*=13.32; *N*=201) after combination with school assessment results and completed by geographic means (*M*=87.91; *Range*=53.50↔ 107.33; *SD*=12.58; *N*=100). The use of only the lowest or highest IQ measurements for each country decreased or increased the mean of around 6 IQ-points.

Weightings, combinations and completions led to only marginal and non-significant changes, with *t*=-0.026 (*p*>.999) by comparing means of [UW] and [NW], *t*=-0.064 (*p*>.999) by comparing means of [UW] and [QNW], and *t*=1.526 (*p*=.127) by comparing means of [UW] and [QNW+SAS+GEO9. [SAS-IQ] differ significantly from purely psychometrics with *t*=-2.17 (*p*<.031) if compared with [UW], and also if compared with [QNW+SAS+GEO] with *t*=3.730 (*p*<.001). No significant differences could be found between the estimates by the NIQ-dataset and those from Lynn and Vanhanen, with *t*=-0.111 (*p*=0.912) if [QNW+SAS+GEO] was compared with the L&V12-estimates and *t*=0.726 (*p*=0.468) if [QNW+SAS +GEO] was compared with the estimated from Rindermann (see Appendix I in Becker & Rindermann, 2016). Significant differences can be found if the means of lowest and highest IQs were compared with means from all samples (*t*=3.730|-3.905; *p*<0.001) or means of lowest and highest IQs with each other (*t*=-7.274; *p*<.001).

The significant differences described in the paragraph above might implement the relevance of collecting multiple samples per country and the differences between psychometric and school assessment results that both variables could only be an approximation to each other. However, these differences might be due to the countries in the different samples. The variable [SAS-IQ] missed to include many developing nations in low-IQ areas, as it can be seen in Fig. 2, and is therefore expected to be higher than [UW] and this, in turn, missed to include nations in low-IQ areas which were added by geographic means in the [QNW+SAS+GEO].

As already shown at the sample level, mean ages of the individuals included for each nation varied of around ±5.00y around a mean of 14.45y (*Range*=4.94↔41.75; *SD*=6.31; *N*=128), which gave the NIQs a representativeness best for older children and younger adolescents. The data quality is satisfying with a mean of .71 (*Range*=.37↔.97; *SD*=.14; *N*=128). On average 5.21 samples (*Range*=1.00↔58.00; *SD*=6.50; *N*=128) were available for each nation, however, the *SD* is very high. For 21.86% of the 128 nations only one sample was included, for another 12.50% only two. So, psychometric IQs of 45.31% of the 128 nations were estimated by three or more samples and 89.06% from a number of samples within the range of one SD from the median of 3.00. The national psychometric measurements covered on average 4825.27 individuals (*Range*=19.00↔62649.00; *SD*=8977.21; *N*=128) and 63.28% of them covered more than 1000 but only 10.94% more than 10,000.

Table 21. *Descriptive statistics for 22 variables the national level.*

	Variables	*M*	*Lowest*	*Highest*	*SD*	*N* (nat.)
	1. UW	84.21	42.79	110.31	12.88	128
	2. UW (*SD*)	7.21	0.62	21.80	3.79	84
	3. *N* (spl.)	5.21	1.00	58.00	6.50	128
	4. Lowest	77.89	33.29	105.30	14.20	128
	5. Highest	90.86	46.38	123.34	14.33	128
	6. NW	84.31	43.01	108.41	13.16	128
	7. QNW	84.46	42.99	108.69	13.24	128
NIQ	8. SAS	87.91	53.50	107.33	12.58	100
	9. ONW+SAS	83.96	42.99	106.48	13.34	146
	10. QNW+SAS+GEO	81.94	42.99	106.48	13.32	201
	11. L&V12	86.06	60.10	107.10	11.04	133
	12. L&V12+GEO	84.35	60.10	107.10	10.77	199
	13. IQ(L&V12)-NIQ	2.44	-15.10	35.01	7.14	197
	14. |IQ(L&V12)-NIQ|	4.98	0.02	35.01	5.67	197
	15. R	83.21	60.19	105.29	11.53	199

	Variables	*M*	*Lowest*	*Highest*	*SD*	*N* (nat.)
Samples	16. Lowest age	10.44	1.00	34.50	4.36	127
	17. Highest age	19.21	6.00	76.00	10.88	127
	18. Mean age	14.45	4.94	41.75	6.31	128
	19. N (ind.)	4825.27	19.00	62649.00	8977.21	128
Quality	20. Mean	.71	.37	.97	.14	128
	21. Cumulated	3.62	0.42	27.66	3.92	128
	22. Mean QN-Factor	690.63	8.87	5790.09	907.76	128

Table 22. *Correlation matrix for 21x21 variables at the cross-national level.*

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. UW		-.11	.03	.88	.89	.98	.97	.80	.95	.95	.87
2. UW (*SD*)	.299		.19	-.40	.26	-.05	-.04	-.11	-.07	-.07	-.17
3. *N* (spl.)	.763	.083		-.27	.25	.04	.04	.00	.03	.03	.03
4. Lowest	.000	.000	.002		.62	.84	.83	.63	.82	.82	.76
5. Highest	.000	.016	.004	.000		. 88	.88	.64	.85	.85	.79
6. NW	.000	.654	.685	.000	.000		1.00	.78	.97	.97	.87
7. QNW	.000	.688	.660	.000	.000	.000		.78	.97	.97	.87
8. SAS	.000	.403	.989	.000	.000	.000	.000		.97	.97	.91
9. ONW+SAS	.000	.508	.719	.000	.000	.000	.000	.000		1.00	.89
10 .QNW+SAS+GEO	.000	.508	.719	.000	.000	.000	.000	.000	-		.89
11. L&V12	.000	.141	.753	.000	.000	.000	.000	.000	.000	.000	
12. L&V12+GEO	.000	.270	.487	.000	.000	.000	.000	.000	.000	.000	-
13. IQ(L&V12)-NIQ	.000	.585	.705	.000	.000	.000	.000	.000	.000	.000	.064
14. |IQ(L&V12)-NIQ|	.000	.697	.321	.000	.000	.000	.000	.000	.000	.000	.000
15. R	.000	.152	.486	.000	.000	.000	.000	.000	.000	.000	.000
16. Lowest age	.033	.928	.963	.049	.052	.055	.056	.622	.078	.078	.248
17. Highest age	.916	.941	.762	.949	.830	.848	.846	.154	.630	.630	.243
18. Mean age	.028	.665	.820	.015	.112	.027	.028	.212	.062	.062	.615
19. N (ind.)	.082	.394	.000	.684	.001	.056	.057	.633	.112	.112	.138
20. Mean quality	.556	.313	.430	.424	.707	.468	.462	.049	.265	.265	.377
21. Cumulated quality	.931	.080	.000	.000	.003	.865	.836	.560	.989	.989	.995
22. Mean QN-Factor	.060	.744	.995	.078	.068	.047	.053	.747	.128	.128	.075

Notes: Pearson's *r* above the diagonal, *p*-values below the diagonal (.000 is <.001); *N* varies (100 – 201).

Table 22 (continued).

Variables	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
1. UW	.84	-.56	-.64	.83	-.19	.01	-.19	.15	-.05	.01	.17
2. UW (*SD*)	-.12	-.06	.04	-.16	-.01	-.01	.05	.09	-.11	.19	-.04
3. *N* (spl.)	.06	.03	-.09	.06	.00	-.03	.02	.69	-.07	.96	.00
4. Lowest	.71	-.49	-.55	.72	-.17	-.01	-.21	-.04	-.07	-.32	.16
5. Highest	.77	-.47	-.55	.76	-.17	-.02	-.14	.30	-.03	.26	.16
6. NW	.83	-.60	-.66	.82	-.17	.02	-.20	.17	-.06	.02	.18
7. QNW	.83	-.60	-.66	.82	-.17	.02	-.19	.17	-.07	.02	.17
8. SAS	.91	-.67	-.70	.96	.06	.16	.14	.05	-.22	-.07	-.04
9. ONW+SAS	.86	-.63	-.68	.87	-.16	.04	-.17	.14	-.10	.00	.14
10 .QNW+SAS+GEO	.85	-.60	-.63	.85	-.16	.04	-.17	.14	-.10	.00	.14
11. L&V12	1.00	-.16	-.42	.98	-.11	.11	-.05	.14	-.09	.00	.17
12. L&V12+GEO		-.08	-.36	.98	-.07	.12	-.03	.16	-.10	.04	.15
13. IQ(L&V12)-NIQ	.253		.64	-.13	.20	.12	.28	-.02	.05	.06	-.03
14. |IQ(L&V12)-NIQ|	.000	.000		-.40	.28	.05	.27	-.12	.12	-.07	-.07
15. R	.000	.077	.000		-.05	.13	-.02	.15	-.11	.03	.13
16. Lowest age	.414	.028	.002	.567		.64	.73	-.02	-.04	.00	-.07
17. Highest age	.174	.193	.605	.154	.000		.72	-.03	-.21	-.04	-.06
18. Mean age	.716	.001	.002	.811	.000	.000		.01	-.16	.01	-.06
19. N (ind.)	.064	.807	.171	.084	.866	.713	.878		.06	.68	.55

Variables	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
20. Mean quality	.267	.558	.169	.204	.670	.017	.068	.505		.08	.26
21. Cumulated quality	.690	.536	.403	.722	.973	.648	.916	.000	.357		.05
22. Mean QN-Factor	.088	.756	.466	.148	.449	.489	.491	.000	.003	.589	

Correlations between the different IQ-estimates are strong and positive, with *r*=.98 (*N*=128; *p*<.001) between [UW] and [NW], *r*=.97 (*N*=128; *p*<.001) between [UW] and [QNW], *r*=.95 (*N*=128; *p*<.001, Fig. 10) between [UW] and [QNW+SAS+GEO] and even .80 (*N*=82; *p*<.001) between [UW] and [SAS-IQ]. This correlation remained stable if [UW] was exchanged for [NW] or [QNW] (*r*=.78; *N*=82; *p*<.001, Fig. 11). The use of only the lowest and highest IQs resulted in correlations of *r*=.88 (*N*=128; *p*<.001) and r=.89 (*N*=128; *p*<.001) to [UW], and *r*=.62 (*N*=128; *p*<.001; Fig. 12) between lowest and highest IQs themselves.

With regard to the alternative IQ-estimates from Lynn and Vanhanen and from Rindermann, the [QNW+SAS+GEO] shows strong correlation with *r*=.85 (*N*=181|197; *p*<.001, Fig. 13), however, there are also strong correlations of *r*=-.60 and -.63 (*N*=197; *p*<.001, Fig. 14) between [QNW+SAS+GEO] and (absolute) differences to the estimates from Lynn and Vanhanen, so deviations between both variables are stronger for countries with lower IQs compared to countries with higher IQs.

Regarding the sample characteristics and quality indices, [QNW+SAS+GEO] showed weak to moderate correlations without significance, however *p*-values might be inappropriate in a cross-national application when the maximum number of available observations (here: countries in the world) is limited closely to the maximum number of recorded observations (here: countries in the dataset) and if observations have emerged from aggregations of *N*>1 cases (Pollet, 2013). The closest to a minimum of significance would be the correlation of [QNW+SAS+GEO] to the mean age with *r*=-.17 (*N*=;128 *p*=.062) followed by -.16 (*N*=128; *p*=.078) to the lowest age, means that individuals in samples for countries with lower IQs were on average older than individuals in samples for countries with higher IQs. Both for the mean (*r*=-.10; *N*=128; *p*=.265) and cumulative (*r*=.00; *N*=128; *p*=.989) ratings the correlations to [QNW+SAS+GEO] are negligible, but not for the mean QN-Factor (*r*=.14; *N*=128; *p*=.128).

Fig. 10. *Scatterplot between the variables [NIQ (UW)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.95; N=128; p<.001).*

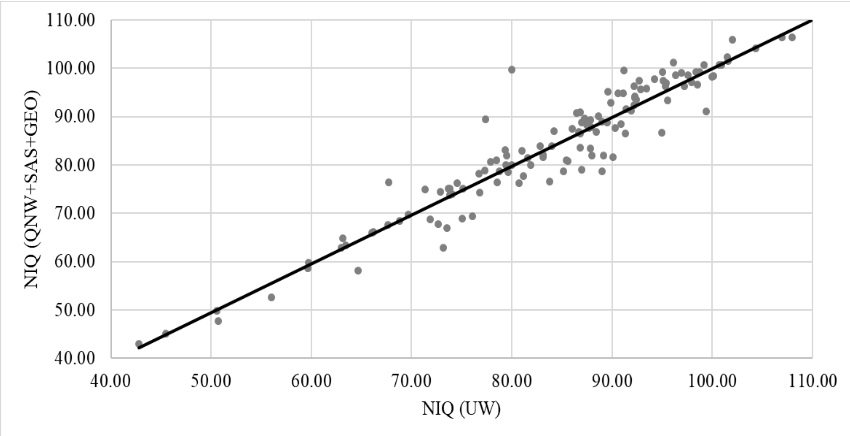


Fig. 11. *Scatterplot between the variables [NIQ (UW)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.78; N=82; p<.001).*

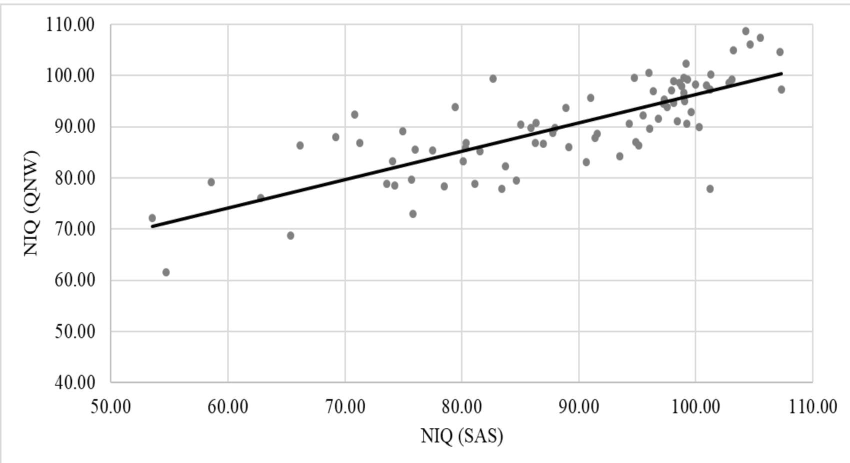


Fig. 12. *Scatterplot between the variables [NIQ (lowest)] and [NIQ (highest)] at the cross-national level (r=.62; N=182; p<.001).*

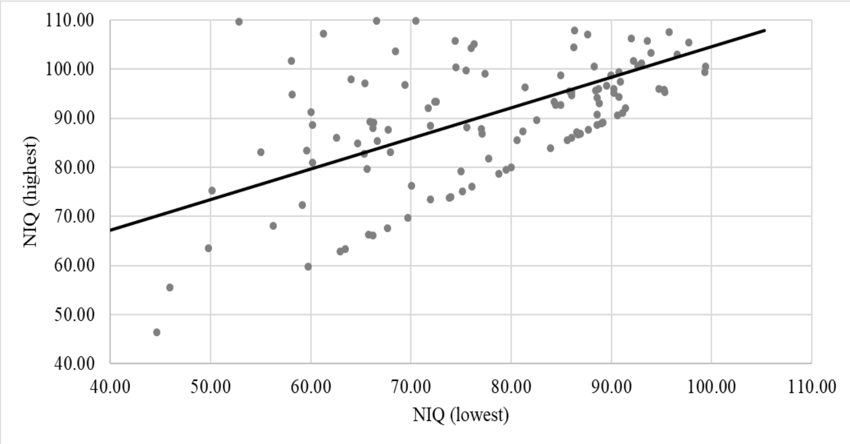


Fig. 13. *Scatterplot between the variables [L&V12] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.85; N=197; p<.001).*

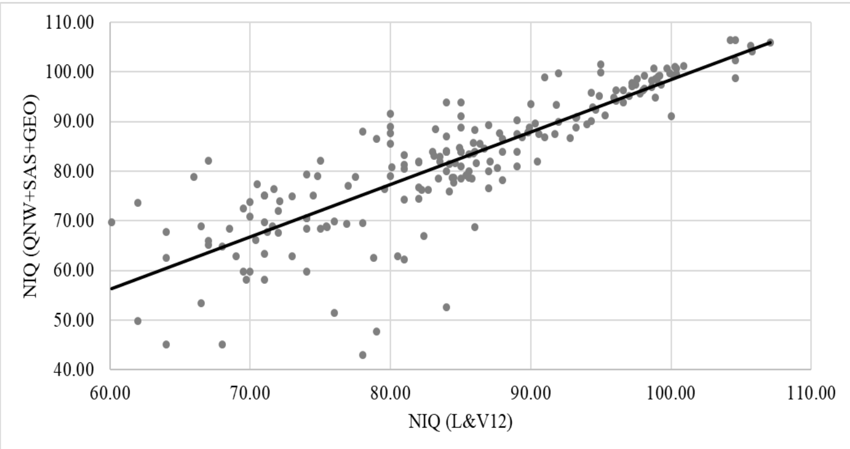
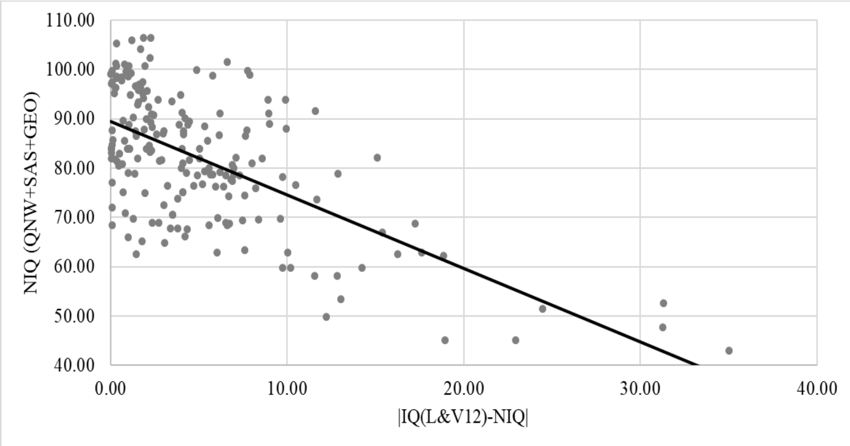


Fig. 14. *Scatterplot between the variables [|IQ(L&V12)-NIQ|] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.63; N=197; p<.001).*



In conclusion, the methodological differences between national IQs from Lynn and Vanhanen and from the NIQ-dataset are quite significant but gave similar results. The remaining question is: Which factors caused these differences? Therefore, a regression analysis was conducted including the variables which could have affected the named differences. Tables 23 and 24 show that the eight selected independent variables are not able to explain the biggest share of the variance in the differences, whether the differences were real or absolute. The strongest effects were detected for the age-variables. An increase of the mean age of one *SD* led to a decrease of 0.42 *SD* in real IQ-differences and an increase of 0.37 *SD* in absolute differences. Additionally, an increase in the cumulative data quality of one *SD* led to an increase of 0.21 *SD* in real IQ-differences and a decrease of .17 *SD* in absolute differences. Means that absolute differences between the L&V12 IQs and those IQs from the NIQ-dataset were higher if samples for a nation had higher mean ages and/or lower data quality, but the main cause of the difference is not hidden in these non-IQ-variables. If [QNW+SAS+GEO] was added as a further independent variable, residual variances decrease strongly to .50 for real and .46 for absolute differences. An increase of one *SD* in [QNW+SAS+GEO] leads to a decrease of relative differences of .64 *SD* and of absolute differences of 0.67 *SD*. So, in light of the previous findings and methodical features described in 2.2.4, it seems most likely that much of the variance in IQ-differences between the Lynn and Vanhanen estimates and the NIQ-dataset are caused by the use of formulas that convert Raven's-raw scores to IQ-scores and the associated lengthening of the variance-observed ranges of the Raven's Matrices scales. They are thus to be expected.

Table 23. *Regression analysis including eight independent variables and [IQ(L&V12)-NIQ] as the dependent variable.*

Variables	*β*	*S.E.*	*p*
3. *N* (spl.)	-.06	0.43	.889
16. Lowest age	-.01	0.15	.966
17. Highest age	-.16	0.14	.247
18. Mean age	-.42	0.15	.006
19. *N* (ind.)	-.17	0.20	.407
20. Mean quality	.06	0.12	.609
21. Cumulated quality	.21	0.41	.608
22. QN-Factor	.05	0.15	.721
Residual variances of 13.IQ(L&V26)-NIQ	.87	0.06	<.001

Notes: *β* = standardized regression coefficients; *N* varies (100-201).

Table 24. *Regression analysis including eight independent variables and [|IQ(L&V26)-NIQ|] as the dependent variable.*

Variables	*β*	*S.E.*	*p*
3. *N* (spl.)	.17	0.42	.684
16 .Lowest age	.22	0.14	.110
17. Highest age	-.33	0.13	.012
18. Mean age	.37	0.15	.012
19. *N* (ind.)	-.15	0.19	.448
20. Mean quality	.16	0.11	.171
21. Cumulated quality	-.17	0.39	.666
22. QN-Factor	.00	0.14	.999
Residual variances of 14.|IQ(L&V26)-NIQ|	.82	0.07	<.001

Notes: *β* = standardized regression coefficients; *N* varies (100-201).

Even if Table 20 showed significant differences between IQs measured with different tests, this pattern did not repeat on the cross-national level, if unweighted national IQs were calculated by only one type of test, as can be seen in Table 25. Neither all Raven's Matrices nor all Wechsler Scales, nor different versions of both test families differ significantly from the total mean. The highest difference was found for the CFT with 6.21 scores above the total mean of 84.21 but remained non-significant due to the small number of only 25 nations for which CFT-administrations were available. Finally, correlations are also strong between most of the test pairings (Table 26). [UW] from all tests correlated strongest with $r=.98$ ($N=107$; $p<.001$) to [UW] from Raven’s Matrices only and weakest with $r=.78$ ($N=25$; $p<.001$) to [UW] from CFT only. Within the Raven’s Matrices, correlations reached from $r=.88$ ($N=7$; $p=.009$) between [UW] from SPM and SPM+ only, to $r=.66$ ($N=39$; $p<.001$) between [UW] from SPM and CPM only. Interestingly, the correlation between [UW] from Raven’s Matrices and Wechsler Scales only were just as strong as the highest Intra-Raven’s Matrices correlation with $r=.88$ ($N=28$; $p=.009$; Fig. 15). [UW] from CFT only showed on average weakest correlations to [UW] from other tests or test families, with weakest positive $r=.39$ ($N=10$; $p=.880$) to Wechsler Scales and to SPM+ even negative with $r=-.19$ ($N=3$; $p=.880$). However, significance is not given in both pairings due to very low numbers of observations.

Table 25. *Descriptive and t-statistics for 128 nations from all and selected psychometric data.*

Groups		*N* (Nat.)	UW	UW (*SD*)	*Dif.*	*d*	*S.E.*	*t*
Total	-	128	84.21	12.88	0.00	0.00	1.14	.000
	RPM	107	84.86	14.52	-0.65	-0.05	1.40	-.364
	SPM	77	86.04	13.72	-1.83	-0.14	1.56	-.961
	SPM+	15	86.00	15.71	-1.79	-0.14	4.06	-.497
Test (cal)	CPM	59	86.19	14.26	-1.98	-0.15	1.86	-.944
	APM	52	82.94	17.70	1.27	0.09	2.45	.535
	WIS	46	86.08	10.49	-1.87	-0.15	1.55	-.884
	CFT	25	90.42	896	-6.21	-0.02	179.20	-.079

Notes: Comparative statistics use all cases ("Total" in first line) as reference; *d* = Cohen’s with pooled SD and $d\geq0.41$ for recommended minimum effect sizes,

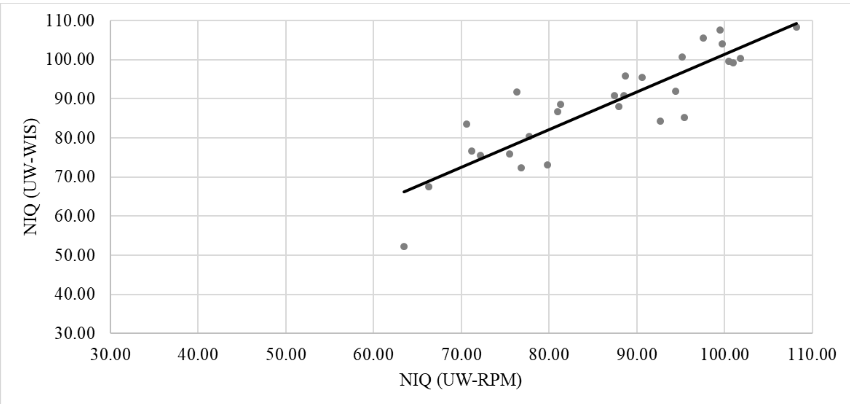
$d \geq 1.15$ for moderate effects and $d \geq 2.7$ for strong effect sizes (see: Ferguson, 2009); for *t*-values: $^{*}p \leq .05$, $^{**}\ p \leq .01$, $^{***}\ p \leq .001$.

Table 26. *Correlation matrix for 9x9 [NIQ (UW)] from specified tests only.*

Variables	1.	2.	3.	4.	5.	6.	7.	8.
1. NIQ UW		.98	.95	.85	.88	.95	.92	.78
2. NIQ RPM	.001		.95	.93	.92	.96	.88	.57
3. NIQ SPM	.001	.001		.88	.66	.85	.80	.77
4. NIQ SPM+	.001	.001	.009		.70	.67	-	-.19
5. NIQ CPM	.001	.001	.001	.122		.76	.78	.74
6. NIQ APM	.001	.001	.001	.099	.001		.86	.77
7. NIQ WIS	.001	.001	.001	-	.001	.001		.39
9. NIQ CFT	.001	.011	.004	.880	.010	.005	.269	

Notes: Pearson's *r* above the diagonal, *p*-values below the diagonal (.000 is <.001); *N* varies (6 – 107).

Fig. 15. *Scatterplot between the variables [NIQ (UW-RPM)] and [NIQ (UW-WIS)] at the cross-national level (r=.88; N=28; p<.001).*



2.8. A Necessary Comment

The results from the NIQ-dataset have substantiated the validity of previous IQ lists from Lynn and Vanhanen and thus of the results of all studies based on them, which are to be listed in the following chapter. They have shown that, despite the use of partially different methods and an extended amount of additional non-IQ data, the established pattern could be replicated in its entirety. However, a few important notes are to be made at the end of this chapter, regarding further work on the dataset itself as well as its application for other studies:

The analyses have shown that national IQs depend partly on characteristics of the samples on which they were measured, even if these samples have gone through a selection process before, and strength and direction of the effects of such characteristics vary between countries of different IQ-levels. The future work on the NIQ-dataset should therefore not only aim for the inclusion of further countries, but also improve the data of already integrated countries in quantity and quality. This is especially relevant for the age groups covered by the samples. As could often be observed during calculations of mean IQ-scores across varying age-groups, different speeds in cognitive development exist between populations with different mean IQs and were mostly delayed if the mean IQs were below 100. In combination with the different demographic structures of countries, such as between the older Western and younger developing countries, this might be a source of the underrating of the intelligence of low-IQ countries. The variations that were mentioned in the previous paragraph also imply that the NIQ-dataset is suitable for identifying global patterns and performing quantitative analyses at the cross-national level but should not be used as an index of exact individual country IQs or to rank countries which score relatively close to each other. It is also proposed to introduce a lower threshold at 60 for the scale of national IQs or at least to check the robustness of results with an additional use of a shortened scale. IQ-tests are mostly designed to reflect the normal range of a population with an IQ similar to that of Britain. Many developing countries had mean scores close to or even within the percentiles where tests lose their reliability. In the following chapter this critical point should be taken into account as a guideline for the application of the dataset.

Chapter 3. Causes, Correlates and Consequences of National IQs

This chapter reviews the numerous studies that have been published on the correlates of national IQs and shows that these are generally consistent with the associations among individuals. Results from these studies are partially compared with those obtained if national IQs from the NIQ-dataset were correlated with non-IQ variables from sources that seem most appropriate to us and for as many nations as possible. Here, correlations were given for the full IQ-range (left of the vertical hyphen) and one restricted to a minimum IQ of 60.00 (right of the vertical hyphen) for reasons discussed in part 2.8. All national IQs that were originally below the mentioned restriction were corrected to 60.00. This affects the 14 countries: Cape Verde; Cote d'Ivoire; The Gambia; Ghana; Guatemala; Guinea; Liberia; Mali; Mauritania; Nepal; Nicaragua; Sierra Leone; South Sudan; Togo. It was not applied for the correlations with results from PISA, TIMSS and PIRLS, which in turn fell below the minimum of 60.00 for some countries after being converted to IQs.

1. Educational Attainment

Many studies have shown that the intelligence of children predicts subsequent educational attainment among individuals typically at a magnitude of a correlation of around .5 to .7. For example, Benson (1942) showed that in the United States intelligence measured at the age of 12 years predicted educational attainment at age 23 at correlation of .57. Thienpont and Verleye (2003) showed that in Britain intelligence measured at age 11 years predicted educational attainment at age 21 at correlation of .70. Deary, Strand, Smith and Fernandes (2007) report a correlation of .81 between an intelligence test taken by approximately 70,000 British school children at the age of 11 and their educational achievement in examinations taken at age 16. This correlation is the same as that typically present between two intelligence tests. The genetic explanation for the high correlation between IQ tests and educational tests is that the same genes determine both (Bartels, Rietveld, van Baal & Boomsma, 2002; Petrill & Wilkerson, 2000; Wainwright, Wright, Geffen, Luciano, & Martin, 2005a,b). These are designated "generalist genes" by Kovas, Harlaar, Petrill and Plomin (2005) because they determine many expressions of cognitive ability including IQs, math, reading, science, etc. More recently, Johnson, Deary and Iacono (2008, p.475) in a study of the high correlation between IQ measured at age 11 and GPA (Grade Point Average) at age 17 conclude that "The genetic correlation between IQ and GPA was both substantial and significant".

It would be expected from these results that the same positive relation should be present across nations. Studies showing that this is the case are summarized in Table 1. Rows 1 and 2 give our first report of correlations of .88 and .87 for 38 counties between national IQs and scores obtained by school students in math and science in the 1999 TIMSS (The International Math and Science Study). Rows 3, 4 and 5 give correlations of .88, .83 and .87 between national IQs and scores obtained by school students in math and science in the 2000 and 2003 PISA (Program for International Student Assessment) study. Row 6 gives a correlation of .81 for national IQs with scores on reading obtained by 10 year old school students in the 2001 PIRLS (Progress in International Reading) study. Rows 7 and 8 give correlations .92 and .91 for 46 countries of national IQs with scores obtained by 14 year old school students in math and science in the 2003 TIMSS study.

Row 9 gives a correlation of .89 between national IQs and math and science scores of school students obtained in the TIMSS studies averaged for the years 1995-2003 based on 63 nations. Row 10 gives a correlation of .84 between national IQs and aggregated math, science and literacy scores of 15 year old school students obtained in the PISA 2006 study and based on 56 nations. Row11 gives a correlation of .90 between national IQs and math and science based on 73 nations and calculated as the average of the standardized scores on the international school achievement tests in math and science from TIMSS (Third International Mathematics and Science Study) averaged from the 1995, 1999 and 2003 assessments and the PISA 2003 and 2006 assessments. For each country, all available data were computed into a single overall score. Row 12 gives a correlation of .74 between national IQs and the arcsine-transformed average of the 1990 and 2002 adult literacy rates given by the United Nations for 2004, based on the 187 countries for which both measures are available. Row 13 gives a correlation of .91 between national IQs and educational attainment scores aggregated from the all PISA and TIMSS studies published hitherto, based on 108 countries. The correlation corrected for attenuation is 1.0. Row 14 gives a correlation of .92 between national IQs and educational attainment scores aggregated from all PISA, TIMSS and other studies. Row 15 gives a correlation of .97 between national IQs and educational attainment measured by all the PISA (Program for International Student Assessment) studies of the attainment of 15 year olds in math, science and reading comprehension and the TIMSS studies, providing strong predictive validity for the national IQs.

Row 16 gives a correlation of .64 between national IQs and adult literacy rates confirming the result given in row 12. Row 17 gives a correlation of .97 between national IQs and educational attainment measured by all the PISA studies of the attainment of 15 year olds in math, science and reading comprehension, the TIMSS studies, and all the PIRLS (Progress in International Reading Literacy Study) studies. This study also showed that the correlation between IQ and the tests' g loadings was higher in the 53 higher IQ counties ($r = .720$) than in the 53 lower IQ counties ($r = .651$) contrary to the prediction from Spearman’s Law of Diminishing Returns.

Row 18 gives a correlation of .23 between national IQs and educational attainment measured by the GMAT a widely-used, standardized, English-language test designed for candidates for the MBA and for other graduate education programs in business. It assesses analytical, writing, quantitative, verbal, and reading skills. The sample consisted of candidates from countries with at least

1,000 test-takers taking the test for admission to a graduate school during the five-year period 2008-09 to 2012-13.

Tables 2, 3 and 4 show correlations between the weighted national IQs ([QNW]) and results from PISA 2000 to 2015 (OECD/UNESCO-UIS, 2003; OECD, 2004, 2007, 2010, 2015, 2016), TIMSS 1995 to 2015 (Martin et al., 1997, 2000, 2004, 2012; Mullis et al., 1997, 2000, 2004, 2012a, 2016b; Beaton et al., 1997b; Mullis, Martin & Foy, 2008) and PIRLS 2001 to 2016 (Mullis et al. 2003, 2007, 2012b, 2017). The NIQ variable [QNW] was selected because it is not yet corrected by the educational variables observed here. In each row one of Tables 2, 3 and 4 the correlation of the total educational results from all scales, grades and aggregated over time with national IQs are strong with .76 (N=65; p<.001) for PISA, .82 (N=72; p<.001) for TIMSS and .73 (N=54; p<.001) for PIRLS. These coefficients are on average .05 to .10 below those from Table 1, for example .84 vs .77 for PISA Total in 2006, .83 vs. .87 for PISA Math in 2003, and .82 to .83 vs. .87 for TIMSS Science in 2003. Also, they do not reach the high value of .97 Rindermann and Coyle (2013) calculated for the combined score from PISA, TIMSS and PIRLS. Even the correlation between [QNW] and [SASIQ], as reported in part 2.7, is below the .97 with .78 (N=82; p<.001). However, coefficients in Tables 2 and 3 show the same pattern if scores for Math and Science were compared, where that for maths is always stronger than that for science. Scores for Reading show mostly the lowest correlations to national IQs with a range from .71 to .78 in PISA and .65 to .79 in PIRLS. In contrast, the correlation of .84 (N=35; p<.001) for Problem Solving given by the report of PISA (2006) (OECD, 2007) is one of the highest across all PISA-results and even across all school assessment results.

In addition to the general performance scales, Mullis et al. (2016a, Exhibit 8.1, 8.2) reported scores for teachers' formal education, which correlate with .45 (N=37; p=.005) with [QNW], similar to scores for school discipline, reported by Mullis et al. (2016a, Exhibit 7.1, 7.2), which correlate with .46 (N=37; p=.002) with [QNW]. In contrast, no correlation could be found for the educational gap between natives and immigrants in TIMSS-2015 (*r*=.00; *N*=33; *p*=982), reported by Wendt et al. (2016; Fig. 11.1; 11.2). This is consistent with the findings from Rindermann and Thompson (2016) which found a very strong positive correlation of .92 between educational attainment (there: “cognitive competences”) of natives and immigrants or a very weak correlation of .09 between the mean score for natives and the native–migrant gap.

Data for school discipline were also provided by Mullis et al. (2017) and show a correlation of .50 (*N*=43; *p*=.001) with [QNW], slightly higher than those from TIMSS-2015. Although a correlation of .41 (*N*=41; *p*=007) could be found between early literacy activities and [QNW], there is a negative correlation of -.26 (*N*=41; *p*=.107) between early literacy skills and [QNW]. This is all the more remarkable since the number and selection of the cases were identical in both calculations, but the negative correlation has no significance and there is no statistical relation between early literacy activities and early literacy skills (*r*=-.02; *N*=45; *p*=886).

An identical pattern emerges for PISA, TIMSS and PIRLS when the change in correlations are observed if different volumes of the school assessment studies were used (Fig. 1, 2 and 3). In case of all three studies, strengths of correlations increased first and decreased later, especially on the latest volume. PISA-scores show the strongest correlation for 2009 (*r*=.84; *N*=61; *p*<.001) but weakest for 2015 (*r*=.74; *N*=60; *p*<.001). TIMSS-scores show the strongest correlation for 2011 (*r*=.86; *N*=57; *p*<.001) and weakest for 1995 (*r*=.69; *N*=39; *p*<.001), which could be explained by changes in the country sample, but also a slightly weaker correlation for 2015 (*r*=.80; *N*=54; *p*<.001). PIRLS-scores show the strongest correlation for 2011 (*r*=.79; *N*=44; *p*<.001) and weakest for 2001 (*r*=.65; *N*=30; *p*<.001), which could be explained by changes in the country sample, but also a slightly weaker correlation for 2016 (*r*=.73; *N*=43; *p*<.001). While in the case of TIMSS and PIRLS the scores at the mean and the 5.00th P show strong similarities in strength and course of correlations with [QNW] over time, in the case of PISA the scores at the 95.00th *P* resemble those at the mean.

Part of the explanation for the positive correlation between national IQs and educational attainment appears to lie in the poor quality of teaching in much of sub-Saharan Africa documented by Bold, Filmer, Martin, Molina et al. (2017) who describe their study as follows: “In each school, during a first announced visit, up to ten teachers were randomly selected from the teacher roster. At least two teaching days after the initial survey, an unannounced visit was conducted, during which the enumerators were asked to identify whether the selected teachers were in the school, and if so, if they were in class teaching. Both assessments were based on directly observing the teachers and their whereabouts. ... Averaging across countries, 44 percent of teachers were absent from class, either because they were absent from school or in the school, but not in the classroom. Moreover, even when in the classroom, teachers may not necessarily be teaching. We carried out classroom observation as part of the survey, recording a minute-by-minute snapshot of what the teacher was doing, for a randomly selected fourth-grade mathematics or language class. The percentage of the lesson lost to nonteaching activities varied from 18 percent in Nigeria, the country with the lowest classroom absence rate, to 3 percent in Uganda, the country with the highest classroom absence rate. ... Students are taught, on average, 2 hours and 46 minutes per day, or roughly half of the scheduled time... For the language subject area, we formally define “minimum knowledge for teaching” as marking at least 80 percent of the items on the language test correctly. Only 7 percent of the language teachers meet this minimum. ... A mathematics teacher is defined as having minimum knowledge for teaching if he/she scores at least 80 percent on the tasks covered in the math curriculum up to grade 4. ... 15% can solve a difficult math story problem. ... Almost one-quarter of the teachers cannot subtract double-digit numbers and one-third of the teachers cannot multiply double-digit numbers...After more than three years of compulsory language teaching, four out of five students in Mozambique and Nigeria cannot read simple words of Portuguese and English, respectively. Only one-quarter of Indian students in grade four can manage tasks—such as basic subtraction—that are part of the curriculum for the second grade. Roughly half of the students in Uganda, after three years of mathematics teaching, cannot place numbers between 0 and 999 in order".

A further the explanation for the poor educational attainment in sub-Saharan Africa may be that in some countries teachers demand sex or money from pupils in return for the award of passes or grades. This has been described for the Central African Republic by Bangui (2018) who writes "Teachers abuse pupils or extort money in exchange for good marks, permission to graduate or even to obtain textbooks. School children have a nickname for such predatory practices: sexually transmitted grades". This practice is likely not conducive to good educational attainment.

Table 1. *Educational attainment.*

	Variable	***N* Countries**	***r* x IQ**	**Reference**
1	TIIMSS: Math 1999	38	.88	Lynn & Vanhanen, 2002
2	TIMSS: Science 1999	38	.87	
3	PISA: Math 2000	40	.88	Lynn & Vanhanen, 2006
4	PISA: Science 2000	40	.83	
5	PISA: Math 2003	39	.87	
6	Reading	35	.81	Barber, 2006
7	TIMSS: Math 2003	46	.92	Lynn & Mikk, 2007
8	TIMSS: Science 2003	46	.87	
9	TIMSS: Math & Science	63	.89	Rindermann, 2007
10	PISA: 2006	56	.84	Lynn & Mikk, 2009
11	Math, Science	73	.90	Meisenberg, 2009
12	Adult literacy	187	.74	
13	PISA, TIMSS	108	.91	Lynn & Meisenberg, 2010
14	PISA, TIMSS	82	.92	Meisenberg & Lynn, 2012
15	PISA, TIMSS	47	.97	Rindermann et al., 2012
16	Adult literacy	197	.64	Lynn & Vanhanen, 2012
17	PISA, TIMSS, PIRLS	106	.97	Coyle & Rindermann, 2013
18	GMAT	167	.73	Thiers, 2018

Table 2: *Correlations between [NIQ (QNW)] and selected PISA variables.*

Variable	*r* x NIQ (QNW)	*N* (ctr.)	*p*	Source of compared variable
PISAIQ	.76	65	<.001	self-calculated
PISA (2000)-Total *M*	.79	37	<.001	OECD/UNESCO-UIS (2003)
PISA (2000)-Total 5th *P*	.71	37	<.001	
PISA (2000)-Total 95th *P*	.79	37	<.001	
PISA (2000)-Science *M*	.77	37	<.001	
PISA (2000)-Reading *M*	.76	37	<.001	
PISA (2000)-Math *M*	.81	37	<.001	
PISA (2003)-Total *M*	.81	35	<.001	OECD (2004)
PISA (2003)-Total 5th *P*	.71	35	<.001	
PISA (2003)-Total 95th *P*	.82	35	<.001	
PISA (2003)-Science *M*	.78	35	<.001	
PISA (2003)-Reading *M*	.72	35	<.001	
PISA (2003)-Math *M*	.83	35	<.001	
PISA (2006)-Prob.solv. *M*	.84	35	<.001	OECD (2007)
PISA (2006)-Total *M*	.77	50	<.001	
PISA (2006)-Total 5th *P*	.70	50	<.001	
PISA (2006)-Total 95th *P*	.79	50	<.001	
PISA (2006)-Science *M*	.78	50	<.001	
PISA (2006)-Reading *M*	.71	49	<.001	
PISA (2006)-Math *M*	.80	50	<.001	
PISA (2009)-Total *M*	.84	61	<.001	OECD (2010)
PISA (2009)-Total 5th *P*	.76	61	<.001	
PISA (2009)-Total 95th *P*	.84	61	<.001	
PISA (2009)-Science *M*	.83	61	<.001	
PISA (2009)-Reading *M*	.78	61	<.001	
PISA (2009)-Math *M*	.87	61	<.001	

Variable	*r* x NIQ (QNW)	*N* (ctr.)	*p*	Source of compared variable
PISA (2012)-Total *M*	.75	58	<.001	OECD (2015)
PISA (2012)-Total 5th *P*	.63	58	<.001	
PISA (2012)-Total 95th *P*	.76	58	<.001	
PISA (2012)-Science *M*	.73	58	<.001	
PISA (2012)-Reading *M*	.73	58	<.001	
PISA (2012)-Math *M*	.77	58	<.001	
PISA (2015)-Total *M*	.74	60	<.001	OECD (2016)
PISA (2015)-Total 5th *P*	.59	60	<.001	
PISA (2015)-Total 95th *P*	.72	60	<.001	
PISA (2015)-Science *M*	.71	60	<.001	
PISA (2015)-Reading *M*	.71	60	<.001	
PISA (2015)-Math *M*	.75	60	<.001	

Fig. 1. *Strength of correlations between the variables [NIQ (QNW)] and the mean, 5th and 95th percentiles of PISA-Total across time.*

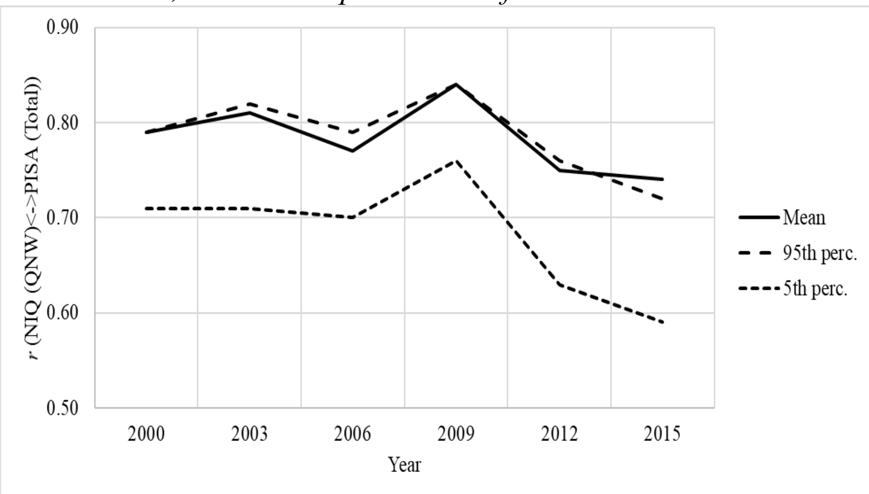


Table 3. *Correlations between [NIQ (QNW)] and selected TIMSS variables.*

Variable	*r* x NIQ (QNW)	*N* (ctr.)	*p*	Source of compared variable
TIMSSIQ	.82	.82	<.001	self-calculated
TIMSS (1995)-Total *M*	.69	.69	<.001	Martin et al. (1997); Mullis et al. (1997)
TIMSS (1995)-Total 5th *P*	.68	.68	<.001	
TIMSS (1995)-Total 95th *P*	.64	.64	<.001	
TIMSS (1995)-Total 4thG *M*	.69	.69	<.001	
TIMSS (1995)-Total 8thG *M*	.68	.68	<.001	
TIMSS (1995)-Math 4thG *M*	.66	.66	<.001	
TIMSS (1995)-Science 4thG *M*	.68	.68	<.001	
TIMSS (1995)-Math 8thG *M*	.61	.61	<.001	
TIMSS (1995)-Science 8thG *M*	.77	.77	<.001	
TIMSS (1999)-Total 8thG *M*	.79	.79	<.001	Martin et al. (2000); Mullis et al. (2000)
TIMSS (1999)-Total 8thG 5th *P*	.75	.75	<.001	
TIMSS (1999)-Total 8thG 95th *P*	.78	.78	<.001	
TIMSS (1999)-Math 8thG *M*	.79	.79	<.001	
TIMSS (1999)-Science 8thG *M*	.74	.74	<.001	
TIMSS (2003)-Total *M*	.85	.85	<.001	Martin et al. (2003); Mullis et al. (2003)
TIMSS (2003)-Total 5th *P*	.83	.83	<.001	
TIMSS (2003)-Total 95th *P*	.85	.85	<.001	
TIMSS (2003)-Total 4thG *M*	.84	.84	<.001	
TIMSS (2003)-Total 8thG *M*	.84	.84	<.001	
TIMSS (2003)-Math 4thG *M*	.84	.84	<.001	

Variable	*r* x NIQ (QNW)	*N* (ctr.)	*p*	Source of compared variable
TIMSS (2003)-Science 4thG *M*	.83	.83	<.001	
TIMSS (2003)-Math 8thG *M*	.85	.85	<.001	
TIMSS (2003)-Science 8thG *M*	.82	.82	<.001	
TIMSS (2007)-Total *M*	.84	.84	<.001	Martin, Mullis & Foy (2008); Mullis, Martin & Foy (2008)
TIMSS (2007)-Total 5th *P*	.82	.82	<.001	
TIMSS (2007)-Total 95th *P*	.80	.80	<.001	
TIMSS (2007)-Total 4thG *M*	.82	.82	<.001	
TIMSS (2007)-Total 8thG *M*	.82	.82	<.001	
TIMSS (2007)-Math 4thG *M*	.82	.82	<.001	
TIMSS (2007)-Science 4thG *M*	.80	.80	<.001	
TIMSS (2007)-Math 8thG *M*	.82	.82	<.001	
TIMSS (2007)-Science 8thG *M*	.78	.78	<.001	
TIMSS (2011)-Total *M*	.86	.86	<.001	Martin et al. (2012); Mullis et al. (2012a)
TIMSS (2011)-Total 5th *P*	.87	.87	<.001	
TIMSS (2011)-Total 95th *P*	.81	.81	<.001	
TIMSS (2011)-Total 4thG *M*	.83	.83	<.001	
TIMSS (2011)-Total 8thG *M*	.89	.89	<.001	
TIMSS (2011)-Math 4thG *M*	.84	.84	<.001	
TIMSS (2011)-Science 4thG *M*	.80	.80	<.001	
TIMSS (2011)-Math 8thG *M*	.87	.87	<.001	
TIMSS (2011)-Science 8thG *M*	.87	.87	<.001	
TIMSS (2015)-Total *M*	.80	.80	<.001	Mullis et al. (2016a,b)

Variable	*r* x NIQ (QNW)	*N* (ctr.)	*p*	Source of compared variable
TIMSS (2015)-Total 5th *P*	.80	.80	<.001	
TIMSS (2015)-Total 95th *P*	.68	.68	<.001	
TIMSS (2015)-Total 4thG *M*	.77	.77	<.001	
TIMSS (2015)-Total 8thG *M*	.85	.85	<.001	
TIMSS (2015)-Math 4thG *M*	.78	.78	<.001	
TIMSS (2015)-Science 4thG *M*	.81	.81	<.001	
TIMSS (2015)-Math 8thG *M*	.82	.82	<.001	
TIMSS (2015)-Science 8thG *M*	.79	.79	<.001	
TIMSS (2015)-Teachers form. educ.	.45	.45	.005	Mullis et al. (2016a, Exhibit 8.1, 8.2)
TIMSS (2015)-School Discipline	.46	.46	.002	Mullis et al. (2016a, Exhibit 7.1, 7.2)
TIMSS (2015)-Native-Immi.-Gap	.00	.00	.982	Wendt et al. (2016; Fig. 11.1; 11.2)

Fig. 2. *Strength of correlations between the variables [NIQ (QNW)] and the mean, 5th and 95th percentiles of TIMSS-Total across time.*

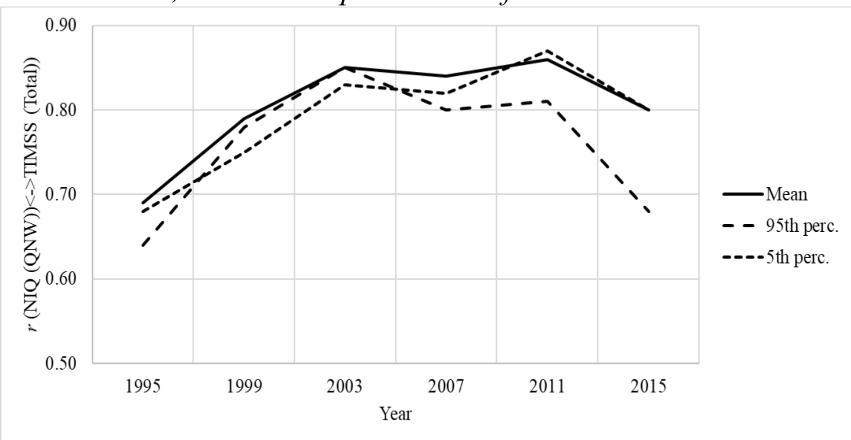
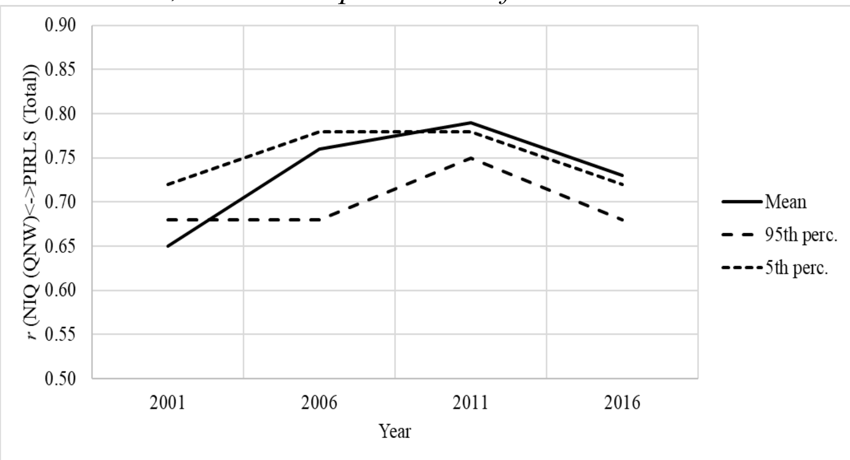


Table 4. *Correlations between [NIQ (QNW)] and selected PIRLS variables.*

Variable	*r* x NIQ (QNW)	*N* (ctr.)	*p*	Source of compared variable
PIRLSIQ	.73	54	<.001	self-calculated
PIRLS (2001) *M*	.65	30	<.001	Mullis et al. (2003)
PIRLS (2001) 5th *P*	.72	43	<.001	
PIRLS (2001) 95th *P*	.68	43	<.001	
PIRLS (2006) *M*	.76	34	<.001	Mullis et al. (2007)
PIRLS (2006) 5th *P*	.78	34	<.001	
PIRLS (2006) 95th *P*	.68	34	<.001	
PIRLS (2011) *M*	.79	44	<.001	Mullis et al. (2012b)
PIRLS (2011) 5th *P*	.78	44	<.001	
PIRLS (2011) 95th *P*	.75	44	<.001	
PIRLS (2016) *M*	.73	43	<.001	Mullis et al. (2017)
PIRLS (2016) 5th *P*	.72	43	<.001	
PIRLS (2016) 95th *P*	.68	43	<.001	
PIRLS (2016) *SD*	-.65	43	<.001	
PIRLS (2016) Early Literacy Activities	.41	41	.007	
PIRLS (2016) Early Literacy Skills	-.26	41	.107	
PIRLS (2016) School Discipline	.50	43	.001	

Fig. 3. *Strength of correlations between the variables [NIQ (QNW)] and the mean, 5th and 95th percentiles of PIRLS across time.*



2. Education: Years, Quality and Other Variables.

National IQs are highly correlated with the years of education of the population shown in the first ten studies summarised in Table 5. Row 11 gives a positive correlation of national IQs with the percentage of the population with tertiary education. Rows 12 and 13 give positive correlations of national IQs with the percentage of the population with a high school or secondary education. The high correlations between national IQs and years of education are best understood as arising from reciprocal causation or a positive feed loop in which national IQs are a determinant of per capita income, and higher per capita income raises the quantity of schooling, which feeds back to increase intelligence and literacy. The explanation of the association between national IQs and adult literacy has been discussed by Barber (2005, p. 280). He suggests that adult literacy is not simply a function of the proportion of children enrolled in secondary education because "illiteracy had strong and consistent negative effects on IQ, even with schooling controlled" (p. 280). He suggests that "perhaps a high level if illiteracy in a society impoverishes the overall level of intellectual stimulation with a depressing effect on IQ scores". This explanation is consistent with studies showing that greater secondary education is a determinant of IQ among individuals shown by Ceci (1991), in a number of studies reviewed by Mackintosh (2011, pp. 303-5) and a study showing that years of primary school education is a determinant of IQ by Bergoll, Wirthwein, Rost and Steinmayer (2017). The study by Burhan et al. (2017) also showed that national IQs are correlated at .60 with the education of the parents of the children whose IQs were assessed showing a further positive association between national IQs and education.

Row 14 gives a positive correlation of national IQs assessed as the percentage of children with IQs of 115 plus and the quality of education. Row 15 gives a correlation of .19 between national IQs and public expenditure per primary school student. The low correlation is not statistically significant and suggests that the amount spent on primary school education makes no contribution to national IQs. This result is consistent with other studies reporting that the effects of expenditure are small or even negligible, e.g. Hattie (2009, p.74) and Hanushek, Peterson and Woessmann (2013, p.98): "An additional $1,000 in per-pupil spending is associated with a trivial annual gain in achievement of 0.1 percent of a standard deviation". Row 16 gives a positive correlation of national IQs and the average level of education of the population.

Table 5. *Years, quality of education and other educational variables.*

	Variable	*N* Countries	*r* x IQ	Reference
1	Years	78	.77	Meisenberg, 2004
2	Years	173	.78	Rindermann, 2008a
3	Years	137	.64	Hassall & Sherratt, 2011
4	Years	91	.80	Meisenberg, 2012a
5	Years	143	.75	Meisenberg & Woodley, 2013
6	Years	138	.73	Daniele & Ostuni, 2013
7	Years	116	.76	Jones & Potrafke, 2014
8	Years	61	.51	Burhan et al, 2014b
9	Years	93	.70	Salahodjaev, 2015
10	Years	101	.54	Rindermann, 2018
11	Tertiary %	178	.79	Vanhanen, 2014
12	High school %	74	.62	Hafer, 2017
13	High school %	55	.62	Burhan et al., 2017
14	Quality	64	.85	Tovar et al., 2017
15	Educational expenditure	124	.19	McDaniel & Whetzel, 2006
16	Adult education	192	.74	Rindermann, 2018
17	Educational expenditure	116	.63	
18	Teacher salary	40	.32	
19	Kindergarten	82	.69	
20	Tracking young age	72	.28	
21	Language identical	93	.30	
22	Discipline	95	.49	
23	School autonomy	72	.49	
24	Teacher quality	93	.49	
25	Young age of enrolment	96	.05	

	Variable	*N* Countries	*r* x IQ	Reference
26	Amount of instruction	96	-.14	
27	Direct instruction	80	.06	
28	Achievement tests	88	.08	
29	Central exam tests	54	.11	
30	Private schools	68	.12	
31	Class size	189	-.66	
32	Repetition rate	68	-.26	
33	Homework	91	-.18	

Rows 17 through 19 show further positive correlations of national IQs with educational expenditure (Row17); teacher salary (Row 18); percentage in kindergarten (Row 19). However, Rindermann notes that a number of studies have shown that attendance at kindergarten does not have any long-term effect on increasing intelligence and suggests the positive correlation with national IQs is likely attributable to modernization; tracking at young age (Row 20); language identical, i.e. the students have the same language as the teachers (Row 21); discipline assessed as regular attendance and good behavior (Row 22); school autonomy (Row 23); teacher quality (Row 24). Rows 25 through 30 show non-significant correlations between national IQs and young age of enrolment confirming that education at an early age has no long-term effect on increasing intelligence (Row 25); the amount of instruction given in a year (Row 26); direct instruction (Row 27); achievement tests (Row 28); central exam tests (Row 29); and private schools (Row 30). Rows 31 through 33 show negative correlations between national IQs and class size showing smaller classes are associated with higher national IQs (Row 31); repetition rate, the percentages of pupils required to repeat a year (Row 32); and homework (Row 33), a result contrary to studies at the individual level reporting positive associations between homework and cognitive ability.

3. Per Capita Income

There is a large research literature showing the positive effect of intelligence on earnings among individuals. The classical study is Christopher Jencks' *Inequality* (1972) in which he synthesized American research and estimated that the correlation between intelligence and earnings at .31. He also estimated that IQ has a heritability of about 50 per cent, and therefore that genetic factors contribute to income differences. Jencks' estimate has proved remarkably accurate in the light of later studies reported for a number of countries. For instance, it was shown in a national sample in Britain that intelligence measured at the age of 8 years was correlated with income at the age of 43 years at .37 for men and at .32 for women (Irwing and Lynn, 2006). A meta-analysis of longitudinal research on the relation of intelligence to socio-economic success has been given by Strenze (2007). A study that intelligence predicts earnings has been reported in Germany by Anger and Heineck (2010).

Nations are aggregates of individuals so it would be expected that the positive relation of IQ and income for individuals would hold for nations. We examined this expectation in Lynn and Vanhanen (2002) in which we gave measured IQs for 81 nations and additional estimated IQs for 104 nations estimated from the measured IQs of neighbouring nations with similar populations. We showed that measured average national IQs were positively correlated with per capita GDP (Gross Domestic Product, a measure of per capita income) at .66. Thus, IQ explained 44 per cent of the variance in per capita GDP among nations. For 185 nations, average national IQs were positively correlated with per capita GDP at .68. From this result we argued that national IQs are the single most important variable in the determination of national per capita income. We proposed a positive feedback relation between national IQs and per capita income in which IQ is a determinant of income, and income is a determinant of IQ through its positive effects on nutrition, health and education. We proposed that the other principal determinants of income are free market economies and the possession of natural resources such as oil in the Gulf states.

These results are summarised in Table 6. Rows 1 and 2 give our first results followed by a number of studies confirming the association between national IQs and per capita income. Row 5 shows that the positive association was present in the year AD 1 for 120 populations corresponding approximately to contemporary nations, although at a lower correlation (.24) than in subsequent years (Lynn and Vanhanen, 2012, p.113). Rows 6 through 16 show that the positive association was also present in subsequent years including 1500 and 1820 when it was at approximately the same magnitude (.68 and .63) as those reported in our study of contemporary nations. Rows 17 to 23 give results of further studies confirming the positive association between national IQ and per capita income. Row 17 gives the first of these published by Meisenberg (2004) reporting a correlation of .82 between national IQ and per capita log GDP averaged for the years 1975-2003 and therefore higher than any of our correlations.

Rows 18 and 19 give results of Dickerson's (2006) study confirming the positive relation between national IQs and per capita income and also showing that IQ and GDP data are best fitted by an exponential function that increases the linear correlation for 81 nations from .54 to .695 and for 185 nations from .38 to .482. Dickerson concludes that as a rough approximation "an increase of 10 points in mean IQ results in a doubling of the per capita GDP".

Row 20 gives McDaniel & Whetzel's (2006) study confirming the positive relation of .60 between national IQs and per capita income in 2002 and also showing that showing that there is a slightly higher curvilinear positive relation between national IQ and per capita income in 2002 of .67. This study also showed that when the IQs of all countries IQ with IQs below 90 were raised to 90, the correlations with national IQs increased slightly from and .60 to .65 (linear) and from .67 to .70 (curvilinear).

Rows 21 to 27 give results of seven studies confirming the positive relation between national IQs and per capita income. Christainsen (Row 27) argues that causality runs mainly from national IQs to the socio-economic variables and not from the socio-economic variables to national IQs.

Rows 28 to 32 give results of five studies confirming the positive relation between national IQs and per capita income in years from 1500 to 2005. Daniele (2013) concludes from his low correlation of .11 between national IQs and GDP per capita in 1500 that national IQs have not been a determinant of per capita income because if they were the correlation would be higher, and therefore that “differences in the timing of agriculture transition and the histories of states, not population IQ differences, predict international development differences before the colonial era. The average IQ of populations appears to be endogenous, related to the diverse stages of nations’ modernization, rather than being an exogenous cause of economic development”. This conclusion cannot be accepted because Daniele’s low correlation of .11 between national IQs and GDP per capita in 1500 is based on the measurement of GDP by the extent of population density and urbanization and this is not a satisfactory measure of GDP. When GDP per capita is measured in $US international dollars given by Maddison (2007), the correlation between national IQs and GDP in 1500 is .68 given by Lynn and Vanhanen (2012, p.115) showing that the positive relationship between national IQs and GDP per capita was present in 1500.

Rows 33 through 48 give results of subsequent studies reporting further confirmation of the positive relation between national IQ and per capita income. Row 45 (Coyle et al., 2016) used PISA, TIMSS and PIRLS data as a proxy for national IQs and showed a slightly higher correlation with GDP for the ability of the intellectual class defined as the top 5 percent than of .79 compared with the average of .76. This result confirms Rindermann's cognitive capitalism theory set out in Rindermann, Sailer and Thompson (2009) that the IQ of the intellectual class has a greater effect on national achievements than the IQ of the average.

Row 47 (Burhan et al., 2017) used PISA 2009 and 2012 averaged as a proxy for national IQs. The authors argue that national per capita income determines national IQs (r =.68) and do not discuss the possibility that national IQs determine per capita income. In my previous publications I have preferred a positive feedback model in which national IQs and per capita income augment each other. The authors also argue that “per capita income had indirectly channeled its positive effect on cognitive ability through the reduction in child mortality”. It is not clear how the reduction in child mortality would increase national IQs. It seems more probable that the correlation of -.77 between national IQs and child mortality is attributable to national IQs reducing child mortality especially since an association between low intelligence of parents and infant mortality has been shown at the individual level by Savage (1946). Row 48 gives national incomes measured as 2005 US$ at constant prices. Row 49 gives a positive correlation between national IQs assessed as the percentage of children with IQs of 115 plus and economic wealth defined as individual net worth.

Rows 50 and 51 show national IQ positively correlated with log GDP per capita (at purchasing power parity) in 2010 and 2012 Rindermann and Becker (2018) show that increases in national IQs lead to subsequent increases in per capita income indicating that the major direction of causality is from national IQs and per capita income. The studies summarized in Table 3 show that national IQs explain between a third and half of the variability of the global differences in per capita income and that this relationship has been present at least since 1500.

The highest correlations to [QNW+SAS+GEO] of .73|.75 (*N*=159; *p*<.001) was found for Log GDP/c from 2008 (Table 7; Fig. 5), taken from the Maddison Project (2013), which is within the range of the findings presented in Table 6. The logarithmization of GDP/c from 2008 only gives minor increases in correlations from .71|.74 (*N*=159; *p*<.001; Fig. 4) to the coefficients named above. If GDP/c from different years were used, correlations to [QNW+SAS+GEO] increased strongly. They were even stronger for 1900 (*r*=.57|.57; *N*=38; *p*<.001) than for 1950 (*r*=.25|.26; *N*=137; *p*=.003) but the number of observed countries increased strongly between the two years.

Table 6. *Per capita income*

	Variable	*N* Countries	*r* x IQ	Reference
1	GDP per cap	81	.66	Lynn & Vanhanen, 2002
2	GDP per cap	185	.68	
3	GNI per cap	113	.68	Lynn & Vanhanen, 2006
4	GNI per cap	192	.60	
5	GDP per cap AD 1	120	.24	Lynn & Vanhanen, 2012
6	GDP per cap AD 1000	120	.10	
7	GDP per cap 1500	120	.68	
8	GDP per cap 1600	120	.66	
9	GDP per cap 1700	145	.58	
10	GDP per cap 1820	147	.63	
11	GDP per cap 1870	149	.55	
12	GDP per cap 1913	149	.57	
13	GDP per cap 1950	152	.26	
14	GDP per cap 1973	152	.49	
15	GDP per cap 1990	153	.70	
16	GDP per cap 2003	154	.71	
17	Log GDP per cap	81	.82	Meisenberg, 2004
18	GDP per cap	81	.38	Dickerson, 2006
19	GDP per cap	185	.54	
20	GDP per cap 2000	185	.60	McDaniel & Whetzel, 2006
21	GDP per cap	137	.72	Hassall & Sherratt, 2011
22	GNI log per cap	46	.77	Rindermann et al, 2012
23	Log GDP per cap	91	.78	Meisenberg, 2012a
24	GDP per cap	97	.76	Meisenberg & Woodley, 2013
25	Log GDP per cap	50	.78	Stolarski et al., 2013
26	GNI per cap	124	.71	Cribari-Neto & Souza, 2013
27	GDP 2005 per cap	130	.24	Christainsen, 2013
28	GDP 1500 per cap	140	.11	Daniele, 2013
29	GDP 1820 per cap	52	.26	
30	GDP 1870 per cap	61	.50	
31	GDP 1960 per cap	136	.60	
32	GDP 2005 per cap	156	.81	
33	Log GDP per cap	109	.65	Dama, 2013
34	GNI per cap	138	.72	Daniele & Ostuni, 2013
35	Log GDP per cap	129	.73	Kanyama, 2014
36	GDP 1970 per cap	118	.67	Burhan et al., 2014a
37	IGDP per cap	118	.47	
38	GDP 2005 per cap	116	.57	Jones & Potrafke, 2014
39	Log GDP per cap	93	.69	Salahodjaev, 2015
40	GDP log per cap	93	.69	
41	GDP per cap	162	.52	Salahodjaev, 2015a

	Variable	*N* Countries	*r* x IQ	Reference
42	Per cap income	52	.31	Cribari-Neto & Souza, 2015
43	GDP log per cap	75	.85	Stolarski et al., 2015
44	GDP log per cap: 2001-12	93	.76	Lv & Xu, 2016
45	GDP log per cap: 2010	93	.76	Coyle et al., 2016
46	GDP per cap: 1985	74	.60	Haffer, 2017
47	Log GDP per cap: 1992-2011	55	.68	Burhan et al., 2017
48	Log GDP per cap: 2005	101	.75	Lv, 2017a
49	Wealth per cap	64	.82	Tovar et al., 2017
50	GDP log per cap: 2010	161	.82	Rindermann, 2018
51	GDP log per cap: 2012	143	.76	Odilova & Lynn, 2019

Table 7. *Correlations between NIQ (QNW+SAS+GEO) and selected economic variables.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N* (ctr.)	*p*	Source of compared variable
GDP/C (1900AD) ($)	.57|.57	38	<.001	Maddison Project (2013)
GDP/C (1950AD) ($)	.25|.26	137	.003	
GDP/C (1990AD) ($)	.68|.72	159	<.001	
GDP/C (2000AD) ($)	.66|.69	159	<.001	
GDP/C (2008AD) ($)	.71|.74	159	<.001	
Log GDP/C (2008AD) ($)	.73|.75	159	<.001	self-calculated

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r*.

Fig. 4. *Scatterplot between the variables [GDP/C (2008AD)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.71; N=159; p<.001).*

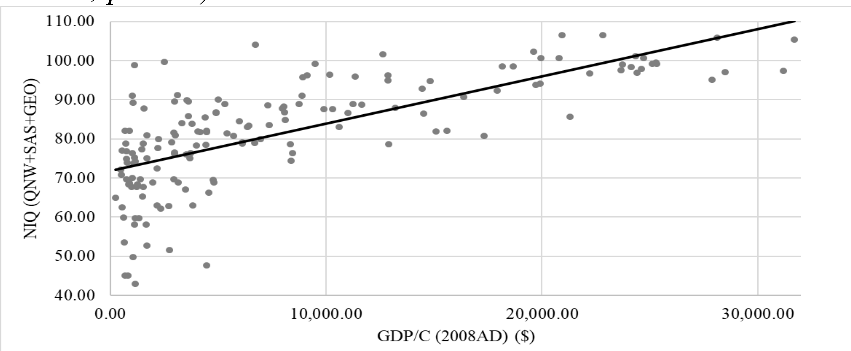
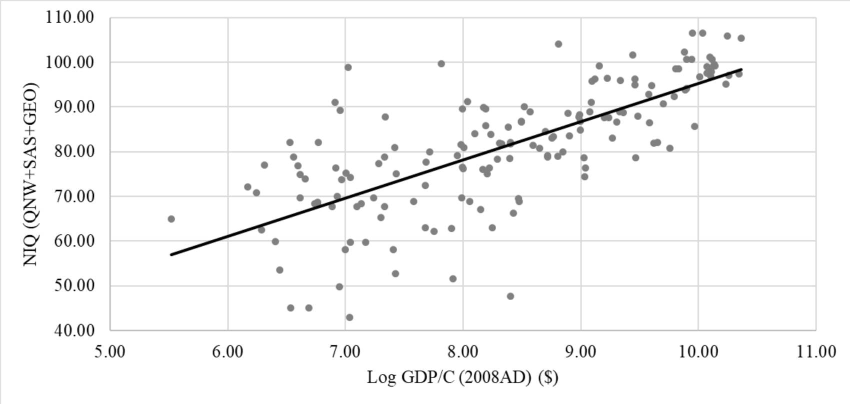


Fig. 5. *Scatterplot between the variables [Log GDP/C (2008AD)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.73; N=159; p<.001).*



4. Economic Growth

It was argued in Lynn and Vanhanen (2002) that their finding that national IQs are substantially correlated with per capita income implies that national IQs must be associated with economic growth at some time in the past. Their result showing that this was correct for the growth of GDP per capita for 1950-1990 but not for growth of GDP per capita for the shorter time periods 1995-1998 and 1990-2002 for which the correlations were effectively zero (-.01), are shown rows 1 and 2 of Table 8. Their positive correlation (.45) for 1950-1990 was accepted by Erich Weede and Sebastian Kampf (2002) who wrote: "there is one clear and robust result: average IQ does promote growth"; by Edward Miller (2002): "the theory helps significantly to explain why some countries are rich and some poor historians and development economists who prefer not to use IQ as an analytical input".

This is supported by findings obtained if data from the Maddison Project (2013) were correlated with [QNW+SAS+GEO] (Table 9). Correlations were strongest positives for annual growth in GDP/c from 1999 to 2000 (r=.45|.48; N=159; p<.001), weakest for growth from 1949 to 1950 (r=-.01|-.05; N=47; p=.921) and negative but insignificant in 2008 (r=-.07|-.08; N=159; p=.384). Also, the growth rate of the industrial production, taken from CIA (2017, Index: "Industrial production growth rate"), correlates negatively and insignificant (r=-.13|-.12; N=191; p=.077).

The positive correlation between national IQs and past economic growth over the long term has been confirmed in a number of subsequent studies summarised in Table 8. Row 4 shows a substantial correlation (.75) for the growth of GDP per capita for 1950-2001 but Row 5 shows an effectively zero (-.06) correlation for growth of GDP per capita for the shorter time period 1990-2002. Row 6 confirms the positive correlation (.44) between national IQs and the growth of GDP per capita for 1500-1900 for 185 countries.

Rows 7 and 8 give further data showing positive correlations between national IQs and the growth of GDP per capita for 1975-2005. Row 9 gives a high correlation (.79) between national IQs and GDP growth between 1500 and 2005 although it is based on only 62 countries.

Rows 10 through 14 give five further results showing positive correlations between national IQs and economic growth from the later decades of the twentieth century into the beginning of the twentieth century. The low correlation of .13 given in row 12 is attributable to the measure of annual GDP growth rates at market prices based on local currency. The study in row 14 also reported the correlation of .25 for the top 5 percent fractionally lower that the .26 for the average.

Row 15 shows a negative correlation between national IQs and the growth volatility in the growth of real economic output, higher IQ countries tend to have more stable economies.

The principal conclusion to be drawn from these studies is that national IQs predict economic growth rates over long time periods but not over shorter time periods shown in rows 2,3, 5 and 14. The explanation for this is that shocks to the economy such as wars, large increases in the price of oil and so on, reduce the growth rate of some countries in the short term, but over the long term these have little effect and national IQ emerges as the major determinant of economic growth rates.

This conclusion may be surprising to economists because theoretically it would be expected that low IQ countries would have faster economic growth rates than high IQ countries because of what Weede and Kämpf (2002) call "the advantage of backwardness". This advantage should be present because of the potential of poor countries to adopt the technologies and management practices of wealthier countries, whereas wealthier countries depend on innovation. However, the studies summarized in this section show that this is not so, and that the correlation between national IQs and economic growth over the long term is positive. Meisenberg (2011) discusses this question and suggests that the explanation may be that a high IQ population is more likely to establish effective economic institutions that favor economic growth.

Table 8. *Economic growth*

	Variable	***N* Countries**	***r* x IQ**	**Reference**
1	GDP per cap: 1950-1990	166	.45	Lynn and Vanhanen, 2002
2	GDP per cap: 1995-1998	123	-.01	
3	GDP per cap: 1987-1998	127	-.01	
4	GDP per cap: 1950-2001	132	.75	Lynn and Vanhanen, 2006
5	GDP per cap: 1990-2002	145	-.06	
6	GDP per cap: 1500-1900	185	.44	Rindermann, 2008
7	Economic growth: 1975-2005	126	.37	Meisenberg, 2011
8	Economic growth: 1975-2005	134	.48	Meisenberg, 2012c
9	Growth GDP: 1500-2005	62	.79	Daniele, 2013
10	Growth GDP: 1970-2010	118	.55	Burhan et al., 2014a
11	Economic growth: 1950-2001	61	.26	Burhan et al, 2014b
12	Economic growth: 1950-2001	93	.13	Salahodjaev, 2015a

	Variable	*N* Countries	*r* x IQ	Reference
13	GDP per cap: 1985-2005	74	.58	Hafer, 2017
14	Economic growth:1990-2010	61	.26	Burhan et al, 2018
15	Growth volatility	115	-.54	Hafer, 2018

Table 9. *Correlations between NIQ (QNW+SAS+GEO) and selected variables representing economic growth.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N*	*p*	Source of compared variable
Ann. GDP/c growth to prev. y. (1900AD) (%)	.32|.18	27	.109	Maddison Project (2013)
Ann. GDP/c growth to prev. y. (1950AD) (%)	-.01|-.05	47	.921	
Ann. GDP/c growth to prev. y. (1990AD) (%)	.40|.43	137	<.001	
Ann. GDP/c growth to prev. y. (2000AD) (%)	.45|.48	159	<.001	
Ann. GDP/c growth to prev. y. (2008AD) (%)	-.07|-.08	159	.384	
Industrial production growth rate (%)	-.13|-.12	191	.077	CIA (2017, Index: "Industrial production growth rate")

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60 set to 60; *p*-values for left *r*

5. Income Inequality

Meisenberg (2004) was the first to report a negative correlation (-.60) for national IQs with income inequality measured with the Gini index, the values of which range from zero (all citizens have the same income) to 1 (one person earns everything). Further studies confirming that there is less income inequality in high IQ countries are summarised in Table 10. Lynn & Vanhanen (2012) confirmed the negative relationship and also showed that national

IQs are negatively correlated with the percentage of national wealth consumed by the highest 20 per cent of the population (147 nations, r = -.47) as another measure of income inequality. The explanation proposed by Lynn & Vanhanen (2012) is that "more intelligent people are able to establish more equal economic conditions than less intelligent people". The explanation proposed by Meisenberg (2012a) is that "a more-or-less equal income distribution leads to the greatest happiness of the greatest number. We can expect that societies whose members are capable of reasoning at this level will develop mechanisms to restrain the exploitation of the weak by the strong and to redistribute wealth from the rich to the poor". Salahodjaev and Kanazawa (2017) confirm the negative association and propose that social transfers from the wealthy to the poor are a major mechanism by which higher IQ nations achieve lower income inequality and that this is because more intelligent individuals are more likely to have a preference for such transfers.

Salahodjaev and Kanazawa (2017) provide a useful discussion of why nations with higher IQs have lower levels of income inequality. They write: "First, income inequality and poverty are deep-rooted in discriminative institutions and social injustice. Populations with higher average intelligence may adopt more inclusive institutions (Kanyama, 2014) that eradicate discrimination and offer greater liberties and rights to marginalized groups of society (Solon, 2014). For example, Salahodjaev and Azam (2015), using data from 107 countries, documented that intelligence has a direct and significantly positive effect on both formal and informal institutions that foster gender equality, even after controlling for culture, religion, type of political systems and level of development. Similarly, Nikolaev and Salahodjaev (2016) reported that cognitive abilities, proxied by intelligence levels or scores from vocabulary knowledge tests, lead to more equal distribution of national happiness both across countries and states. Therefore, it is possible to hypothesize that societies with higher average intelligence may be more likely to escape institutional inequality traps. Moreover, while there is evidence that income inequality exists when 'members of the better-off social group broadly share a taste for discrimination against the social group populated by the poor' (Mogues & Carter, 2005, p. 194), a number of studies have shown that cognitively able societies are more likely to exhibit tolerance (Rashidova & Salahodjaev, unpublished), vote for democratic parties and take part in political activities (Deary et al., 2007).

Second, while previous articles have argued that 'poorest groups in a country may benefit from redistribution' (Deininger & Squire, 1997; Doerrenberg & Peichl, 2014), recent evidence shows that countries with higher cognitive capital redistribute more efficiently public goods such as health care (Lv & Xu, 2016) or environmental benefits (Salahodjaev, 2016), leading to more equal distribution of well-being within society (Nikolaev & Salahodjaev, 2016). McKay et al. (2003) argued that the relative size of redistributive policies and higher taxation on the wealthier strata of the society depend on the capacity of the low-income class to organize themselves, which in turn may be a function of cognitive abilities (Proto et al., 2014). While Kenworthy & McCall (2008) suggested that government is more likely to implement redistributive policies when voters express their preferences for state spending priorities via voting, public polls or referenda, there is evidence that high-IQ individuals are more likely to participate in boycotts, sign petitions and vote in elections (Deary et al., 2007).

Third, a common aspect of societies with higher levels of income inequality is when productive resources are diverted toward appropriative activities, resulting in a misallocation of resources in the economy [the so-called rent-seeking phenomenon] (Chakraborty & Dabla-Norris, 2005, p. 3). Countries in which rent-seeking activities are followed by corruption, underground activities and government bureaucracy tend to establish institutions that neglect property rights and economic freedoms. National institutions that fail to provide economic agents with greater liberties and freedom of choice lead to uneven distribution of income and wealth. In contrast, the ruling elite in countries with higher cognitive capital are more likely to support redistributive policies as 'more intelligent people demonstrate less of a preference for smaller, immediate rewards versus larger, delayed rewards' (Shamosh & Gray, 2008). Thus, it has been shown that intelligence is negatively correlated with corruption (Potrafke, 2012) and the extent of the shadow economy (Salahodjaev, 2015) and positively correlated with the provision of financial resources to the private sector (Kodila-Tedika & Asongu, 2015). Kanazawa (2009) has offered an explanation for the link between intelligence and redistribution policies consisting of his Savanna-IQ Interaction Hypothesis proposing that more intelligent individuals are more likely to acquire and adopt evolutionarily novel preferences and values that our ancestors did not possess. Concerns for the underprivileged outsiders that are not part of the in-group such as blood-relatives, tribal members or repeated exchange partners are clearly evolutionarily novel. Early humans, when they were spreading around the world, used to settle in small groups of about 150 individuals and thus did not possess altruistic values towards out-group strangers. Large countries inhabited by ethnically diverse populations and political systems that pursue inclusive developmental agenda are evolutionarily novel. The Savanna-IQ Interaction Hypothesis would therefore predict that more intelligent individuals are more likely to adopt evolutionarily novel concerns for the welfare of genetically unrelated others and the willingness to contribute larger proportions of private resources for the welfare of these others, than are less intelligent individuals.

Table 10. *Income inequality: the Gini index*

	***N* Countries**	***r* x IQ**	**Reference**
1	59	-.06	Meisenberg, 2004
2	127	-.51	Kanazawa, 2009
3	147	-.47	Lynn & Vanhanen, 2012
4	134	-.58	Meisenberg, 2012c
5	52	-.43	Cribari-Neto & Souza, 2015
6	147	-.04	Obydenkova & Salahdjaev, 2017a
7	165	-.32	Salahodjaev & Kanazawa, 2018

6. Other Economic Variables

A number of other economic correlates of national IQs are summarised in Table 11 and compared with new correlations with IQs from the NIQ-dataset in Table 12.

Rows 1, 2 and 3 of Table 11 give positive correlations between national IQs and the Human Development Index, a composite measure consisting of life expectancy, years of education and GNI (Gross National Income). The correlation of .78 from Lynn and Vanhanen (2012) is confirmed by the correlations of .74|.76 (N=185; p<.001) between HDI from the United Nations Development Programme (2018) and [QNW+SAS+GEO]. The strength of this coefficient increased if HDI is adjusted by inequality (r=.80|.83; N=150; p<.001; Fig. 6). No differences were found between the coefficients for correlations between the female HDI with [QNW+SAS+GEO] (r=.78|.80; N=160; p<.001) and between the male HDI with [QNW+SAS+GEO] (r=.78|.79; N=160; p<.001). Countries with lower national IQs show, on average, a stronger increase in HDI from 1990 to 2015 that countries with higher national IQs (r=-.34|-.33; N=144; p<.001).

Row 4 of Table 11 gives a negative correlation between national IQs and the rate of unemployment, i.e. countries with low IQs have high unemployment. The correlation of -.76 for 107 nations reported by Lynn and Vanhanen (2012) is much stronger than the correlations of -.23|-.27 (N=191; p=.001) from the use of [QNW+SAS+GEO] and unemployment data from CIA (2017, Index: Unemployment rate) reported in Table 12 but the sample of nations is twice as large in the second case. Remarkably, the correlation almost disappears if only the unemployment rate of youth aged from 15 to 24^{h} years is used (r=-.06|-.09; N=152; p=.488). The negative correlation between national IQs and the rate of unemployment is consistent with studies showing that there is an association between low intelligence and unemployment among individuals. In the United States, Toppen (1971) reported that a sample of the unemployed had an average IQ of 81. Herrnstein and Murray (1994) reported that 14 per cent of those with IQs below 74 had been unemployed for one month or longer during the preceding year, and the percentages of the unemployed declined in successively higher IQ groups to 4 percent among those with IQs above 126. Mroz and Savage (2006) showed that in the National Longitudinal Survey of Youth lower IQ predicted higher probability of unemployment within the last year, higher average weeks of unemployment, and higher probability of job change, even after controlling for years of education, ethnicity, parental education, whether the person's childhood home received periodicals, and a number of additional covariates. Thus, both the rate of job destruction and the length of job search are higher for workers with lower IQ. Finally, Lynn, Hampson and Magee (1984) reported that a sample of the unemployed in Northern Ireland had an average IQ of 92 significantly below the national population mean of 100.

The principal explanation for the association between low IQ and high rates of unemployment among individuals within countries is that those with low IQs normally perform poorly at school and do not acquire educational credentials or skills. Employers typically select employees on the basis of educational qualifications and are reluctant to employ those without educational qualifications. If those with low IQs do secure jobs, they typically perform poorly, since numerous studies have shown that intelligence is positively related to the efficiency of performance. This has been reported in the United States (Ghiselli, 1966; Hunter and Hunter, 1984; Schmidt and Hunter, 1998) and in Europe (Salgado, Anderson, Moscoso et al., 2003). When those with low IQs perform poorly in employment, they are frequently dismissed. They acquire a poor work history, and this makes employers reluctant to employ them.

It may be surprising that there is a negative correlation between national IQs and the rate of unemployment because low IQ countries have low wages so would be expected to attract industries and services from high IQ rich countries and this should generate high levels of employment. The likely explanation that this evidently does not occur is that the populations of low IQ countries are not able to produce goods and services so efficiently for sale in international markets, as compared with the populations of high IQ countries, and this offsets their low wage advantage.

Row 5 gives a positive correlation between national IQs and economic development corroborating the studies reporting positive correlations between national IQs and per capita incomes summarised in Section 3.

Rows 6 and 7 of Table 11 give positive correlations between national IQs and economic openness measured in row 7 as openness to trade as the GDP share of the value of total exports and imports averaged for the years 2006-2010.

Row 8 gives a negative correlation between national IQs and the possession of natural resources for which the author proposes the explanation is that the possession of natural resources may create conditions favourable to rent-seeking and a proliferation of regulations and corruption. Alternatively, it may be a coincidence that a number of countries with abundant natural resources of oil happen to have quite low national IQs.

Row 9 gives a positive correlation between national IQs and high quality entrepreneurs measured by the Acs and Szerb Global Entrepreneurship Development Index (GEDI).

Rows 10 and 11 give positive correlations between national IQs and the supply of finance measured as a percentage of GDP and as an index of the size of the banking sector, and the stocks traded as a percentage of GDP. He concludes that "these findings underline the importance of intelligence in economic development through the effect on financial markets" (p.285).

Row 12 gives a positive correlation of .62 between national IQs and economic welfare a measure of the quality of life defined as composed of fewer working hours, longer lives, more consumption and less income inequality. Row 13 gives a positive correlation between national IQs and investment as a percentage of annual GDP average over the years 1970-2010. Rows 14 and 15 give positive correlations between national IQs and investment in physical capital as a percentage of GDP. Row 16 confirms the positive correlation between national IQs and the openness to trade given in row 7.

Row 17 gives a positive correlation between national IQs and alcohol consumption averaged to .46 from per capita beer consumption (.41) and per capita wine consumption (.52). These results are consistent with positive correlations at the individual level reported by Batty et al. (2008) and Kanazawa (2012) who finds that children with higher intelligence are more apt to engage in binge drinking in early adulthood.

Row 18 gives a zero highest marginal tax rate. Row 19 confirms this by showing a low and non-significant correlation between national IQs and fiscal burden defined as the tax burden index.

Row 20 gives a negative correlation between national IQs and the extent of the shadow economy also known as the black, informal or underground economy defined as "all market based legal production of goods and services that are deliberately concealed from public authorities". The shadow economy is illegal because it avoids taxation. The author suggests that populations with higher IQs are more willing to comply with government laws prohibiting the shadow economy. The result is consistent with the higher rates of corruption and crime in low IQ countries.

Row 21 gives a negative correlation between national IQs and the contribution to the economy of agriculture as a percentage of GDP. This negative relation is confirmed by correlations of -.45|-.43 (N=200; p<.001) between [QNW+SAS+GEO] and the share of nations' GDP by contributions from the sector of agriculture in Table 12, provided by the CIA (2017, Index: GDP - composition, by sector of origin). In contrast, positive but insignificant correlations of .12|.09 (N=200; p=.101) are found between [QNW+SAS+GEO] and the share of contribution from industry, and positive and significant correlations of .12|.09 (N=200; p<.001) between [QNW+SAS+GEO] and the share of contribution from the sector of services. Moreover, by using data from CIA (2017, Index: GDP - composition, by end use), there are correlations of .34|.35 (N=201; p<.001) between [QNW+SAS+GEO] and the share of GDP used for exports and -.15|-.17 (N=201; p=.031) for imports.

Row 22 of Table 12 gives a positive correlation between national IQs and meat consumption arising because the populations of countries with higher IQs are more affluent and can afford more meat. Row 23 gives a zero (-.02) correlation between national IQs and oil production. Row 24 gives a positive correlation between national IQs and statistical capacity assessed as the capacity of governments to produce accurate national economic data defined by the Bulletin Board on Statistical Capacity of the World Bank. Rows 25 through 28 give positive correlations between national IQs and economic freedom, confirmed by correlations of .44|.46 (*N*=183; *p*<.001) between [QNW+SAS+GEO] and the total score for economic freedom in 2017, reported by The Heritage Foundation (2017), presented in Table 12 and Fig. 7.

Row 29 gives a negative correlation between national IQs and the percentage of the population living in poverty defined as having an income below $2 a day during the years 1993-2008. Row 30 gives a positive correlation between national IQs and economic diversification of exports.

Rows 31 through 33 (Coyle et al., 2016) used PISA, TIMSS and PIRLS data as a proxy for national IQs and show positive correlations with economic freedom defined as the Fraser Index, innovation defined as the Global Innovation Index, and competitiveness defined as the Global Competitiveness Index. These three studies showed slightly higher correlations with the ability of the intellectual class defined as the top 5 percent than with the average and confirm Rindermann's cognitive capitalism theory (Rindermann, Sailer & Thompson, 2009) that the IQ of the intellectual class has a greater effect on national achievements than the IQ of the average.

Row 34 gives a positive correlation between the percentage of the population with IQs of 115 plus and entrepreneurial abilities (acceptance to risk, start up skills confidence, product and process innovation). The correlation between national IQs at 85 IQ is lower showing that the ability of the cognitive elite with an IQ of 115 plus makes the most important contribution to entrepreneurial activities and economic wealth.

Row 35 gives a positive correlation between national IQs and ease of doing business. This study also gives positive correlations between national IQs and a number of associated characteristics, e.g. registering a property (.284), getting credit (.392), enforcing contacts (.592) and resolving insolvency (.672). Correlations with the percentage of the population with an IQ of 115 are slightly higher. The authors claim that the higher intelligence of the creative minority provides the infrastructure for entrepreneurial innovation.

Row 36 gives a zero correlation between national IQs and banking development in 25 Sub-Saharan African countries. Row 37 gives a positive correlation between the national IQs of immigrants in eleven countries and their employment rates in Denmark (.74), Norway (.66) and Sweden (.66) averaged to .69. Row 38 gives a positive correlation between national IQs and export productivity measured as EXPY. Row 39 gives a positive correlation between national IQs and the rate of globalization measured by the KOF index of globalization and defined as the interaction and integration among the cultures, enterprises and governments of different countries, a process driven by international flow of goods and investment and aided by information technology. Salahodjaev (2019a) has reported that globalization, assessed with the KOF index of globalization, is positively correlated with income inequality in countries with cognitive abilities below international averages ($r = 0.17$; $n = 76$), while in nations with national IQs above 84 points globalization reduces income inequality ($r = -0.35$;$n = 85$). Row 40 gives a positive correlation between national IQs and productivity and shows that productivity increases nonlinearly at higher levels of ability suggesting that these disproportionately boost national productivity.

Row 41 gives a positive correlation between national IQs and time since the origin of agriculture showing that high IQ countries developed agriculture sooner.

Row 42 gives a negative correlation between national IQs and the extent of the slave trade between 1400 and 1900. The authors propose that populations with higher IQ were better able to avoid being captured and sold as slaves. Row 43 gives a positive correlation between national IQs and the complexity of products assessed by the economic complexity index.

Table 11. *Other Economic Variables*

	Variable	*N* Countries	*r* x IQ	Reference
1	Human Development Index	176	.78	Lynn & Vanhanen, 2006
2	Human Development Index	45	.85	Rindermann et al., 2012
3	Human Development Index	59	.69	Woodley et al., 2014
4	Rate unemployment	107	-.76	Lynn & Vanhanen, 2012
5	Economic development	147	.54	Obydenkova & Salahdjaev, 2017
6	Economic openness	124	.29	Cribari-Neto & Souza, 2013
7	Trade	129	.36	Kanyama, 2014
8	Natural resources	129	-.21	
9	Entrepreneurship	60	.65	Hafer & Jones, 2015
10	Supply finance	180	.70	Salahodjaev, 2015a
11	Stocks traded	180	.64	
12	Economic welfare growth	74	.62	Hafer, 2017
13	Investment	118	.47	Burhan et al., 2014a
14	Investment	93	.43	Salahodjaev, 2015a
15	Investment	74	.71	Hafer, 2017
16	Trade	93	.11	Salahodjaev, 2015a
17	Alcohol consumption	99	.46	Belasen & Hafer, 2013
18	Highest marginal tax rate	112	.08	Kanazawa, 2009
19	Fiscal burden	162	-.12	
20	Shadow economy	162	-.58	Salahodjaev, 2015a
21	Agriculture	162	-.64	
22	Meat consumption	63	.53	Hill & Williams, 2017
23	Oil production per cap	182	-.02	McDaniel & Whetzel, 2006
24	Statistical capacity	118	.61	Kodila-Tedika et al., 2017
25	Economic freedom	152	.51	McDaniel & Whetzel, 2006
26	Economic freedom	59	.76	Meisenberg, 2004
27	Economic freedom	125	.61	Meisenberg, 2011
28	Economic freedom	134	.49	Meisenberg, 2012c
29	Poverty	101	-.71	Lynn & Vanhanen, 2012
30	Export diversification	170	.71	Kodila-Tedika & Simplice, 2016a
31	Economic freedom	97	.45	
32	Innovation	95	.79	Coyle et al., 2016
33	Competitiveness	94	.67	

	Variable	*N* Countries	*r* x IQ	Reference
34	Entrepreneurial abilities	64	.81	Tovar et al., 2017
35	Ease doing business	71	.65	Burhan et al., 2017
36	Banking development	25	-.03	Aluko & Ajayi, 2017
37	Employment	11	.69	Kirkegaard, 2017
38	Export productivity	138	.60	Odilova, 2018
39	Globalization	138	.71	
40	Productivity	94	.67	Coyle et al., 2018
41	Origin agriculture	143	.51	Meisenberg & Woodley, 2013
42	Product complexity	124	.76	Azam, 2017
43	Product complexity	108	.77	Lapatinas & Litina, 2018

Table 12. *Correlations between NIQ (QNW+SAS+GEO) and other economic variables.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N*	*p*	Source of compared variable
GDP – comp., by sector of origin (agric. %)	-.45|-.43	200	<.001	CIA (2017, Index: “GDP - composition, by sector of origin”)
GDP – comp., by sector of origin (ind. %)	.12|.09	200	.101	
GDP – comp. by sector of origin (serv. %)	.31|.31	200	<.001	
GDP – comp., by end of use (exports %)	.34|.35	201	<.001	CIA (2017, Index: “GDP - composition, by end use”)
GDP – comp., by end of use (imports %)	-.15|-.17	201	.031	
Inflation rate (consumer prices) (%)	-.24|-.24	199	.001	CIA (2017, Index: “Inflation rate (consumer prices)”)
Unemployment rate, youth ages 15-24 (%)	-.06|-.09	152	.488	CIA (2017, Index: “Unemployment rate”)
Unemployment rate (%)	-.23|-.27	191	.001	
HDI (2015)	.74|.76	185	<.001	United Nations Development Programme (2018)
Average annual HDI growth (1990-2015)	-.34|-.33	144	<.001	
Inequality-adjusted HDI (2015)	.80|.83	150	<.001	

Variable	*r* x NIQ (QNW+SAS+GEO)	*N*	*p*	Source of compared variable
Coefficient of human inequality (2015)	-.77|-.80	150	<.001	
Gender Development Index (2015)	.52|.54	160	<.001	
HDI - Female (2015)	.78|.80	160	<.001	
HDI - Male (2015)	.78|.79	160	<.001	
Index of Global Inequality (mean)	.74|.77	176	<.001	Vanhanen (2014, Tab. 5.1)
Index of Global Inequality (fitted)	.85|.88	176	<.001	
Economic Freedom total score (2017)	.44|.46	183	<.001	The Heritage Foundation (2017)
Economic Freedom Property Rights (2017)	.62|.65	182	<.001	
Economic Freedom Judical Effect. (2017)	.48|.50	181	<.001	
Economic Freedom Gov. Integrity (2017)	.57|.60	182	<.001	
Economic Freedom Tax Burden (2017)	-.17|-.18	179	.021	
Economic Freedom Gov't Spending (2017)	-.38|-.38	180	<.001	
Economic Freedom Fiscal Health (2017)	.19|.20	182	.011	
Economic Freedom Business (2017)	.44|.46	183	<.001	
Economic Freedom Labor (2017)	.27|.26	183	<.001	
Economic Freedom Monetary (2017)	.16|.16	180	.035	
Economic Freedom Trade (2017)	.42|.44	180	<.001	
Economic Freedom Investment (2017)	.24|.25	178	.002	
Economic Freedom Financial (2017)	.41|.42	178	<.001	

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r*.

Fig. 6. *Scatterplot between the variables [Inequality-adjusted HDI (2015)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.80; N=150; p<.001).*

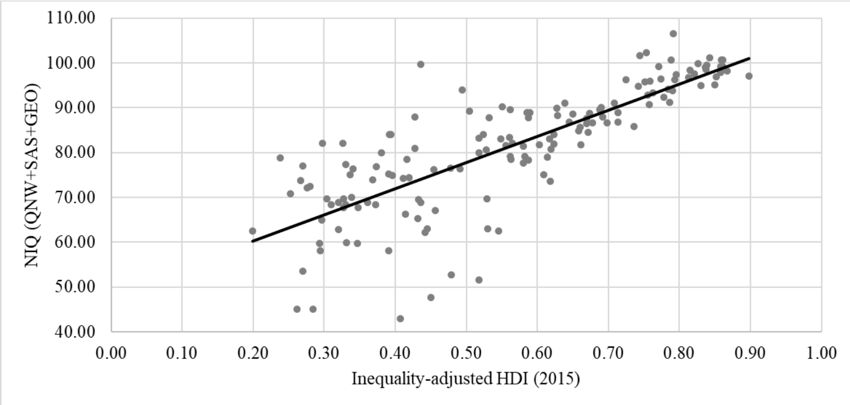
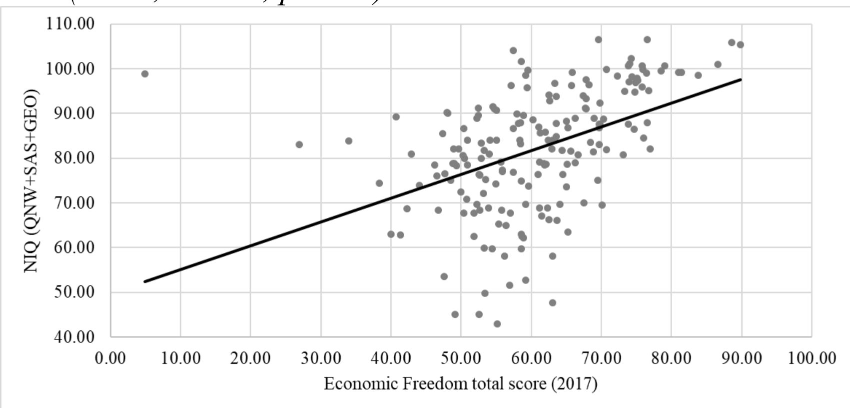


Fig. 7. *Scatterplot between the variables [Economic Freedom total score (2017)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.44; N=183; p<.001).*



7. Cognitive Achievement

A high IQ is required for intellectual achievement so it would be expected that there would be positive correlations between national IQs and indices of this. Studies showing this is the case are summarised in Table 13. Row 1 gives a positive correlation between national IQs and the numbers of papers per capita published in academic journals. Row 2 gives a positive correlation of 0.59 between national IQ and the number of books in the home, probably largely reflecting the higher literacy in high IQ countries. Row 3 gives a positive correlation between national IQs and the patent index measured as the number of patents granted in the USA per million population. Gelade adopts the patent index as a measure of a nation's technological achievement and writes "technological achievement mediates the relationship between IQ and wealth; in other words, high IQ nations generate more technical knowledge, which in turn leads to more wealth" (Gelade, 2008, p. 712). Row 4 confirms this with a correlation of .40 between national IQs and patents per capita granted during 1960-2007, based on 76 nations.

Row 5 gives a correlation of 0.63 between national IQs and "intellectual autonomy" defined as follows: "in cultures that emphasise intellectual autonomy individuals are encouraged to create and innovate, and to pursue their own ideals" (Gelade, 2008, p. 172). The author predicted that cultures that value intellectual autonomy should have high production of patents, which in turn promotes economic development. This prediction was confirmed by the correlation of 0.71 between intellectual autonomy and per capita income.

Row 6 gives a positive correlation between national IQs and STEM, a measure of scientific, technological, engineering and mathematical excellence.

Rows 7, 8 and 9 give positive correlations between national IQs and Nobel prizes awarded per capita (1901-2004) for literature (0.13), peace (0.21) and science (0.34), based on 97 nations. It may be surprising that the correlation with literature is as low as 0.13 and is not statistically significant. The reason for this is that the Nobel Committee has not been good at picking works of literature that have endured. Who now reads or has even heard of the first literature Nobel prizewinners Sully Prudhomme (1901), Theodor Mommsen (1902), Bjørnstjerne Bjørnson (1903), Frédéric Mistral (1904), Henryk Sienkiewicz (1905) and Giosuè Carducci (1906).

Yet remarkably the prize was not awarded to Leo Tolstoy who did not die until 1910.

The correlations with peace and science are statistically significant, although the correlation with science (.34) may be surprising low. One reason for this is that the nations of Northeast Asia (China, Japan, Korea, Singapore and Hong Kong) have the highest IQs but win few Nobel Prizes. It has been proposed that the explanation for this is that the Northeast Asian peoples have lower creativity than the Europeans, who have won nearly all the Nobel prizes for science (Lynn, 2007; Kura, te Nijenhuis & Dutton, 2015).

Row 10 gives a correlation of 0.61 between national IQs and the numbers of scientists and engineers working in research, per capita. Row 11 gives a correlation of 0.38 between national IQs and technology exports as percentage of all manufactured exports. Row 12 gives a correlation of .36 between national IQs and the cognitive ability of politicians 1990-2009 estimated from their educational qualifications,

Row 13 gives a positive correlation between national IQs and performance in the International Mathematical Olympiad (IMO), a competition for young people below age 20 years. Countries select six individuals to participate in the IMO which consists of mathematical problems in geometry, number theory and functional equations. The study gives national IMO scores, relative to the population size, in the IMO from 1991 to 2010. The proposed explanation is that national IQs are a significant determinant of high mathematical ability.

Row 14 gives a positive correlation of .67 between national IQs and the numbers of researchers in research and development per million population in 1900-2003. When per capita income, democratization and the level of tertiary education are added to national IQ, the multiple correlation to explain variation in R&D rises to 0.795 (N=96) and the explained part of variation to 63 per cent, which is 19 percentage points more than national IQ explains (44%). National IQ remains as the dominant explanatory factor, but the three environmental variables raise the explained part of variation significantly.

Rows 15 and 16 give positive correlations between national IQs and *g* factor loadings as .8870 in 53 low IQ countries and .8375 in 53 high IQ countries. The difference confirms Spearman's law of diminishing returns that states that *g* loadings are lower in high IQ populations.

Row 17 gives a positive correlation between national IQs and STEM, a measure of scientific, technological, engineering and mathematical excellence, confirming the result in row 6. This study reports a slightly higher correlation with the ability of the intellectual class defined as the top 5 percent (.54) than with the average (.51) and confirms Rindermann's cognitive capitalism theory (Rindermann, Sailer & Thompson, 2009) that the IQ of the intellectual class (also designated the smart fraction or the cognitive elite) has a greater effect on national achievements than the IQ of the average. Row 18 gives a positive correlation between national IQs and the percentage of the population with IQs of 115 plus and STEM, a measure of scientific, technological, engineering and mathematical excellence, confirming the results in row 17.

Rows 19 through 25 give a positive correlations between national IQs and the percentage of eminent scientists, the 18th century enlightenment index, patents, high- tec exports, innovation assessed from the World Intellectual Property Organization, high citations of research articles and top universities.

Rows 29 through 29 give a positive correlations between national IQs and measures of safety in airlines, road traffic, occupations and technology. The author notes that intelligence is positively associated with the avoidance of accidents at both the individual and national level. Row 30 gives a positive correlation with numbers of eminent scientists from 800 BC to 1950 AD given by Murray (2003).

Rows 31 and 32 give positive correlations between national IQs and the annual number of patents granted in the U.S. per capita averaged for 2000-9, confirming the results given in rows 3,4 and 21; and with the number of researchers per million of the population. Rows 33 and 34 give positive correlations between national IQs and the numbers of papers published in science journals and science Nobel prizes, per capita. This paper argues that high androgens also contribute to these achievements and proposes that lower androgen levels partly explain the relatively few Nobel prizes won by Northeast Asians compared with Europeans. Further evidence for lower androgen levels in Northeast Asians is given in Lynn (2018a).

Row 35 gives a positive correlation between national IQs and numbers of top players per capita in twelve mental sports (chess, scrabble, poker, etc.).

Table 13. *Cognitive Achievement*

	Variable	*N* Countries	*r* x IQ	Reference
1	Academic papers	139	.87	Morse, 2008
2	Books in home	63	.59	Rindermann, 2008
3	Patents	112	.51	Gelade, 2008
4	Patents	76	.40	Rindermann, Sailer & Thompson, 2009
5	Intellectual autonomy	63	.63	Gelade, 2008
6	STEM	90	.74	Rindermann, Sailer & Thompson, 2009
7	Nobels: literature	97	.13	
8	Nobels::peace	97	.21	
9	Nobels: science	97	.34	
10	Scientists, engineers	51	.61	
11	Technology exports	61	.38	
12	Politicians' ability	90	.36	
13	Math Olympiad	108	.68	Rindermann, 2011
14	R & D researchers	97	.67	Lynn & Vanhanen, 2012
15	G factor loadings	53	.89	Coyle & Rindermann, 2013
16	G factor loadings	53	.83	
17	STEM	97	.51	Coyle et al., 2016
18	STEM	64	.73	Tovar et al., 2017
19	Eminent scientists	42	.37	Rindermann, 2018
20	Enlightenment	32	.34	
21	Patents	76	.49	
22	High- tec exports	-	.52	
23	Innovation	142	.83	
24	High citations	93	.44	
25	Top universities	103	.74	
26	Airline safety	37	.53	
27	Road safety	182	.51	
28	Occupation safety	192	.71	

	Variable	*N* Countries	*r* x IQ	Reference
29	Technological safety	194	.71	
30	Eminent scientists	196	.40	
31	Patents	66	.55	Burhan et al., 2018
32	Researchers	66	.24	
33	Publications: science	96	.62	Van der Linden et al., 2018
34	Nobels: science	153	.39	
35	Mental sports	195	.79	Kirkegaard, 2018

8. Political Institutions

Studies of national IQ and political institutions are summarised in Table 14. Rows 1 through 12 show that national IQs are positively associated with democracy. The correlations are between .44 and .65. This range is confirmed by correlations between [QNW+SAS+GEO] and different indices for democracy in different times, shown in Table 15. In the case of the Vanhanen's Index of Democracy, also known as the Polyarchy index or Polyarchy dataset (Vanhanen, 2000), the correlations increased over time, starting with .19|.21 (N=28; p=.345) in 1910 to 1825 and ending with 56|.59 (N=180; p<.001; Fig. 8) in 1976 to 2000. The most recent measurement in 2000 correlates with .54|.56 (N=180; p<.001). The Transformation Index from the Bertelsmann Stiftung (2018) (BTI) was developed especially for countries in the transformation and therefore excludes established democracies. Political and economic transformation is measured by the BTI-Status index and correlates with [QNW+SAS+GEO] with .39|.42 (N=128; p<.001; Fig. 9). The correlation is weaker for the BTI-Index of Democracy with .24|.27 (N=128; p=.006) and strongest for the BTI-Index of Market Economy with .51|.54 (N=128; p<.001).

The major exception to this positive association is China which has a high IQ but is not a democracy. The study in row 6 gives three positive correlations of various magnitudes depending on how democracy is measured. The authors conclude that “all countries do not have equal chances to establish and maintain democratic systems” (p.149).

The study in row 10 assesses democracy as the sum of the Freedom House Political Rights and Civil Liberties Indices used to measure the level of democracy rescaled to 2 (least democracy) to 14 (most democracy). Rows 13 and 14 show that national IQ is positively associated with democracy combined with political freedom.

Rows 15 through 18 show that national IQ is positively associated with economic freedom defined and measured in row 15 as the extent of personal choice, voluntary exchange, freedom of economic competition, and the rule of law providing legal protection for the person and property. Row 17 shows this result confirmed with economic freedom measured as the EFR (Economic Freedom in the World) index calculated from the size of government, legal security of property rights, sound money, free trade across countries, and regulation of credit, labour and business.

Rows 19 through 27 show that national IQ is positively associated with institutions normally associated with democracy including the rule of law, political freedom, economic freedom, property rights, freedom of expression, the ease of conducting business transactions measured by the Doing Business Index for 21 Asian countries, the efficiency of bureaucracy measured as the quality and speed of decisions made by public officials and institutional quality.

Row 25 shows that national IQ is positively associated with freedoms measured as the sum of freedom from want (to enjoy a decent standard of living), freedom from fear (no threats to personal security), freedom of expression and participation (self-expression with individuals having much control over their own lives, and freedom from discrimination by race, ethnicity, gender or religion.

Rows 27 and 28 show that national IQ is positively associated with property rights measured by the International Property Rights Index (IPRI). Row 29 shows that national IQ is positively associated with property rights protection in 2016. Row 30 shows that national IQ is positively associated with institutional quality.

Rows 31 through 38 show that national IQ is negatively associated with the extent of corruption measured by the Perception of Corruption Index (CPI), i.e. countries with high IQs have less corruption. Potrafke (2012) proposes that populations with higher IQs have longer time horizons that enable them to resist corruption. Lv (2017b) has confirmed the negative association between national IQs and corruption in a study of 171 countries over the period 2007–2011 but he does not give the correlation. He has also shown that there is an inverted U-shaped relationship between national IQs and corruption, such that at the early stages of cognitive development, an increase in national IQ increases corruption but as IQ increases beyond a certain threshold, the relationship appears to reverse and corruption tends to diminish.

Rows 39 and 40 show that national IQ is positively associated with "big government" defined as government expenditure as a percentage of GDP showing a small tendency for high IQ nations to have more government expenditure, confirmed in row 41. Row 42, however, shows a negative correlation between national IQ and government consumption relative to GDP.

Rows 43 and 44 show that national IQ is positively associated with government effectiveness given by the World Bank's government effectiveness index. Row 45 shows that national IQ is positively associated with good governance in 35 African countries. Row 46 shows that national IQ is positively associated with regulatory quality, a characteristic associated with government effectiveness.

Rows 47 and 48 show that national IQ is positively associated with political stability. Row 49 shows that national IQ is positively associated with "voice and accountability". This variable is not defined but probably means that the population has a greater voice in the government of the country and the government is more accountable to the people.

Row 50 shows that national IQ is negatively associated with the Failed State Index, a measure of vulnerability to political breakdown and measured as a combination of 12 social, economic and political indicators. The correlation reported by Voracek (2013) is -.72 for 117 countries, only slightly stronger than the correlations -.66|-.69 (N=176; p<.001) calculated between [QNW+SAS+GEO] and total scores at the Failed State Index of 2017 (The Fund For Peace, 2017). Averaged across the indices from 2006 to 2017, the correlations are -.60|-.62 (N=144; p<.001; Fig. 10) and close to those from 2017. The negative correlation with national IQ shows higher national intelligence is associated with lower vulnerability to political breakdown.

Rows 51 and 52 show that national IQs are positively associated with gender equality assessed by the representation of women in parliament and negatively associated with gender inequality assessed with the UNDP's gender inequality index.

Row 53 shows a negative correlation of - 0.22 between national IQs and war measured as participation, intensity and destructive effects of war in the years 1960-2000, including civil wars. The negative correlation shows that higher IQ countries have less engagement in war. The correlation is low but statistically significant. Possibly the explanation for this negative correlation is that high IQ countries are more likely to be democratic and democracies are less likely to engage in war.

Rows 54 and 55 show positive correlations between national IQs and patent protection and intellectual property rights protection assessed by the Intellectual Property Protection Index, a component of the Global Competitiveness Index of the World Economic Forum. Rows 56 through 60 show positive correlations between national IQs and four human rights, namely physical integrity defined as the absence of torture and extrajudicial execution, freedom of speech, freedom of religion and women's rights, and for these averaged to give a measure of general human rights.

Row 61 shows a positive correlation of .86 between national IQs and an index of global inequality assessed as the aggregate of per capita income, percentage with tertiary education, low child mortality, high life expectancy, good sanitation and democracy (Vanhanen, 2014). The same index correlated with [QNW+SAS+GEO] gives correlations of .74|.77 (N=176; p<.001) for the unfitted version and .85|.88 (N=176; p<.001; Fig. 11) for the version fitted by residuals. The second scores are almost the same as calculated by Vanhanen.

Table 14. *Political Institutions*

	Variable	*N* Countries	*r* x IQ	Reference
1	Democracy	192	.53	Lynn & Vanhanen, 2006
2	Democracy	156	.47	McDaniel & Whetzel, 2006
3	Democracy	183	.56	Rindermann, 2008a
4	Democracy	170	.65	Meisenberg, 2009
5	Democracy	84	.60	Rindermann et al., 2009
6	Democracy	188	.51	Lynn & Vanhanen, 2012
7	Democracy	178	.55	Vanhanen, 2014
8	Democracy	93	.53	Salahodjaev, 2015
9	Democracy	162	.47	Salahodjaev, 2015a
10	Democracy	151	.52	Obydenkova & Salahodjaev, 2016
11	Democracy	101	.44	Lv, 2017a
12	Democracy	187	.55	Rindermann., 2018
13	Democracy/freedom	126	.57	Meisenberg, 2011
14	Democracy/freedom	134	.60	Meisenberg, 2012c
15	Economic freedom	152	.51	McDaniel & Whetzel, 2006
16	Economic freedom	59	.76	Meisenberg, 2004
17	Economic freedom	125	.61	Meisenberg, 2011
18	Economic freedom	134	.49	Meisenberg, 2012c
19	Rule of law	131	.64	Rindermann, 2008a
20	Rule of law	129	.60	Kanyama, 2014
21	Rule of law	153	.63	Rindermann., 2018
22	Efficiency of bureaucracy	140	.64	Rindermann, 2008a
23	Political freedom	170	.49	Meisenberg, 2009
24	Political liberty	193	.41	Rindermann, 2018
25	Doing business Index	21	.72	Jones, 2011
26	Freedom	71	.68	Van de Vliert, 2013
27	Property rights	116	.63	Jones & Potrafke, 2014
28	Property rights	74	.63	Hafer, 2017
29	Property rights	127	.63	Odilova & Xiaomin, 2017
30	Institutional quality	21	.72	Jones, 2011
31	Corruption	126	-.54	Meisenberg, 2004
32	Corruption	132	-.59	Lynn & Vanhanen, 2006
33	Corruption	132	-.60	Rinderman, 2008a
34	Corruption	180	-.59	Lynn & Vanhanen, 2012
35	Corruption	125	-.63	Potrafke, 2012
36	Corruption	91	-.63	Meisenberg, 2012a
37	Corruption	134	-.55	Meisenberg, 2012c
38	Control of corruption	129	.56	Kanyama, 2014
39	Big government	134	.22	Meisenberg, 2012c

	Variable	*N* Countries	*r* x IQ	Reference
40	Big government	147	.22	Obydenkova & Salahdjaev, 2017a
41	Govt. expenditure	93	.20	Salahodjaev, 2015
42	Govt. consumption	74	-.23	Hafer, 2017
43	Govt. effectiveness	129	.66	Kanyama, 2014
44	Govt. effectiveness	129	.64	Salahodjaev, 2015a
45	Govt. effectiveness	35	.25	Kodila-Tedika, 2015
46	Regulatory quality	129	.62	Kanyama, 2014
47	Political stability	129	.46	
48	Political stability	118	.57	Burhan et al., 2014a
49	Voice & accountability	129	.49	Kanyama, 2014
50	Failed State Index	117	-.72	Voracek, 2013
51	Gender equality	187	.31	Lynn & Vanhanen, 2012
52	Gender inequality	136	-.86	
53	War	186	-.22	Rindermann, 2008a
54	Patent protection	88	.63	Odilova & Gu, 2016
55	Property protection	139	.52	Odilova & Xiaomin, 2017
56	Physical integrity	95	.53	Rindermann & Carl, 2018
57	Freedom of speech	95	.30	
58	Freedom of religion	95	.28	
59	Women's rights	95	.54	
60	Human rights	95	.51	
61	Global inequality	178	.86	Vanhanen, 2014

Table 15. *Correlations between NIQ (QNW+SAS+GEO) and selected variables representing quality of political institutions.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N*	*p*	Source of compared variable
PRIO 1810-1825	.19|.21	28	.345	Vanhanen & PRIO (2000)
PRIO 1826-1850	.20|.22	41	.209	
PRIO 1851-1875	.27|.29	44	.075	
PRIO 1876-1900	.34|.37	47	.019	
PRIO 1901-1925	.50|.54	66	<.001	
PRIO 1926-1950	.52|.55	83	<.001	
PRIO 1951-1975	.50|.53	148	<.001	
PRIO 1976-2000	.56|.59	180	<.001	
PRIO 2000	.54|.56	180	<.001	
BTI 2018 – Status	.39|.42	128	<.001	Bertelsmann Stiftung (2018)
BTI 2018 - Democracy	.24|.27	128	.006	
BTI 2018 - Market Economy	.51|.54	128	<.001	
BTI 2018 - Governance	.22|.25	128	.012	
FSI total (2006-2017)	-.64|-.66	176	<.001	The Fund For Peace (2017)
FSI total (2006)	-.60|-.62	144	<.001	

Variable	*r* x NIQ (QNW+SAS+GEO)	*N*	*p*	Source of compared variable
FSI total (2007)	-.59|-.62	175	<.001	
FSI total (2008)	-.60|-.62	175	<.001	
FSI total (2009)	-.60|-.63	175	<.001	
FSI total (2010)	-.61|-.64	175	<.001	
FSI total (2011)	-.63|-.65	175	<.001	
FSI total (2012)	-.64|-.66	176	<.001	
FSI total (2013)	-.65|-.68	176	<.001	
FSI total (2014)	-.65|-.68	176	<.001	
FSI total (2015)	-.66|-.68	176	<.001	
FSI total (2016)	-.66|-.69	176	<.001	
FSI total (2017)	-.66|-.69	176	<.001	
Index of Global Inequality (mean)	.74|.77	176	<.001	Vanhanen (2014, Tab. 5.1)
Index of Global Inequality (fitted)	.85|.88	176	<.001	

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r.*

Fig. 8. *Scatterplot between the variables [PRIO 1976-2000] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.56; N=180; p<.001).*

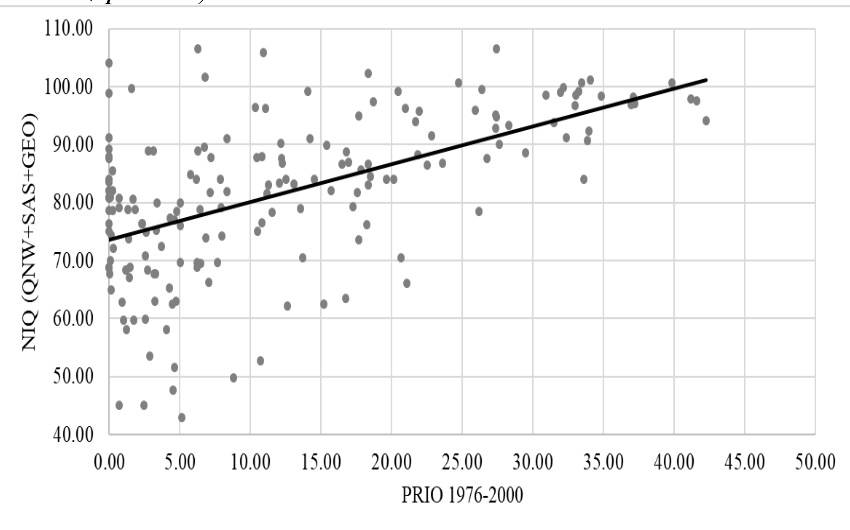


Fig. 9. *Scatterplot between the variables [BTI – 2018 Status] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.39; N=128; p<.001).*

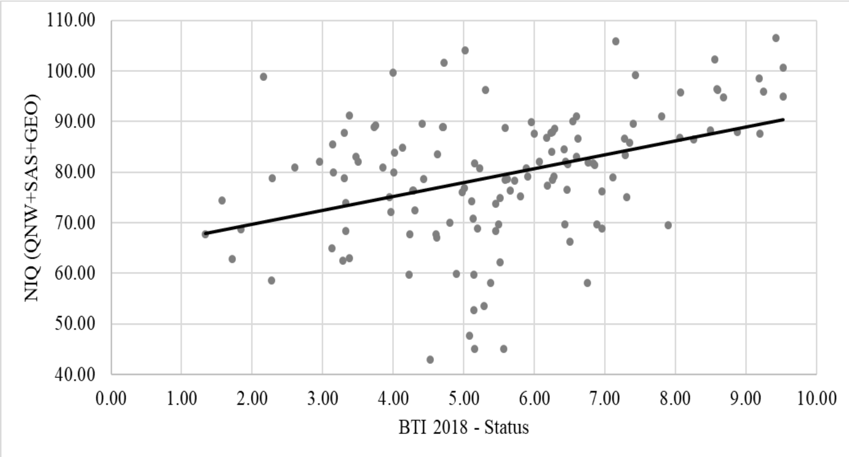


Fig. 10. *Scatterplot between the variables [FSI total (2006-2017)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.64; N=176; p<.001).*

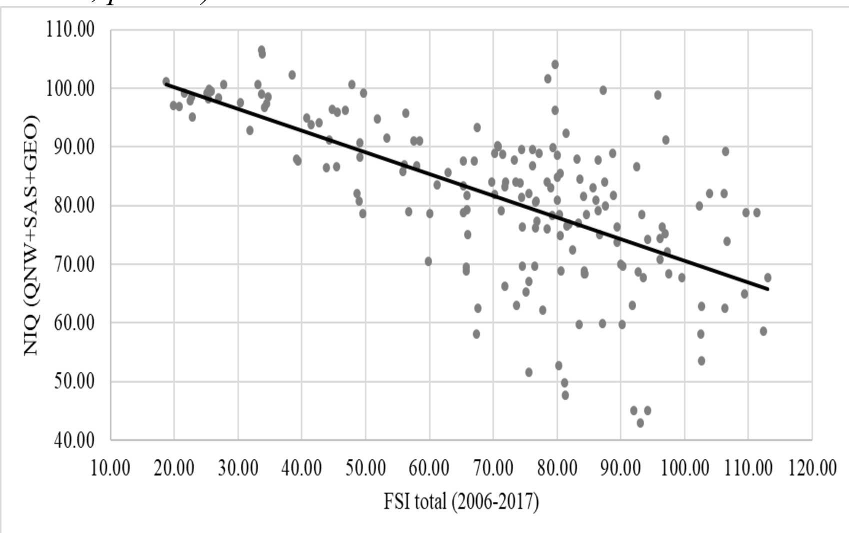
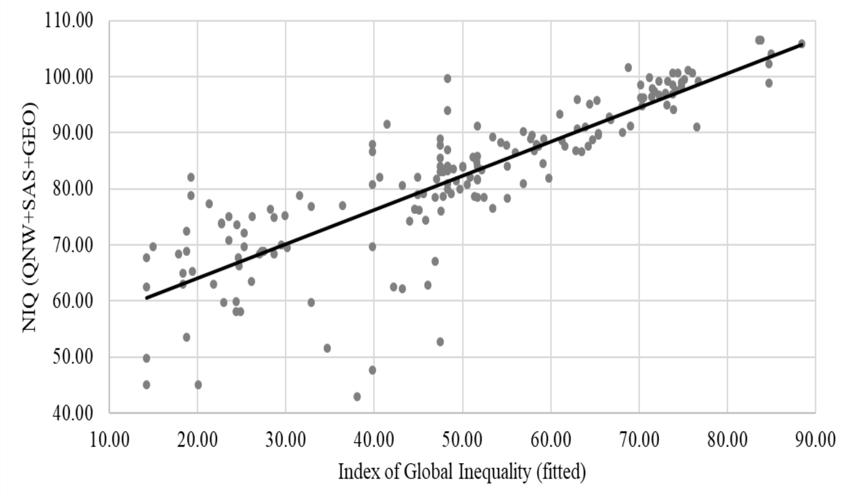


Fig. 11. *Scatterplot between the variables [Index of Global Inequality (fitted)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.85; N=176; p<.001).*



9. Personality

Studies of national IQs and personality are summarised in Table 16. Rows 1 through 5 give the relation between national IQs and the "big five" personality traits showing non-significant correlations of -.01 for Neuroticism and .16 for Conscientiousness, and significant correlations of .30 for Extraversion, .34 for Openness and .33 for Agreeableness. The positive correlation between national IQs and openness confirms this relationship found in studies of individuals (Ackerman and Heggestad, 1997). The standardized T-scores from Schmitt et al. (2007, Table 5) were used for correlations to [QNW+SAS+GEO] to review these findings. It should be noted that the standardization inverted the scales in the case of Conscientiousness and Agreeableness, so negative correlations from Table 16 had to be confirmed by positive correlations in Table 17, and vice versa. Instead of -.01 for Neuroticism we obtained 32|.32 (*N*=56; *p*=.017), instead of .16 for Conscientiousness we obtained -.52|-.52 (*N*=56; *p*<.001; Fig. 12), instead of .30 for Extraversion we obtained .08|.08 (N=56; p=.580), instead of .34 for Openness we obtained -.08|-.08 (*N*=56; *p*=.555) and instead of .33 for Agreeableness we obtained -.50|-.50 (*N*=56; *p*<.001). Although the directions of the correlations could be confirmed, these discrepancies are too strong to confirm all the results of Stolarski et al. (2013). The statistical relations between big five personality traits and national IQ are significant only in the case of Neuroticism, Conscientiousness and Agreeableness.

Row 6 in Table 16 shows a positive correlation for 10 Asian countries between national IQs and a low time preference defined as a preference for a larger gain in the future than an immediate smaller gain or, in psychological terms, a capacity to delay gratification. In this study, low time preference was measured by responses to the question "Would you prefer $3400 this month or $3800 next month?" Choosing the second option indicates a low time preference or in psychological terms, present-orientation, delay discounting and a capacity to delay gratification. The authors' proposed explanation for high IQ countries having low average rates of time preference is that a low time preference generates higher savings rates and stocks of financial capital. It has been shown in a meta-analysis of 24 studies that a low time preference (a capacity to delay gratification) is correlated with IQ at 0.23 (Shamosh and Gray, 2008).

Rows 7 through 10 confirm this result by showing positive correlations between national IQs and the savings rates. Row 7 gives a positive correlation between national IQs and the savings rate calculated from the ratio of the holdings of US treasury bonds to nominal GDP over the years 1980-2005. The authors argue that this is predictable from the positive association of IQ with a lower time preference and a greater propensity to postpone immediate gratification for future benefits among individuals. Row 8 confirms this, showing a positive correlation between national IQs and the savings rates (gross domestic savings rate average 1975-2005). Row 9 provides further confirmation in an examination of liquid liabilities, private credit and bank assets as measures of savings and reports correlations with national IQs of 0.66, 0.76 and 0.66, respectively. The author considers private credit is the most accurate. He considers these correlations show that higher IQ countries have more developed financial markets to accommodate this increased savings activity. Hafer examines other predictive variables, and finds they made a contribution, but not so much as to alter the conclusion that the main driver is human ability. He shows that the effect of national IQ occurs independently of a country's legal origin, its initial level of real GDP per capita and its level of economic freedom. This finding is robust to a variety of tests, including the addition of alternative institutional measures, such as human development, health, and education, as well as more specific indexes of economic freedom. He shows that individuals with higher IQs tend to be thriftier and save more, and that countries comprised of such individuals apparently establish and develop financial institutions that promote such behaviour. Money transfers are the first step and financial instruments like mortgages and futures markets are the second. These markets facilitate the saving habit, reduce transaction costs, speed up the re-allocation of resources, and provide the wealth to get societies through times of trouble. The study period covered the years 1980-2009. Row 10 gives a further confirmation using the gross domestic savings rate 1975-2005. These results are consistent with a number of studies of individuals showing that those with higher levels of intelligence save more than those with lower levels of intelligence, e.g. Dohmen, Falk, Huffman and Sunde (2010) and Hafer (2016).

Row 11 gives a positive correlation between national IQs and Rushton’s (2000) K life history variable, a measure of high investment in smaller numbers of offspring, slow maturation and large brain. Row 12 gives a positive correlation between national IQs and time since the origin of agriculture showing that high IQ countries developed agriculture sooner and supporting Meisenberg and Woodley’s (2013) theory that agriculture selected for foresight and long-term planning associated with intelligence and high K life history. This theory is elaborated further by Woodley and Fernandes (2014). Row 13 gives a positive correlation between national IQs and “interpersonal trust” defined as the extent to which people trust each other to behave honestly in transactions. This association has also been reported among individuals by Sturgis, Reid and Allum (2010). Row 14 gives a further positive correlation between national IQs and trust between individuals measured by the percentage of a population that answers "Yes" to the World Value Survey (WVS) question "In general, do you think that most people can be trusted?", supplemented by data from the Danish Social Capital Project, the Latinobarometro and the Afrobarometer.

Row 15 gives a positive correlation between national IQs and the speed of life measured as the speed of service at post offices, walking speed and the accuracy of clocks. The positive correlation suggests that the populations of high IQ countries are more energetic. However, Woodley and Fernandes (2014) have shown that speed of life is not associated with intelligence at the individual level and suggest as possible explanations that "national level correlations result from population level stratification reflecting historical co-selection for both slow life history and high IQ, or that national IQ is qualitatively different from individual differences level IQ and somehow captures variance that is related to life history".

Row 16 gives a positive correlation of .56 for 93 countries between national IQs and individualism as contrasted with collectivism showing that high IQ nations are generally more individualistic. People high in individualism actively seek associations, friendships, and partners in a horizontal relationship without a strong authority. The size of the correlation is reduced because Europeans score higher on individualism than Northeast Asians shown by Hofstede (2001) who reports a difference of 1.98 standard deviation between major European countries and six Northeast Asian countries. This difference has been confirmed by Chiao and Blizinsky (2010) who report an allele responsible for it.

Row 17 gives a negative correlation of -0.55 between national IQs and "acquiescence" defined as agreement with statements presented in opinion surveys. The negative correlation shows that people in low IQ countries are more likely to acquiesce. Meisenberg and Williams (2008) report that acquiescence is associated at the individual level with low IQ, predict that the same association should be present across nations, and demonstrate that this is the case.

Row 18 gives a negative correlation of -0.78 between national IQs and "extremity" defined as the preferential use of the end points of the scale in statements presented in opinion surveys. Meisenberg and Williams (2008) note that extremity is associated at the individual level with low IQ, predict that the same association should be present across nations, and verify the prediction.

Row 19 gives a positive correlation of .55 between national IQs and honesty. Row 20 in the same study gives a negative correlation of -.68 between national IQs and rule violation. These two results are consistent with the positive correlation between national IQs and conscientiousness shown in row 5 and also with studies at the individual level showing intelligence is positively correlated with moral judgment, e.g. at .62 (Krebs and Gillmore, 1982).

Table 9. *Personality*

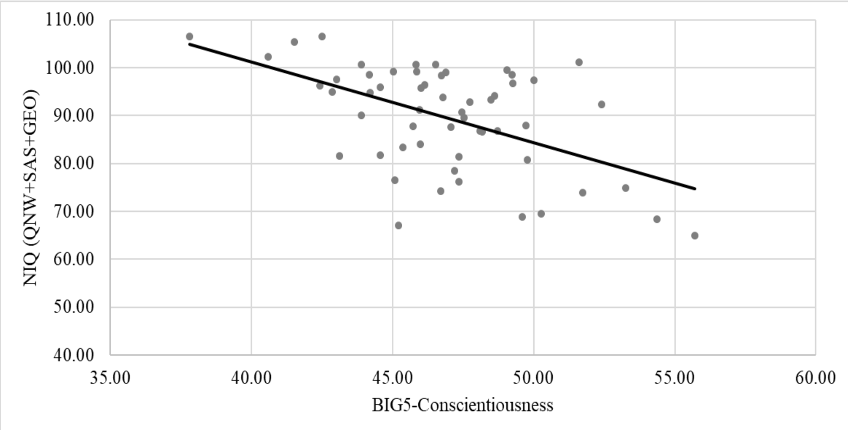
	Variable	*N* Countries	*r* x IQ	Reference
1	Neuroticism	51	-.01	Stolarski et al., 2013
2	Extraversion	51	.30	
3	Openness	51	.34	
4	Agreeableness	51	.33	
5	Conscientiousness	51	.16	
6	Low time preference	10	.70	Jones, 2011
7	Savings	129	.48	Jones & Podemsk, 2010
8	Savings	97	.34	Meisenberg & Woodley, 2013
9	Savings	76	.38	Woodley & Fernandes, 2014
10	Savings	80	.76	Hafer, 2016
11	K life history	97	.88	Meisenberg & Woodley, 2013
12	Origin agriculture	143	.51	
13	Interpersonal trust	41	.49	Rindermann, 2008a
14	Trust	85	.41	Lv, 2017a
15	Speed of life	31	.59	Rindermann, 2008a
16	Individualism	75	.51	Stolarski et al., 2015
17	Acquiescence	79	-.55	Meisenberg & Williams, 2008
18	Extremity	79	-.78	
19	Honesty	23	.55	Rindermann et al,, 2018
20	Rule violation	23	-.68	

Table 17. *Correlations between NIQ (QNW+SAS+GEO) and BIG-5 scales.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N* (ctr.)	*p*	Source of compared variable
BIG5-Extraversion	.08|.08	56	.580	Schmitt et al. (2007)
BIG5-Agreeableness	-.50|-.50	56	<.001	
BIG5-Conscientiousness	-.52|-.52	56	<.001	
BIG5-Neuroticism	.32|.32	56	.017	
BIG5-Openness	-.08|-.08	56	.555	

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r*.

Fig. 12. *Scatterplot between the variables [BIG5-Conscientiousness] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.52; N=56; p<.001).*



10. Liberalism-Conservatism

There is a liberalism-conservatism dimension of political and social values. Kanazawa's (2009) has defined liberalism (as opposed to conservatism) as *the concern for the welfare of genetically unrelated others and the willingness to contribute larger proportions of private resources for the welfare of such others*. More broadly, liberalism can be defined as a set of values including sympathetic attitudes to the poor, the unemployed, immigrants, criminals, alcoholics, drug addicts, the mentally retarded, and people with AIDS, toleration of homosexuality, prostitution and of others with different views, support for abortion, lack of respect for authority, and lack of belief in religion. Conservatism consists of holding the opposite of these values. It has been shown by Kanazawa (2010) that liberalism is associated with intelligence. He reported that those who identified themselves as "very liberal" had a childhood IQ of 106.4, while those who identified themselves as "very conservative" had a childhood IQ of 94.8.

We can predict from this result that there should be a positive correlation across nations between national IQs and liberalism. Studies confirming that this is so are summarized in Table 18. Rows 1 and 2 show that national IQs are positively correlated with "Modernism" (a liberal set of values such as support for abortion and euthanasia, lack of respect for authority, and lack of belief in religion) and "Post-Modernism" (a liberal set of values including sympathy for and acceptance of homosexuality and prostitution, criminals, immigrants, alcoholics, people with AIDS and of those with different views). The positive correlations show that countries with higher IQs have stronger Modernist and Post-Modernist values.

Row 3 gives a positive correlation of 0.49 between national IQ and "interpersonal trust" defined as the extent to which people trust each other to behave honestly in transactions. Apparently "interpersonal trust" is stronger in more liberal and modern populations.

Row 4 gives Kanazawa's study showing that national IQs are negatively correlated with income inequality measured by the Gini coefficient, confirming a number of other studies given in Table 10. Kanazawa argues that low income inequality is a consequence of income redistribution from the wealthy to the poor, produced, among other mechanisms, by progressive taxation and is therefore a measure of liberalism expressed as willingness of the more wealthy to pay higher proportions of their incomes in taxes to the government and to fund its social welfare programs.

Kanazawa's theory is that liberalism is evolutionarily novel. Humans (like other species) are designed by evolution to be altruistic toward their genetic kin (Hamilton, 1964), their repeated exchange partners (Trivers, 1971), and members of their deme (a group of intermarrying individuals) or ethnic group (Whitmeyer, 1997). They are not designed to be altruistic toward an indefinite number of complete strangers whom they are not likely ever to meet or exchange with. This is largely because our ancestors lived in small bands of 50-150 genetically related individuals and large cities and nations with thousands and millions of people are evolutionarily novel. His Savanna-IQ interaction hypothesis would therefore predict that more intelligent individuals are more likely to espouse liberal political ideology than less intelligent individuals.

Row 5 gives a negative correlation of - 0.73 between national IQ and conservatism for 35 countries. This study reported the same negative correlation for individuals.

Row 6 shows that national IQs are positively correlated with the acceptance homosexuality. Row 7 shows that national IQs are significantly negatively associated with gender inequality, i.e. high IQ countries have greater gender equality. The study shows that the association remains robust after introducing a wide range of control variables.

These results are consistent with studies showing a positive correlation between intelligence and liberal attitudes among individuals. For instance, Deary, Batty and Gale (2008a, 2008b) have shown that more intelligent British children are more likely to become liberal adults. Further evidence is given by Kanazawa (2008, 2010) and in the United States it was reported that 44 percent of college graduates had mostly liberal values and 29 percent had mostly conservative values (Pew Research Center, 2016). However, Solon (2014) contends that there is a U-shaped relationship between intelligence and leftist political values that are held by those with low and high intelligence and Carl (2015) shows that in the United States intelligence is negatively associated with liberalism/leftism defined as support for measures of economically statist attitudes. Row 8 shows that national IQs are positively correlated with tolerance of others assessed with the Global Social Tolerance Index (GSTI) using data from nationally representative World Values Survey (WVS).

Table 18. *Liberalism-conservatism*

	Variable	*N* Countries	*r* x IQ	Reference
1	Modernism	45	.74	Meisenberg, 2004
2	Post-Modernism	45	.43	
3	Interpersonal trust	41	.49	Rindermann, 2008a
4	Gini index	127	-.51	Kanazawa, 2009
5	Conservatism	35	-.73	Stankov, 2009
6	Acceptance homosexuality	52	.58	Souza & Cribari-Neto, 2015
7	Gender inequality	105	-.82	Salahodjaev & Azam, 2015b
8	Tolerance	55	.60	Salahodjaev, 2019

11. Happiness and Life Satisfaction

A review by Frey (2008, p.150) concluded that there is no association between intelligence and happiness in economically developed nations. He reported also that there is a low positive association (r = about 0.20) between income and happiness. He concluded that this is not because income as such confers happiness. This is evident because incomes have increased considerable in many countries since 1945, but surveys have shown that there has been no increase in happiness. The reason for the low positive association between income and happiness appears to be that one determinant of happiness is people's social status relative to others in the society in which they live, and people with higher incomes regard themselves as having higher social status. The conclusion that there is no association between intelligence and happiness in economically developed nations has been confirmed in a subsequent review by Veenhoven and Choi (2012). However, Nikolaev and McGee (2016) report a positive association (correlation not given) between intelligence and happiness in the United States.

Studies of the relation between national IQs and happiness are summarised in Table 19. Row 1 gives a zero correlation (.03) between national IQ and happiness measured by the question "Taking all things together, would you say that you are – very happy- quite happy – not very happy – not at all happy?" The data are given by Veenhoven (2004) and are based on 62 economically developed nations.

Subsequent studies that included economically developing nations given in rows 2, 3 and 4 have shown positive correlations. The Veenhoven & Choi (2012) study shows that the correlation national IQs and happiness is greater in economically developing nations (r= .52) than in economically developed nations (r =.17).

Rows 5 and 6 show low positive correlations with the related concept of subjective well-being in economically developed nations. Rows 7 through 11 show positive correlations between national IQs and related concept of life satisfaction. These results are consistent with studies showing that economic development is positive correlated with life satisfaction (Kacapyr, 2008). These results show that the populations of higher IQ nations tend to be happier and have greater life satisfaction than those of low IQ nations.

Row 12 gives a result showing that national IQs are negatively associated with happiness inequality, i.e. there is less happiness inequality in high IQ nations while in low IQ nations there is a greater range of happiness measured as the greater standard deviation of life satisfaction. The authors propose their results show that "intelligence is a powerful tool in reducing happiness inequality".

Row 13 gives a positive correlation between national IQs and well-being showing that high-IQ populations transform environmental consumption into well-being more efficiently. The study also reports little evidence in support of an inverted-U curve between economic development and EWEB, and that the findings shed new light on the economic development-EWEB nexus. Row 14 gives a further positive correlation with well-being assessed from wealth, health, life satisfaction and trust, democracy, rule of law, gender equality and low crime, corruption and divorce.

Table 19. *Happiness and Life Satisfaction*

	Variable	*N* Countries	*r* x IQ	Reference
1	Happiness	62	.03	Lynn & Vanhanen, 2006
2	Happiness	148	.64	Lynn & Vanhanen, 2012
3	Happiness	143	.60	Veerhoven & Choi, 2012
4	Happiness	75	.60	Stolarski et al., 2015
5	Subjective well-being	51	.12	Meisenberg, 2004
6	Subjective well-being	50	.25	Lynn et al., 2007
7	Life satisfaction	136	.63	Lynn & Vanhanen, 2012
8	Life satisfaction	81	.54	Nikolaev & Salahodjaev, 2016a
9	Life satisfaction	115	.62	Burhan et al., 2014a
10	Life satisfaction	76	.70	Woodley & Fernandes, 2014
11	Life satisfaction	147	.66	Obydenkova & Salahdjaev, 2017
12	Happiness inequality	81	-.50	Nikolaev & Salahodjaev, 2016a
13	Well-being	101	.34	Lv, 2017a
14	Well-being	200	.71	Rindermann, 2018

These studies indicate that across economically developed nations there is no association or possibly a weak positive relation between national IQs and happiness, suggested by the positive correlations given in rows 1, 5 and 6. These zero or near zero correlation would be expected from Frey's work, because national IQs are strongly associated with per capita income, yet happiness has not increased within countries with increases in per capita income over time. These studies are consistent with Frey's (p.41) study that showed that in 2001-2003 there was a positive association among poor nations with per capita income below $10,000 of happiness with per capita income while among affluent nations with per capita income above $10,000, there was no association between per capita income and happiness. The explanation for this difference is probably that in very poor nations, people suffer more from poor health, high mortality, political instability, extremes of wealth and poverty, political instability, ethnic conflicts and civil wars, and these tend to produce unhappiness.

12. Religious Belief

Studies of the relation between national IQs and religious belief are summarised in Table 20. Row 1 gives a negative correlation of -0.60 between national IQ and religious belief measured as the percentage of the population who say they believe in God. Rows 2, 3 and 4 give further confirmations reported by Kanazawa (2009) whose theory is that "The human brain may be biased to perceive intentional forces (the hands of God at work) behind a wide range of natural physical phenomena whose exact causes are unknown. If these theories are correct, then it means that religion and religiosity have an evolutionary origin. It is evolutionarily familiar and natural to believe in God, and evolutionarily novel not to be religious". He proposes that intelligence has evolved as an adaptation to deal with novel situations and to adopt novel beliefs. As religious disbelief is novel, more intelligent individuals are more likely to be atheist than less intelligent individuals. Kanazawa's theory that religion has an evolutionary origin is supported by a review of the literature by Segal (2012, p.144) giving the heritability of religious belief as approximately 50 percent.

Row 5 gives a confirmation of this result. Rows 6 and 7 give negative correlations between national IQs and religious belief for former communist countries and for non-communist countries.

Row 8 gives a negative correlation of -0.48 between national IQs and religious belief measured as the percentages of the population who say they have religious belief of some kind including Confucianism and Buddhism. Row 9 shows that national IQ is correlated at .75 with the percentage of the population affirming the importance of religion given in the World Values Surveys of 1999-2002. Rows 9 through 12 give positive correlations between national IQs and the percentage of the population who are atheists and do not believe in god.

Row 13 shows that national IQ is correlated at .73 with the gender difference in religiosity (i.e. the extent to which women are more religious than men) in 66 non-communist countries showing that in higher IQ countries there is a greater gender difference in religiosity. The effect is confirmed with a correlation of .348 (ns) in 25 communist and ex- communist countries.

These results are consistent with a number of studies reporting a negative relationship between intelligence and religious belief among individuals. This negative relationship was first shown in the United States in the 1920s by Gilkey (1924), Howells (1928) and Sinclair (1928), who reported negative correlations between intelligence and religious belief among college students of -.27 to -.36 (using different measures of religious belief). In a further study, Verhage (1964) reported that in a nationally representative sample in the Netherlands agnostics scored 4 IQs higher than believers. These results have been confirmed by a review of 43 studies by Bell (2002) finding that all but four found a negative correlation. Kanazawa (2010) reported that in a nationally representative sample in the United States agnostics scored 6 IQs higher than "very religious" believers. Later studies documenting negative correlations between religious belief and religious attendance with intelligence are reviewed by Zuckerman et al. (2013) and Dutton (2014).

Table 20. *Religious Belief*

	Variable	*N* Countries	*r* x IQ	References
1	Belief in God	137	-.60	Lynn, Harvey et al., 2009
2	Belief in God	58	-.58	Kanazawa, 2009
3	Importance of God	60	-..75	
4	Religiosity	60	-.56	
5	Religious belief	92	-.76	Meisenberg, 2011
6	Religiosity	25	-.64	Meisenberg, 2012b
7	Religiosity	81	-.76	
8	Religious belief	191	-.48	Lynn & Vanhanen, 2012
9	Importance of religion	80	-.75	
10	Atheism	137	.60	Reeve, 2009
11	Atheism	124	.73	Cribari-Neto & Souza, 2013

	Variable	*N* Countries	*r* x IQ	References
12	Atheism	52	.64	Cribari-Neto & Souza, 2015
13	Religiosity: gender difference	66	.73	Meisenberg, 2012b

13. Health: Life Expectancy and Mortality

Studies reporting positive associations between national IQs and health assessed as life expectancy and mortality are summarised in Table 21. Rows 1 through 14 give positive correlations between national IQs and life expectancy at birth. These are confirmed by findings in Table 22. Death rates for children below the 5th year of life correlate between -.58 to -.62 depending on year of measurements showing across-time stability. The correlations of -.73 from Lynn and Vanhanen (2006), -.65 from Reeve (2009) and -.77 from Daniel and Ostuni (2013) are on average stronger than those calculated by using [QNW+SAS+GEO] and data for the mean maternal mortality rate (r=-.67|-.66; N=181; p<.001; Fig. 14) given by the WHO et al. (2015), but these correlations are still strong and significant. One explanation for this is the positive correlation of .33 for 46 countries between national IQs and the quality of nutrition assessed by energy consumption in Kcal per day 2003-5 reported by Rindermann, Woodley and Stratford (2012). Another factor is that higher IQ countries spend more on health as a percentage of GDP (Burhan et al., 2015; Lv and Xu (2016b) showing that high national IQ contributes to good health through greater expenditure.

The positive correlations between national IQs and longevity are consistent with studies at the individual level showing that higher IQs are associated with greater longevity. This was shown first in Australia by O'Toole and Stankov (1992) in a study of 2,309 men who were conscripted into the military and intelligence tested at the age of 18, between 1965 and 1971. They were followed up in 1982, when they were aged between 22 and 40, and it was found that 523 had died. These had an IQ 4 points lower than those who remained alive. The commonest cause of death was accidents of various kinds

(389), of which motor vehicle accidents (217) were the most frequent. It seems probable that the explanation for this association is that those with lower IQs make more misjudgements, some of which result in fatal accidents, and some of these are fatal.

Gottfredson (2004) has reviewed a number of subsequent studies confirming the association of low intelligence with high mortality, and this has also been found in Sweden (Hemmingsson, 2009). An extensive research program in Scotland examining the relation of IQ measured at the age of 11 to age of death has been summarized by Deary, Whalley and Starr (2009). They confirm that low intelligence predicts early mortality and have found that low intelligence is associated several specific causes of death including smoking and death from lung cancer and other smoking-related cancers, namely mouth, pharynx, esophagus, larynx, pancreas and bladder cancers, and with death from all cardiovascular diseases, coronary heart disease, stroke, and respiratory disease. They suggest four explanations for these associations. First, childhood IQ might be partly caused by illness, poor nutrition and injuries. Second, childhood IQ might be a marker for genetic bodily system integrity. Third, people with higher IQs may be better at avoiding risks and at preserving their health, for instance by eating sensible foods, avoiding smoking, recognizing symptoms that might be injurious to health, consulting physicians, and complying with prescribed treatments. Fourth, people with higher IQs may tend to work in occupations where there is less risks of death.

A further study reporting a positive correlation between intelligence and longevity has been published by Beaver, Schwartz, Connolly, Said Al-Ghamdi, Kobeisy, Barnese and Boutwell (2016), who showed that adolescent IQ predicted risk for mortality by the age of 32 such that the average IQ of those who had died was approximately 95 compared with 100 of those who were alive.

Rows 15 through 21 give negative correlations between national IQs and infant mortality (death rates of infants in the first year). This was first shown by Barber (2005) who reported a negative correlation for 81 countries of -.34 for infant mortality rates averaged for 1978-1980 and suggested that this arises because "infant mortality is affected by the prevalence of infection as well as infant nutritional status and is considered a sensitive indicator of infant health for a population" (p.278). These results are consistent with the association between low intelligence and infant mortality shown at the individual level by Savage (1946).

Rows 22, 23 and 24 give negative correlations between national IQs and child mortality (death rates of children aged between one and five years). The negative correlations of national IQs with infant and child mortality are predictable from the negative relationship among individuals reviewed by Čvorović, Rushton and Tenjevic (2008). Row 25 gives a negative correlation between national IQs and perinatal mortality assessed as deaths from prematurity and birth trauma.

Rows 26, 27 and 28 give results showing negative correlations between national IQs and maternal mortality.

Rows 29 and 30 give negative correlations between national IQs and low birthweight defined by Barber (2005) as birthweight below 2500 gr. He suggested the likely explanation is that the incidence of low birthweight is determined largely by malnutrition and diseases, and that these are partly determined by national IQ. A meta-analysis has shown that low birth weight adversely affects intelligence such that each kilogram increase in birthweight is associated with a 0.13 SD increase in fluid intelligence (Grove, Lim, Gale and Shenkin, 2017). This indicates a positive feedback relation between national IQ and birthweight.

Rows 31, 32 and 33 show positive correlations between national IQs and health expenditure. Row 34 shows a positive correlation between national IQs and expenditure on private health insurance.

We propose that there is a positive feedback loop across nations between good health, IQ, and per capita income. Healthy people work more efficiently than unhealthy workers, so good health promotes high per capita income, good nutrition and health care, and higher intelligence.

Rows 35 through 43 give nine studies giving positive correlations ranging from 0.37 to 0.70 between national IQs and suicide rates and showing that suicide rates are higher in high IQ nations. These results are consistent with the positive correlation of .49 between suicide and IQs in 20 regions of Italy reported by Voracek (2013) and by Templer (2013). The evidence on the relation between suicide and intelligence among individuals is conflicting. Voracek (2006) has reported a correlation of .13 between suicide and IQs assessed by scores on the American College Test in the United States.

Four further studies have reported that suicide is associated with higher IQ (De Hert,McKenzie and Peuskens, 2001; Fenton, 2000; Webb, Långström, Runeson, Lichtenstein and Fazel, 2011; Westermeyer, Harrow and Marengo, 1991). On the other hand a study in Sweden has shown that suicide is associated with low IQ among males, although not among females (Andersson, Allebeck, Gustafsson and Gunnell, 2008). Other studies have shown that suicide is associated with poor educational attainment in Australia, Norway, Denmark and Finland (Gunnell, Lofving, Gustafsson and Allebeck, 2011). In the United Sates, university students who have higher than average IQs, have lower suicide rates than non-students of the same age, where the percentages of deaths due to suicide are 14.4% for students and 16.7% non-students (Stack, 2011).

A theory to explain the positive association between suicide and intelligence among individuals and across nations has been proposed by Voracek (2004, 2009a), who suggests that a certain level of intelligence is required to understand that a person's kin would benefit from one's death, and therefore that suicide can increase a person's inclusive fitness. A possible alternative or additional explanation is that depression is less prevalent in the low IQ countries of sub-Saharan Africa. This was noted in the early 1950s by Carothers (1953, p. 144), a medical officer at the mental hospital in Nairobi, who recorded that among 1,508 patients admitted over the years 1939-48, only 24 suffered from depression, amounting to 1.6 per cent of admissions. He contrasted this with 22 per cent of admissions of European patients admitted to the same hospital diagnosed as depressives. He wrote that "there is no doubt that classical psychotic depression of any type is relatively rare in the African" (p. 145). The low prevalence of depression among sub-Saharan Africans has been confirmed in the United States by Gonzalez, Neighbors, Nesse, Sweetman & Jackson (2007) and in a number of countries by Lynn (2018).

Row 44 gives a positive correlation between national IQs and the quality of sanitation interpreted as one of the factors responsible for good health.

Table 21. *Health: Life Expectancy and Mortality*

	Variable	*N* Countries	*r* x IQ	Reference
1	Life expectancy	192	.75	Lynn & Vanhanen, 2006
2	Life expectancy: men	126	.78	Kanazawa, 2006
3	Life expectancy: women	126	.82	
4	Life expectancy	56	.76	Lynn et al., 2007
5	Life expectancy	98	.51	Ram, 2007
6	Life expectancy	129	.84	Templer, 2008
7	Life expectancy	113	.74	Rushton & Templer, 2009
8	Life expectancy	192	.75	Reeve, 2009
9	Life expectancy	179	.76	Lynn & Vanhanen, 2012
10	Life expectancy	99	.82	Belasen & Hafer, 2013
11	Life expectancy	118	.85	Burhan et al., 2014a
12	Life expectancy	76	.74	Woodley & Fernandes, 2014
13	Life expectancy	178	.81	Vanhanen, 2014
14	Life expectancy	93	.81	Lv & Xu, 2016a
15	Infant mortality	81	-.34	Barber, 2005
16	Infant mortality	149	-.77	Lynn & Vanhanen, 2006
17	Infant mortality	191	-.76	Reeve, 2009
18	Infant mortality	113	-.67	Rushton & Templer, 2009
19	Infant mortality	109	-.65	Dama, 2013
20	Infant mortality	76	-.74	Woodley & Fernandes, 2014
21	Infant mortality	55	-.77	Burnhan et al., 2017
22	Child mortality	130	-.65	Christainsen, 2013
23	Child mortality	178	-.79	Vanhanen, 2014
24	Child mortality	55	-.77	Burnhan et al., 2017
25	Perinatal mortality	138	-.79	Daniele & Ostuni, 2013
26	Maternal mortality	140	-.73	Lynn & Vanhanen, 2006
27	Maternal mortality	191	-.65	Reeve, 2009
28	Maternal mortality	138	-.77	Daniele & Ostuni, 2013
29	Low birth weight	81	-.48	Barber, 2005
30	Low birth weight	109	-.45	Dama, 2013
31	Heath expenditure	132	.56	McDaniel & Whetzel, 2006
32	Health expenditure	107	.70	Burhan et al., 2015
33	Health expenditure	93	.35	Lv & Xa, 2016a

	Variable	*N* Countries	*r* x IQ	Reference
34	Health insurance	107	.50	Burhan et al., 2015
35	Suicide	70	.53	Lester, 2003
36	Suicide-men	85	.39	Voracek, 2004
37	Suicide-women	85	.46	
38	Suicide, age 65+	48	.06	Voracek, 2005
39	Suicide	85	.54	Voracek, 2008
40	Suicide-men	-	.70	Templer et al., 2007
41	Suicide-women	-	.46	
42	Suicide-men	73	.37	Voracek, 2009
43	Suicide-women	73	.48	
44	Sanitation	178	.72	Vanhanen, 2014

Table 22. *Correlations between NIQ (QNW+SAS+GEO) and selected variables representing life expectancy and mortality.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N* (ctr.)	*p*	Source of compared variable
Death rate (child.<5y; 1991-1993)	-.58|-.58	122	<.001	von Grebmer et al. (2017, Appendix C)
Death rate (child.<5y; 1999-2001)	-.59|-.61	125	<.001	
Death rate child.<5y; 2007-2009)	-.59|-.62	128	<.001	
Death rate child.<5y; 2014-2016)	-.58|-.61	130	<.001	
Mat. mort. rate (2015, lower bound)	-.67|-.66	181	<.001	
Mat. mort. rate (2015, point est.)	-.67|-.66	181	<.001	
Mat. mort. rate per (2015, upper bound)	-.65|-.65	181	<.001	

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r*.

Fig. 13. *Scatterplot between the variables [Death rate (child.<5y; 2014-2016)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.58; N=130; p<.001).*

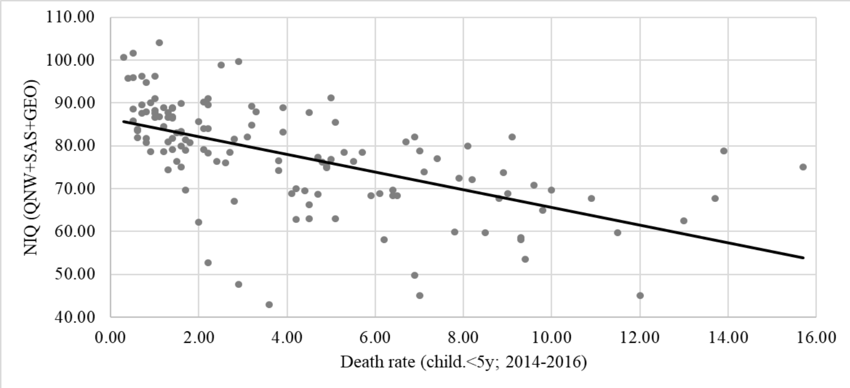
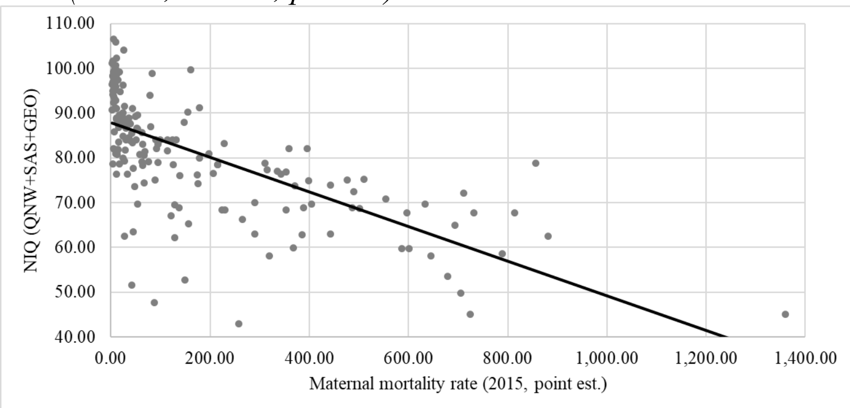


Fig. 14. *Scatterplot between the variables [Mat. mort. rate (2015, point est.)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.67; N=181; p<.001).*



14. Health: Nutrition

Good nutrition promotes good health while inadequate nutrition impairs health. Studies reporting correlations between national IQs and nutrition are summarised in Table 23. Rows 1, 2 and 3 give positive correlations between national IQs and daily consumption per capita of calories, protein and fat. Rows 4 through 7 give negative correlations between national IQs and the percentage of children with malnutrition.

Row 8 gives a positive correlation between national IQs and the quality of nutrition defined as per capita energy consumption in Kcal per day 2003-5. Rows 9, 10 and 11 give further studies reporting negative correlations between national IQs and malnutrition. Rows 12 through 15 give studies reporting negative correlations between national IQs and specific nutritional deficiencies. These negative correlations are attributable to the populations of low IQ countries failing to provide adequate nutrition for many of their children and are consistent with studies showing that nutritional deficiencies have an adverse effect on intelligence at the individual level (Lynn, 1990, 2009). Row 16 gives a positive correlation between national IQs and meat consumption arising because the populations of countries with higher IQs are more affluent and can afford more meat, and by reciprocal causation that greater meat consumption increases intelligence.

The Food and Agriculture Organization of the United States (2014) provides three measures of nutrition: energy consumption, fat consumption and protein consumption. Data are available for three periods of time: 1994 to 1996, 1999 to 2001 and 2003 to 2005. Correlations are stable across time, as it can be seen in Table 24, so we focus on the mean from all periods. Here, the correlations with [QNW+SS+GEO] are .59|.61 (N=169; p<.001) for energy, .62|.65 (N=169; p<.001) for fat and .64|.65 (N=169; p<.001) for protein. These coefficients confirm the findings from Wicherts et al. (2010) and Hill and Williams (2017) reported in Table 23. When all three factors are standardized and averaged, correlations of .65|.67 (N=171; p<.001; Fig. 15) are obtained between the total consumption from 1994 to 2005 and [QNW+SS+GEO]. Correlations between 2017-scores of the World Hunger Index (WHI or GHI), provided by von Grebmer et al. (2017, Table 2.1), and [QNW+SS+GEO] are -.52|-.54 (N=117; p<.001) are close to the coefficients reported by Lynn and Meisenberg (2011) and Lynn and Vanhanen (2012) reported in Table 23. Additionally, the adult prevalence rate for obesity, given by the CIA (2017, Index: Obesity

- adult prevalence rate) is correlated with [QNW+SS+GEO] at .29|.29 (*N*=186; *p*<.000; Fig. 16).

Table 23. *Health: Nutrition*

	Variable	*N* Countries	*r* x IQ	Reference
1	Calories	78	.44	Wicherts et al., 2010
2	Protein	78	.54	
3	Fat	78	.55	
4	Malnutrition	120	-.49	Lynn & Meisenberg, 2011
5	Malnutrition	144	-.52	Lynn &Vanhanen, 2012
6	Malnutrition	108	-.47	
7	Malnutrition	130	-.72	Christainsen, 2013
8	Nutrition quality	46	.33	Rindermann et al., 2012
9	Nutritional deficiency	137	-.75	Hassall & Sherratt, 2011
10	Nutritional deficiency	138	-.77	Daniele & Ostuni, 2013
11	Nutritional deficiency	59	-.69	Woodley et al., 2014
12	Protein/energy deficiency	138	-.70	Daniele & Ostuni, 2013
13	Iodine deficiency	138	-.40	
14	Vitamin A deficiency	138	-.67	
15	Iron deficiency anemia	138	-.69	
16	Meat consumption	63	.53	Hill & Williams, 2017

Table 24. *Correlations between NIQ (QNW+SAS+GEO) and variables representing quality and quantity of nutrition.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N*	*p*	Source of compared variable
Dietary energy consumption (1994-2005)	.59|.61	169	<.001	Food and Agriculture Organization of the United States (2014, Index: "Dietary energy consumption")
Dietary energy consumption (1994-1996)	.59|.61	169	<.001	
Dietary energy consumption (1999-2001)	.60|.61	171	<.001	
Dietary energy consumption (2003-2005)	.60|.62	171	<.001	
Dietary fat consumption (1994-2005)	.62|.65	169	<.001	Food and Agriculture Organization of the United States (2014, Index:

Variable	*r* x NIQ (QNW+SAS+GEO)	*N*	*p*	Source of compared variable
Dietary fat consumption (1994-1996)	.61|.64	169	<.001	"Dietary fat consumption")
Dietary fat consumption (1999-2001)	.62|.65	171	<.001	
Dietary fat consumption (2003-2005)	.64|.67	171	<.001	
Dietary protein consumption (1994-2005)	.64|.65	169	<.001	Food and Agriculture Organization of the United States (2014, Index: "Dietary protein consumption")
Dietary protein consumption (1994-1996)	.64|.65	169	<.001	
Dietary protein consumption (1999-2001)	.64|.65	171	<.001	
Dietary protein consumption (2003-2005)	.63|.64	171	<.001	
Total consumption (1994-2005)	.65|.67	171	<.001	self-calculated
WHI-Scores (1992)	-.42|-.43	93	<.001	von Grebmer et al. (2017, Table 2.1)
WHI-Scores (2000)	-.50|-.52	113	<.001	
WHI-Scores (2008)	-.54|-.56	116	<.001	
WHI-Scores (2017)	-.52|-.54	117	<.001	
Share of malnourished people (1991-1993)	-.19|-.21	94	.065	von Grebmer et al. (2017, Appendix C)
Share of malnourished people (1999-2001)	-.31|-.32	114	.001	
Share of malnourished people (2007-2009)	-.33|-.34	117	<.001	

Variable	*r* x NIQ (QNW+SAS+GEO)	*N*	*p*	Source of compared variable
Share of malnourished people (2014-2016)	-.34|-.35	118	<.001	
Preval. of wasting (child.<5y; 1991-1993)	-.25|-.27	122	.006	
Preval. of wasting (child.<5y; 1999-2001)	-.27|-.29	126	.002	
Preval. of wasting (child.<5y; 2007-2009)	-.33|-.35	128	<.001	
Preval. of wasting (child.<5y; 2014-2016)	-.31|-.34	128	<.001	
Obesity – Adult prevalence rate (%)	.29|.29	186	<.001	CIA (2017, Index: "Obesity - adult prevalence rate")

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r*.

Fig. 15. *Scatterplot between the variables [Total consumption (1994-2005)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.65; N=171; p<.001).*

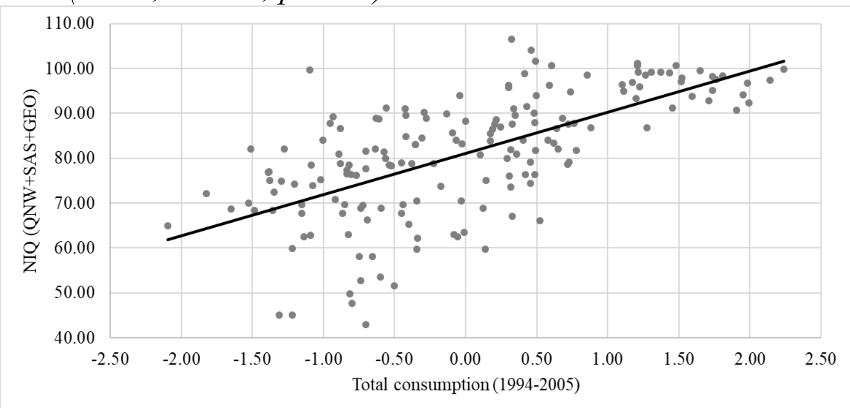
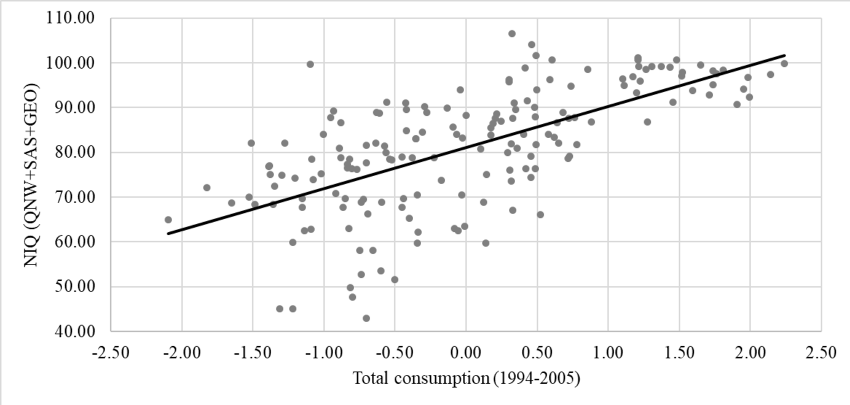


Fig. 16. *Scatterplot between the variables [Obesity – Adult prevalence rate (%)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.29; N=186; p<.001).*



15. Disease

Studies reporting negative associations between national IQs and the prevalence of disease showing that high IQ nations have less disease are summarised in Table 25. Rows 1, 2, 3 and 4 give negative correlations between national IQs and the prevalence of infectious disease showing that low IQ countries are less able to control disease.

Rows 5 through 14 give negative correlations between national IQs and the prevalence of HIV/AIDS infection. Rows 15, 16 and 17 give negative correlations between national IQs and the prevalence of STDs (sexually transmitted diseases) including syphilis, gonorrhoea and chlamydia, but excluding HIV/AIDS. These high HIV and STD infection rates in low IQ countries are attributed by Oesterdiekoff and Rindermann (2007) to a lack of understanding that these are frequently caused by unprotected sex. They write that “in sub-Saharan Africa with infection rates up to 40% of people behave in the same way as they did before AIDS was known... One important cause is that people do not recognize HIV/AIDS as a natural and physical phenomenon that can be treated and encountered by cautious and careful behavior. It is seen as a magical power that can only be fought by mystical forces, not by scrupulousness in sexual behavior and relationships”. These results are consistent with the finding that state IQs in the USA have been shown to be correlated (r= .39) with lower rates of HIV infection and AIDS (Reeve and Basalik, 2010). Rindermann (2018, p.240) adds further reasons for the high prevalence of HIV and AIDS in sub-Saharan Africa including "having more than one husband or wife in loose relationships" and prostitution. The findings are confirmed if the adult prevalence rate of HIV/AIDS and deaths from HIV/AIDS per 1,000, given by the CIA (2017; Index: HIV/AIDS – deaths) are correlated with [QNW+SAS+GEO], although the correlations of -.23|-.28 (*N*=107; *p*=.019; Fig. 18) and -.22|-.31 (*N*=62; *p*=.080) are significantly lower than in the results given in Table 25.

Rows 18 and 19 give negative correlations between national IQs and the prevalence of tuberculosis infection. Rows 20 through 29 give negative correlations between national IQs and the prevalence of ten further diseases.

Rows 30 and 31 give negative correlations between national IQs and parasite load defined as the prevalence of parasites in the body. Rindermann (2018, p.233) explains that "the cause of this negative relationship is seen within the individual body and here in the competition for relevant nutrients between fighting off infectious diseases versus neurological maturation and brainwork". This result is consistent with studies showing a negative relationship between intelligence and disease among individuals, e.g. for children in Brazil (Jardin-Boteldata et al., 2008).

Von Grebmer et al. (2017, Appendix C) also provided prevalences of growth retardation for children younger than five years of life, which correlate with [QNW+SAS+GEO] with -.56|-.58 (*N*=128; *p*<.001; Fig. 17) with data from 2014 to 2016.

Table 25. *Disease*

	Variable	*N* Countries	*r* x IQ	Reference
1	Infectious disease	184	-.89	Eppig et al., 2010
2	Infectious disease	59	-.81	Woodley et al., 2014
3	Infectious disease	138	-.87	Daniele & Ostuni, 2013
4	Disease burden	137	-.85	Hassall & Sherratt, 2011
5	HIV infection	165	-.49	Oesterdiekoff & Rindermann, 2007
6	HIV infection	165	-.48	Rindermann, 2008a

	Variable	*N* Countries	*r* x IQ	Reference
7	HIV infection	129	-.46	Templer, 2008
8	HIV infection	165	-.48	Rindermann & Meisenberg, 2009
9	HIV infection	82	-.30	Rindermann et al., 2009
10	HIV infection	113	-.52	Rushton & empler, 2009
11	HIV infection	138	-.69	Daniele & Ostuni, 2013
12	HIV infection	145	-.41	Rindermann , 2018
13	AIDS	83	-.21	Rindermann et al., 2009
14	AIDS	104	-.47	Reeve, 2009
15	STD infection	97	-.88	Meisenberg & Woodley, 2013
16	STD infection	138	-.82	Daniele & Ostuni, 2013
17	STD infection	76	-.89	Woodley & Fernandes, 2014
18	Tuberculosis	154	-.57	Lynn & Vanhanen, 2012
19	Tuberculosis	138	-.62	Daniele & Ostuni, 2013
20	Diarrhoea diseases	138	-.74	
21	Meningitis	138	-.74	
22	Hepatitis B	138	-.36	
23	Hepatitis C	138	-.25	
24	Malaria	138	-.73	
25	Tropical diseases	138	-.75	
26	Leprosy	138	-.06	
27	Dengue	138	-.11	
28	Trachoma	138	-.45	
29	Intestinal infection	138	-.60	
30	Parasite load	-	-.76	Eppig et al., 2010
31	Parasite load	143	-.65	Odilova & Lynn., 2019

Table 26. *Correlations between NIQ (QNW+SAS+GEO) and prevalences of diseases.*

Variable	***r* x NIQ (QNW+SAS+GEO)**	***N* (ctr.)**	***p***	**Source of compared variable**
Prev. of growth ret. (child.<5y; 1991-1993)	-.47|-.49	122	<.001	von Grebmer et al. (2017, Appendix C)
Prev. of growth ret. (child.<5y; 1999-2001)	-.49|-.50	126	<.001	
Prev. of growth ret. (child.<5y; 2007-2009)	-.55|-.57	128	<.001	
Prev. of growth ret. (child.<5y; 2014-2016)	-.56|-.58	128	<.001	
HIV/AIDS – Adult prevalence rate (%)	-.23|-.28	107	.019	

Variable	*r* x NIQ (QNW+SAS+GEO)	*N* (ctr.)	*p*	Source of compared variable
HIV/AIDS – Deaths/1,000c	-.22|-.31	62	.080	CIA (2017; Index: "HIV/AIDS – deaths")

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r*.

Fig. 17. *Scatterplot between the variables [Preval. of growth ret. (child<5y; 2014-2016)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.56; N=128; p<.001).*

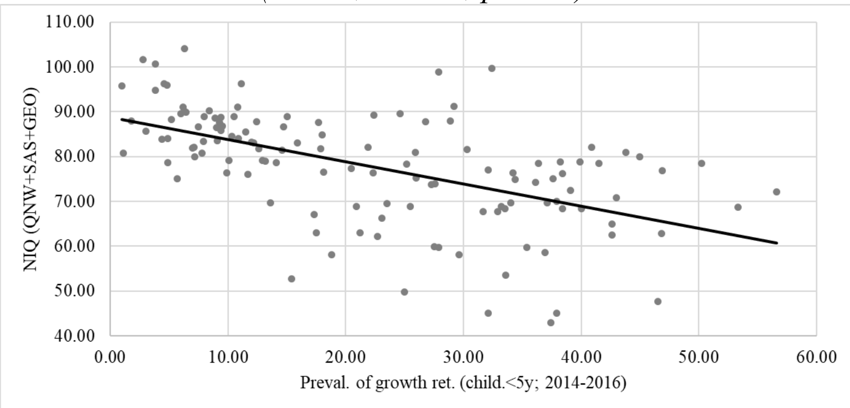
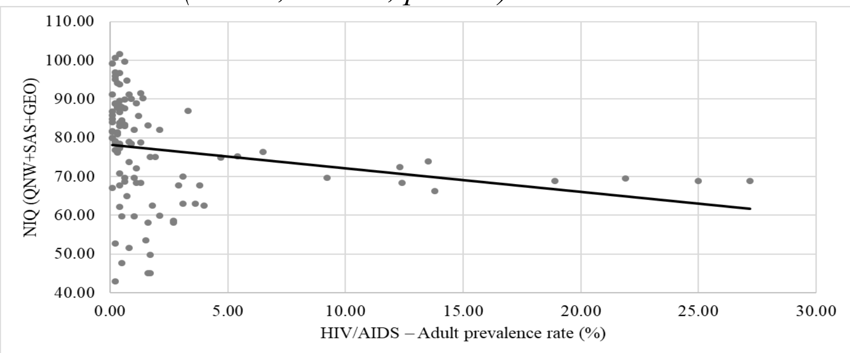


Fig. 18. *Scatterplot between the variables [HIV/AIDS – Adult prevalence rate (%)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.23; N=107; p=.019).*



16. Crime

Studies at the individual level have shown that intelligence is negatively associated with crime, e.g. Wilson and Herrnstein (1985), Herrnstein and Murray (1994), Beaver, Schwartz, Nedelec, Connolly et al. (2013). The same negative relation has been reported for nations shown in studies summarised in Table 27. Row 1 gives the first study reporting a negative correlation for 70 countries between national IQs and homicide at -.50. Rows 2 through 4 give negative correlations for 116 countries between national IQs and homicide at -.25, rape at -.29 and assault at -.21. Row 5 confirms these results for homicide and rows 6 and 7 confirm them for all crime measured as crime victimization obtained by the Gallop World Poll.

Row 8 gives a negative correlation between national IQs and the shadow economy also known as the informal or underground economy. The shadow economy is illegal and criminal because those who work in it avoid paying taxes. The negative relation between national IQs and crime is further confirmed by the high rate of corruption in low IQ countries given in Section 8.

Row 9 gives a negative correlation between national IQs and traffic violation measured as use of a mobile phone without a hand-free kit while driving. National IQs were measured as *g* calculated from tests of educational attainment given by Rindermann (2007). Row 10 gives a negative relation calculated as a standardized path estimate between national IQs and software piracy. Row 11 gives a negative relation with the rate of murder per 100,000 population, 2008-2011.

Table 27. *Crime*

	Variable	*N* Countries	*r* x IQ	Reference
1	Homicide	70	-.50	Lester, 2003
2	Homicide	116	-.25	Rushton & Templer, 2009
3	Assault	116	-.21	
4	Rape	116	-.29	
5	Homicide	97	-.64	Meisenberg & Woodley, 2013
6	Crime	97	-.51	
7	Crime	76	-.61	Woodley & Fernandes, 2014
8	Shadow economy	162	-.58	Salahodjaev, 2015b

	Variable	*N* Countries	*r* x IQ	Reference
9	Traffic violation	41	-.57	De Winter & Dodou. 2016
10	Software piracy	102	-.64	Odilova, 2017
11	Murder	178	-.48	Rindermann, 2018

17. Fertility and Sexual Behavior

Table 28 gives negative correlations between -.69 and -.80 between national IQs and fertility in rows 1 through 8. In the first of these studies, Lynn & Harvey (2008) calculated that this had produced a decline in the world's genotypic IQ of 0.86 IQ points for the years 1950-2000 and therefore of 0.172 IQ points a decade. A higher estimate of the decline in the world's genotypic IQ at 0.253 points a decade has been calculated by Woodley, Piffer, Peñaherrera & Rindermann (2016).

Shatz (2008, p.111) suggests as possible explanations of negative relation between national IQs and fertility that (1) "the IQ fertility relationship is mediated by economics… it is possible that countries that are poorer have lower quality educational systems, lower quality health care, and more difficult access to birth control, all of which may contribute to higher fertility rates"; (2) "differential K theory … it is possible that countries with higher IQ scores and lower fertility rates have larger aggregates of high K selected individuals with lower IQ scores and higher fertility rates". Burhan et al. (2017) propose that a low fertility rate increases national IQ through the Zajonc effect according to which sibling size reduces a child's intelligence (Zajonc, 2001). Rodgers (2001) has disproved the theory and a more probable explanation is that low IQ populations use contraception less efficiently as shown in row 7.

Rows 9, 10 and 11 give negative correlations between national IQs and the birth rate as would be expected from the negative correlations between national IQs and fertility. The correlations of -.85 reported by Templer (2008), -.76 reported by Rushton and Templer (2009) and -.82 reported by Woodley and Fernandes (2014) are confirmed by births rates reported by the CIA (2017, Index: Birth rate) that are correlated with [QNW+SAS+GEO] (*r*=-.68|-.70; *N*=200; *p*<.001; Fig. 19).

Row 12 gives a positive correlation of .73 between national IQs and the use of contraception suggesting that the inefficient use or non-use of contraception in low IQ countries.

Row 13 gives a negative correlation between national IQs and the rate of teenage pregnancy calculated as the proportion of children born to adolescent women below the age of 20 suggesting further evidence that the inefficient use or non-use of contraception in low IQ countries.

Row 14 gives a correlation of .27 between national IQs and differential fertility defined as the extent to which high religiosity is associated with high fertility in 66 non-communist countries. However, the direction of the correlation is reversed at -.445 in 25 communist and ex-communist countries. The proposed explanation for this is that communist and ex-communist countries with higher IQs (for example the Baltic countries) have near-zero relationship between religiosity and fertility. Everyone in these countries has low fertility, including religious people. But in Kyrgyzstan, for example, there is a significant positive relationship between fertility and religiosity. This seems to indicate that there still are many traditionally religious people in Kyrgyzstan who are also resistant to modernization. The positive correlation in the non-communist countries is caused by near-zero relationships between religiosity and fertility in many low IQ countries. This may be because everyone there is highly religious, and in the African countries perhaps because religion causes unmarried women to have fewer children.

Further effects of the low use of contraception in low IQ countries given in row 12 are the high prevalence of HIV and sexually transmitted diseases shown in Section 15.

Row 15 gives a correlation of .29 between national IQs and maternal age showing that women in high IQ countries tend to have their children later than those in low IQ countries and contributing to the negative correlations between national IQ and fertility given in rows 1 through 8. These results are consistent with studies at the individual level showing that more intelligent women have fewer children than less intelligent women although this association is absent or less pronounced among men (Lynn, 2011; Woodley & Figueredo, 2013). Data from the CIA (2017; Index: Mother's mean age at first birth) give a much higher correlation of .55|.56 (*N*=201; *p*<.001; Fig. 20).

Table 28. *Fertility and Sexual Behavior*

	Variable	*N* Countries	*r* x IQ	Reference
1	Fertility	57	-.80	Lynn et al., 2007
2	Fertility	192	-.73	Lynn & Harvey, 2008
3	Fertility	130	-.73	Rindermann, 2008a
4	Fertility	111	-.71	Shatz, 2008
5	Fertility	192	-.73	Reeve, 2009
6	Fertility	109	-.72	Dama, 2013
7	Fertility	78	-.75	Wicherts et al., 2010
8	Fertility	55	-.69	Burhan et al., 2017
9	Adolescent fertility	122	-.61	Luoto, 2018
10	Birth rate	129	-.85	Templer, 2008
11	Birth rate	116	-.76	Rushton & Templer, 2009
12	Birth rate	76	-.82	Woodley & Fernandes, 2014
13	Use contraception	97	.73	Meisenberg & Woodley, 2013
14	Teen pregnancy	97	-.69	
15	Differential fertility	66	.27	Meisenberg, 2012b
16	Maternal age	109	.29	Dama, 2013

Table 29. *Correlations between NIQ (QNW+SAS+GEO) and selected variables representing fertility and sexual behaviour.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N* (ctr.)	*p*	Source of compared variable
Birth rate (births/1,000c)	-.68|-.70	200	.000	CIA (2017, Index: "Birth rate")
Death rate (deaths/1,000c)	.10|.10	200	.143	CIA (2017, Index: "Death rate")
Mother's mean age at 1st birth (2006-2015)	.55|.56	201	.000	CIA (2017; Index: "Mother's mean age at first birth")

Note: Left r: estimated IQs in full range; right r: all NIQ<60.00 set to 60.00; *p*-values for left *r*.

Fig.19. *Scatterplot between the variables [Birth rate (births/1,000c)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.68; N=200; p<.001).*

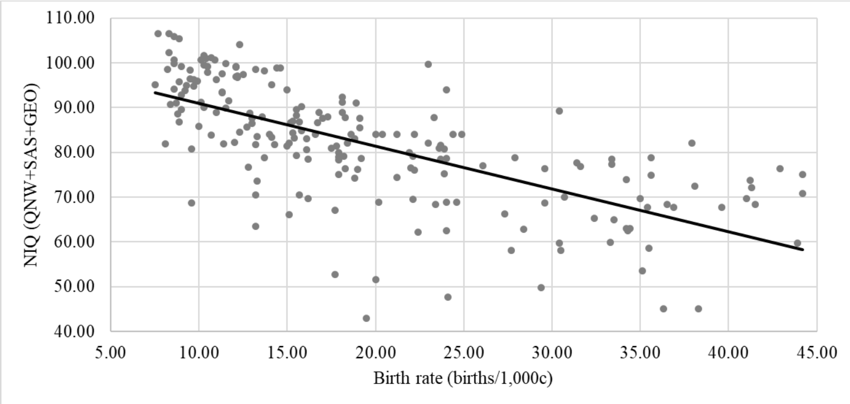
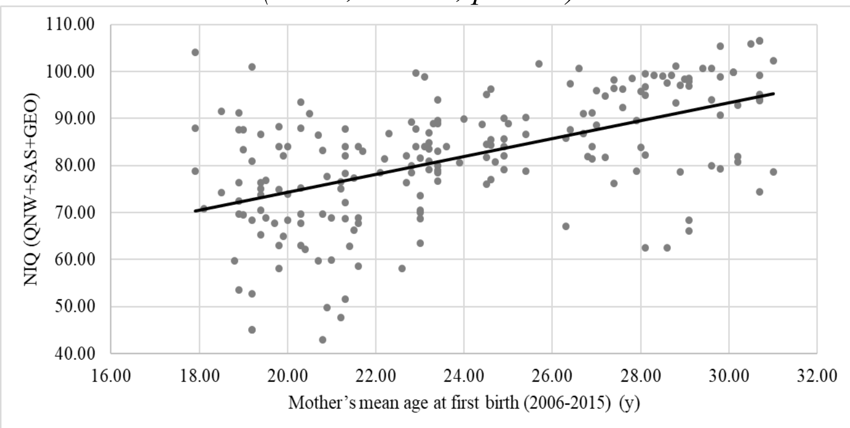


Fig. 20. *Scatterplot between the variables [Mother's mean age at first birth (2006-2015) (y)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.55; N=201; p<.001).*



18. Ethnic and Religious Diversity

Studies of the relation between national IQs and ethnic and religious diversity are summarised in Table 30. Rows 1 through 3 give results showing national IQs are significantly negatively correlated with ethnic and religious diversity defined as the probability of a religious person encountering an atheist. Row 4 shows national IQs are significantly positively correlated with sectarian ethnic diversity defined as the numbers of different religions. Row 5 shows national IQs positively correlated with religious diversity contrary to the result in row 3 but for a much smaller number of countries. For a sample of 174 countries Vanhanen (2012, Table 4.1) reported an index representing ethnic heterogeneity, which shows correlations of -.24|-.24 (*N*=174; *p*<.001) with [QNW+SAS+GEO], and an index representing ethnic conflicts (fitted), which shows correlations of -.25|-.24 (*N*=174; *p*<.001; Fig. 21) with [QNW+SAS+GEO].

Table 30. *Ethnic and Religious Diversity*

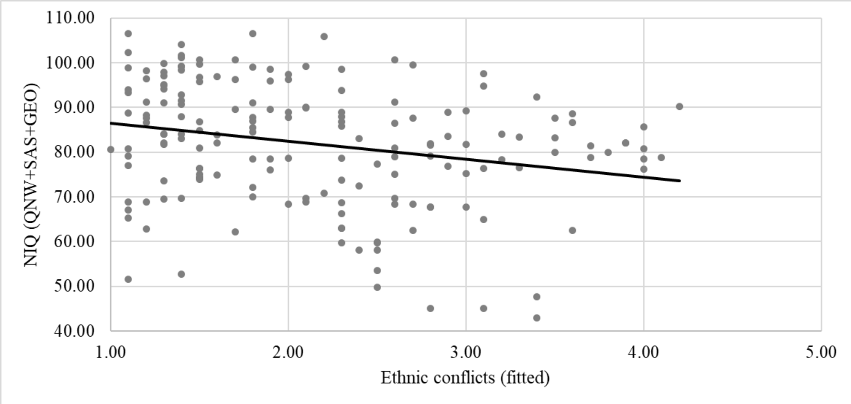
	Variable	*N* Countries	*r* x IQ	Reference
1	Ethnic diversity	127	-.44	Meisenberg, 2007
2	Ethnic diversity	147	-.49	Obydenkova & Salahdjaev, 2017a
3	Religious diversity	127	-.34	Meisenberg, 2007
4	Sectarian diversity	127	.40	
5	Religious diversity	52	.46	Cribari-Neto & Souza, 2015

Table 31. *Correlations between NIQ (QNW+SAS+GEO) and variables representing ethnic diversity.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N* (ctr.)	*p*	Source of compared variable
Ethnic heterogeneity	-.24|-.24	174	.001	
Ethnic conflicts (mean)	-.28|-.28	174	<.001	Vanhanen (2012, Tab. 4.1)
Ethnic conflicts (fitted)	-.25|-.24	174	.001	

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r*

Fig. 21. *Scatterplot between the variables [Ethnic conflicts (fitted)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.25; N=201; p=.001).*



19. Demography

Studies of the relation between national IQs and demography are summarised in Table 32. Rows 1 through 3 give results showing national IQs are significantly negatively correlated with population growth showing that the populations of low IQ countries have been growing faster than those of high IQ countries. The analysis based on data from the Maddison Project (2013) confirm this negative relation, given in Table 33 and Fig. 25, especially if annual growth rates from 1999 to 2000 (r=-.52|-.53; N=199; p<.001) and 2007 to 2008 (r=-.48|-.49; N=199; p=.212) are used. For the predicted annual growth rates from 2029 to 2030 the correlations are a bit weaker at -.38|-.39 (N=199; p<.001). These results would be predicted from the negative correlation between national IQs and fertility shown in Section 17. The effect of this is a decline in the world's genotypic IQ estimated at -.253 points a decade by Woodley, Piffer, Peñaherrera and Rindermann (2016). Furthermore, all the high IQ counties have below replacement fertility entailing declining populations. This is a major problem for high IQ countries.

Row 4 of Table 32 gives a positive correlation of national IQs with urbanization, confirmed by correlations of .38|.39 (N=201; p<.001) between [QNW+SAS+GEO] and urban population shares in 2017 from the CIA (2017, Index: Urbanization), presented in

Table 33. Row 5 of Table 32 gives a low but statistically significant positive correlation of .20 of national IQs with population density interpreted as a measure of urbanization.

Row 6 gives a positive correlation between national IQs and the sex ratio at birth. The sex ratio at birth is the proportion of male offspring born and is typically greater than the proportion of females. Dama (2013) shows in regression models that national IQ is a powerful predictor of the sex ratio at birth after controlling for the effects of all the known covariates like fertility, maternal age, polygyny prevalence, wealth, son preference, latitude, low birth weight, and neonatal mortality. He suggests that these results could be caused in part by the higher standard of living in high IQ countries because the male fetus grows faster and requires higher parental investment during gestation, which means that women should be in optimal condition to meet the cost of male offspring, while the male fetus is more spontaneously aborted than female fetus due to nutritional deficiencies and exposure to environmental toxicants.

Row 7 gives a negative correlation of-.132 (not statistically significant) between national IQs and the historical importance of pastoralism estimated as the percentage of the population depending on this mode of existence.

Rows 8 and 9 give negative correlations between national IQs and polygyny/polygamy, the marriage with more than one spouse, usually between one man and more than one woman. Kanazawa (2009) proposes that this can be explained by his Savanna-IQ interaction hypothesis, derived from his Savanna Principle and a theory of the evolution of general intelligence that more intelligent individuals are more likely to acquire and espouse evolutionarily novel values and preferences and that one of these is monogamy. The negative correlation between intelligence and polygyny/polygamy across nations is consistent with that among individuals shown in a study reporting that more intelligent men are more likely to value monogamy and sexual exclusivity than less intelligent men (Kanazawa, 2008a).

Rows 10 and 11 show negative correlations with consanguinity assessed as the percentage of cousin marriages but Woodley (2009) argues that consanguinity has no effect on national IQ once other variables are controlled and reaffirmed this conclusion in a further analysis (Woodley, 2012). Row 12 shows a low (.18) but statistically significant positive correlation between national IQs and son preference. Row 13 shows a low (.10) and non-statistically significant correlation between national IQs and population size.

As shown in Table 33 and Fig. 22, there is a very strong correlation of .73|.76 (N=201; p<.001) between the median age of populations, given by the CIA (2017, Index: Median age), and [QNW+SAS+GEO]. This can be explained by the positive effect of intelligence on life expectancy due to better life conditions (nutrition, health, crime, political institutions, etc.) as well as by the negative effect of intelligence on fertility.

Between the net migration rate (migrants per1,000), provided by the CIA (2017, Index: Net migration rate) and [QNW+SAS+GEO] there is a moderate positive correlation of .25|.26 (N=197; p<.001), showing that countries with lower intelligence have on average higher rates of emigration and/or countries with higher intelligence have on average higher rates of immigration. Fig. 23 shows that this effect is mostly due to immigration into countries with IQs between 90 and 100 and emigration from countries with IQs between 60 and 90, with particularly strong emigration rates of countries with IQs between 80 and 85. Data from the United Nations, Department of Economic and Social Affairs (2013) were used for a more detailed analysis of this issue. The numbers of international migrants as shares of the countries' total populations are positively related to intelligence with correlations with [QNW+SAS+GEO] of .23|.23 (N=200; p<.001), showing that countries with higher intelligence attract on average more migrants than countries with lower intelligence. However, there are correlations of -.12|-.10 (N=200; p=.081) between annual changes in the numbers of international migrants and [QNW+SAS+GEO], which is non-significant. Fig. 24 shows that annual increases in numbers of international migrants of

2.00% to 6.00% present for countries with IQs above and also below the global average.

Table 32. *Demography*

	Variable	*N* Countries	*r* x IQ	Reference
1	Population growth	111	-.52	Shatz, 2008
2	Population growth, 1970-2010	61	-.56	Burhan et al., 2014b
3	Population growth	93	-.70	Salahodjaev, 2015
4	Urbanisation	78	.52	Wicherts et al, 2011
5	Population density	99	.20	Belasen & Hafer, 2013
6	Sex ratio	109	.57	Dama, 2013
7	Pastoralism	143	-.13	Meisenberg & Woodley, 2013
8	Polygyny	187	-.61	Kanazawa, 2009
9	Polygamy	109	-.54	Dama, 2013
10	Consanguinity	72	-.61	Woodley, 2009
11	Consanguinity	75	-.62	Rindermann, 2018
12	Son preference	109	.18	Dama, 2013
13	Population size (log)	115	.10	Salahodjaev, 2018

Table 33. *Correlations between NIQ (QNW+SAS+GEO) and selected demographic variables.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N* (ctr.)	*p*	Source of compared variable
Annual pop. growth to prev. (1900AD)	.18|.18	63	.170	Maddison Project (2013)
Annual pop. growth to prev. (1950AD)	-.29|-.28	64	.020	
Annual pop. growth to prev. (1990AD)	-.35|-.37	200	<.001	
Annual pop. growth to prev. (2000AD)	-.52|-.53	199	<.001	
Annual pop. growth to prev. (2008AD)	-.48|-.49	199	<.001	
Annual pop. growth to prev. (2030AD)	-.38|-.39	199	<.001	
Median age (y)	.73|.76	201	<.001	CIA (2017, Index: "Median age")
Net migration rate (migrant(s)/1,000c)	.25|.26	197	<.001	CIA (2017, Index: "Net migration rate")
Int. migrant stock 2013 (%)	.23|.23	200	.001	United Nations, Department of

Variable	*r* x NIQ (QNW+SAS+GEO)	*N* (ctr.)	*p*	Source of compared variable
Int. migrant stock female share 2013 (%)	.17|.20	200	.019	Economic and Social Affairs (2013, Tab. 1, 3, 4, 5, 6)
Int. migrant stock 2013 (ann. change)	-.12|-.10	200	.081	
Urban population (2017) (%)	.38|.39	201	<.001	CIA (2017, Index: “Urbanization”)
Rate of urb.: Ann. change (2015-20 est.) (%)	-.15|-.15	201	.035	

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r*

Fig. 22. *Scatterplot between the variables [Median age (y)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.73; N=201; p<.001).*

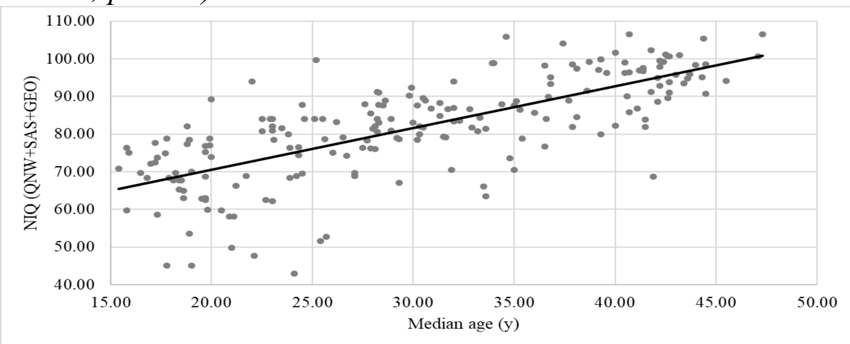


Fig. 23. *Scatterplot between the variables [Net migration rate (migrant(s)/1,000c)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.25; N=197; p<.001).*

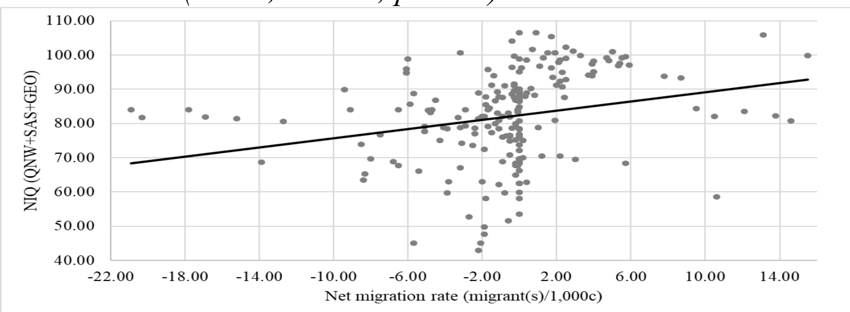


Fig. 24. *Scatterplot between the variables [Int. migrant stock 2013 (ann. change)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.12; N=200; p=.081).*

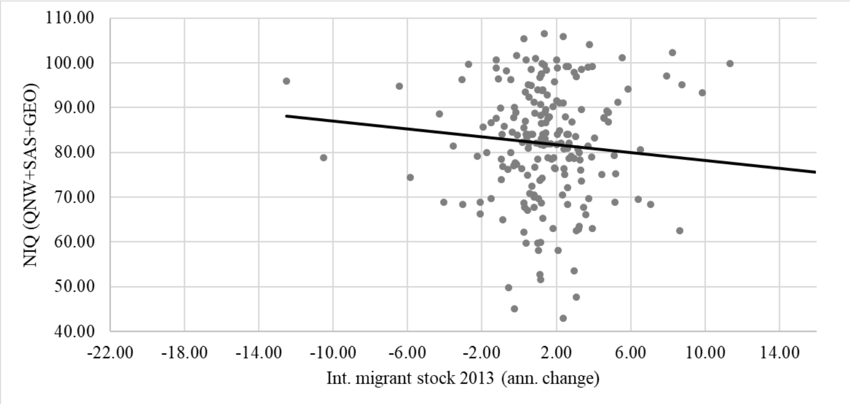
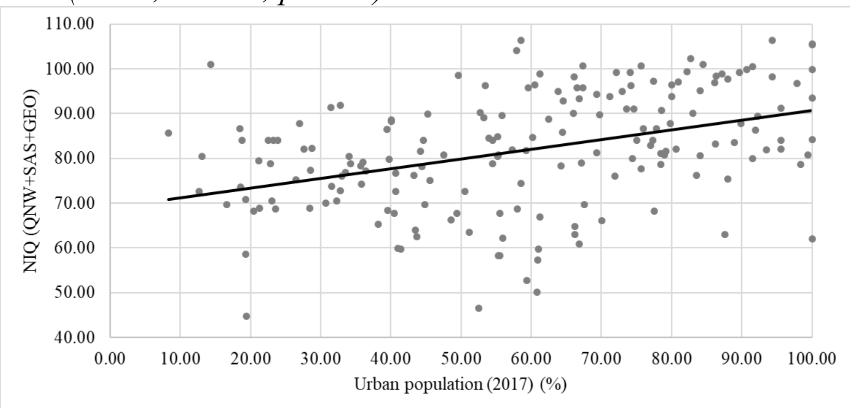


Fig. 25. *Scatterplot between the variables [Urban population (2017) (%)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.38; N=201; p<.001).*



20. Race and Ethnicity

Studies of the relation between national IQs and race and ethnicity are summarised in Table 34. Rows 1, 2 and 3 give results showing national IQs significantly negatively correlated with the percentage of Muslims. It was shown by Templer (2010a) that the mean IQ in Muslim countries is lower than in non-Muslim countries at 80.7 for 31 countries with 80+ percent Muslims compared with 86.3 for 165 non-Muslim countries. This negative correlation between national IQs and the percentage of Muslims is partly attributable to the high percentage of consanguineous marriages given by Templer (2010a). Fareed and Afzal (2014) have reported in a study carried out in India that the children of consanguineous marriages have an IQ 24 points lower than those of non- consanguineous marriages. Templer discusses other explanations for the lower IQs in Muslim countries as hybridization with sub-Saharan Africans, dysgenic fertility and education not fostering critical thinking. Rows 4 and 5 give low positive correlations between national IQs and the percentages of Protestants and Catholics.

Table 34. *Race and Ethnicity*

	Variable	*N* Countries	*r* x IQ	Reference
1	Muslims per cent	124	-.34	Cribari-Neto & Souza, 2013
2	Muslims per cent	52	-.31	Cribari-Neto & Souza, 2015
3	Muslims per cent	101	-.31	Lv, 2017a
4	Protestants per cent	101	.18	
5	Catholics per cent	101	.09	

21. Quality and Protection of the Environment

Studies of the relation between national IQs and the quality and protection of the environment are summarised in Table 35. Rows 1 and 2 give positive correlations between national IQs and the quality of water and sanitation. Row 3 gives a negative correlation between national IQs and rates of deforestation over the period 1990–2010. This study documents that, on average moving from the country with the lowest IQ to the one with highest, national IQ is associated with a 1.15 percentage point reduction in the rate of deforestation. The negative link between intelligence and deforestation remains robust when account is made for the feedback from environment to intelligence. Row 4 gives results confirming this association. Row 5 gives a positive correlation between national IQs and the commitment to environmental protection by ratification of the Doha amendment to limit greenhouse emissions. Row 6 gives a positive correlation between national IQs and the percentage of forest. Row 7 gives a zero correlation between national IQs and air pollution assessed by the amount of carbon dioxide emission. The study shows that relation is curvilinear such that the middle IQ countries with IQs in the range of 81- 83 have highest carbon dioxide emissions. Row 8 gives a positive correlation between national IQs and the extent to which countries implement climate change policies to reduce harming the environment. Row 9 shows that national IQs are negatively correlated with greenhouse gas emissions assessed for the period 1997–2012. This study reports this negative correlation after controlling for the level of economic development, quality of political regimes, population size and a number of other controls and shows that when national IQs increase by one standard deviation, the average annual rate of air pollution declines by nearly 1.7% (slightly less than one half of a standard deviation). Row 10 gives a positive correlation between national IQs and environmental awareness, measured as the share of a country's population who respond that they are 'aware' on the survey question 'How much do you know about global warming or climate change?'. The data come from the largest cross-sectional survey of climate change perceptions conducted by the Gallup World Poll in 119 countries, representing over 90% of the world's population. The climate change awareness levels range from 20% in Liberia to 98% in Japan. The estimates suggest that an increase in average national IQ of one standard deviation increases climate change awareness by approximately 19% (slightly less than one standard deviation). This link remains robust even after controlling for other socio-economic antecedents of environmentalism.

Row 11 gives a positive correlation between national IQs and the sustainable societies index estimated from three wellbeing dimensions (economic, environmental and human wellbeing). Economic wellbeing takes into account economic transition (net adjusted savings and organic farming) and macroeconomic conditions (GDP per capita, employment level and public debt). Human wellbeing captures such aspects as education coverage, longevity, gender equality, distribution of income, growth rate of population and good governance. Environmental wellbeing accounts for depletion of natural resources, climate change (greenhouse gas emissions) and energy use.

Table 35. *Quality and Protection of the Environment*

	Variable	*N* Countries	*r* x IQ	Reference
1	Quality water	166	.62	Lynn &Vanhanen, 2012
2	Quality sanitation	166	.71	
3	Deforestation	185	-.35	Salahodjaev, 2016a
4	Deforestation	181	-.36	Obydenkova et al., 2016
5	Forest stock	181	.16	
6	Environmental protection	151	.45	Obydenkova & Salahodjaev, 2016
7	Air pollution	155	0	Salahodjaev & Yuldashev, 2016
8	Climate change policy	94	.71	Obydenkova & Salahodjaev, 2017b
9	Greenhouse gas emissions	150	-.45	Omanbayev et al., 2018
10	Environmental awareness	115	.84	Salahodjaev, 2018
11	Sustainability	150	.86	Odilova, 2018a

22. Morphology and Physiology

Studies of the relation between national IQs and morphology and physiology are summarised in Table 36. Rows 1 through 5 show that national IQs are positively correlated with light skin colour with high values indicating light skin, showing that skin colour is lighter in high IQ countries.

Rows 6 through 8 confirm these results showing that national IQs are positively correlated with skin reflectance with high values indicating light skin. It has been shown by Templer (2008) that skin colour and skin reflectance are correlated among individuals at .96. Woodley (2012) has shown that skin reflectance has a significant effect on national IQs when the effects of other predictor variables are controlled.

Correlations reported by Templer and Akinawa (2006), Templer (2008), Rushton and Templer (2009), and Rindermann (2018) were calculated by using the same source for skin colour, a map from the book of Biasutti (1967, Fig. 6). This map provides skin colors of native human populations in eight gradations with a total range from "<12" to ">30", transformed by us to a scale from 0 (brightest) to 7 (darkest). Some adjustments to to this map have been made by Rindermann (2018) who averages several gradations for some countries. Maps for population densities are provided by the Socioeconomic Data and Applications Center (SEDAC) of the NASA's Earth Observing System Data and Information System (EOSDIS), hosted by CIESIN at Columbia University in 2000. The correction was done by searching for the centroid of a population's distribution. If this centroid was within the lower skin colour gradient, one gradient was subtracted from the country's mean, and if this centroid was within the higher skin colour gradient, one gradient was added. In addition, adjustments were made to the scores for countries in which today's majority populations have different skin color from that their indigenous populations, mostly for countries from New World areas colonized by European settlers and/or African slaves. Therefore, skin colour gradients for colonized peoples were estimated by rough means of their areas of origin, in particular 1.50 for Europeans, 2.00 for Hispanics and Chinese, 2.50 for Pacific Oceanians, 3.00 for Northern Amerindians, 3.50 for Mixed/Mestizo/Mulato, 4.00 for South- or Meso-American Amerindians, 5.80 for Indians, and 7.00 for Sub-Saharan Africans and Aborigines. Finally, these scores were weighted by percentages of ethnic groups on the total populations provided by the CIA (2017, Index: Ethnic groups) and averaged. Table 37 shows correlations to [QNW+SAS+GEO] of -.70|-.72 (N=199; p<.001) for skin colour-I (no corrections), -.69|-.71 (N=199; p<.001) for Skin colour-II (corrected for population density) and -.67|-.70 (N=201; p<.001; Fig. 31) for skin colour-III (corrected for population density and colonization). These coefficients are weaker than those reported in Table 36, which could be due to the corrections, number of countries in the analyses and/or differences in national IQs but they are still strong and highly significant.

Rows 9, 10 and 11 of Table 36 show that national IQs are positively correlated with cranial capacity given by Beals, Smith and Dodd (1984) as a measure of brain size. This result is consistent with studies of individuals showing that intelligence is positively correlated with brain size. The positive association between brain size and cognitive ability was first shown by Galton (1888) in a study of students at Cambridge University that reported a correlation of .11 between head size and examination results. This positive association was confirmed in a review of studies of head circumference and IQ giving a correlation of .30 (Van Valen, 1974). The first study of intelligence and brain size measured by MRI (Magnetic Resonance Imaging) was reported by Willerman, Shultz, Rutledge and Bigler (1991) who estimated the correlation at .35. This association has been further confirmed in subsequent studies, e.g. at *r* = .43 (Raz, Torres, Spencer et al., 1993), .40 for college students in Turkey (Tan, Tan et al., 1999), .33 in a meta-analysis of 37 studies (McDaniel, 2005), and .24 in the most recent meta-analysis of 88 studies of the relation between brain size and intelligence by Pietschnig, Penke, Wicherts et al. (2015). These results are consistent with studies summarized in Section 23 showing that IQs are higher in colder environments in which populations have larger brain size (Smith and Beals, 1990). In addition, in prehistory the colder South African regions had the most developed artefacts in Africa (Conard, 2008), and in past hominids cranial capacity was greater in higher latitudes (r=. 52) (Henneberg and de Miguel, 2004, p. 28).

All studies in Table 36 that reported cranial capacity (Meisenberg & Woodley, 2013; Woodley & Fernandes, 2014; Rindermann, 2018) used the same source: Beals, Smith and Dodd (1984, Fig. 3), and as in the case of the skin colour data were provided for native human populations. Data were presented in seven gradients in cm^3: >1450, from 1400 to 1449, from 1350 to 1399, from 1300-1349, from 1250-1299, from 1200 to 1249, and <1200, converted to 1475, 1425, 1374, 1325, 1275, 1225 and 1175.

Corrections were carried out in the same way as explained for skin colour. Table 37 shows correlations to [QNW+SAS+GEO] of .49|.52 (*N*=196; *p*<.001) for cranial capacity-I (no corrections), .48|.50 (*N*=196; *p*<.001) for cranial capacity-II (corrected for population density) and .46|.49 (*N*=198; *p*<.001; Fig. 26) for cranial capacity-III (corrected for population density and colonization). These coefficients are once again weaker than those reported in Table 36, which could also be due to the corrections, number of countries in the analyses and/or differences in national IQs.

Row 12 shows that national IQs are negatively correlated with the nasal index, a measure of nasal breadth. The negative correlation is attributed to a wide nose being adaptive in warmer climates and a thin nose being adaptive in colder climates because it warms the air intake. Row 13 shows that national IQs are positively correlated with height attributed higher IQ counties having higher standards of living. The correlation of .46 reported by Rindermann (2018) is close to those calculated between [QNW+SAS+GEO] and body height in 1996 (*r*=.60|.61; *N*=191; *p*<.001; Fig. 27), and [QNW+SAS+GEO] and the mean body height between 1896 and 1996 (*r*=.39|.39; *N*=191; *p*<.001), shown in Table 37. Also, positive correlations of .55|.57 (*N*=191; *p*<.00; Fig. 28) were found for the change in body height between 1896 and 1996, probably attributable to the positive effect of intelligence on health and improved life conditions.

Salahodjaev and Azam (2015a) report an inverted U relation between national IQs (n=187) and BMI (body mass index) such that BMI is low among low IQ nations, increases in middle IQ nations in the range between 80 and 90 as a result of improvements in health care and nutrition, and declines among higher IQ nations with increases in the prevalence of obesity. BMI-data from the NCD Risk Factor Collaboration (2017a, b) are used for a check of these findings. Correlations of .42|.43 (*N*=190; *p*<.001) are present between mean BMI-scores for children and adolescents from 1975 to 2016 and [QNW+SAS+GEO]. Correlations are .40|.40 (*N*=190; *p*<.001) when data from adults instead of children and adolescents were used. Fig. 29 confirms the U-shaped relation.

Table 36. *Morphology and Physiology*

	Variable	*N* Countries	*r* x IQ	Reference
1	Skin color	129	.92	Templer & Akinawa, 2006
2	Skin color	90	.84	Templer, 2008
3	Skin color	113	.92	Rushton & Templer, 2009
4	Skin color	143	.86	Meisenberg & Woodley, 2013
5	Skin color	179	.87	Rindermann, 2018
6	Skin reflectance	58	.80	Meisenberg, 2004
7	Skin reflectance	57	.69	Lynn et al., 2007
8	Skin reflectance	76	.91	Woodley & Fernandes, 2014
9	Cranial capacity	143	.77	Meisenberg & Woodley, 2013
10	Cranial capacity	76	.74	Woodley & Fernandes, 2014
11	Cranial capacity	179	.58	Rindermann, 2018
12	Nasal index	128	-.60	Templer & Stephens, 2014
13	Height	97	.46	Rindermann, 2018

Table 37. *Correlations between NIQ (QNW+SAS+GEO) and selected morphological and physiological variables.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N* (ctr.)	*p*	Source of compared variable
Cranial capacity-I	.49|.52	196	<.001	Beals, Smith & Dodd (1984, Fig. 3)
Cranial capacity-II	.48|.50	196	<.001	
Cranial capacity-III	.46|.49	198	<.001	
Body height 1896 (cm)	.23|.23	191	.001	NCD Risk Factor Collaboration (2017c)
Body height 1996 (cm)	.60|.61	191	<.001	
Body height mean 1896-1996 (cm)	.39|.39	191	<.001	
Body height change 1896-1996 (cm)	.57|.59	191	<.001	
Body height change 1896-1996 (%)	.55|.57	191	<.001	
BMI in children & adol. 1975	.51|.52	190	<.001	NCD Risk Factor Collaboration (2017b)
BMI in children & adol. 2016	.31|.30	190	<.001	
Mean BMI in children & adol. 1975-2016	.42|.43	190	<.001	
BMI change in child. & adol. 1975-2016	-.18|-.20	190	.014	

Variable	*r* x NIQ (QNW+SAS+GEO)	*N* (ctr.)	*p*	Source of compared variable
BMI change in child. & adol. 1975-2016 (%)	-.25|-.27	190	<.001	
BMI in adults 1975	.52|.52	190	<.001	NCD Risk Factor Collaboration (2017a)
BMI in adults 2016	.28|.28	190	<.001	
Mean BMI in adults 1975-2016	.40|.40	190	<.001	
BMI change in adults 1975-2016	-.52|-.54	190	<.001	
BMI change in adults 1975-2016 (%)	-.61|-.63	190	<.001	
Penis length (cm)	-.41|-.42	116	<.001	Lynn (2013, Table 2)
Skin colour-I	-.70|-.72	199	<.001	Biasutti (1967, Fig. 6)
Skin colour-II	-.69|-.71	199	<.001	
Skin colour-III	-.67|-.70	201	<.001	

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r*

Fig. 26. *Scatterplot between the variables [Cranial capacity-III] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.46; N=198; p<.001).*

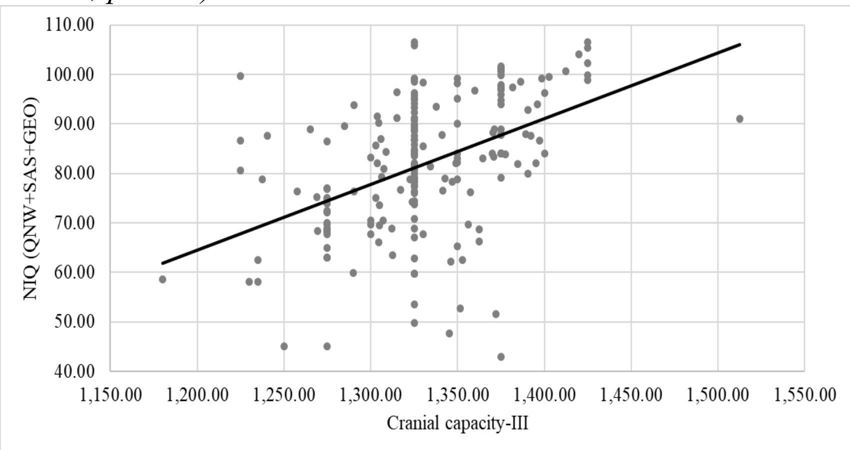


Fig. 27. *Scatterplot between the variables [Body height 1996 (cm)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.60; N=191; p<.001).*

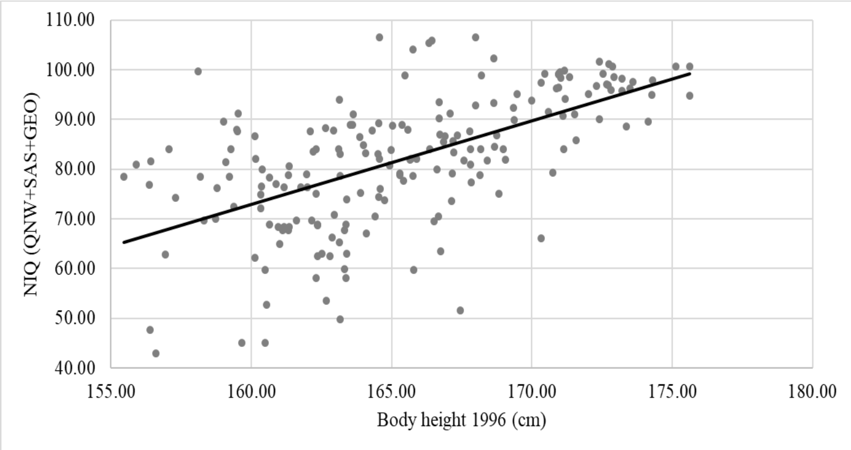


Fig. 28. *Scatterplot between the variables [Body height change 1896-1996 (cm)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.55; N=191; p<.001).*

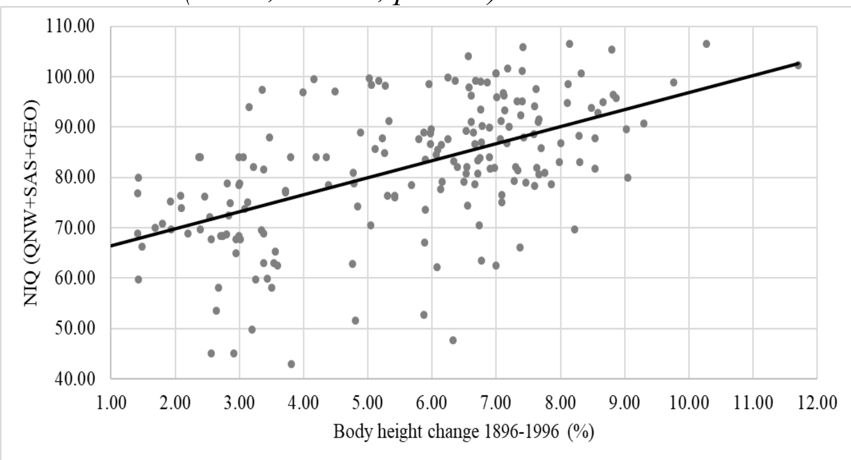


Fig. 29. *Scatterplot between the variables [Mean BMI in children and adolescents 1975-2016] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.42; N=109; p<.001).*

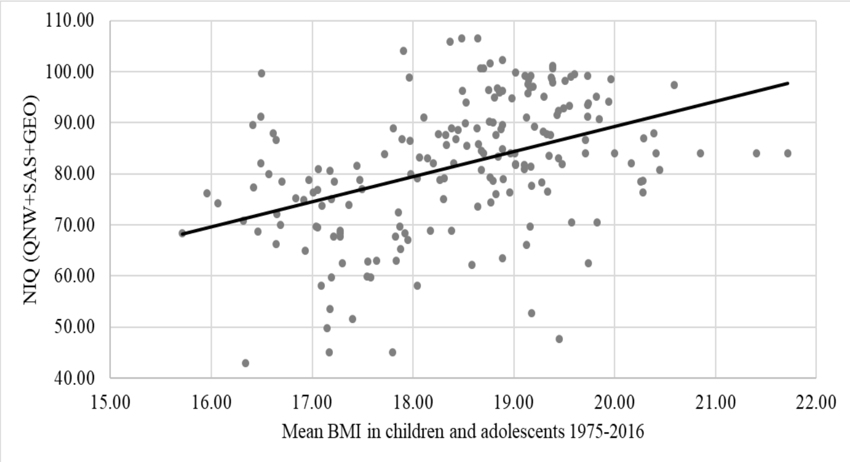


Fig. 30. *Scatterplot between the variables [Penis length (cm)] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.41; N=116; p<.001).*

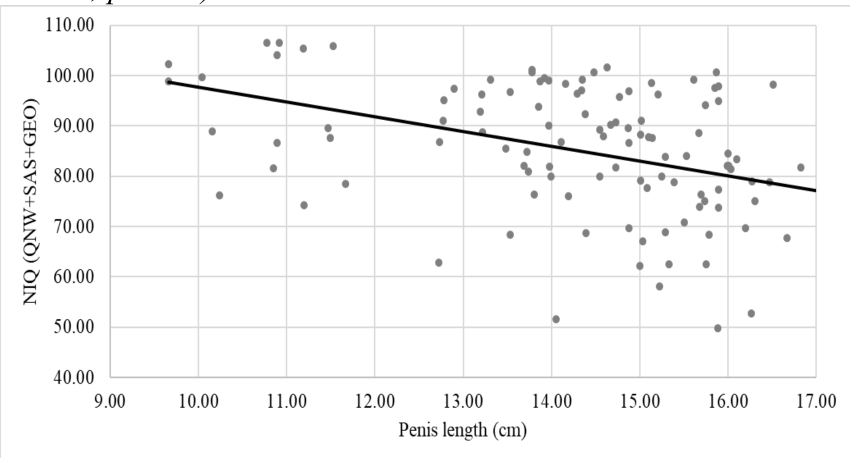
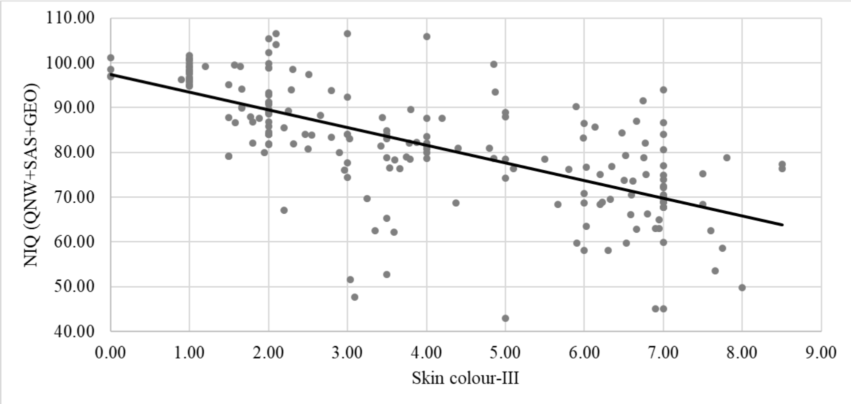


Fig. 31. *Scatterplot between the variables [Skin colour-III] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.67; N=201; p<.001).*



23. Climate

Studies of the relation between national IQs and climate are summarised in Table 38. Rows 1 through 9 give negative correlations between national IQs and temperature showing that national IQs are higher in countries with low temperatures. Row 10 gives a negative correlation of -.87 between national IQs and temperature during the Würm glaciation ice age, which occurred between approximately 30,000 and 11,700 years ago, showing that higher IQ populations in Europe and Northeast Asia experienced lower temperatures during the Würm glaciation.

Row 11 shows a positive correlation between national IQs and temperature range and attributed this to the greater cognitive demands of a wide range of temperature over the year. Row 12 gives a similar results showing a positive correlation between national IQs and temperature range measured as the sum of absolute deviations from 22 C (72 F) for the average lowest and highest temperatures in the coldest month.

Row 13 gives a negative correlation between national IQs and precipitation, i.e. producing a damp environment, in 47 African countries. The author proposes that high precipitation promotes plant growth and this provides a good supply of plant foods, making for an un-cognitively demanding life and hence a low IQ. Row 14 extends this theory by showing a positive correlation between national IQs and low precipitation for 128 countries. The authors write "higher intelligence is needed to devise methods to irrigate farms and tend to livestock in an arid land". Row 15 extends this theory further by showing a positive correlation between national IQs and the range of precipitation. The authors write "it would seem to require greater intelligence to cope with greater range of precipitation". Row 16 gives a further extension of this theory by showing a positive correlation between national and high humidity measured as the amount of water vapour in the air. The authors attribute the positive correlation to humidity being greater in the colder and more adverse environments that are associated with higher IQs. Row 17 gives a negative correlation between national IQs and a tropical climate.

These results corroborate the cold winters theory of national and racial IQs advanced in Lynn (1991, 2006, 2015) stating that higher intelligence evolved in environments with colder winters as adaptations to the greater cognitive demands of survival such as the need to hunt hard-to-catch prey and to make fires, shelters and clothing to survive during cold winter temperature. This theory has been endorsed by many others including Rushton (2000) and Templer and Stephens (2014) and has been further supported by the work of Ash and Gallup (2007) who have shown that during the evolution of Homo over the last 2.8 million years, 52% of the increases in brain size could be accounted for by temperature variation and 22% could be accounted for by colder environments at greater distance from the equator (r = .73). This result was confirmed by Bailey and Geary (2009) in a study showing that significant selective pressures driving the threefold increase in the size of the hominid brain since Homo habilis from 1.9 million to 10 thousand years ago were latitude (r = .61), temperature (r = -.41) and variation in annual temperature (r = .30). However, it does not provide a complete explanation. The most significant exceptions are the rather low IQs in central Asia and of the Inuit. Row 17 gives a negative correlation between national IQs and the strength of ultra violet radiation in 32 European countries supporting Leon's (2018) theory that UVR impairs intelligence. The theory is not supported by Carl (2018) who shows that in Britain regional IQs are higher in the south where UVR is stronger.

Table 38. *Climate*

	Variable	*N* Countries	*r* x IQ	Reference
1	Lowest winter temperature	129	-.61	Templer & Arikawa, 2006
2	Lowest summer temperature	129	-.40	
3	Mean annual temperature	192	-.63	Kanazawa, 2008
4	Mean temperature	172	-.66	Vanhanen, 2009
5	Mean annual temperature	143	-.65	Odilova & Lynn, 2019
6	Warm winters	137	-.64	Hassall & Sherratt, 2011
7	Average winter temperature	143	-.75	Meisenberg & Woodley, 2013
8	Low winter temperature	128	-.60	Templer & Stephens, 2014
9	Average temperature	138	-.66	Daniele & Ostuni, 2013
10	Low Würm temperature	59	-.87	Woodley et al., 2014
11	Temperature range	128	.62	Templer & Stephens, 2014
12	Temperature range	101	.46	Lv, 2017a
13	Precipitation	47	-.56	Templer, 2014
14	Low precipitation	128	.43	Templer & Stephens, 2014
15	Precipitation range	128	.58	
16	Humidity	128	.30	
17	Tropical climate	151	-.50	Obydenkova & Salahodjaev, 2016
18	UV Radiation	32	-.54	Leon, 2018

24. Geographical Location

Geographical location is associated with climate because nations in locations further from the equator have colder climates. Studies of the relation between national IQs and geographical location are summarized in Table 39. Rows 1 through 9 give positive correlations between national IQs and latitude showing that intelligence is greater in countries with higher latitudes in which there are colder climates. These results confirm the cold winters theory advanced in Lynn (1991b) according to which higher IQs evolved in colder latitudes to cope with survival during cold winters. This theory has been endorsed by Rushton (1995, 2000) and Becker and Rindermann (2016) among a number of others. Rindermann (2018) shows the correlation is significant with wealth partialled out. Rows 10 through 14 give positive but very low and generally non-significant correlations between national IQ and longitude. Both positive relations, between latitude and intelligence and between longitude and intelligence, are confirmed using [QNW+SAS+GEO] and geographic data from the CIA (2017, Index: Geographic coordinates), shown in Table 40 and Fig. 32. The correlations increased from .45|.48 (N=201; p<.001) to .61|.64 (N=201; p<.001) if instead of real latitudinal coordinates the absolute latitudinal coordinates are used, which measures the distance from the equator without regard to the north or south direction, an indication that the relation is caused by climatic conditions. Correlations with national intelligence declined from .21|.21 (N=201; p=.003) to .18|.18 (N=201; p=.011) when absolute instead of real coordinates were used.

Rows 15, 16 and 17 of Table 39 give positive correlations with distance from the environment of evolutionary adaptedness supporting Kanazawa's (2008) theory of the evolution of higher intelligence as an adaptation to conditions that were different from the environment of evolutionary adaptedness in equatorial sub-Saharan Africa. His reasoning is that peoples who migrated further from equatorial Africa encountered novel environments and evolved higher IQs. Miller (2018) provides an extensive discussion of the factors contributing to the evolution of higher IQs in higher latitudes. These include colder winters; population size, such that new alleles for higher intelligence appeared more frequently in large populations and less frequently in small populations such as the Australian Aborigines and Native Americans; this may also explain the low IQ of the Inuit given as 91 in Lynn (2015); and population density, such that new alleles for higher intelligence spread more rapidly in sparcely populated areas in which population mobility was greater. Row 18 provides further support for Kanazawa's (2008) theory showing a positive correlation between national IQ and novel environments. Row 19 shows a positive correlation between national IQ and having a coastline. This study also reports a significant negative correlation (.22) between national IQ and being landlocked, i.e. not having a coastline. These results are consistent with the work of Collier (2008) and Paudel (2014) showing that countries without coastlines have lower per capita GDPs.

Table 39. *Geographical Location*

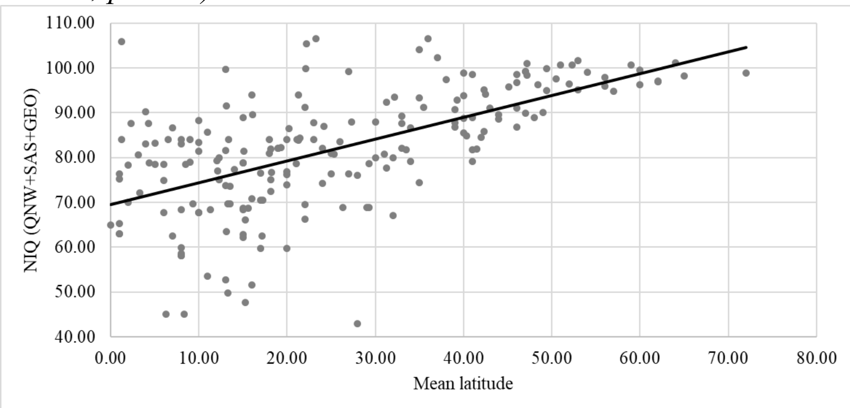
	Variable	*N* Countries	*r* x IQ	Reference
1	Latitude	192	.68	Kanazawa, 2008
2	Latitude	78	.44	Wicherts et al., 2010
3	Latitude	47	.80	Rindermann et al., 2012
4	Latitude	109	.23	Dama, 2013
5	Latitude	138	.70	Daniele & Ostuni, 2013
6	Latitude	101	.37	Becker & Rindermann, 2016
7	Latitude	151	.58	Obydenkova & Salahodjaev, 2016
8	Latitude	199	.53	Rindermann, 2018
9	Latitude	143	.53	Odilova & Lynn, 2019
10	Longitude	192	.23	Kanazawa, 2008
11	Longitude	78	.02	Wicherts et al., 2010
12	Longitude	101	.09	Becker & Rindermann, 2016
13	Longitude	199	.17	Rindermann, 2018
14	Longitude	143	.20	Odilova & Lynn, 2019
15	Distance Envir. Evol.Adapt.	192	.45	Kanazawa, 2008
16	Distance Envir. Evol.Adapt.	137	.60	Hassall & Sherratt, 2011
17	Distance Envir. Evol.Adapt.	143	.25	Odilova & Lynn, 2019
18	Novelty	143	.43	Meisenberg & Woodley, 2013
19	Coastline	143	.27	Odilova & Lynn, 2019

Table 40. *Correlations between NIQ (QNW+SAS+GEO) and geographic coordinates.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N* (ctr.)	*p*	Source of compared variable
Mean latitude	.45|.48	201	<.001	
Mean abs. latitude	.61|.64	201	<.001	
Mean longitude	.21|.21	201	.003	CIA (2017, Index: "Geographic coordinates")
Mean abs. longitude	.18|.18	201	.011	

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r*.

Fig. 32. *Scatterplot between the variables [Mean abs. latitude] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.61; N=201; p<.001).*



25. Genetics

Genetic correlates of national IQs are summarized in Table 41. Row 1 gives a correlation of .43 between national IQs and the average of 8 identified haplogroups. The authors conclude that their results "provide support for a mixed influence on national cognitive ability stemming from both current environmental and past environmental (evolutionary) factors".

Row 2 gives a correlation of .58 between national IQs and COMT Val158Met allele frequencies COMT Val158Met allele frequencies taken from the Allele Frequency Database. In this study Piffer (2013) shows that the COMT Val158Met Polymorphism is significantly correlated with intelligence at the level of individuals and is also correlated with latitude at .55 (N countries = 87) suggesting selective pressure for increased frequencies of this allele in more northerly latitudes. The allele is also more frequent in agricultural (0.366) than in hunter-gatherer (0.211) societies. Frequency of rs236330 is associated with childhood and adult intelligence and it varies in frequency across populations correlated with national IQ at 0.81). COMT and FNBP1L had fairly similar geographical distributions (r = 0.44) although the result did not reach statistical significance. The results suggest that the genotype of a population influences its cultural development in fairly specific and predictable ways. Met allele frequency was positively correlated with latitude (r = 0.56), suggesting selective pressure due to climate. The correlation could be inflated by the presence of other genes coding for intelligence which have a similar geographical distribution to COMT. This study also found a strong association between another important intelligence gene (FNBP1L) and population IQ (r = 0.81). European and East Asian people have the highest IQ in the sample but also the lowest frequency of the ancestral allele (T) rs236330 which is correlated with lower intelligence within populations. Moreover, COMT and FNBP1L seem to present a similar geographical distribution, as suggested by the positive correlation (r = 0.47) between them across the 11 populations sampled in the HapMap project. This phenomenon could explain why the association of human civilizations are markedly different in their levels and types of cultural and technical achievement. Sometime in the Upper Paleolithic, humans started switching from a system of 'maintainable' to one of 'reliable' weapons. The former require comparably less effort to produce but are easier to fix (maintain) when necessary, e.g. when damaged through use. Most stone tools belong to this category (Coolidge et al., 2013). Reliable weapons, on the other hand, are not so easy to maintain (because of their more complex design, consisting of many interrelated parts) but are designed to ensure function, i.e. “to reduce as far as possible the chances for failure” (Coolidge et al., 2013). Complex projectile technology belongs to this category of weapons. Shea and Sisk (2010, p. 101) have argued that this development is a good marker of technical prowess: “we use the term ‘complex projectile technology’ to refer to weapon systems that use and a hunter-gatherer lifestyle.

Row 3 gives a correlation of .79 between national IQs and the frequencies of microcephalin alleles. Row 4 reports a correlation of .25 (NS) between national IQs and the related abnormal spindle-like microcaphaly associated (ASPM) microcephalin alleles. The authors note that although the recently evolved microcephalin and ASPM alleles do not appear to be associated with IQ at the individual differences level, the frequencies of microcephalin are strongly correlated with IQ at the cross-country level. A multiple regression analysis in which the Human Development Index, Disability Adjusted Life Years (DALY) lost due to Infectious diseases, DALY Nutritional deficiencies, and Würm glaciation temperature means were included revealed that microcephalin remained a good predictor of national IQ. Path analysis, with both direct and indirect paths from microcephalin to intelligence, showed good model fit. These multivariate analyses revealed strong and robust associations between DALYs and microcephalin, indicating that DALYs partially mediate the association between microcephalin and IQ. A second smaller correlational analysis involving ten country-level estimates of the frequencies of these two alleles collected from the 1000 genomes database replicated this pattern of results. The authors propose that microcephalin is strongly associated with DNA repair, which indicates a special role for this allele in the intrinsic anti-viral immune response. Enhanced immune functioning may have conferred an advantage in both hunter–gatherer and agrarian societies exposed to the heightened disease burden that resulted from population growth and exposure to zoonotic diseases, making it more likely that population growth and associated increases in intelligence could occur.

Row 5 gives a positive correlation between national IQs and nine SNPs megagene given in the GWAS (Genome Wide Association Studies) data for allele frequencies in populations. The author shows that this association is present at the individual level as well as the national level. The study shows that all of the nine alleles are present at significant frequencies among the five major races of Sub-Saharan Africans, South Asians, Europeans, East Asians and Native Americans. He concludes "Thus, the intelligence polymorphisms do not appear to be race specific but were already present in Homo Sapiens prior to the African exodus circa 60-100 Kya (thousand years ago).. It is thus likely that the vast majority of mutations affecting intelligence were already present in the ancestral African population and as humans settled in different parts of the world, these polymorphisms were subject to directional selection pressure, which produced an overall increase in human intelligence at different rates in different geographical areas" (Piffer, 2015, p. 49).

Row 6 gives a positive correlation between national IQs and genetic distance in 101 old world countries, estimated by comparing allele frequencies between populations. The authors' proposed explanation is that when populations are isolated from each other they accumulate differences in their DNA. Greater north-south geographical distance between populations tends to produce greater genetic differences. The authors conclude that "The findings support then theory of genetic differences as one cause of international differences in cognitive ability".

Row 7 gives a positive correlation between national IQs and genetic distance from the United States and Europe. The authors conclude that the results suggest that genetic distance to global frontiers has a negative relationship with human capital. Countries such as those in sub-Saharan Africa that are genetically far from economically leading nations tend to have lower levels of human capital (IQs) because there are greater barriers to the diffusion of human capital and competence.

Piffer (2018a) has replicated the earlier findings using the 2411 GWAS significant SNPs hits from the most recent and largest

GWAS of educational attainment to date (Lee et al., 2018). Row 8 gives a positive correlation between the polygenic scores (average population allele frequencies weighed by effect size) and population IQ. Moreover, these were very similar to his earlier estimates (r= 0.95) (Piffer, 2015).The analysis was extended to the 52 populations from the Human Genome Diversity Project (HGDP), and 7 sub-continental clusters, finding polygenic scores decreasing in this order: East Asia, Europe, Central-South Asia, Africa, America, Oceania (Piffer, 2018b).

The genetic data from Piffer (2015, Table 2) correlated with [QNW+SAS+GEO] give correlations of .74|.75 (*N*=21; *p*<.001; Fig. 33) with the average of the frequencies of the alleles increasing intelligence of .69|.68 (*N*=21; *p*<.001) with the nine SNP metagene factor, and of .71|.74 (*N*=21; *p*<.001) with the four SNP metagene factor. The correlation of .37 reported by Becker and Rindermann (2016) was calculated for 5050 pairings of countries. The dataset selected for the genetic distances between a country and Kenya was used, because this is the country closest to the cradle of humankind in the Great Rift Valley of Africa. This a correlation of .75|.75 (*N*=95; *p*<.001; Fig. 34), close to the .64 calculated by Kodila-Tedika and Simplice (2017) who applied a similar method with genetic distances from the USA as the "frontier" of human spread.

During the process of meiosis almost no recombination takes place between the male Y chromosome and the female X chromosome, thus genetic markers on the Y chromosome are only passed along patrilineal lineages and can be used to track prehistoric migratory movements and changes in the biodiversity of human populations from the beginnings to the present (Sun & Heitman, 2012; Y Chromosome Consortium, 2002). Sets of markers at the Y chromosome called Y chromosome haplogroups have been associated with intelligence at the cross-national level first by Rindermann, Woodley and Stratford (2012) and elaborated by Becker and Rindermann (2016). In both studies differences, strengths and directions of correlations varied between the different haplogroups with reference to their evolutionary history. Cherson (2012) presented a comprehensive record of haplogroup frequencies which was used here to review the previous findings. Correlations between [QNW+SAS+GEO] and haplogroup frequencies are largely consistent in strength and direction with those from the study by Becker and Rindermann (2016). The only considerable difference can be seen for haplogroup Q, which correlates with [QNW+SAS+GEO] at -.26|-.24 (N=74; p=0.25) but at -.02 in the study of Becker and Rindermann. Differences to the first study are in places larger but this study was restricted to a smaller geographic area. In Fig. 35 haplogroups were arranged in order to their appearance during evolution. The frequency of positive correlations is higher for the younger than for the older haplogroups, however a positive but only non-significant correlation of .24 (N=21; p=.282) between the position along the x-axis and the coefficients on the y-axis is present. This could be a result of a geographic auto-correlation, since haplogroups of closer relationship appeared in closer geographic distances, even though Becker and Rindermann (2016) showed that partial genetic effects remained when controlled for geographic distance and for HDI. In the first study haplogroups were grouped into two sets according to positive (I1, R1a, R1b and N) or negative (J1, E and T [+L]) correlations with intelligence. By grouping our data, the positive set showed correlations of .51|.54 (N=175; p<.001; Fig. 36) and the negative set -.65|-.68 (N=175; p<.000; Fig. 37).

Table 41. *Genetics*

	Variable	*N* countries	*r* x IQ	Reference
1	8 haplogroups	47	.43	Rindermann et al, 2012
2	Met allele	38	.58	Piffer, 2013
3	Microcephalin	59	.79	Woodley et al, 2014
4	ASPM	59	.25	
5	GWAS	23	.86	Piffer, 2015
6	Genetic distance	101	.37	Becker & Rindermann, 2016
7	Genetic distance	167	.64	Kodila-Tedika & Sinplic, 2017
8	GWAS PGS	23	.90	Piffer, 2018a,b

Table 42. *Correlations between NIQ (QNW+SAS+GEO) and selected genetic variables.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*N*	*p*	Source of compared variable
Mean intelligence-associated SNP-freq.	.72|.73	21	<.001	Lee et al. (2018)
Mean intelligence-associated SNP-freq.	.74|.75	21	<.001	Piffer (2015, Tab. 2)
9-SNP metagene factor	.69|.68	21	.001	
4-SNP metagene factor	.71|.74	21	<.001	
Genetic distances from KEN	.75|.75	95	<.001	Becker & Rindermann (2016, private dataset)

Fig. 33. *Scatterplot between the variables [1KGP-PSEA P2015 TA] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.74; N=21; p<.001).*

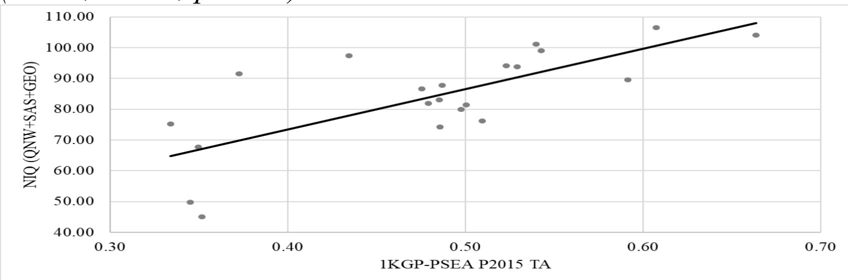


Fig. 34. *Scatterplot between the variables [Gen. Dist. f. KEN] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.75; N=95; p<.001).*

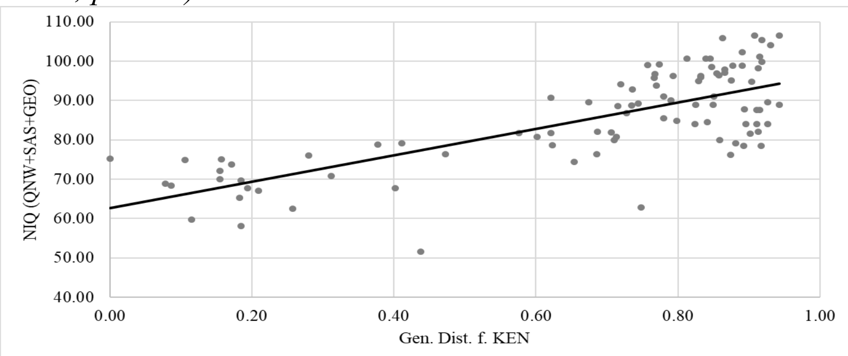
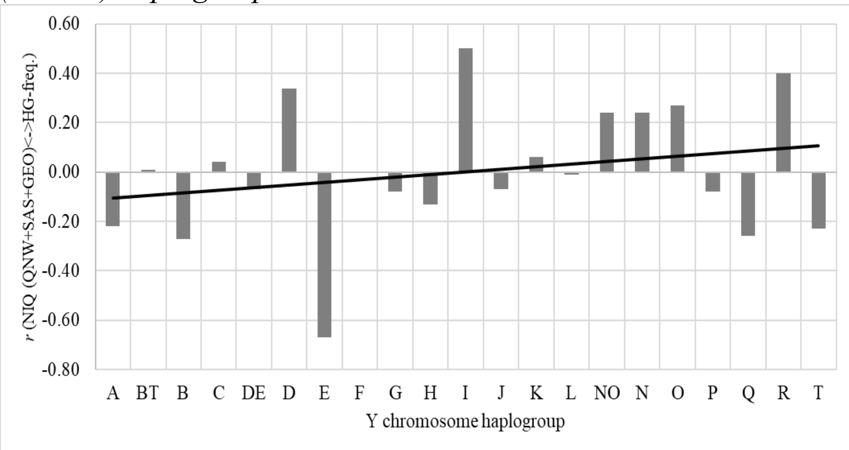


Table 43. *Correlations between NIQ (QNW+SAS+GEO) and frequencies of haplogroups at the human Y-chromosome.*

Variable	*r* x NIQ (QNW+SAS+GEO)	*r* (RWS12)	*r* (BR16)	*N*	*p*	Source of compared variable
Y HG-freq. A	-.22|-.25	-	-.25	88	.042	Cherson (2012, online raw data)
Y HG-freq. BT	.01|.00	-	-	22	.980	
Y HG-freq. B	-.27|-.32	-	-.47	91	.011	
Y HG-freq. C	.04|.03	-	.07	104	.721	
Y HG-freq. DE	-.07|-.08	-	-	74	.540	
Y HG-freq. D	.34|.38	-	.22	33	.054	
Y HG-freq. E	-.67|-.68	-.70	-.73	162	<.001	
Y HG-freq. F	.00|-.01	-	-.05	122	.962	
Y HG-freq. G	-.08|-.08	-.29	.00	136	.382	
Y HG-freq. H	-.13|-.13	-	-.10	101	.185	
Y HG-freq. I	.50|.53	-.02	.46	139	<.001	
Y HG-freq. J	-.07|-.09	-.61	-.12	160	.377	
Y HG-freq. K	.06|.05	-	.01	140	.481	
Y HG-freq. L	-.01|-.02	-	-.08	104	.936	
Y HG-freq. NO	.24|.24	-	-	29	.205	
Y HG-freq. N	.24|.25	.29	.27	84	.028	
Y HG-freq. O	.27|.29	.00	.32	93	.008	
Y HG-freq. P	-.08|-.09	-	.04	97	.459	
Y HG-freq. Q	-.26|-.24	-	-.02	74	.025	
Y HG-freq. R	.40|.44	.43	.43	173	<.001	
Y HG-freq. T	-.23|-.27	-.62	.14	121	.011	
Y HG-freq. HGSP*	.51|.54	.81	-	175	<.001	Cherson (2012, online raw data); Rindermann, Woodley & Stratford (2012, Tab. 1)
Y HG-freq. HGSN*	-.65|-.68	-.88	-	175	<.001	

Note: Left *r*: estimated IQs in full range; right *r*: all NIQ<60.00 set to 60.00; *p*-values for left *r*; RWS12 = Rindermann, Woodley & Stratford (2012); BR16 = Becker & Rindermann (2016)

Fig. 35. *Strength of correlations between the variables [NIQ (QNW+SAS+GEO)] and the frequencies (% on male pop.) of 21 (macro-) haplogroups at the Y chromosome.*



Note: Haplogroups in the order of appearance during evolution with the oldest left and the youngest right.

Fig. 36. *Scatterplot between the variables [Y HG-freq. HGSP] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=.51; N=175; p<.001).*

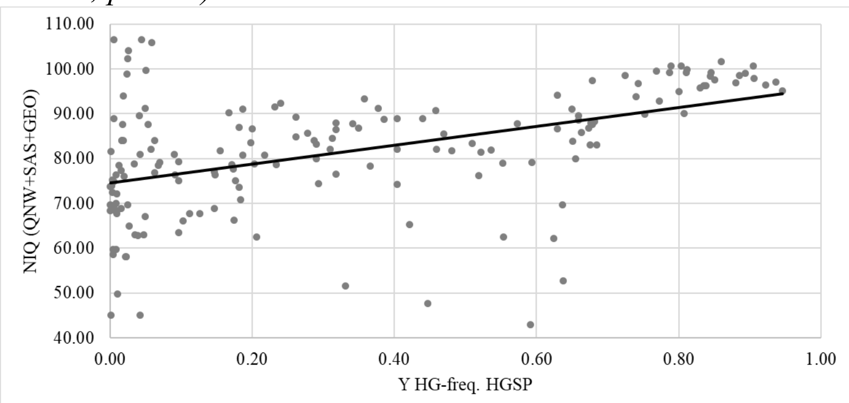
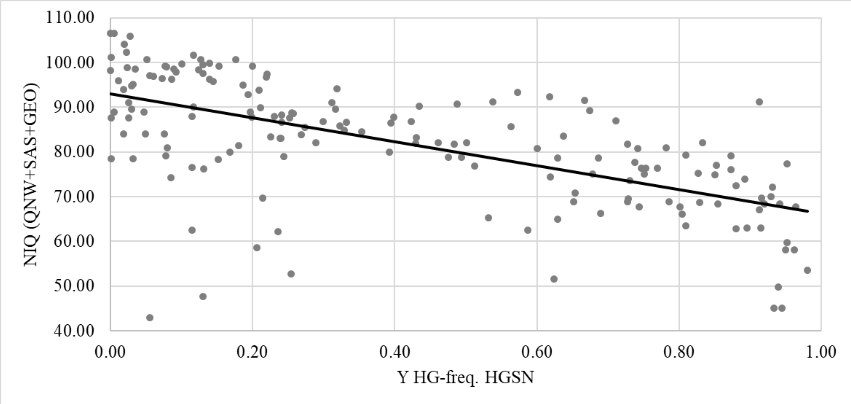


Fig. 37. *Scatterplot between the variables [Y HG-freq. HGSN] and [NIQ (QNW+SAS+GEO)] at the cross-national level (r=-.65; N=175; p<.001).*



Chapter 4. The Future of National IQs

We have seen in Chapter 3 that national IQs are a significant determinant of a number of socially desirable outcomes including income, health and happiness. It would therefore be desirable to increase national IQs. We discuss here how this could be achieved, whether it is likely to be achieved, and therefore what is the likely future of national IQs.

There are five possible strategies to increase national IQs. These are environmentally by (1) improvements in nutrition; (2) improvements in health; (3) improvements in education; and genetically by (4) positive eugenics; and (5) negative eugenics.

1. Improvements in Nutrition

During the twentieth century there were considerable improvements in nutrition in many countries shown by increases in heights that have been documented for several countries by van Wieringen (1978) and for the Netherlands by Martorell (1998). I have argued that these improvements in nutrition contributed to the increase of intelligence (Lynn, 1990). There are three lines of evidence supporting this contention. First, identical twins sometimes have different birth weights as a result of one receiving better nutrition than the other, and in these cases the heavier twin has a higher subsequent IQ than the lighter. Second, nutritional supplements given to pregnant women and children in economically developing countries have increased the children's IQs (Grantham-McGregor, Powell et al., 1994) and this has also been reported for a small minority of iron deficient children in England given iron supplementation (Lynn & Harland, 1998).

Third, a number of studies have reported that breastfeeding infants increases their intelligence. A meta-analysis by Anderson, Johnstone & Remley (1999) reported consistent IQ differences favoring breastfed over formula-fed infants, with most differences in the 2- to 5 IQ point range. This was confirmed in a large study by Kramer, Aboud, Mironova, Vanilovich, Platt et al. (2008) that showed that breast feeding infants increased intelligence by 7.5 IQ at the age of 6 years. Some reviews have concluded that breastfeeding is not significantly associated with increased intelligence in children once the mother's IQ is statistically controlled. This problem has been addressed by Kanazawa (2015) who showed that each month of breast feeding, controlled for parental IQ and other potential confounds, is associated with an increase of .16 IQ points. This study concludes that one year of breast feeding produces an increase of 1.9 IQ points.

The process responsible for the positive effect of breast feeding on intelligence is not securely established. It may be that it is attributable to the higher concentrations of essential long-chain polyunsaturated fatty acids in human milk than in infant formula, or that breast milk contains a higher concentration of insulin-like growth factor I, which has been shown to be absorbed intact across the newborn infant's gastrointestinal tract. Either of these could increase the neurological development of the brain and be responsible for the cognitive advantage.

By the twenty-first century, nutrition appears to be pretty well optimal in economically developed countries because heights have not increased. This was shown for the Netherlands, where have been no increases in height in cohorts born after 1965 (Martorell, 1998). It is therefore doubtful whether there is any scope for improvements in nutrition to increase intelligence except for a small minority of inadequately nourished children. There is, however, scope for improvements in nutrition to increase intelligence in many economically developing countries where nutrition is not optimal. Jausovec & Pahor (2017, p. 290) review research on this and conclude "Systematic review and meta-analyses of nutrition supplementation studies in developing countries suggest that multiple miconutrient nutrition supplementation during pregnancy positively affects infants' birth weight, height and cognitive development by 2 years of age, and in children aged 5-15 years".

2. Improvements in Health

During the twentieth century there were considerable improvements in health in many countries and there is evidence that these contributed to the increase of intelligence. First, a study of children in Brazil showed that those with hookworms and roundworms impaired intelligence assessed by the Progressive Matrices by 8 IQ points (Jardin-Botelho, Raff, Rodrigues et al., 2008). Second, a study in Indonesia showed that deworming children increased their intelligence assessed by the Progressive Matrices by 8 IQ points (Hadidjaja, Bonang, Suyardi et al., 1998). Third, there is a high correlation of -.82 between national IQs and the prevalence of disease suggesting that a high prevalence of disease impairs IQs across nations (Eppig et al., 2010). Thus, there is considerable potential for increasing intelligence by improvements in health in economically developing countries.

Rindermann (2018) has argued that there is some potential for increasing intelligence by improvements in health in economically developed countries and has proposed several measures that could be introduced to achieve this. These include campaigns and laws to prevent pregnant women from smoking and consuming alcohol, the provision of free healthy foods in schools for school children, and the prohibition of cousin-cousin marriages which reduce the intelligence of children by an average of 7.5 IQ points estimated by Jensen (1998, p. 194) and by 3 IQ points estimated by Woodley (2009) in a study of 72 countries. It would, however, be difficult and probably impossible to prohibit cousin-cousin marriages.

3. Improvements in Education

Improvements in education have contributed to the increase of intelligence in many countries. These consist of improvements in formal education (Cahan & Cohen, 1989); Ceci, 1991) and in the length of education (Lynn, 1990). These improvements in education have been usefully summarised and discussed by Meisenberg (2006) in a study of the increase of intelligence of 5.14 IQ points a decade over 35 years in Dominica showing that this is principally attributable to improvements in education.

Rindermann (2018) has proposed several measures that could be introduced to improve education that would have a positive effect on children's intelligence. First, parents should talk a lot to their children, read to them, provide them with, and send them to schools in which the children have high intelligence. Second, education in schools should be increased for adolescents and for pre-school children, and made more effective by firm discipline, examinations, tracking (streaming) in homogeneous ability classes, improved teacher quality, support for highly gifted children and cognitive training.

There is more scope for increasing intelligence by improvements in education in economically developing countries in which much education consists of memorisation rather than the development of reasoning ability. This is suggested by several studies in economically developing countries that have found that the intelligence of children declines with age, compared with that of children in economically developed countries. For instance, it was reported that in Libya the youngest children aged 6 years performed best with an IQ of 98 (relative to British norms), and IQs declined at later ages reaching 74.25 among 11 year olds (Al-Shahomee, Abdalla & Lynn, 2017). This decline with age has been reported in other Middle East countries including Syria and the United Arab Emirates (Khaleefa & Lynn, 2008a, b). The probable explanation for the decline is that education in the Middle East does not develop reasoning ability as effectively as in Britain and other economically developed countries.

4. Positive Eugenics

The intelligence of nations could also be increased genetically by progams of positive and negative eugenics. This was proposed by Francis Galton in the mid-nineteenth century. Galton read Charles Darwin's *The Origin of Species* when it appeared in 1859, and he concluded that the process of natural selection, by which the genetic quality of the population is maintained and sometimes enhanced, had begun to weaken in England and other economically developed nations. He first discussed this problem in 1865, when he wrote that "One of the effects of civilisation is to diminish the rigour of the application of the law of natural selection. It preserves weakly lives that would have perished in barbarous lands" (Galton, 1865, p. 325). He contended that natural selection had weakened against those with low intelligence, poor health and what he called "character", by which he meant a well-developed moral sense, self-discipline and strong work motivation. Galton discussed genetic deterioration at greater length in 1869 in his *Hereditary Genius*. He wrote that in the early stages of civilization "the more able and enterprising men" were the most likely to have children, but in older civilizations, like that of Britain, various factors operated to reduce the number of children of these and to increase the number of children of the less able and the less enterprising. He thought that the most important of these factors was that able and enterprising young men tended not to marry, or only to marry late in life, because marriage and children would impede their careers. The effect of this was that "there is a steady check in an old civilisation upon the fertility of the abler classes: the improvident and unambitious are those who chiefly keep up the breed. So the race gradually deteriorates, becoming in each successive generation less fit for a high civilisation" (Galton, 1869/1962, p. 414).

Galton's view that people with high intelligence were having fewer children that those with low intelligence has been confirmed in numerous subsequent studies that have shown that this is true of women but generally not of men, reviewed in Lynn (2011) and confirmed by Woodley & Figueredo (2013) for a number of economically developed countries and several economically developing countries including Dominica, Libya and Sudan. The effect of this has been a decline in the genotypic intelligence (the genetic component of intelligence) in many countries from the late nineteenth century. This decline has been shown in a meta-analysis of the slowing of simple reaction time from 1889 to 2004 that has brought about a decline of genotypic intelligence of 1.16 IQ points a decade or 13.35 IQ points over the 115 years (Woodley, te

Nijenhuis & Murphy, 2013). During much of the twentieth century, this genetic deterioration was masked by increases in phenotypic (measured) intelligence brought about by improvements in nutrition (Lynn, 1990), health and education (Flynn, 2012). However, from the closing decades of the twentieth century, declines in phenotypic intelligence have been reported in Britain, Denmark, Estonia, Finland, France, the Netherlands and Norway (Dutton, van der Linden & Lynn, 2016).

Galton discussed the problem of genetic deterioration further in 1883 in his *Inquiries into Human Faculty and its Development.* In this he coined the word *eugenics* for policies to increase intelligence and other desirable qualities. Galton's eugenic proposals fell into the two categories of positive and negative eugenics. Positive eugenics consists of policies designed to increase the numbers of those with high intelligence and other desirable qualities. Galton's proposals for positive eugenics consisted of providing financial incentives designed to encourage those with the desirable qualities of high intelligence and strong moral character to have more children. In 1908 he wrote: "I look forward to local eugenic action in numerous directions, of which I will now specify one. It is the accumulation of considerable funds to start young couples of "worthy" qualities in the married life, and to assist them and their families at critical times" (Galton, 1908a, p. 646).

Galton's proposals for positive eugenics by providing financial incentives designed to encourage those with the desirable qualities of high intelligence and strong moral character to have more children were repeated by several eugenicists later in the twentieth century. Ronald Fisher (1929) proposed that parents should be given tax allowances against income for children on the grounds that as only the professional and middle classes, assumed to have high intelligence and desirable personality trait, paid income tax at this time, only these would benefit, while avoiding the provision of similar incentives to low-earning fathers. He also proposed that tax allowances for children should be given proportional to their fathers' incomes, such that fathers with high incomes would receive higher allowances per child than fathers with lower incomes. This would provide incentives for high-earning fathers to have more children (Fisher, 1932).

A further eugenic proposal was made by Cattell (1937) that couples who had produced one highly intelligent child should be offered a grant from the government to have another, on the assumption that the next child would be likely to resemble the first. A similar plan was suggested by Blacker (1952) who proposed that teachers and others holding responsible positions in local communities should identify couples who had produced one or two gifted children and that these "favored married couples whose reproductive lives have already begun should be encouraged, and perhaps helped, to have as many children as their natural inclinations prompt" (p. 311). He suggested that this should be done by the state giving allowances for children proportional to the parents' earned incomes, on the assumption that parents with high earned incomes would have genetically desirable qualities.

Eugenic programs of this kind were introduced in Germany in 1934 and 1935 consisting of the government providing loans to couples assessed as psychologically and biologically sound, and 25 percent of these loans was written off for each baby they produced. Financial grants were given for third and fourth children born to families assessed as genetically desirable. In 1936 Heinrich Himmler set up special maternity hospitals for the wives and mistresses of members of the SS to provide the best medical care during their confinement (Kopp, 1936).

A eugenic measure was introduced in Britain in the 1930s in which university lecturers and professors – supposedly the nation's elite - were paid £50 per annum for every child. This incentive was ended in the 1960s as eugenics fell into disrepute.

The proposal to provide incentives for those with high intelligence to have more children has recently been revived by Rindermann (2018). He follows Fisher and others by proposing that this could be achieved by reducing the taxation of couples with several children. This would provide those who pay taxes and generally have higher cognitive ability with an incentive to have more children, while avoiding giving an incentive for the poor, who pay little tax and generally have lower cognitive ability. He concludes that "successful value-orientated demographic policies are difficult to implement but are vital to support a positive long-term development of society" (p. 517).

Some studies have addressed the issue of the effectiveness of the provision of financial incentives for couples with high intelligence to have children. This has been done by surveys in which women are asked what factors determine the number of children they intend to have. These studies have shown that financial considerations are a significant factor in decisions about family size and suggest that many women would respond to financial incentives by having more children. In a British study of 1,458 married women carried out in 1973, two-thirds said they intended to have the number of children they could afford (Cartwright, 1976). A study carried out in Japan in 1993 found that more than half of working mothers in their twenties and thirties said they would have more children if their employers provided paid maternity leave and gave them an additional allowance for housing (Kazue, 1995).

Other studies have addressed this question by examining whether fertility increases when financial incentives for childbearing are raised. Over the course of the twentieth century, a number of countries gave financial incentives to couples to have children, in the form of either child allowances or income tax reductions. Analyses of the effects of these financial incentives have generally concluded that they are positive but quite small (e.g. Glass, 1940; Schorr, 1970). The impact of financial incentives for children has been analyzed in a cross-country study by Gauthier (1991). He collected information on cash benefits and maternity leave payments for 22 Western countries for the years 1970–86 and examined how far the magnitude of the two benefits was related to fertility. The results showed that the associations were positive but low, suggesting a positive but small effect of state payments for children on fertility.

Further evidence for this conclusion comes from American studies of the effects of Medicaid financial support for childbearing. Joyce and Kaestner (1996b) examined this in a study of trends in birth rates and abortion rates between 1985 and 1991. Over this period, a number of U.S. states increased Medicaid eligibility to provide financial assistance for childbirth, making many more women eligible for free health care. The result of this was that the proportion of births financed by Medicaid increased from 14.5 percent in 1985 to 32 percent in 1991. Coincident with this increase in Medicaid assistance, fertility in the United States rose from 65.4 births per 1,000 women aged 15 to 44 in 1986, to 69.6 births per 1,000 in 1991. Over the same period, the abortion rates fell from 28.0 per 1,000 women in 1985 to 25.9 per 1,000 in 1992. Further examination of this issue in the states of South Carolina, Tennessee, and Virginia for the years 1986–91 concluded that increases in Medicaid assistance for childbirth decreased the abortion rate by approximately 3.5 percent and were responsible for a corresponding increase in the birth rate (Joyce & Kaestner, 1996b; Joyce, Kaestner, & Kwan, 1998).

The only country where positive eugenics was explicitly pursued in the second half of the twentieth century was Singapore. Lee Kuan Yew, the prime minister from 1959 to 1990, was concerned that the Singapore census returns showed that well-educated women were having fewer children than the poorly educated, and he realized that this would have a dysgenic impact on the population. In 1987 he introduced six measures designed to correct this by encouraging women graduates and high earners to marry and to have more children. First, a publicity campaign was launched to encourage childbearing under the rubric, ‘‘Have three, and more if you can afford it”. Government spokespeople explained that the fertility decline of recent years had occurred largely among the better educated and that these needed to be encouraged to have more children. The qualification, “more if you can afford it,” was based on the assumption that people with high incomes were intelligent and had desirable personality qualities and should receive special encouragement to raise their fertility. Second, tax allowances against earned income were given for all children, but only middle-class parents paid sufficient tax to benefit from these; so the effect was to give a selective incentive to the middle class to increase their numbers of children, while not providing this incentive to the working class. Third, medical fees for childbirth were made tax deductible against income for the first four children. This also gave a selective benefit to middle-class parents. Fourth, mothers with good educational qualifications were given additional tax incentives to have children. These incentives consisted of 5 percent of their income free of tax for the first child, 10 percent for the second, and 15 percent for subsequent children. Fifth, tax credits were given for the first three children to attend approved child care centers. Sixth, a special unit was set up in the civil service to bring unmarried men and women graduates together in social settings, such as dances and cruises, with the objective of promoting romance, marriage, and childbearing among the nation's elite.

The impact of these measures can be assessed by examining whether the fertility of better educated women increased following their introduction. Statistics of births to women with secondary education and above, as compared with births to women without secondary education, for 1987, when the measures were introduced, and for 1990, after the measures had been in place for about three years suggest that the measures had a significant impact. Births to women with secondary education and above increased in absolute terms from 16,012 to 24,411, while those of poorly educated women remained static; and that the percentage of births to women with secondary education rose from 36.7 percent to 47.7 percent, while those to poorly educated women showed a corresponding decline (Singapore Ministry of Health, 1994).

Although financial tax incentives for couples with high intelligence to have more children appear to have some effect, it is doubtful whether these would be sufficient to reverse dysgenic fertility in economically developed countries. Studies in a number of counties have shown that dysgenic fertility is largely confined to women (Lynn, 2011b). The principal problem is that many women with high intelligence obtain university degrees and professional qualifications and go on to have rewarding careers in their twenties and early thirties. Many of them have just one child because they are unwilling to jeopardise their careers by having more. Others postpone having children into their mid-thirties when they start to think about having children but some of them find that they are infertile or are unable to find a partner, while others settle for childlessness. Furthermore, providing tax incentives for high earning women to have more children would be widely condemned as unjust to low earners who would have to pay more tax to make up for the lost revenue. Incentives are required to induce these high intelligence career women to have children in their twenties but these are, as Rindermann says, “difficult to implement”.

Galton proposed that positive eugenics could also be promoted by immigration through “the policy of attracting eminently desirable refugees, but no others, and encouraging their settlement and the naturalisation of their children” (Galton, 1869, p.413). He gave as an example of this the benefits gained by England from the Huguenot and Flemish immigrants, writing that they were “able men, and have profoundly influence for good both our breed and our history” (p.411). This proposal has been endorsed by Rindermann (2018) who follows Galton in advocating that Western countries should only admit immigrants with high cognitive ability and he commends Australia and Canada as going some way towards this.

5. Negative Eugenics

Galton's negative eugenics consists of policies designed to reduce the numbers of those with low intelligence and other undesirable qualities. This would be achieved by measures to discourage and prevent those with undesirable qualities from having children. On this he wrote in his autobiography that “I think that stern compulsion ought to be exerted to prevent the free propagation of the stock of those who are seriously afflicted by lunacy, feeble-mindedness, habitual criminality, and pauperism” (Galton, 1908, p.311). He did not spell out how these should be prevented from having children. It can be presumed that he had sterilisation in mind and that he did not elaborate on this to avoid alienating people from his ideas. He appears not to have been aware that in the previous year (1907) the first law providing for the sterilisation of the mentally retarded and habitual criminals was enacted in the American state of Indiana. This was followed in other American states and by 1925 the sterilisation laws had been introduced in twenty five of these.

In the 1920s and 1930s, similar sterilisation laws were introduced in Canada, Japan and a number of European countries including Austria, Denmark, Estonia, Finland, France, Germany, Norway, Sweden and Switzerland. The countries where most sterilisations were carried out were Sweden, where they numbered about 60,000, and Germany, where they numbered about 300,000. Sterilisation became less frequent from the 1960s and virtually ceased by 1980 as the tide of liberal opinion turned increasingly hostile to eugenic measures.

The importance of finding ways to induce those with low intelligence to have fewer children has recently been discussed by Rindermann (2018). He proposes that this could be achieved by abolishing welfare programmes such as child allowances that give incentives for the poor to have more children and that welfare policies should be designed to promote work and self-reliance, but should not allow people to live permanently on welfare. These proposals might reduce the numbers of children of those with low intelligence, but many of these children are unplanned and the effect of abolishing child allowances would be that the families would live in poverty and the children would become malnourished. It is doubtful whether these proposals would be acceptable in Western societies.

Galton proposed that negative eugenics could also be promoted by immigration through “the policy of attracting eminently desirable refugees, but no others” (Galton, 1869, p. 413). This policy has been disregarded in many Western countries that have admitted large numbers of migrants claiming to be refugees with lower intelligence than that of their indigenous people. For instance, in Britain, a study of a representative sample on the CAT (Cognitive Abilities Test) in 2009 reported these non-verbal reasoning IQs: White British 101.4; Indians 100.2; Pakistani 94.5;

Bangladeshi 97.3; Black African 94.1; Black Caribbean 94.6. In Denmark, Nyborg (2013) has calculated that immigrants will become 67 percent of the population by 2072 and that the low intelligence of these will reduce the average intelligence of the country to 93. The lower average IQs of immigrants has also been shown in Sweden by Heller-Sahlgren (2015). Rindermann & Thompson (2016) have calculated that the intelligence of immigrants in all European countries is lower by an average 6 IQ points than that of indigenous populations. Further data confirming this conclusion for a number of economically developed countries have been reported by Woodley of Menie, Peñnaherrera-Aguire, Fernandes & Figueredo (2017).

Rindermann (2018) discusses this problem and follows Galton in contending that refugees with low intelligence should not be admitted and concludes "In Western countries, reforms are urgent and indispensable!" (p. 522). This proposal would require withdrawal from the undertaking given by Western nations in the 1951 United Nations Refugee Convention to admit as refugees those who have a well-founded fear of persecution. This undertaking has been widely honoured by Western nations during the twentieth century and twenty-first centuries, notably by Greece that accepted many thousands of migrants who made the crossing from Turkey, by Italy that accepted approximately 650,000 migrants who made the crossing from Libya in the years 2014-18 and by Germany where Angela Merkel accepted approximately 1.2 million migrants in 2015. These migrants claimed to be refugees but many of them are economic migrants. Their claims to be refugees are assessed and if they are recognised as genuine they are accepted for asylum while if they are rejected they are meant to be deported, but this is frequently impossible and most of them remain in Europe.

This influx has generated widespread opposition in many European countries and these have responded by attempting to reduce it. From 2015, Europe has paid Turkey to keep migrants in camps to prevent them crossing into Greece, and Austria and Hungary has built fences to stop migrants entering from the south.

In June, 2018, Italy and Malta refused to accept a boat of 629 African migrants from Libya who had been picked up in the Mediterranean by the charity ship *Acquarius* and Italy declared she would no longer allow charity ships to land migrants in Italy. The French president, Emmanuel Macron, criticised Italy but refused to allow the ship to dock at French ports but the *Acquarius* was accepted by Spain which has continued to accept African migrants from Morocco and from west Africa landing in the Canary islands.

It can be anticipated that in the decades that lie ahead migrants from sub-Saharan African will continue to try to get into Europe. There has been a huge increase of the population in sub-Saharan Africa from approximately 230 million in 1960 to approximately one billion in 2018 and it will likely continue to grow. There are high rates of unemployment and poverty throughout sub-Saharan Africa that are likely to continue and inevitably large numbers will seek a better life in Europe and many will succeed. Stephen Smith (2018) has predicted in his book *La ruée vers l'Europe* (*The Rush to Europe: Young Africa on the Way to Europe)* that in 35 years there are likely to be between 150 to 200 million sub-Saharan Africans in Europe, around a third of the population. There may be increasing Spanish opposition to this immigration but even if Spain closed its borders to migrants they will find other ways to enter Europe. Many of these will be accepted as asylum seekers and most of those whose asylum claims are rejected will remain because it will be impossible to deport them. In Britain, only 40 percent of those whose asylum claims have been rejected since 2004 have been deported.

It is inevitable that throughout Western Europe the numbers of non-Europeans will increase as a result of immigration and their greater fertility, the continued arrival of asylum seekers, illegal entrants and marriages with Europeans. In Britain, the growth of the proportion of non-Europeans in the population has been calculated by the demographer David Coleman (2010) who estimates that the indigenous peoples will decline from 87 per cent of the population in 2006 to 56 per cent in 2056, and will become a minority by about 2066. Similar projections of the growth in the numbers of non-Europeans in Austria, Belgium, Greece, Germany, Italy and Spain leading to their becoming majorities of the populations in the second half of the twenty-first century have been made by Ediev, Coleman and Sherbokov (2013). In Western Germany, 42% of children under the age of six came from a migrant background in 2018. In Britain. Kaufmann (2018) has calculated that the indigenous people will fall to 32 per cent of the population in 2020.

Immigration will also have a dysgenic effect in the United States where most immigrants are Hispanics and approximately two-thirds of these are from Mexico, where approximately 9 percent of the population are white, approximately 60 percent are Mestizo, and approximately 30 percent Native American. A meta-analysis of 39 studies of adult Hispanics in the United States concluded that they have an average IQ of 89 (Roth, Bevier, Bobko, Switzer & Tyler, 2001). The low average IQ of Hispanics is to some degree compensated for by the high IQ of Northeast Asians (Chinese, Japanese and Koreans) but Rindermann (2018) has calculated that the average intelligence of immigrants in the United States is approximately 7 IQ points lower than that of the population and is therefore reducing the national intelligence. This will likely continue as the Hispanic population is estimated to become approximately 60 million in 2018 and is predicted to exceed 100 million by 2050.

Many Americans have been unsympathetic to this influx and this was one of the reasons that Donald Trump won the presidential election in 2017 with his promise to prevent it by building a wall along the border with Mexico. It is doubtful whether such a wall, if it is ever build, would be effective because Hispanics could continue to enter the United States by tunnelling under it, by boat or by air, including flying to Canada and crossing into the US. Further dysgenic immigration into the United States is unstoppable. Europeans are already a minority of the school-age population and will become a minority of the adult population about the year 2044. In the second half of the twenty-first century, Europeans will become a dwindling minority through the continued immigration of Hispanics and their greater fertility.

There has also been dysgenic immigration in Canada. Bélanger (2006) has shown in an analysis of the 2001 Census that the total fertility rate has been around 1.5 children per woman for a number of years and women who immigrated in the previous 10 years were 19% more likely than other women to have borne a child during the year. The Blacks, Filipinos and Arabs had the highest fertility with 60%, 28% and 22%, respectively, more likely than Whites to have a child under the age of one year. Chinese, Korean, Japanese and West Asian women were the least fertile.

In a further paper, Bélanger (2007) gives the numbers of immigrants as 1.1 million in 1981, 1.6 million in 1986, 2.5 million in 1991, 3.2 million in 1996, and 4.1 million (13.4 per cent of the population) in 2001. Taking into account likely future immigration and fertility, he estimates that in 2031 the number will be 10,600 million (27.4 per cent of the population). He estimates that during the years to 2031 the immigrants would increase at an average rate of 32 per thousand a year while the rest of the population would grow at a rate of about 2 per thousand a year.

Dysgenic immigration has been less of a problem in Australia and New Zealand. Australia has prohibited ships bringing migrants from landing and diverted them to camps in Papua New Guinea. Non-European immigrants have been mainly Chinese and Indians who in the 2006 census had become 6 percent of the population. These immigrants have mostly done well in Australia so they are not a dysgenic problem. The dysgenic problem in Australia is the high fertility of the Aborigines resulting in an increase of their numbers from 106,000 in the 1961 census to 517,000 in the 2006. The average IQs of these is 62 (Lynn, 2015).

In New Zealand there was a decline in the proportion of Europeans from 1956 to 2001 from 94 percent to 74 percent and an increase in the proportion of Asians from zero to 6 percent (New Zealand Statistical Office, 2010). In 2001, 56 percent of the Asians were Chinese, Japanese and Koreans, 26 percent were from the Indian sub-continent, and the remaining 18 percent were from the rest of Asia. These are not a serious dysgenic problem. The main dysgenic problem is the increase in the proportion of the Maori from 6 percent in 1956 to 16 percent 2001, resulting from their high fertility, and of Pacific Islanders from zero in 1956 to 10 percent 2001, resulting from immigration. The average IQ of these is 90 (Lynn, 2015).

6. Conclusions on the Future of National IQs

We envisage (envision for American readers) five scenarios on the probable future of national IQs. First, in the economically developed countries the declines in national IQs that have been reported in a number of these will continue as a result of dysgenic fertility and immigration. Dysgenic fertility has been reported in many countries summarised in Lynn (2011) and more recently in the Russian Federation (Chmykova, Davydov & Lynn, 2016), Taiwan (Chen, Chen, Liao, Chen & Lynn, 2017) and in a review of 17 studies by Reeve, Heeney & Woodley of Menie (2018) including 11 in the USA, 2 in Europe, 3 in East Asia and one in Dominica showing that there has been dysgenic fertility in all of them and that this is greater for women for whom the correlation between IQ and their number of children is -.197 than for men for whom the correlation is -.077. The principal problem is the large number of highly educated high IQ career women who remain childless. It is probably impossible to introduce policies to increase the fertility of these women who have been educated out of their reproductive function. It is also probably impossible to introduce policies to reduce the fertility of those with low intelligence.

In Western Europe, the United States and Canada intelligence will also decline as a result of dysgenic immigration consisting of the continued settlement of immigrants with lower intelligence and greater fertility than that of the host populations. Measures designed to prevent this, such as building a wall along the American-Mexican border or attempting to restrict immigration into Western Europe, will be ineffective. The decline of intelligence will reduce the economic, technological, scientific and military power of these countries.

Second, national IQs will continue to decline in Eastern Europe, Japan, Taiwan, South Korea, Australia and New Zealand as a result of the low fertility of high IQ career women but the decline will not so great as in Western Europe, the United States and Canada because in these countries there is little dysgenic immigration.

Third, while Australia and New Zealand have had little dysgenic immigration, their indigenous peoples with their low IQs will continue to grow because of their high fertility. It will not be possible to reduce this and it will have some adverse effect on their national IQs.

Fourth, national IQs will continue to increase in economically developing nations. There may be some dysgenic fertility resulting in a decline in genotypic intelligence where it has been reported is Dominica (Meisenberg, 2006) but this will be more than compensated for as a result of improvements in nutrition, health and education as it was in economically developed nations during most of the twentieth century. The differences in intelligence between economically developed and economically developing nations will therefore be reduced, although it will not be eliminated because the populations of the economically developed nations will retain a genetic advantage as shown by their larger average brain size.

Fifth, there has been dysgenic fertility in China during the last half century reported by Wang, Fuerst & Ren (2016). Despite this, there was a large increase of 15 IQ points in the intelligence of Chinese children from 1988 to 2006 as a result of improvements in nutrition, health and education and the British IQ of Chinese children in 2006 is estimated as 109.8 (Wang & Lynn, 2018). By 2016, the National Science Board reported that China had overtaken the United States for the number of articles published in science and technology. It is likely that this lead will grow as intelligence in China continues to increase, as it has in other economically developing nations, as a result of further environmental improvements. There is also likely to be an increase of intelligence in China with a reduction in air pollution which at present is impairing intelligence in many towns and cities (Zhang, Chen and Zhang (2018).

Thus, as intelligence continues to increase in China and decline in Europe and the United States, China is likely to emerge as the world's superpower in the second half of the twenty-first century.

References

Abdel-Khalek, A. M. (1988). Egyptian results on the Standard Progressive Matrices. *Personality and Individual Differences, 9,* 193-195.

Abdel-Khalek, A.M., & Lynn, R. (2006). Sex differences on the Standard Progressive Matrices and in educational attainment in Kuwait. *Personality and Individual Differences, 40,* 175-182.

Abdel-Khalek, A. & Lynn, R. (2008a). Intelligence, family size and birth-order: some data from Kuwait. *Personality and Individual Differences*, *44*, 1032-1038.

Abdel-Khalek, A. M. & Lynn, R. (2008b). Norms for intelligence assessed by Standard Progressive Matrices in Oman. *Mankind Quarterly*, *49*, 184-186.

Abdel-Khalek, A. M., & Lynn, R. (2009). Norms for intelligence in Saudi Arabia assessed by the Standard Progressive Matrices. *Mankind Quarterly, 50*, 106-113.

Abdel-Khalek, A.M., & Lynn, R. (2010). Norms for intelligence assessed by the Standard Progressive Matrices in Oman. *Mankind Quarterly, 49,* 78-83.

Abdel-Khalek, A. M., Nour-Eddin, A. S., & Lynn, R. (2014). A Study of the Intelligence of University Students in Egypt. *Mankind Quarterly, 55,* 129-135.

Abdel-Khalek, A., & Raven, J. (2008). Kuwaiti norms for the classic SPM in an international context. In J. Raven & J. C. Raven (Eds), *Uses and abuses of intelligence. Studies advancing Spearman's and Raven's quest for non-arbitrary metrics.* Unionville, NY: Royal Fireworks Press.

Abdul-Hubb, D. (1972). Application of Progressive Matrices in Iraq. In L. J. Cronbach & P. J. Drenth (Eds) *Mental Tests and Cultural Adaptation*. The Hague: Mouton.

Aboud, F., Samuel, M., Hadera, A. & Addus, A. (1991). Intellectual, social, and nutritional status of children in an Ethiopian orphanage. *Social Science and Medicine, 33,* 1275-1280.

Aboussaleh, Y., Ahami, A.O.T., Bonthoux, F., Marenddaz, C., & Valdois, S. (2006). Performances cognitives des enfants anémiques âgés de 6 à 11 ans en milieu urbain du Nord-Ouest Marocain. *Journal de Thérapie Comportementale et Cognitive, 16,* 249-54.

Abu-Hatab, F., Zahran, H., Mousa, A., Khedr, A. Yousef M. & Sadek, A. (1977). The standardization of the Standard Progressive Matrices in a Saudi sample. In F. Abu-Hatab (Ed.), *Studies on the standardization of psychological tests* (vol. 1: pp. 191-246). Cairo: Anglo-Egyptian Library (in Arabic).

Adherents.com. (2009). 43,941 adherent statistic citations: membership and geography data for 4,300+ religions, churches, tribes, etc. Attained at: http://www.adherents.com/Na/Na_517.html.

Adler, L. L. (Ed.) (1981). C*ross-cultural research at issue.* New York, USA: Academic Press.

Afzal, M. (1988). Consequences of consanguinity on cognitive behavior. *Behavior Genetics, 18,* 583-594.

Agrawal, N., Sinha, S. N., & Jensen, A. R. (1984). Effects of inbreeding on Raven matrices. *Behavior Genetics, 14,* 579-585.

Ahmad, R., Khanum, S. J., Riaz, Z., & Lynn, R (2009). Gender differences in means and variance on the Standard Progressive Matrices in Pakistan. *Mankind Quarterly, 49,* 50-57.

Ahmed, A. S. F., Osman, H. A., Bakhiet, S. F. A., Cheng, H., & Lynn, R. (2017). Gender Differences on the Standard Progressive Matrices of South Sudanese Living in Khartoum. *Mankind Quarterly, 58,* 2.

Ahmed, R. A. (1989). The development of number, space, quantity and reasoning concepts in Sudanese schoolchildren. In L. L. Adler (Ed.), *Cross Cultural Research in Human Development.* Westport, CT: Praeger.

Akande, A. (2000). Order effects on neuropsychological test performance of normal, learning disabled and low functioning children: A cross-cultural study. *Early Child Development and Care, 165*, 145-161.

Albalde Paz, E. & Muños, C. J. (1993). *El test PMS de Raven y los escolares de Galicia.* Universidade da Coruña: Servicio de Publicasiones.

Al-Heeti, K., Ganem, A., Al-Kubaldi, A. & Al-Nood, Y. (1997). Standardization of Raven's Coloured Progressive Matrices Scale on primary school children ages 6-11 in Yemen schools. *Indian Psychological Review, 48*, 49-56.

Allik, J. (2007). Geographical distribution of mental abilities and its moral consequence. *European Journal of Personality, 21*, 707-708.

Almond, D. & Edlund, L. (2007). Trivers-Willard at birth and one year: evidence from US natality data 1983-2001. *Proceedings of Biological Science, 274*, 2491-2496.

Al Said, T. B. T. (2014). The relationship between nonverbal intelligence and emotional intelligence among children in UK and Oman. *International Journal of Psychological Studies, 6,* 79-86.

Al-Shahomee, A. A., & Lynn, R. (2010a). Norms and sex differences for the Standard Progressive Matrices in Libya. *Mankind Quarterly, 51,* 97-107.

Al-Shahomee, A. A., & Lynn, R. (2010b). IQs of Men and Women and of Arts and Science Students in Libya. *Mankind Quarterly, 51,* 154-158.

Al-Shahomee, A. A., & Lynn, R (2012). A standardisation of the Standard Progressive Matrices for Libyan adults aged 38 to 50 years. *Mankind Quarterly, 52,* 292-310.

Al-Shahomee A. A., Lynn, R., & Abdalla S. E-G. (2013). Dysgenic fertility, intelligence and family size in Libya. *Intelligence, 41,* 67-69.

Al-Shahomee, A.A., Abdalla, S.E. & Lynn, R. (2017). An increase in intelligence in Libya from 2006 to 2017. *Mankind Quarterly, 58*, 290-296.

Al-Shahomee, A. A., Abdalla, S. E., Attashania, A. S. & Lynn, R. (2018). Intelligence, family size and dysgenic fertility in Libya. *Mankind Quarterly, 59*, 255-265.

Alderman, H., Hawkesworth, S., Lundberg, M., Tasneem, A., Mark, H., & Moore, S. E. (2014). Supplemental feeding during pregnancy compared with maternal supplementation during lactation does not affect schooling and cognitive development through late adolescence. *American Journal of Clinical Nutrition, 99,* 122-129.

Alonso Garcia, O. S. (1973). Raven. Factor "g", edad y escolaridad. *Revista del Hospital Psiquiátrico de La Habana, 14,* 60-77.

Aluko, O.A. & Ajayi, M.A. (2017). Deteminants of banking sector development: Evidence from Sub-Saharan African countries. *Borsa Istanbul Review, 20*, 1-18.

Alvi, S. A., Khan, S. B., Vegeris, S. L. & Ansari, Z. A. (1986). A cross-cultural study of psychological differentiation. *International Journal of Psychology, 21*, 659-670.

Anderson, J.W., Johnstone, B.M. & Remley, D.T. (1999). Breast-feeding and cognitive development: a meta-analysis. *American Journal of Clinical Nutrition, 70*, 525-535.

Andersson, L., Allebeck, P., Gustafsson, J-E. & Gunnell, D. (2008). Association of IQ scores and school achievement with suicide in a 40-year follow-up of Swedish cohort. *Acta Psyciatrica Scandinavia, 118*, 99-105.

Andreu, B.I., Alvarez, V., & Veray, B. (1991). Estudio comparativo de la Escala de Inteligencia Wechsler para Adultos y la Escala de Inteligencia Wechsler para Adultos Revisada en una poblacion universitaria puertorriquena. *Revista Puertorriquena de Psicologia, 7,* 1-11.

Angelini, A. L., Alves, I. C., Custodio, E. M. & Duarte, W. F. (1988). *Manual Matrices Progressivas Coloridas.* Sao Paulo: Casa do Psicologo.

Anger, S. & Heineck, G. (2011). Cognitive ability and earnings: First evidence for Germany. *Applied Economics Letters, 17*, 699-703.

Ani, C. C., & Grantham-McGregor, S. (1998). Family and personal characteristics of aggressive Nigerian boys. *Journal of Adolescent Health, 23,* 311-317.

Anstey, K. J., Low, L-F. & Sachdev, P. (2009). Level of cognitive performance as a correlate and predictor of health behaviors that protect against cognitive decline in old age. *Intelligence, 37*, 600-606.

Anum, A. (2014). A Standardisation Study of the Raven's Coloured Progressive Matrices in Ghana. *Ife Psychologia, 22,* 27-35.

Ash, J. & Gallup Jr., G. G. (2007). Paleoclimatic variation and brain expansion during human evolution. *Human Nature, 18*, 109-124.

Aslam, M. (2009). The Relative Effectiveness of Government and Private Schools in Pakistan: Are Girls Worse Off? *Education Economics, 17,* 329-354.

Aslam, M., & Lehrer, K. (2014). Learning by Doing: Skills and Jobs in Urban Ghana. *The Journal of Development Studies, 50,* 1119-1134.

Astwood, N. C. (1976). A comparison of American and Bermudian children on the WISC-R. *Dissertation Abstracts International, 191636,* 6368B.

Asongu, S. & Kodila-Tedika, O. (2018). "This one is 400 Libyan dinars, this one is 500": Insights from cognitive human capital and slave trade. *International Economic Journal.* DOI:10.1080/10168737.2018.1480643.

Avenant, T. J. (1988). *The Establishment of an Individual Intelligence Scale for Adult South Africans. Report No. P-91*. Pretoria: Human Sciences Research Council.

Ayalew, T. (2005). Parental preference, heterogeneity, and human capital inequality. *Economic Development and Cultural Change, 54*, 381-407.

Aziz, Sh., & Farooqi, Gh. N. (1991). Gender, age, grade, and socioeconomic status differences on Raven's Coloured Progressive Matrices. *Pakistan Journal of Psychological research, 6,* 91-102.

Badri, M. B. (1965a). The use of finger drawing in measuring the Goodenough quotient of culturally deprived Sudanese children. *Journal of Psychology, 59*, 333-334.

Badri, M. B. (1965b). Influence of modernization on Goodenough quotients of Sudanese children. *Perceptual and Motor Skills, 20,* 931-932.

Bagby, E. T. (2011). *Essays on human capital development in developing countries.* Ph.D. University of Illinois at Urbana-Champaign.

Bagley, C., Iwawaki, S. & Young, L. (1983). Japanese children: group-oriented but not field dependent? In C. Bagley & G. K. Verma (Eds) *Multicultural Childhood: Education, Ethnicity and Cognitive Styles.* Aldershot, UK: Gower Publishing.

Bailey, D. H. & Geary, D. C. (2009). Hominid brain evolution: Testing climatic, ecological, and social competition models. *Human Nature, 20*, 67-79.

Bakhiet, S. F.A (2008). Application of progressive matrices in the Sudan. *Arab Psynet, 19,* 223-225.

Bakhiet, S. F. A., Abdelrasheed, N. S. G., Lynn, R., & Essa, Y. A. S. (2015). A Study of the Colored Progressive Matrices in Kuwait. *Mankind Quarterly, 56,* 168-172.

Bakhiet, S. F. A., Abdelrasheed, N. S. G., & Lynn, R. (2017). A New Study of the Coloured Progressive Matrices in Libya. *Mankind Quarterly, 58,* 297-300.

Bakhiet, S. F. A., Abdelrasheed, N. S. G., Cheng, H., Lynn, R., Essa, Y. A. S., & Blahmar, T. A. M. (2017). Sex differences on the Coloured Progressive Matrices in Sudan. *Mankind Quarterly, 57,* 581-584.

Bakhiet, S. F. A., Abdelrasheed, N. S. G., Al-Khadher, M. M. A., Adan, M. H., Cheng, H., & Lynn, R. (2017). A study of sex differences in intelligence of Somali refugees in Kenya. *Mankind Quarterly, 58,* 301-306.

Bakhiet, S. F. A., Al-Khadher, M. A, & Lynn, R. (2015d). A Study of Means and Sex Differences on Raven's Standard Progressive Matrices Plus in Yemen. *Mankind Quarterly, 55,* 268-277.

Bakhiet, S.F.A., Barakat, S.M.R. & Lynn, R. (2014). A Flynn Effect among deaf boys in Saudi Arabia. *Intelligence, 44*, 75-77.

Bakhiet, S. F. A., Dutton, E., Ashaer, K., Essa, Y., Blahmar, T., Hakami, S., & Madison, G. (2018). Understanding the Simber Effect: Why is the age-dependent increase in children's cognitive ability smaller in Arab countries than in Britain? *Personality and Individual Differences, 122*, 38-42.

Bakhiet, S. F. A., Essa, Y. A. S., Dwieb, A. M. M., Elsayed, A. M. A., Sulman, A. S. M., Cheng, H., & Lynn, R. (2016). Correlations between intelligence, head circumference and height: Evidence from two samples in Saudi Arabia. *Journal of Biosocial Science, 2017,* 1-5.

Bakhiet, S. F. A., & Lynn, R. (2014a). A study of intelligence in Jordan. *Psychological Reports: Mental & Physical Health, 115,* 515-516.

Bakhiet, S. F. A., & Lynn, R. (2014b). A study of the IQ in Palestine. *Intelligence, 47,* 10-11.

Bakhiet, S. F. A., & Lynn, R. (2014y). Intelligence in Jordan: Norms for the Standard Progressive Matrices. *Open Differential Psychology,* 15 April.

Bakhiet, S. F. A., & Lynn, R. (2015a). A note on a new study of intelligence in Egypt. *Psychological Reports, 115,* 810-812.

Bakhiet, S. F. A., & Lynn, R. (2015b). A Standardization of the Coloured Progressive Matrices in Tripoli, Libya. *Mankind Quarterly, 56,* 79-86.

Bakhiet, S. F. A., & Lynn, R. (2015c). A Standardization of the Standard Progressive Matrices in Egypt. *Mankind Quarterly, 56,* 79-86.

Bakhiet, S. F. A., & Lynn, R. (2015d). A study of intelligence in Oman. *Psychological Reports: Mental & Physical Health, 115,* 840-841.

Bakhiet, S. F. A., & Lynn, R. (2015e). Gender differences on the Wechsler Intelligence Scale for Children-III in Bahrain and the United States. *Psychological Reports, 117,* 794-8.

Bakhiet, S. F. A., & Lynn, R. (2015f). Norms for the Standard Progressive Matrices in the Gaza Strip. *Mankind Quarterly, 56,* 87-95.

Bakhiet, S. F. A., & Lynn, R. (2015g). Regional differences in intelligence in Sudan. *Intelligence, 50,* 150-152.

Bakhiet, S. F. A., Sles, N., Lynn, R., & Meisenberg, G. (2018). A Study of the Standard Progressive Matrices Plus in Cambodia. *Mankind Quarterly, 58,* 580-587.

Bala, G., & Kati, R. (2009). Sex differences in anthropometric characteristics, motor and cognitive functioning in preschool children at the time of school enrolment. *Collegium Anthropologium, 33,* 1071-1078.

Bala, G., Krneta, Z., & Drid, P. (2013). The effects of kinesiologal activity on motor and intellectual functioning of children in relation to their physical condition at birth. *Collegium Anthropologium, 37,* 161-170.

Ballington, J. & Karam, A. (Eds) (2005). *Women in Parliament: Beyond Numbers.* Stockholm: International IDEA.

Bandeira, D. R., Alves, I. C. B., Giacomel, A. E., & Lorenzatto, L. (2004). Matrizes Progressivas Coloridas de Raven – Escala especial: Notmas para Porto Allegre, RS. *Psicologia em Estudio, 9,* 479-486.

Bandeira, D. R., Costa, A., & Arteche, A. (2012). The Flynn effect in Brazil with DAP and Raven. *Revista Latinoamericana de Psicología, 44,* 9-18.

Bangui, J.L. (2018). Children in civil war denounce teachers who trade marks for sex. The Times, 12 March, p. 32.

Baraheni, M. N. (1974). Raven's Progressive Matrices as applied to Iranian children. *Educational & Psychological Measurement, 34,* 983-988.

Barber, N. (2005). Educational and ecological correlates of IQ: a cross-national investigation*. Intelligence, 33*, 273-284.

Barber, N. (2006). Is the effect of national wealth on academic achievement mediated by mass media and computers? *Cross-Cultural Research, 40*, 130-141.

Bardet, C., Moreigne, F. & Sénégal, J. (1960). Application de test de Goodennough à des écoliers africains de 7 à 14 ans. *Enfance,* 199-208.

Barnabus, I.P., Kapur, M. & Rao, S. (1995). Norm development and reliability of Coloured Progressive Matrices Test. *Journal of Personality and Clinical Studies, 11,* 17-22.

Barnett, S. M., & Williams, W. (2004). National Intelligence and the Emperor's New Clothes. *Contemporary Psychology, 49,* 389-396.

Barrett, D. B., Kurian, G. T. & Johnson, T. M. (2001). *World Christian Encyclopedia. A comparative survey of churches and religions in the modern world. Volume 1: The world by countries: religionists, churches, ministries. Second edition.* New York, NY: Oxford University Press.

Bart, W., Kamal, A. & Lane, J. F. (1987). The development of proportional reasoning in Qatar. *Journal of Genetic Psychology, 148*, 95-103.

Bartels, M., Rietveld, M. J. H., van Baal, G. C. & Boomsma, D. I. (2002). Genetic and environmental influences on the development of intelligence. *Behavior Genetics, 32*, 237-249.

Bartels, J. M., Ryan, J. J., Urban, L. S. & Glass, L. A. (2010). Correlations between state IQ and FBI crime statistics. *Personality and Individual Differences, 48*, 579-583.

Bass, N. (2000). *The Raven's Coloured Progressive Matrices Test: A pilot study for the establishment of normative data for Xhosa speaking Primary School pupils in the Grahamstown region.* MA Social Science, Rhodes University, Grahamstown, South Africa.

Batterjee, A. A. (2011). Intelligence and education: the Saudi case. *Mankind Quarterly, 52,* 133-190.

Batterjee, A. A., & Ashria, I. (2015). Intelligence and education: The Sudan case. *Mankind Quarterly, 56,* 135-166.

Batterjee, A.A., Khaleefa, O., Yousef, K. & Lynn, R. (2012). The relation between IQ, height and head circumference in a sample in Saudi Arabia. *Journal of Biological Science, 45,* 433-450.

Batterjee, A. A., Khaleefa, O., Ashaer, K., & Lynn, R. (2013). Normative data for IQ, height and head circumference for children in Saudi Arabia. *Journal of Biosocial Science, 45,* 451-459.

Batty, G.D., Deary, I.J., Schoon, I., Emslie, C., Hunt, K. & Gale, C. (2008). Childhood mental ability and adult alcohol intake and alcohol problems: the 1970 British cohort study. *American Journal of Public Health, 98*, 2237-2243.

Basso, A., Capitani, E. & Laiacona, M. (1987). Raven's Coloured Progressive Matrices: normative values on 305 adult normal controls. *Functional Neurology, 2,* 189-194.

Bautista, A., Barker, P. A., Dunn, J. T., Sanchez, M., & Kaiser, D. K. (1982). The effects of oral iodized oil on intelligence, thyroid status, and somatic growth in school-age children from an area of endemic goiter. *The American Journal of Clinical Nutrition, 35,* 127-134.

Beals, K. L., Smith, C. L., and Dodd, St. M. (1984). Brain Size, Cranial Morphology, Climate, and Time Machines. *Current Anthropology, 25,* 301-330.

Beam, Ch. R., Turkheimer, E., Dickens, W. T., & Winders Davis, D. (2015). Twin differentiation of cognitive ability through phenotype to environment transmission: The Louisville Twin Study. *Behavioral Genetics, 45,* 622-634.

Beaton, A. E., Martin, M. O., Mullis, I. V. S., Gonzalez, E. J., Smith, T. A., & Kelly, D. A. (1997a). *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Beaton, A. E., Mullis, I. V. S., Martin, M. O., Gonzalez, E. J., Kelly, D. A., & Smith, T. A. (1997b). *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Beaver, K. M., Schwartz, J. A., Connolly, E. J., Nedelec, J. L., Al-Ghamdi, M. S., & Kobeisy, A. N. (2013). The genetic and environmental architecture to the stability of IQ: Results from two independent samples of kinship pairs. *Intelligence, 41,* 428-438.

Beaver, K.M., Schwartz, J.A., Nedelec, J.L., Connolly, E.J., Boutwell, B. B. & Barnes, J. C., (2013). Intelligence is associated with criminal justice processing: Arrest through incarceration. *Intelligence, 41*, 277-288.

Beaver, K. M., Schwartz, J. A., Connolly, E. J., Said Al-Ghamdi, M., Kobeisy, A.N., Barnese, J.C. & Boutwell, B. B. (2016). Intelligence and early life mortality: Findings from a longitudinal sample of youth. *Death Studies, 40*, 298–304.

Beck, L. R. & St. George, R. (1983). The alleged cultural bias of PAT: reading comprehension and reading vocabulary tests. *New Zealand Journal of Educational Studies, 18*, 32-47.

Becker, D., & Rindermann, H. (2016). The relationship between cross-national genetic distances and IQ-differences. *Personality and Individual Differences, 98,* 300-310.

Becker, K. A. (2003). *History of the Stanford-Binet intelligence scales: Content and psychometrics. (Stanford-Binet Intelligence Scales, Fifth Edition Assessment Service Bulletin No. 1).* Itasca, IL: Riverside Publishing.

Belacchi, C., Carretti, B., & Cornoldi, C. (2010). The role of working memory and updating in Coloured Raven Matrices performance in typically developing children. *European Journal of Cognitive Psychology, 22,* 1010-1020.

Belacchi, C., Scalisi, T. G., Cannoni, E., & Cornoldi, C. (2008). *Analisi della distribuzione descrittiva ai punteggi CPM del campione normativo, per fascia di età e per tipo di somministrazione (N = 4678)*. Firenze: Giunti O.S. Organizzaazioni Speciali.

Bélanger, A. (2006). Report on the Demographic Situation in Canada, 2003-2004. Statistics Canada Cat. No. 91-209-XIE. 128 pages. http://www.statcan.ca/english/freepub/91-209-XIE/91-209-XIE2003000.pdf

Bélanger, A., Malenfant, É. C. Martel, L. & Gélinas, R. (2007). *Projecting ethno-cultural diversity of the Canadian population using a microsimulation approach. Work Session on Demographic Projections, Bucharest, 10–12 October 2007.* Luxemburg: Eurostat. Office for Official Publications of the European Communities, pp. 339–353 http://www.unece.org/stats/documents/ece/ces/ge.11/2007/wp.8.e.pdf.

Belasen, A. & Hafer, R.W. (2013). IQ and alcohol consumption: International data. *Intelligence, 41,* 615-621.

Bell, P. (2002). Would you believe it? Mensa Magazine, Feb., 12-13.

Bella, H., Khalil, M. S., Al-Almaie, S. M., Kurashi, N. Y., & Wahas, S. (2005). The effects of birth interval on intellectual development of Saudi school children in Eastern Saudi Arabia. *Saudi Medical Journal, 26,* 741-745

Bellis, G., Chaventre, A., Roux, F. & Bisset, J. P. (1988). Measurement of endemic cretinism in the Bwa region (Mali). *Collegium Anthropologium, 12*, 237-245.

Belsky, D. W., Caspi, A., Goldman-Mellor, S., Meier, M. H., Ramrakha, S., Poulton, R., & Moffitt, T. E. (2013). Is obesity associated with a decline in intelligence quotient during the first half of the life course? *American Journal of Epidemiology, 178,* 1461-1468.

Benson, V. E. (1942). The intelligence and later scholastic success of sixth grade pupils. *School and Society, 55*, 163-167.

Bentham, J. (1789). *Introduction to the Principles of Morals and Legislation.* London.

Bergoll, S.,Wirthwein, L., Rost,D.H. & Steinmayer, R. (2017). What happens if the same curriculum is taught in five instead of six years? A quasi-experimental investigation of the effect of schooling on intelligence. *Cognitive Development, 44*, 98-105.

Berkman, D. S., Lescano, A. G., Gilman, R. H., Lopez, S. L. L., & Black, M. M. (2002). Effects of stunting, diarrhoeal disease, and parasitic infection during infancy on cognition in late childhood: a follow-up study. *The Lancet, 359,* 564-571.

Berlioz, L. (1955). Etude des progressive matrices faite sur les Africains de Douala. *Bulletin du Centre Etude Recherche Psychotechnique, 4*, 33-44.

Bernhagen, P. (2009). Measuring Democracy and Democratization. In C. W. Haerpfer, P. Bernhagen, R. F. Inglehart & C. Welzel (Eds) *Democratization.* Oxford: Oxford University Press.

Berry, J. W. (1966). Temne and Eskimo perceptual skills. *International Journal of Psychology, 1,* 207-229.

Bertelsmann Stiftung (2018). *Bertelsmann Stiftung's Transformation Index (BTI).* Retrieved from: https://www.bti-project.org/en/home/

Bethge, H.-J., Carlson, J. S., & Wiedl, K. H. (1982). The effects of dynamic assessment procedures on Raven Matrices Performance, visual search behavior, test anxiety and test orientation. *Intelligence, 6,* 89-97.

Bhakta, P., Hackett, R. J., & Hackett, L. (2002). Prevalence and associations of reading difficulties in a population of South Indian children. *Journal of Research in Reading, 25,* 191-202.

Bhogle, S. & Prakash, I. J. (1992). Performance of Indian children on the Coloured Progressive Matrices. *Psychological Studies, 37*, 178-181.

Bhutta, A. T., Cleves, N. A., Casey, P. H., Cradock, M. M. & Anand, K. J. S. (2002). Cognitive and behavioral outcomes of school-aged children who were born preterm: A meta- analysis. *Journal of the American Medical Association, 288*, 728-737.

Binnie-Dawson, J. L. (1984). Biosocial and endocrine bases of spatial ability. *Psychologia, 27*, 129-151.

Biasutti, R. (1967). *Le Razze E I Populi Della Terra.* Torino: Tipografia Torinese S.p.A..

Birney, D. P., Beckmann, J. F., Beckmann, N., & Double, K. S. (2017). Beyond the intellect: Complexity and learning trajectories in Raven's Progressive Matrices depend on self-regulatory processes and conative dispositions. *Intelligence, 61,* 63-77.

Bishop, E. G., Cherny, St. S., Corley, A., Plomin, R., DeFries, J. C., & Hewitt, J. K. (2003). Development genetic analysis of general cognitive ability from 1 to 12 years in a sample of adoptees, biological siblings, and twins. *Intelligence, 31,* 31-49.

Bishop, J. H. (1989). Is the test score decline responsible for the productivity growth decline? *American Economic Review, 79,* 178-197.

Blacker, C. P. (1952). *Eugenics: Galton and after*. Cambridge, MA: Harvard University Press.

Bleichrodt, N., Drenth, P. J. D., & Querido, A. (1980). Effects of iron deficiency on motor and psychomotor abilities. *American Journal of Physical Anthropology, 53,* 55-67.

Blumen, S. (2000). *Identification of and attention for the highly able in Lima.* PhD thesis, University of Nijmegen.

Boben, D. (2003). Prirocnik za Ravnove progresivne matrice in besedne lestvice. Slovenska standardizacija Ravnovih progresivnih matric: norme CPM, SPM, APM. (Manual for Raven's Progressive Matrices).

Boben, D. (2007). The standardization of all the main Raven Progressive Matrices tests in Slovenia. In J. Raven & J. C. Raven (Eds), *Uses and abuses of intelligence. Studies advancing Spearman's and Raven's quest for non-arbitrary metrics.* Unionville, NY: Royal Fireworks Press.

Boissiere, M., Knight, J. B. & Sabot, R. H. (1985). Earnings, schooling, ability and cognitive skills. *American Economic Review, 75*, 1016-1030.

Boivin, M. J. (2002). Effects of early cerebral malaria on cognitive ability in Senegalese children. *Journal of Developmental & Behavioral Pediatrics, 23*, 353-364.

Boivin, M. J., & Giordani, B. (1993). Improvements in cognitive performance for schoolchildren in Zaire following an iron supplement and treatment for intestinal parasites. *Journal of Pediatric Psychology, 18,* 249-264.

Boivin, M. J., Giordani, B., & Bornfeld, B. (1995). Use of the tactual performance test for cognitive ability testing with African children. *Neuropsychology, 9,* 409-417.

Boivin, M. J., Giordani, B., Crist, C. L., & Chounramany, C. (1996). Validating cognitive ability testing protocol with Lao children for community development applications. *Neuropsychology, 10,* 588-599.

Boivin, M. J., Giordani, B., Ndanga, K., Maky, M. M., Manzeki, K. M., Ngunu, N., & Muamba, K. (1993). Effects of treatment for intestinal parasites and malaria on the cognitive abilities of schoolchildren in Zaire, Africa. *Health Psychology, 12,* 220-226.

Boivin, M. J., Okitundu, D., MD, Bumoko, G. M.-M., Sombo, M. Th., Mumba, D., Tylleskar, Th., MD, Page, C. F., Muyembe, J.-J. T., MD, & Tshala-Katumbay, D., (2013). Neuropsychological effects of Konzo: a neuromotor disease associated poorly processed cassava. *Pediatrics, 131,* 1231-1239.

Bold, T., Filmer, D., Martin, G., Molina, E., Stacy, B., Rockmore, C. & Wane, W. (2017). Enrollment without learning: Teacher effort, knowledge, and skill in primary schools in Africa. *Journal of Economic Perspectives, 31,* 185–204.

Bondeson, U. (2003). *Nordic Moral Climates*. New Brunswick, NJ: Transaction Publishers.

Bouchard, M. F., Sauvé, S., Barbeau, B., Legrand, M., Brodeur, M.-E., Bouffard, Th., Limoges, E., Bellinger, D. C., & Mergler, D. (2011). Intellectual impairment in school-age children exposed to manganese from drinking water. *Environmental Health Perspectives, 119,* 138-143.

Boucher, O., Muckle, G., Saint-Amour, D., Dewailly, É., Ayotte, P., Jacobson, S. W., Jacobson, J. L., & Bastien, C. H. (2009). The relationship of lead neurotoxicity to the event-related potential P3B component in Inuit children from arctic Québec. *Neurotoxicology, 30,* 1070-1077.

Bourdier, G. (1964). Utilisation et nouvel étalonnage du P.M. 47. *Bulletin de Psychologie, 235*, 39-41.

Boutwell, B.B., Franklin, T.W., Barnes, J.C. et al. (2013). Country-level IQ and fertility rates: A partial test of Differential K theory. *Personality and Individual Differences, 55*, 547-552.

Bratsberg, B. & Rogeberg, O. (2018). Flynn effect and its reversal are both environmentally caused. *Proceedings of the National Academy of Sciences.* https://doi.org/10.1073/pnas.1718793115

Broer, M. (1996). Rasch-homogene Leistungstests (3DW, WMT) im Kulturvergleich Chile- Österreich: Erstellung einer spanischen Version einer

Testbatterie und deren interculturellen Validierung in Chile (Rasch-homogeneous achievement tests (3DW, WMT) in a cross-cultural comparison of Chile and Austria: development of a Spanish test-battery version and its cross-cultural validation in Chile). M.Sc. thesis, University of Vienna.

Broman, S., Nichols, P. L., Shaughnessy, P. & Kennedy, W. (1987). *Retardation in Young Children.* Hillsdale, N J.: Lawrence Erlbaum.

Brooks-Gunn, J., Klebanov, P. K., & Duncan, G. J. (1996). Ethnic Differences in Children's Intelligence Test Scores: Role of Economic Deprivation, Home Environment, and Maternal Characteristics. *Child Development, 67,* 396-408.

Brown, W. W. & Reynolds, M. O. (1975). A model of IQ, occupation, and earnings. *American Economic Review, 65*, 1002-1007.

Buckley, G. J., Murray-Kolb, L. E., Khatry, S. K., LeClerq, S. C., Wu, L., West Jr, K. P., & Christian, P. (2013). Cognitive and motor skills in school-aged children following maternal vitamin A supplementation during pregnancy in rural Nepal: a follow-up of a placebo-controlled, randomised cohort. *BMJ Open, 3,* e002000.

Buj, V. (1981). Average IQ values in various European countries. *Personality and Individual Differences, 2,* 168-169.

Bulley, N. (1973). *The Progressive Matrices as an instrument for determining educability in Ghana*. Accra: University of Accra.

Burhan, N.A.S., Mohamad, M. R., Kurniawan, Y. & Sidek, A.H. (2014a). National intelligence, basic human needs, and their effect on economic growth. *Intelligence, 44,* 103-111.

Burhan, N.A.S., Mohamad, M. R., Kurniawan, Y. & Sidek, A.H. (2014b). The impact of low, average and high IQ on economic growth and technological progress. *Intelligence, 46*, 1-8.

Burhan, N.A.S., Kurniawan, Y., Mohamad, M..R. & Sidek, A.H. (2014c). Crime and the bell curve: The role of people with high, average and low intelligence. *Intelligence, 47,* 12-22.

Burhan, N. A. S., Razak, R.C., Ibrahim, S., Selamat, M. R. & Rosli, M. R. (2018). Social classes of intelligence, economic growth and technological achievement: Robust regression and outlier detection. *Journal of Interdisciplinary Economics, 30,* 1-16.

Burhan, N.A.S., Razak, R. E., Salleh, F. & Labastida Tovar, M. E. (2017). The higher intelligence of the creative minority provides the infrastructure for entrepreneurial innovation. *Intelligence, 65*, 93-106.

Burhan, N.A.S., Yanus, M.M., Tovar, M.E.L., & Burhan, N.M.G. (2017). Why are cognitive abilities so different across countries? The link between major socio-economic factors and PISA test scores. *Personality and Individual Differences, 105,* 95-106.

Burhan, N.A.S., Razak, R.C., Rahman, A.R.A., Selamat, M.R., Zalli, M.M.M. & Rosli, M.R. (2018). Intellectual giftedness for leadership: How robust is the crime reducing effect of intellectual class? *Mankind Quarterly*, 59, 57-86.

Cagnacci, A., Renzi, A., Arangino, S., Alessandrini, C. & Volpe, A. (2004). Influences of maternal weight on the secondary sex ratio of human offspring. *Human Reproduction, 19*, 442-444.

Cagnacci, A., Renzi, A., Arangino, S., Alessandrini, C. & Volpe, A. (2005). Interplay between maternal weight and seasons in determining the secondary sex ratio of human offspring. *Fertility & Sterility, 84*, 246-248.

Cahan, S. & Cohen, N. (1989). Age versus schooling effects on the intelligence development. *Child Development, 60,* 1239-1249.

Calderon, M. C., & Hoddinott, J. (2010). *The inter-generational transmission of cognitive abilities in Guatemala.* International Food Policy Research Institute.

Cameron, E. Z. & Dalerum, F. (2009). A Trivers-Willard effect in contemporary humans: male- biased sex ratios among billionaires. *PLoS One, 4(1),* e4195.

Canfield, R. L., Henderson Jr., Ch. R., Cory-Slechta, D. A., Cox, Ch., Jusko, T. A., & Lanphear, B. P. (2003). Intellectual Impairment in Children with Blood Lead Concentrations below 10 µg per Deciliter. *The New England Journal of Medicine, 348,* 1517-1526.

Carothers, J. C. (1953). *The African Mind in Health & Diseases*. Geneva: WHO.

Carl, N. (2015). Does intelligence have a U-shaped relationship with leftism? *Intelligence, 49*, 159-170.

Carl, N. (2018). The relationship between solar radiation and IQ in the United Kingdom. *Mankind Quarterly, 58*, 650-653.

Carr, A. (1993). Twenty years a growing: a research note on gains in the intelligence test scores of Irish children over two decades. *Irish Journal of Psychology, 14,* 576-582.

Carroll, J. B. (1993). *Human Capital Abilities*. Cambridge: Cambridge University Press.

Cartwright, A. (1976). *How many children?* London: Routledge and Kegan Paul.

Cassidy, T. & Lynn, R. (1991). Achievement motivation, educational attainment, cycles of disadvantage, and social competence: some longitudinal data. *British Journal of Educational Psychology, 61*, 1-12.

Cattell, R. B. (1937). *The fight for our national intelligence*. London: P. S. King.

Cattell, R. B. (1950). *Cultural Fair (or Free) Intelligence Test (A Measure of "g") Skala 1. Handbook for the Individual or Group.* Champaign, Illinois, USA: Institute for Personality and Ability Testing.

Cattell, R. B. (1960). *Culture free intelligence test, Scale 2.* Champaign, Illinois, USA: Institute for Personality and Ability Testing.

Cattell, R. B. (1961). *Culture free intelligence test, Scale 3.* Champaign, Illinois, USA: Institute for Personality and Ability Testing.

Cattell, R. B. (1966). *Handbook for the Cultural Fair Intelligence Test, Scale 1.* Champaign, Illinois, USA: Institute for Personality and Ability Testing.

Cattell, R. B. (1973). *Measuring intelligence with the Culture Fair Tests; Manual for Scales 2 and 3.* Champaign, Illinois, USA: Institute for Personality and Ability Testing.

Cavalli-Sforza, L. L. (2000). *Genes, Peoples and Languages.* New York: North Point.

Cavalli-Sforza, L. L., Menozzi, P. & Piazza, A. (1996). *The History and Geography of Human Genes.* Princeton, NJ: Princeton University Press.

Ceci, S.J. (1991). How much does schooling influence general intelligence and its cognitive components? A Reassessment of the evidence. *Developmental Psychology, 27,* 703-722.

Central Intelligence Agency. *Yearbook (2003, 2008).* Washington, D.C.: CIA.

Chaim, H. H. (1994). *Is the Raven Progressive Matrices valid for Malaysians?* Unpublished. John Raven archive.

Chakraborty, S. & Dabla-Norris, M. E. (2005). Rent Seeking. No. 5–43, International Monetary Fund.

Chambers, R. M., Morrison-Levy, N., Chang, S., Tapper, J., Walker, S., & Tulloch-Reid, M. (2014). Cognition, academic achievement, and epilepsy in school-age children: A case–control study in a developing country. *Epilepsy & Behavior, 33,* 39-44.

Chan, J., & Vernon, P. E. (1988). Individual differences among the peoples of China. In S. H. Irvine & J. W. Berry (Eds), *Human Abilities in Cultural Context.* Cambridge, UK: Cambridge University Press.

Chan, J., Eysenck, H. J., & Lynn, R. (1991). Reaction time and intelligence among Hong Kong children. *Perceptual and Motor Skills, 72,* 427-433.

Chappell, W. R., Abernathy, C. O., & Calderon, R. C. (1990), *Arsenic exposure and health effects.* New York, USA: Elsevier.

Charlemaine, Ch., & Pons, C. J. (1998). What Monozygotic Twins Tell Us About Genetic Determinism. *Race, Gender & Class, 5,* 12-40.

Chen, C., Lee, S. & Stevenson, H. W. (1996). Long term prediction of academic achievements of American, Chinese and Japanese adolescents. *Journal of Educational Psychology, 98*, 750-759.

Chen,H-Y., Chen, Y-H., Liao, Y-K., Chen, H-P. & Lynn, R. (2017). Dysgenic fertility for intelligence and education in Taiwan. *Intelligence, 63*, 29-32.

Cherson, A. D. (2012). *Atlas of Genetic Genealogy. Greencore Environmental Information Services.* Retrieved from: http://atlas.xyvy.info.

Chiao, J. Y. & Blizinsky, K. D. (2010). Culture-gene coevolution of individualism-collectivism and the serotonin transporter gene (5-HTTLPR). *Proceedings of the Royal Society B: Biological Sciences*, *277* (1681), 529-537.

Chiplonkar, S. A., & Kawade, R. (2014). Linkages of biomarkers of zinc with cognitive performance and taste acuity in adolescent girls. *International Journal of Food Science & Nutrition, 65,* 399-415.

Chong, Y.-S., Liang, Y., Gazzard, G., Stone, R. A., & Saw, S.-M. (2005). Association Between Breastfeeding and Likelihood of Myopia in Children. *Journal of the American Medical Association, 293,* 3001-3002.

Chou, E.C., & Lau, L.J. (1987). *Farmer ability and farm productivity: a study of farm households in the Chiang Mai valley, Thailand 1972-1978.* Report No. EDT62. Education & Training Department, Washington, DC, USA: World Bank.

Choudhury, N., & Gorman, K. (1999). The relationship between reaction time and psychometric intelligence in a rural Guatemalan adolescent population. *International Journal of Psychology, 34,* 209-217.

Christian, P., Murray-Kolb, L. E., Khatry, S. K., Katz, J., Schaefer, B. A., Cole, P. M., LeClerq, S. C., & Tielsch, J. M. (2010). Prenatal micronutrient supplementation and intellectual and motor function in early school-aged children in Nepal. *Journal of the American Medical Association, 304,* 2716-2713.

Christiansen, T., & Livermore, G. (1970). A comparison of Anglo-American and Spanish-American children on the WISC. Journal of Social Psychology, 81, 9-14. From: R. R. Valencia & L. A. Suzuki (Eds). *Intelligence Testing and Minority*

Students. Foundations, Performance, Factors, and Assessment Issues. Thousand Oaks, London, New Delhi: Sage Publications Inc.

Christainsen, G.B. (2013). IQ and the wealth of nations: How much reverse causality? *Intelligence, 41*, 688-698.

Chronicle of Parliamentary Elections. See Inter-Parliamentary Union.

Chuderski, A. (2015). The broad factor of working memory is virtually isomorphic to fluid intelligence tested under time pressure. *Personality and Individual Differences, 85,* 98-104.

Chmykova, E, Davydov, D. & Lynn, R. (2016). Dysgenic fertility in the Russian Federation. *Mankind Quarterly* 57: 269-276.

CIA (2008, 2009, 2010). *The CIA World Factbook.* New York: Skyhorse Publishing.

CIA (2017). *The World Fact Book.* Retrieved from: https://www.cia.gov/library/publications/the-world-factbook/

Claassen, N. C. W. (1990). The comparability of General Scholastic Aptitude Test scores across different population groups. *South African Journal of Psychology, 20*, 80-92.

Claassen, N. C. W., Krynauw, A. H., Paterson, H. & Mathe, M. W. G. (2001). *A standardisation of the WAIS-III for English speaking South Africans.* Pretoria, South Africa: Human Sciences Research Council.

Clay, M. M. (1971). The Polynesian language skills of Maori and Samoan school entrants. *International Journal of Psychology, 6*, 135-145.

Coleman, J. S. (1990). *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.

Collier, P. (2008). The Bottom Billion: *Why the poorest counties are failing and what can be done about it.* Oxford: Oxford University Press.

Coleman, D. (2010). Projections of the ethnic minority populations of the United Kingdom 2006–2056. *Population and Development Review, 36*, 441–486.

Colom, R., & Flores-Mendoza, C. (2007). Intelligence predicts scholastic achievement irrespective of SES factors: evidence from Brazil. *Intelligence, 35,* 243-251.

Colom, R., Flores-Mendoza, C. & Abad, F. J. (2006). Generational changes on the Draw-a-Man Test: a comparison of Brazilian urban and rural children tested in 1930, 2002, and 2004. *Journal of Biosocial Science, 35*, 33-39.

Comber, I. C. & Keeves, J. P. (1973). *Science education in nineteen countries.* New York: Wiley.

Comin, D. A., Easterly, W. & Gong, E. (2008). *Was the wealth of nations determined in 1000 B.C.?* Working Paper 09-052. Harvard Business School.

Conant, L. L., Fastenau, P. S., Giordani, B. et al. (1999). Modality specificity of memory span tasks among Zairian children: a developmental perspective. *Journal of Experimental & Clinical Neuropsychology, 21*, 375-384.

Conard, N.J. (2008). A critical view of the evidence for a Southern African origin of behavioral modernity. *Southern African Archaeological Society Goodwin Series, 10*, 175-179.

Connelly, J. B. (1983). Recategorized WISC-R score patterns of older and younger referred Tlingit Indian children. *Psychology in the School, 20,* 271-275.

Coolidge F.L., Wynn T. & Overmann K.A. (2013). The evolution of working memory. In: Alloway T.P. & Alloway R.G. (Eds) *Working Memory: The Connected Intelligence.* New York: Psychology. Press.

Costenbader, V. & Ngari, S. M. (2000). A Kenya standardisation of the Coloured Progressive Matrices. *School Psychology International, 22*, 258-268.

Cottereau-Reiss, O. & Lehalle, H. (1998). Comparaison des performances d'enfants Kanak et d'enfants français dans une situation de jugements de morphismes: structuration spatiale et moulin à vent. *Archives de Psychologie, 66,* 3-21.

Cotton, S. M., Kiely, P. M., Crewther, D. P., Thomson, B., Laycock. R. & Crewther, S. G. (2005). A normative and reliability study for the Raven's Colored Progressive Matrices for primary school aged children in Australia. *Personality and Individual Differences, 39,* 647-660.

Cox, M. V., Perara, J. & Fan, X. U. (1998). Children's drawing ability in the UK and China. *Psychologia, 41,* 171-182.

Cox, M. V., Koyasu, M., Hranamu, H. & Perara, J. (2001). Children's human figure drawings in the UK and Japan: the effects of age, sex and culture. *British Journal of Developmental Psychology, 19,* 275-292.

Coyle, T.R. & Rindermann, H. (2013). Spearman’s law of diminishing returns and national IQ. *Personality and Individual Differences, 55*, 406-410.

Coyle, T. R., Rindermann, H. & Hancock, D. (2016). Cognitive capitalism: Economic freedom moderates the effects of intellectual and average classes on economic productivity. *Psychological Reports, 119*, 411-427.

Coyle, Th. R., Rindermann, H., Hancock, D. G. & Freeman, J. (2018). Nonlinear effects of cognitive ability on economic productivity. *Journal of Individual Differences*. DOI: 10.1027/1614-0001/a000247.

Craig, J. D. (1974*). A Study of the Education and Abilities of Young Australian Male Adults*. Australian Department of Labor Research Report. Canberra: Government Printing Service.

Crawley, J., Heckman, J. & Vytlacil, E. (2001). Three observations on wages and measured cognitive ability. *Labour Economics, 8*, 419-442.

Cribari-Neto, F. & Souza, T.C. (2013). Religious belief and intelligence: worldwide evidence. *Intelligence, 41,* 482-489.

Crouse, J. (1979). The effects of academic ability. In C. Jencks (Ed.), *Who Gets Ahead? The Determinants of Economic Success in America*. New York: Basic Books.

Cvorovic, J., Rushton, J. P. & Tenjevic, L. (2008). Maternal IQ and child mortality in 222 Serbian Roma (Gypsy) women. *Personality and Individual Differences, 44*, 1604-1609.

Čvorović, J., & Lynn, R. (2014). Intelligence and reproductive success of Bosniaks, Serbs and Roma in Serbia. *Mankind Quarterly, 54,* 434-446.

Costenbader, V., & Ngari, S. M. (2001). A Kenya standardisation of the Coloured Progressive Matrices. *School Psychology International, 22,* 258-268.

Cotten, J. (1985). *Evaluation Research on the PL 480 Title II School Feeding Program in Haiti.* Port-au-Prince: USAID/Haiti.

Cotton, S. C., Kiely, P. M., Crewther, D. P., Thomson, B., Laycock, R., & Crewther, S. G. (2005). A normative and reliability study for the Raven's Coloured Progressive Matrices for primary school aged children from Victoria, Australia. *Personality and Individual Differences, 39,* 647-659.

Counter, S. A., Buchanan, L. H., Rosas, H. D., & Ortega, F. (1998). Neurocognitive effects of chronic lead intoxication in Andean children. *Journal of Neurological Science, 160,* 47-53.

Dague, P. Garelli, M. & Lebettre, S. (1964). Recherches sur l'échelle de maturité mentale de Columbia. *Revue de Psychologie Applique, 14*, 71-96.

Daley, T. C., Whaley, S. E., Sigman, M. D., Espinosa, M. P., & Neuman, C. (2003). IQ on the rise: the Flynn effect in rural Kenyan children. *Pychological Science, 14,* 215-219.

Daley, T. C., Whaley, S. E., Sigman, M. D., Espinosa, M. P., & Neuman, C. (2003). IQ on the rise: the Flynn effect in rural Kenyan children. *Pychological Science, 14,* 215-219.

Dama, M.S. (2013). Cognitive ability, used as an indirect measure of cross-cultural variation in condition, predicts sex ratio at birth. *Naturwissenschaften, 100,* 559-569.

Dan, L., Yu, J., Vandenberg, S. G., Yuemei, Z. & Caihong, T. (1990). Report on Shanghai norms of the Chinese translation of the Weschsler Intelligence Scale for Children – Revised. *Psychological Reports, 67*, 531-541.

Daniele, V. (2013). Does the intelligence of populations determine the wealth of nations? *Journal of Socio-Economics*, *46*, 27-37.

Daniele, V. & Ostuni, N. (2013). The burden of disease and the IQ of nations. *Learning & Individual Differences*, *28*, 109-118.

Darcy, N. T. (1946). The effect of bilingualism upon the measurement of the intelligence of children of preschool age. *The Journal of Educational Psychology, 37,* 21-44.

Darwin, L. (1914). Letter. London Times, Sept. 12.

Das, J. & Zajonc, T. (2010). India shining and Bharat drowning: comparing two Indian states. *Journal of Development Economics, 92*, 175-187.

Dasen, P. R. & Ngini, L. (1979). Cross-cultural training studies of concrete operation. In L.Eckensberger, W. Lonner & Y. H. Poortinga (Eds), *Cross-culural contributions to Psychology.* Lisse, Netherlands: Swets & Zeitlinger.

de Abreu, P. M. J. E., Nikaedo, C., Abreu, N., Tourinho, C. J.,1, Miranda, M. C., Bueno, O. F. A., & Martin, R. (2014). Working memory screening, school context, and socioeconomic status: An analysis of the effectiveness of the working memory rating scale in Brazil. *Journal of Attention Disorders, 18,* 346-356.

Deary, I. J. (2004). Intelligence Differences. In R. L. Gregory (Ed.) *The Oxford Companion to the Mind.* Oxford: Oxford University Press.

Deary, I. J., Batty, G. D. & Gale, C. R. (2008a). Bright children become enlightened adults. *Psychological Science, 19*, 1-6.

Deary, I. J., Batty, G. D. & Gale, C. R. (2008b). Childhood intelligence predicts voter turnout, voting preferences, and political involvement in adulthood: The 1970 British Cohort Study. *Intelligence, 36*, 548-555.

Deary, I. J., Strand, S., Smith, P. & Fernandes, C. (2007). Intelligence and educational achievement. *Intelligence, 35*, 13–21.

Deary, I.J., Whalley, L.J. & Starr, J.M. (2009). *A Lifetime of Intelligence*. Washington, D.C.: American Psychological Association.

de Catanzaro, D. (1981). *Suicide and self-damaging behavior: A sociobiological perspective*. New York: Academic Press.

De Hert, M., McKenzie, K. & Peuskens, J. (2001). Risk factors for suicide in young people suffering from schizophrenia: a long term follow-up study. *Schizophrenia Research, 47*, 127-134.

Deininger, K. & Squire, L. (1997). Economic growth and income inequality: re-examining the links. *Finance and Development, 34*, 38–41.

De Kohan, N. C. (1997). Logros en educaciob primaria y su relacion con inteligencia general y con los procesos de pensamiento en la resolucion de problemas. *Revista Latinoamericana de Psicolgia, 29,* 65-79.

Dendir, S. (2013). Children's endowment, schooling, and work in Ethiopia. *WIDER Working Paper, No. 2013/086.* Information Center for Economics.

de Neubourg, E., & de Neubourg, Ch. (2011). *The Impact of Malnutrition and Post Traumatic Stress Disorder on the Performance of Working Memory in Children.* Preliminary draft.

Dennis, W. (1957). Performance of Near Eastern children on the Draw-a-Man test. *Child Development, 28*, 427-430.

Dent, G. R. (1937). An investigation into the applicability of certain performance and other mental tests to Zulu children. In E. G. Malherbe (Ed.) *Report of New Education Conference.* Cape Town, South Africa: Juta & Co.

de Ronceray, H., & Petit-Frere, S. (1975). Project experimentale sur le bilinguisme Creole-Francais au niveau de l'enseignement primaire en Haiti. *Bulletin d'Informations du CHISS, 4,* 2-25.

Devlin, B., Fienberg, S. E., Resnick, D. P. & Roeder, K. (Eds) (1997). *Intelligence, Genes and Success.* New York: Springer-Verlag.

De Winter, J.C.R & Dodou, D. (2016). National correlates of self-reported traffic violations across 41 countries. *Personality and Individual Differences*, *98*, 145-132.

De Wit, G. & Winden, F. A. A. M. (1989). An empirical analysis of self-employment in the Netherlands. *Small Business Economics, 1*, 263-272.

Diaz, A., Sellami, K., Infanzón, E., Lanzón, T., & Lynn, R. (2010). Sex differences in means and variance of intelligence: Some data for Spain. *Mankind Quarterly, 50,* 210-220.

Díaz, A., Sellami, K., Infanzón, E., Lanzón, T., & Lynn, R. (2012). A comparative study of general intelligence in Spanish and Moroccan samples. *Spanish Journal of Psychology, 15,* 526-532.

Dickerson, R. E. (2006). Exponential correlation of IQ and the wealth of nations. *Intelligence, 34*, 292-295.

Djapo, N., & Lynn, R. (2010). Gender differences in means and variability on the Progressive Matrices in Bosnia-Herzegovina. *Mankind Quarterly, 50,* 221-224.

Dobrean, A., Raven, J., Comşa, M., Rusu, C., & Balazsi, R. (2008). Romanian standardization of Raven's Standard Progressive Matrices Plus. In J. Raven & J. C. Raven (Eds), *Uses and abuses of intelligence. Studies advancing Spearman's and Raven's quest for non-arbitrary metrics*. Unionville, NY: Royal Fireworks Press.

Dockal, V. (2009). Intercultural differences manifested in the European standardizations of the SON- R 2 1/2 - 7 non-verbal intelligence test. *Studia Psychologica, 51*, 35-51.

Dodge, P. R., Palkes, H., Fierro-Benitez, R. & Ramirez, I. (1969). Effect on intelligence of iodine in oil administration to young adult Andean children. In J. B. Stanbury (Ed.) *Endemic Goitre.* Washington, D.C.: Pan American Health Organization.

Doerrenberg, P. & Peichl, A. (2014). The impact of redistributive policies on inequality in OECD countries. *Applied Economics, 46*, 2066–2086.

Dohmen, T., Falk, A., Huffman, D. & Sunde, U. (2010). Are risk aversion and impatience related to cognitive ability? *American Economic Review*, *100*, 1238-1260.

Douyon, C. (1982). Les problèmes scolaires de l'enfant haïtien à Boston. In C. Pierre-Jacques (Ed.), *Enfants des migrants haïtiens en Amérique du Nord* (pp. 53-60). Centre de Recherches Caraïbes, Université de Montréal.

Dramé, C. & Ferguson, Ch. J. (2017). Measurements of intelligence in sub-Saharan Africa: Perspectives gathered from research in Mali. *Current Psychology.* doi:10.1007/s12144-017-9591-y

Drid, P., Vujkov, S., Jakšić, D. Trivić, T., Marinković, D., & and Bala, G. (2013). Differences in motor and cognitive abilities of children depending on their body mass index and subcutaneous adipose tissue. *Collegium Anthropologium, 37,* 171-177.

Dronkers, J. (1999). Jeugdige intelligentie en later success in onderwijs en beroeb (Children's intelligence and success in education and later work). *Psygologie & Maatschappij, 87,* 152-165.

Duncan, O. D. (1968). Ability and achievement. *Eugenics Quarterly, 15*, 1-11.

Duncan, O. D., Fetherman, D. L. & Duncan, B. (1972). *Socio-economic Background and Achievement.* New York: Seminar Press.

Durbrow, E. H., Schaefter, B. A. & Jimerson, A. (2002). Diverging academic paths in rural Caribbean children. *School Psychology International, 23*, 155-168.

Dutton, E. (2014). *Religion and intelligence: an evolutionary analysis.* London: Ulster Institute for Social Research.

Dutton, E., & Lynn, R. (2014). The Canadian IQ calculated from the standardization of the WAIS IV. *Open Differential Psychology, 20th of August, 2014*.

Dutton, E. & Lynn, R. (2015). A negative Flynn effect in France, 1999 to 2008-9. *Intelligence, 51*, 57-66.

Dutton, E., Bakhiet, S. F., Ziada, K. E., Essa, A. A. S., & Blahmar, T. A. M. (2017). A negative Flynn Effect in Khartoum, the Sudanese capital. *Intelligence, 63,* 51-55.

Dutton, E., Becker, D., Osman, H. A., Bakhiet, S. F., Essa, Y. A. S., Ali, H. A. A., Alqafari, Sh. M., Hamdi, A. H. M. N., & Alfaleh, A. S. H. (2018). The Raven's test performance of South Sudanese samples: A validation of criticisms of the utility of Raven's among Sub-Saharan Africans. *Personality and Individual Differences, 128,* 122-126.

Dutton, E., Essa, Y. Ah. S., Bakhiet, S. F., Ali, H. A. A., Alqafari, Sh. M., Alfaleh, A. S. H., & Becker, D. (2018). Brain drain in Syria's ancient capital: No Flynn Effect in Damascus, 2004–2013/14. *Personality and Individual Differences, 125,* 10-13.

Dutton, E., te Nijenhuis, J., & Roivainen, E. (2014). Solving the puzzle of why Finns have the highest IQ, but one of the lowest number of Nobel prizes in Europe. *Intelligence, 46,* 192-202.

Dutton, E., van der Linden, D. & Lynn, R. (2016). The negative Flynn effect: A systematic review. *Intelligence, 59*, 163-169.

Duzen, N. E., Sahin, N., Raven, J., & Raven, C. J. (2008). The Classic Form of the Standard Progressive Matrices in Turkey. In J. Raven & J. C. Raven (Eds), *Uses and abuses of intelligence. Studies advancing Spearman's and Raven's quest for non-arbitrary metrics.* Unionville, NY: Royal Fireworks Press.

Easterlin, R. A. (1981). Why isn't the whole world developed? *Journal of Economic History, 41*, 1-18.

Echeverri-Gent, J. (2009). Persistent high inequality as an endogenous political process. *PS Political Science & Politics, 42*, 633-638.

Economist. (2009) September 19th, p. 79.

Ediev, D., Coleman, D. & Sherbokov, S. (2013). New measures of population reproduction in an era of high migration. *Population, Space and Place* DOI: 10,1002

El Azmy, J., Ahami, A. O. T., Badda, B., Azzaoui, F. Z., Aboussaleh, Y., Latifi, M., & El Hessni, A. (2013). Evaluation des performances neurocognitives des collégiens à M'rirt (Moyen Atlas, Maroc). *Antropo, 30,* 33-43.

Elley, W. B. (1992). *How in the world do students read? IEA study of reading literacy.* International Association for the Evaluation of Educational Achievement. Report No. ISBN-92-9121-002-3. Accessed 15 June 2009 at: http://eric.cd.gov/ERICCDocs/data/ericdocs2sql/content/storage01/0000019b/80/ 13/07/42.pdf.

Ellis, L. & Walsh, A. (2003). Crime, delinquency and intelligence. In H. Nyborg (Ed), *The scientific study of general Intelligence.* Amsterdam: Elsevier.

El-Mneizel, A. F. (1987). Development and psychometric analysis of a Jordanian adaptation of the Kaufman Assessment Battery for Children. Ph.D Thesis, University of Alabama.

Engelhardt, L. E., Mann, F. D., Briley, D. A., Church, J. A., Harden, K. P., & Tucker-Drob, E. M. (2016). Strong Genetic Overlap Between Executive Functions and Intelligence. *Journal of Experimental Psychology: General, 145,* 1141-1159.

Eppig, C., Fincher, C. L. & Thornhill, R. (2010). Parasite prevalence and the worldwide distribution of cognitive ability. *Proceedings of the Royal Society B, 277*, 3801-3808.

Ervik, A. O. (2003). Review of IQ and the Wealth of Nations. *The Economic Journal, 113*, 406-408.

Escobal, J., Lanata, C., Madrid, S., Penny, M., Saavedra, J., Suárez, P., Verastegui, H., Villar, E., & Huttly, Sh. (2003). *Young Lives Preliminary Country Report: Peru. Young Lives: An International Study of Child Poverty.*

Estrada, E., Ferrer, E., Abad, F. J., Román, F. J., & Colom, R. (2015). A general factor of intelligence fails to account for changes in tests' scores after cognitive practice: A longitudinal multi-group latent-variable study. *Intelligence, 50,* 93-99.

Evans, E. M., Schweingruber, H. & Stevenson, H. W. (2002). Gender differences in interest and knowledge acquisition: The United States, Taiwan, and Japan. *Sex Roles, 47*, 153-167.

Fagerlind, I. (1975). *Formal education and adult earnings.* Stockholm: Almqvist and Wiksell.

Fahmy, M. (1964). Initial exploring of the intelligence of Shilluk children. *Vita Humana, 7*, 164-177.

Fahrmeier, E. D. (1975). The effect of school attendance on intellectual development in Northern Nigeria. *Child Development, 46*, 281-285.

Fajgelj, S., Bala, G., & Katić, R. (2010). Latent Structure of Raven's Colored Progressive Matrices. *Collegium Antropologicum, 34,* 1015-1026.

Fareed, M. & Afzal, M. (2014). Estimating the inbreeding depression on cognitive behavior: A population based study of a child cohort. *PLoS ONE* 9(10):

e109585. doi:10.1371/journal.pone.0109585

Fatours, M. (1972). The influence of maturation and education on the development of abilities. In L.J. Cronbach & P. J. Drenth (Eds) *Mental Tests and Cultural Adaptation.* The Hague: Mouton.

Faverge, J. M. & Falmagne, J. C. (1962). On the interpretation of data in intercultural psychology. *Psychologia Africana, 9*, 22-96.

Fenton, W. S. (2000). Depression, suicide, and suicide prevention in schizophrenia. *Suicide and Life Threatening Behavior, 30*, 34-49.

Ferguson, Ch. J. (2009). An Effect Size Primer: A Guide for Clinicians and Researchers. *Professional Psychology: Research and Practice, 40,* 532-538.

Fergusson, D. M., & Horwood, L. J. (1997). Sex differences in educational achievement in a New Zealand birth cohort. *New Zealand Journal of Educational Studies, 32,* 83-95.

Fergusson, L. C., Bonshek, A. J., & Le Masson, G. (1995). Vedic science based education and nonverbal intelligence: A preliminary longitudinal study in Cambodia. *Higher Education Research and Developmen, 15,* 73-82.

Fernandez, M. (2001). A study of the intelligence of children in Brazil. *Mankind Quarterly, 42,* 17-21.

Ferron, O. (1965). The test performance of coloured children. *Educational Research, 8*, 42-57.

Fick, M. L. (1929). Intelligence test results of poor white, native (Zulu), coloured and Indian school children and the social and educational implications. *South Africa Journal of Science, 26*, 904-920.

Fick, M. L. (1939). *The Educability of the South African Native.* Pretoria: Council for Educational and Social Research.

Fierro-Benitez, R., Cazar, R. & Sandoval, H. (1989). Early correction of iodine deficiency and late effects on psychomotor capabilities and migration. In G. R. de Long, J. Robbins & P. G. Condliffe (Eds) *Iodine and the Brain.* New York: Plenum.

Finnish Social Science Data Archive. University of Tampere. Available at: http://www.fsd.uta.fi.

Fischer, C. S., Hout, M., Jankowski, M. S., Lucas, S. R., Swidler, A. & Voss, K. (1996). *Intelligence by Design.* Princeton, NJ: Princeton University Press.

Fisher, R.A. (1929). *The Genetical Theory of Natural Selection.* Oxford: Clarendon Press.

Fisher, R.A. (1932). Family allowances in the contemporary economic situation. *Eugenics Review, 24*, 87-95.

Flaherty, M. (1997). The validity of tests of visuo-spatial skills in cross-cultural studies. *Irish Journal of Psychology, 18,* 439-412.

Flores, M. B., & Evans, G. T. (1972). Some differences in cognitive abilities between selected Canadian and Filipino students. *Multivariate Behavioral Research, 7,* 175-191.

Flores-Mendoza, C. E., & Nascimento, E. (2007). Condição cognitiva de crianças de zona rural. *Estudos de Psicologia I Campinas, 24,* 13-22.

Flores-Mendoza, C., Jardim, G. L., Abad, F. J., & Rodrigues, L. A. (2010). Informação geral e atual e sua relação com a inteligência e a personalidade em crianças escolares. *Estudos de Psicologia I Campinas, 27*, 161-168.

Flores-Mendoza, C., Widaman, K., Mansur-Alves, M., Bacelar, T. D., & Saldanha, R. (2013). Psychoticism and disruptive behavior can be also good predictors of school achievement. *Spanish Journal of Psychology, 16,* 1-13.

Flynn, J. R. (1984). The mean IQ of Americans: Massive gains 1932 to 1978. *Psychological Bulletin, 95,* 29-51. doi:10.1037/0033-2909.95.1.29

Flynn, J. R. (1987). Massive IQ gains in 14 nations: what IQ tests really measure. *Psychological Bulletin, 101*, 171-191.

Flynn, J. R. (1991). *Asian Americans: Achievement Beyond IQ.* Hillsdale, NJ: Lawrence Erlbaum.

Flynn, J. R. (2007). *What is Intelligence? Beyond the Flynn Effect.* Cambridge: Cambridge University Press.

Flynn, J. R. (2012). *Are we getting smarter? Rising IQ in the twenty-first century.* Cambridge: Cambridge University Press.

Flynn, J. R., & Rossi-Casé, L. (2012). IQ gains in Argentina between 1964 and 1988. *Intelligence, 40,* 145-150.

Foley, R. (1987). *Another Unique Species.* New York: Wiley.

Fontaine, C. (1963). Notes sur une expérience d'application de tests au Mali. *Bulletin de l'Assessment International de Psychologie Appliqué, 13*, 235-246.

Food and Agriculture Organization of the United States (FAO) (2014). *Indicators from Household Surveys (gender, area, socioeconomics).* Retrieved from: http://www.fao.org/faostat/en/#data/HS

Fox, R. (Ed.). (1975). *Biosocial Anthropology.* London: Malaby Press.

Fraser, S. (1995). *The Bell Curve Wars.* New York: Basic Books.

Freedom House. (2009). *Freedom in the World 2009.* Available at:

http://www.freedomhouse.org/ Freedom House. (2010).

Freedom in the World 2010. New York: Rowman & Littlefield Publishers.

Frey, B. (2008). *Happiness: A Revolution in Economics.* Cambridge, MA: MIT Press.

FSD1289 Measures of Democracy 1810-2008. (2009).

FSD2183 Women's Representation in National Parliaments 1970-2008. (2009).

Friedman, N. P., Miyake, A., Young, S. E., DeFries, J. C., Corley, R. P., & Hewitt, J. K. (2008). Individual Differences in Executive Functions Are Almost Entirely Genetic in Origin. *Journal of Experimental Psychology: General, 137,* 201-225.

Frydman, M., & Lynn, R. (1989). The intelligence of Korean children adopted in Belgium. *Personality and Individual Differences, 10,* 1323-1325.

Fuertes de la Haba, A., Santiago, G., & Bangdiwala, I.S. (1976). Measured intelligence in offspring of oral and nonoral contraceptive users. *American Journal of Obstetrics & Gynecology, 125,* 980-983.

Galeazzi, A., Castelli, G. & Saccomani, M. V. (1979). Contributo alla taratura delle PM47 per soggetti in eta dai 4 agli 11 anni. *Bolletino di Psicologia Applicata, 152*, 79-91.

Galler, J. R., Ramsey, F. C., Forde, V., & Archer, E. (1987). Long-term effects of early kwashiorkor compared with marasmus. II. Intellectual performance. *Journal of Pediatric Astroenterology & Nutrition, 6,* 847-854.

Galton, F. (1865). Hereditary talent and character. *MacMillan's Magazine, 12,* 157-166; 318-327.

Galton, F. (1869/1962). *Hereditary Genius.* London: MacMillan. Republished in 1962 by Collins.

Galton, F. (1883). *Inquiries into Human Faculty and its Development.* London: Dent.

Galton, F. (1908). *Memories of My Life.* London: Methuen.

Galton, F. (1908a). Local associations for promoting eugenics. *Nature*, *78*, 645-647.

Galton, F. (1909). *Essays in Eugenics.* London: Eugenics Society.

Galván, M., Uauy, R., López-Rodríguez, G., & Kain, J. (2013). Association between childhood obesity, cognitive development, physical fitness and social-emotional wellbeing in a transitional economy. *Annals of Human Biology, 4,* 101-106.

Gamble, C. (1993). *Timewalkers.* Bath, UK: Alan Sutton.

Gandhi-Kingdon, G. (1996). The quality and efficiency of private and public education: A case-study of urban India. *Oxford Bulletin of Economics and Statistics, 58,* 57-82.

Ganguli, M., Ratcliff, G., Huff, F. J., Belle, S., Kancel, M. J., Fischer, L., Seaberg, E. C., & Kuller, L. H. (1991). Effects of gender, age, and education on cognitive tests in a rural elderly community: norms from the Monongahela sample. *Neuroepidemiology, 10,* 42-52. doi:10.1159/000110246

Garcia, I. Q. (2016) *Normativos da Forma Geral das Matrizes Progressivas de Raven numa Amostra da Comunidade.* Dissertação de Mestrado em Psicologia Clínica Ramo de Especialização em Terapias Familiares e Sistémicas, Coimbra.

Geary, D. C., Hamson, C. O., Chen, G-P., Liu, F., Hoard, M. K. & Salthouse, T. A. (1997). Computational and reasoning abilities in arithmetic: cross-generational change in China and the United States. *Psychonomic Bulletin and Review, 4*, 425-430.

Geary, D. C., Liu, F., Chen, G-P., Salts, S. J. & Hoard, M. K. (1999). Contributions of computational fluency to cross-national differences in arithmetical reasoning abilities. *Journal of Educational Psychology, 91*, 716-719.

Gelade, G. A. (2008). The geography of IQ. *Intelligence, 36,* 495-501.

Georgas, J. G. & Georgas, C. (1972). A children's intelligence test for Greece. In L. J. Cronbach & P. J. D. Drenth (Eds) *Mental Tests and Cultural Adaptation.* The Hague: Mouton.

Georgas, J., Weiss, L. G., van der Vijver, F., & Saklofske, D. H. (Eds) (2003). *Culture and Children's Intelligence.* Amsterdam: Academic Press.

Gestel, S. F., Thiery, E., Deram, C., Beeckmans, K., & Derom, R. (1997*). Intelligence in Twins: Effect of Chorion Type.* Center for Human Genetics, Herestraat 49 O&N6, B-3000 Leuven, Belgium.

Gewa, C. A., Weiss, R. E., Bwibo, N. O., Whaley, Sh., Sigman, M., Murphy, S. P., Harrison, G., & Neumann, Ch. G. (2009). Dietary micronutrients are associated with higher cognitive function gains among primary school children in rural Kenya. *Journal of Nutrition, 101,* 1378-1387.

Ghazi, H. F., Isa, Z.M., Aljunid, S., Tamil, A. M., & Abdalquader, M. A. (2012). Nutritional Status, Nutritional Habit, and Breakfast Intake, in Relation to IQ among primary school children in Bagdad City Iraq. *Pakistan Journal of Nutrition, 11,* 379-382.

Ghiselli, E. E. (1966). *The Validity of Occupational Aptitude Tests.* New York: Wiley.

Gibson, M. A. & Mace, R. (2003). Strong mothers bear more sons in rural Ethiopia. *Proceedings of Biological Science, 270* Suppl 1, S108-109.

Gilkey, C. K. (1924). Religion among American students. J*ournal of Religion*, *1*, 4.

Gill, P. & Byrt, E. (1973). *The standardization of Raven's Progressive Matrices and the Mill Hill Vocabulary Scale for Irish school children aged 6-12 years.* University College, Cork: MA Thesis.

Ginsburg, P. H., Choi, E., Lopez, L. S., Netley, R. & Chao-Yuan, C. (1997). Happy birthday to you: early mathematical thinking of Asian, South American and U.S. children. In T. Nunes & P. Bryant (Eds) *Learning and Teaching Mathematics: An International Perspective.* Hove, UK: Psychology Press.

Gintilienë, G., & Butkienë, D. (2005). Raveno spalvoto Progresuoljaneio Matrico standartizacija lietuvoje. *Psichologija, 32,* 1-13.

Giordani, B., Boivin, M. J., Opel, B., Nseyila, D. N. & Lauer, R. E. (1996). Use of the K-ABC with children in Zaire. *International Journal of Disability, Development and Education, 43*, 5-24.

Glewwe, P., & Jaccoby, H. (1992). *Estimating the Determinants of Cognitive Achievement in Low Income Countries.* Washington, DC: World Bank.

Globerson, T. (1983). Mental capacity and cognitive functioning: developmental and social class differences. *Developmental Psychology, 19*, 225-230.

Godman, A. (1964). *The attainments and abilities of Hong Kong primary IV pupils: a first study*. Hong Kong: Hong Kong University Press.

Goldbeck, L., Daseking, M., Hellwig-Brida, S., Waldmann, H. C., & Petermann, F. (2010). Sex Differences on the German Wechsler Intelligence Test for Children (WISC-IV). *Journal of Individual Differences, 31,* 22-28.

Goldman, R. J. (1965). Do we want our children taught about God? *New Society,* 27 May.

Gonzales, E. J., Galia, J., Arora, A., Erberber, E. & Diaconu, D. (2004). Reporting students' achievement in mathematics and science. In M. O. Martin, J. V. S. Mullis, & S. J. Chrostowski (Eds) *TIMSS 2003 Technical Report,* pp. 274-307. Chestnut Hill

(MA): TIMSS & PIRLS International Study Center. Accessed 9 June 2009 at: http://timss.bc.edu/timss2003i/technicalD.html.

Gonzalez, H. M., Neighbors, H., Nesse, R., Abelson, J. M., Sweetman, J. & Jackson, J. S. (2007). Prevalence and distribution of major depressive disorder in African Americans, Caribbean Blacks, and Non-Hispanic Whites from the National Survey of American Life. *Archives of General Psychiatry, 64,* 305-315.

Goosens, G. (1952a). Ētalonnage du Matrix 1947 de J. C. Raven. *Revue Belge de Psychologie et de Pédagogie, 14*, 74-80.

Goosens, G. (1952b). Une application du test d'intelligence de R. B. Cattell. *Revue Belge de Psychologie et de Pédagogie, 14*, 115-124.

Gottfredson, L. S. (2004). Intelligence: is it the epidemiologists' elusive fundamental cause of social class inequalities in health? *Journal of Personality and Social Psychology, 86*, 174-199.

Gottfredson, L. S. & Deary, I. J. (2004). Intelligence predicts health and longevity, but why? *Current Directions in Psychological Science, 13*, 1-4.

Grantham-McGregor, S., Powell, C., Walker, S., Chang, S., & Fletcher, P. (1994). The long-term follow-up of severely malnourished children who participated in an intervention program. *Child Development, 65,* 428-439.

Grantham-McGregor, S.M., Walker, S.P., Chang, S.M., & Powell, C.A. (1997). Effects of early childhood supplementation with and without stimulation on later development in stunted Jamaican children. *American Journal of Clinical Nutrition, 66,* 247-253.

Greeley, A. M. (2003). *Religion in Europe at the End of the Second Millennium. A Sociological Profile.* New Brunswick, NJ: Transaction Publishers.

Green, R.F. (1972). On the correlation between IQ and amount of “white” blood. *Proceedings of the Annual Convention of the American Psychological Association, 7,* 285-286.

Green, R. F., & Martínez, J. N. (1967). *Standardization of a Spanish language adult intelligence scale. Final Report.* Washington, DC, USA: US Department of Health, Education & Welfare.

Grigorenko, E. L. & Sternberg, R. J. (2001). Analytical, creative and practical intelligence as predictors of self-reported adaptive functioning: a case study in Russia. *Intelligence, 29*, 57-73.

Grigoriev, A., & Lynn, R. (2014). A study of the IQ in Kazakhstan. *Intelligence, 46,* 40-46.

Grob, A., Petermann, F., Lipsius, M, Costan-Dorigan, J., Petermann, U., & Daseking, M. (2008). Differences in Swiss and German children’s intelligence as measured by the HAWIK-1V. *Swiss Journal of Psychology, 67,* 113-118.

Grove, B.J., Lim, S.J., Gale, C. R., & Shenkin, S.D. (2017). Birth weight and cognitive ability in adulthood: A systematic review and meta-analysis. *Intelligence, 61,* 140-146.

Gunnell, D., Lofving, S., Gustafsson, J-E. & Allebeck, P. (2011). School performance and risk of suicide in early adulthood: Follow-up of two national cohorts of Swedish schoolchildren. *Journal of Affective Disorders, 131*, 104-112.

Gruszka, A., & Owen, A. M. (2015). Temperamental variation in learned irrelevance in humans. *Current Issues in Personality Psychology, 3,* 94-104.

Gupta, G. C. and Gupta, S. (1966). Norms for Raven's Colored Progressive Matrizes. *Manus, 13*, 87-89.

Guthke, J. & Al-Zoubi, A. (1987). Kulturspezifische Differenzen in den Coloured Progressive Matrices (CPM) und in einer Lerntestvariante der CPM. *Psychologie in Erziehung und Unterricht, 34*, 306-311.

Hackett, R., Hackett, L., & Bhakakta, P. (1998). Psychiatric disorder and cognitive function in children with epilepsy in Kerala, South India. *Seizure, 7,* 321-324.

Hadidjaja, P., Bonang, E., Suyardi, A., Abidin, A. N., Ismid, I. S., & Margono, S. S. (1998). The effect of intervention methods on nutritional status and cognitive function of primary school children infected with ascaris lumbricoides. *American Journal of Tropical Medicine, 59,* 791-795.

Hadidjaja, P., Mahfudin, H., Ismid, I. S., Bonang, E., Yunandi, R., & Hartana, D. B. (1996). The effect of ascariosis treatment and health education on the cognitive function of primary school children. *Medical Journal of Indonesia, 5,* 189-194.

Hafer, R.W. (2016). Cross-country evidence on the link between IQ and financial development. *Intelligence, 55,* 7-13.

Hafer, R.W. (2017). New estimates on the relationship between IQ, economic growth and welfare. *Intelligence, 61*, 92-101.

Hafer, R.W. & Jones, G. (2015). Are entrepreneurship and cognitive skills related? Some international evidence. *Small Business Economics*, *43*, 283-298.

Hamadani, J. D., Tofail, F., Nermell. B., Gardner, R., Shiraji, S., Bottai, M., Arifeen, S. E., Huda, S. N., & Vahter, M. (2011). Critical windows of exposure for arsenic-associated impairment of cognitive function in pre-school girls and boys: a population-based cohort study. *International Journal of Epidemioliology, 40,* 1593-1604.

Hambleton, R. K., Merenda, P. F., & Spielberger, Ch. D. (2005*). Adapting Educational and Psychological Tests for Cross-Culture.* Mahwah, New Jersey, London: Lawrence Erlbaum Associates, Publishers.

Hamers, J. H. M., Hessels, M. G. P. & Pennings, A. H. (1996). Learning potential of ethnic minority children. *European Journal of Psychological Assessment, 12,* 183-192.

Hamid, J. J. M., Mitra'z, A. K., Hasmiza, H., Pim, C. D., Ng, L., & Wan Manan, W. M. (2002). Effect of gender and nutritional status on academic achievement and cognitive function among primary school children in a rural district in Malaysia. *Malaysian Journal of Nutrition, 17*, 189-200.

Hamilton, W. D. (1964). Genetical evolution of social behavior. *Journal of Theoretical Biology, 7,* 1-52.

Hansen, K. T., Heckman, J. J. & Mullen, K. J. (2004). The effect of schooling and ability on achievement test scores. *Journal of Econometrics, 121*, 39-98.

Hanushek, E. A. & Kimko, D. D. (2000). Schooling, labor force quality, and the growth of nations. *American Economic Review, 90*, 1184-1208.

Hanushek, E.A., Peterson, P.E. & Woessmann, L. (2013). *Endangering Prosperity.* Washington, D.C.: Brookings.

Haraldsson, E., Fowler, P. C., & Periyannanpillai, V. (2000). Psychological characteristics of children who speak of a previous life: a further field study in Sri Lanka. *Transcultural Psychiatry, 37,* 525-544.

Harari, R., Julvez, J., Murata, K., Barr, D., Bellinger, D. C., Debes, F., & Grandjean, Ph. (2010). Neurobehavioral deficits and increased blood pressure in school-age children prenatally exposed to pesticides. *Environmental Health Perspectives, 118*, 890-896.

Hassall, C. & Sherratt, T.N. (2011). Statistical inference and spatial patterns in correlates of IQ. *Intelligence, 39,* 303-310.

Hattie, J.A.C. (2009). *Visible Learning: A synthesis of over 800 meta-analyses relating to achievement.* London: Routledge.

Hause, J. C. (1971). Ability and schooling as determinants of lifetime earnings. *American Economic Review, 61*, 289-298.

Hauser, R. M., Sewell, W. H. & Alqin, D. F. (1973). High school effects on achievement. In W.H. Sewell, R. M. Hauser & D. L. Featherman (Eds) *Schooling and Achievement in American Society.* New York: Academic Press.

Haward, L. C. & Roland, W. A. (1954). Some inter-cultural differences on the Draw-a-Man test: Goodenough's scores. *Man, 54,* 86-88.

Heady, C. (2003). The effect of child labor on learning achievement. *World Development, 31,* 385-398.

Heaton, T. B. & Albrecht, S. L. (1996). The changing patterns of inter-racial marriage. *Social Biology, 43*, 203-217.

Heilmann, S. (2013). *Life-chances of children in Indonesia: The links between parental resources and children's outcomes in the areas of nutrition, cognition and health.* A thesis submitted to the Department of Social Policy of the London School of Economics for the degree of Doctor of Philosophy, London, September 2013.

Heiz, J., & Barisnikov, K. (2016). Visual-motor integration, visual perception and motor coordination in a population with Williams syndrome and in typically developing children. *Journal of Intellectual Disability Research, 60,* 945-955.

Heller-Sahlgren, G. (2015). Immigration helps explain Sweden's school problem. *The Spectator*, 10 August.

Hemmingsson, T. (2009). Cognitive ability in adolescence and mortality in middle age: a prospective life course study. *Journal of Epidemiology & Community Health, 63*, 697-702.

Henneberg, M. & de Miguel, C. (2004). Hominins are a single lineage: Brain and body size variability does not reflect postulated taxonmomic diversity of hominins. *Homo – Journal of Comparative Human Biology*, *55*, 21-37.

Herrnstein, R. J. & Murray, C. (1994). *The Bell Curve: Intelligence and Class Structure in American Life.* New York: The Free Press.

Heyneman, S. P. (1977). Relationships between the primary school community and academic achievement in Uganda. *Journal of Developing Areas, 11*, 245-259.

Heyneman, S. P. & Jamison, D. T. (1980). Student learning in Uganda. *Comparative Education Review, 24*, 207-220.

Helland, I. B., Smith, L. Blomén, B., Saarem, K., Saugstad, O. D., & Drevon, Ch. A. (2008). Effect of supplementing pregnant and lactating mothers with n-3 very-long-chain fatty acids on children's IQ and body mass index at 7 years. *Pediatrics, 122,* e472-479.

Hertzig, M. E., Birch, H. G., Thomas, A., & Mendez, O. A. (1968). Class and ethnic differences in the responsiveness of preschool children to cognitive demands. *Monographs of the Society for Research in Child Development, 33,* 1-69.

Heyneman, S. P., & Jamison, D. T. (1980). Student learning in Uganda. *Comparative Education Review, 24,* 207-220.

Hickling, F. W., Matthies, B. K., Morgan, K., & Gibson, R. C. (Eds.) (2012). *Perspectives in Caribbean Psychology*. London, UK: Jessica Kingsley Publishers.

Hill, L.J. & Williams, A.C. (2017). Meat intake and the dose of vitamin B – Nicotinamide: Cause of the causes of disease transitions, health divides, and health futures? *International Journal of Tryptophan Research*, 10(1)
DOI: 10.1177/1178646917704662

Hoekstra, R. A., Bartels, M., & Boomsma, D. I. (2007). Longitudinal genetic study of verbal and nonverbal IQ from early childhood to young adulthood. *Learning and Individual Differences, 17,* 97-114.

Høie, B., Mykletun, A., Sommerfelt, K., Bjørnæs, H., Skeidsvoll, H., & Waaler, P. E. (2005). Seizure-related factors and non-verbal intelligence in children with epilepsy. *A population-based study from Western Norway. Seizure, 14,* 223-231.

Horn, J. M., Loehlin, J. C., & Willerman, L. (1979). Intellectual resemblance among adoptive and biological relatives: The Texas Adoption Project. *Behavior Genetics, 9,* 177-207.

Holding, P. A., Taylor, H. G., Kazungu, S. D. & Mkala, T. (2004). Assessing cognitive outcomes in a rural African population: development of a neuropsychological battery in Kilifi district, Kenya. *Journal of the International Neuropsychological Society, 10*, 246-260.

Hofstede, G. (2001). *Culture's consequence: comparing values, behaviors, institutions, and organizations across nations.* London: Sage.

Howells, T. H. (1928). A comparative study of those who accept as against those who reject religious authority. *University of Iowa Studies of Character, 2*, No. 3.

Hsu, C.-C. (1971). Chinese children's responses to Raven's Colored Progressive Matrices. *Journal of Formosan Medical Association, 70*, 579-593.

Hsu, C.-C., See, R. and Lin, C.-C. (1973). Assessment of learning potential of Chinese children with Raven's Standard Progressive Matrices. *Journal of Formosan Medical Association, 72*, 658-670.

Hsu, C. (1976). The learning potential of first graders in Taipei city as measured by Raven's Coloured Progressive Matrices. *Acta Pediatrica Sinica, 17*, 262-274.

Human Development Report. See UNDP.

Hunkin, V. (1950). Validation of the Goodenough Draw-a-Man test for African children. *Journal for Social Research, 1*, 52-63.

Hunt, E. (2011). *Human Intelligence.* Cambridge: Cambridge University Press.

Hunt, E., & Carlson, J. (2007). Considerations Relating to the Study of Group Differences in Intelligence. *Perspectives on Psychological Science, 2,* 194-213.

Hunt, E., & Sternberg, R. J. (2006). Sorry, wrong numbers: An analysis of a study of a correlation between skin color and IQ. *Intelligence, 34,* 131-137.

Hunt, E. & Wittmann, W. (2008). National intelligence and national prosperity. *Intelligence, 36*, 1-9.

Hunter, J. E. & Hunter, R. F. (1984). Validity and utility of alternative predictors of job performance. *Psychological Bulletin, 96*, 72-98.

Humble, S., Dixon, P., & Schagen, I. (2016). Assessing intellectual potential in Tanzanian children in poor areas of Dar es Salaam. *Assessment in Education: Principles, Policy & Practice*.

Hur, Y.-M., & Lynn, R. (2013). Twin-singleton differences in cognitive abilities in a sample of Africans in Nigeria. *Twin Research and Human Genetics, 16,* 1-8.

Hur, Y.-M., te Nijenhuis, J., & Jeong, H. U. (2017). Testing Lynn's theory of sex differences in intelligence in a large sample of Nigerian school-aged children and adolescents (N > 11,000) using Raven's Standard Progressive Matrices Plus. *Mankind Quarterly, 57,* 428-437.

Inglehart, R., Basanez, M., Diez-Medrano, J., Halman, L. & Luijkx, R. (Eds) (2004). *Human Beliefs and Values: A Cross-Cultural Sourcebook Based on the 1999-2002 Value Surveys.* Buenos Aires, Argentina: Siglo Veintiuno Editores.

Ijarotimi, O. S., & Ijadunola, K. T. (2007). Nutritional status and intelligence quotient of primary school children in Akure community of Ondo State, Nigeria. *Tanzania Health Research Bulletin, 9,* 69-76.

Iliescu, D., Ilie, A., Ispas, D., Bobrean, A., & Clinciu, A. L. (2016). Sex differences in intelligence: A multi-measure approach using nationally representative samples from Romania. *Intelligence, 59,* 54-61.

Iloh, K. K., Ubesie, A. C., & Iloh, O. N. (2017). Do Socio-demographic characteristics influence the performance of children on Raven Progressive Matrices in Enugu, Nigeria? *International Neuropsychiatric Disease Journal, 9,* 1-6.

Imperato-McGinley, J., Pichardo, M., Gautler, T., Voyer, D., & Brydent, M. P. (1991). Cognitive abilities in androgen-insensitive subjects: comparison with control males and females. *Clinical Endocrinology, 34,* 341-347.

Inoguchi, T., Tanaka, A., Sonoda, S. & Tadabaev, T. (2006). *Human Beliefs and Values in Striding Asia.* Japan: Akashi Shoten.

Inter-Parliamentary Union. (1969-2009). *Chronicle of Parliamentary Elections.* Geneva: Inter- Parliamentary Union.

IRFAD (2014). *Iraq Education.* Retrieved from: http://irfad.org/iraq-education/

Irvine, S. H. (1969). Figural tests of reasoning in Africa: studies in the use of Raven's Progressive Matrices across cultures. *International Journal of Psychology, 4*, 217-228.

Irvine, S. H. (1969). Figural tests of reasoning in Africa: studies in the use of Raven's Progressive Matrices across cultures. *International Journal of Psychology, 4,* 217-228.

Irvine, S. H., & Berry, J. W. (1988). *Human Abilities in Cultural Context.* Cambridge, UK: Cambridge University Press.

Irwing, P., Hamza, A., Khaleefa, O., & Lynn, R. (2008). Effects of Abacus training on the intelligence of Sudanese children. *Personality & Individual Differences, 45,* 694-696.

Irwing, P. & Lynn, R. (2006). The relation between childhood IQ and income in middle age. *Journal of Social, Political and Economic Studies, 31,* 191-196.

Ishikuma, T., Moon, S. and Kaufman, A. S. (1988). Sequential simultaneous analysis of Japanese children's performance on the Japanese McCarthy scales. *Perceptual and Motor Skills, 66*, 355-362.

Ismail, Z., & Mehmood, L. (1986). Social class and sex differences in Pakistan on the Raven's Standard Progressive Matrices. *Pakistan Journal of Psychology, 17,* 23-35.

International Organization for Standardizations (ISO) (2013). *ISO 3166-1:2013 Codes for the representation of names of countries and their subdivisions -- Part 1: Country codes.* Retrieved from: https://iso.org/standard/63545.html

Jamil, F., & Khalid, R. (2016). Predictors of Academic Achievement in Primary School Students. *Pakistan Journal of Psychological Research, 31,* 45-61.

Jamison, D. T., & Lockheed, M. E. (1985). *Participation in Schooling: Deferminants and Learning Outcomes in Nepal.* World Bank.

Jamison, D. T., & Moock, P. R. (1984). Farmer Education and Farm Efficiency in Nepal: The Role of Schooling, Extension Services, and Cognitive Skills. *World Development, 12,* 67-86.

Janssen, A. B., & Geiser, Ch. (2012). Cross-Cultural Differences in Spatial Abilities and Solution Strategies-- An Investigation in Cambodia and Germany. *Journal of Cross-Cultural Psychology, 43,* 533.

Jardim-Botelho, A., Raff, S., Rodrigues, R. A., Hoffman, H. J., Diemert, D. J., Correˆa-Oliveira, R., Bethony, J. M., & Gazzinelli, M. F. (2008). Hookworm, Ascaris lumbricoides infection and polyparasitism associated with poor cognitive performance in Brazilian schoolchildren. *Tropical Medicine and International Health, 13,* 994-1004.

Jausovec, N. & Pahor, A. (2017). *Increasing Intelligence.* London: Academic Press.

Jaworowska, A. & Szustrowa, T. (1991). *Podrecznik Do Testu Matryc Ravena.* Warsaw: Pracownia Testow Psychologicznych.

Jeffers, A. & Fitzgerald, M. (1991). *Irish families under stress. Vol.2. An epidemiological study of psychological adjustment, reading attainment and intelligence of 2029 ten and eleven year old children in Dublin.* Dublin: Eastern Health Board.

Jegede, R. O., & Bamgboye, A. (1981). Self-concepts of young Nigerian adolescents. *Psychological Reports, 49,* 451-454.

Jencks, C. (1972). *Inequality: A reassessment of the effects of family and schooling in America.* New York: Basic Books.

Jencks, C. (1979). *Who Gets Ahead*. New York: Basic Books.

Jensen, A.R. (1980). *Bias in Mental Testing*. London: Methuen.

Jensen, A. R. (1983). Effects of inbreeding on mental-ability factors. *Personality and Individual Differences, 4*, 71-89.

Jensen, A. R. (1998). *The g Factor: The Science of Mental Ability.* Westport, Connecticut: Praeger.

Jinabhai, C. C., Taylor, M., Rangongo, N. J., Mkhize, S., Anderson, S., Pillay, B. J., & Sullivan, K. R. (2004). Investigating the mental abilities of rural primary school children in South Africa. *Ethnicity and Health, 9,* 17-36.

John, J. St., Krichev, A., & Bauman, E. (1976). Northwestern Ontario Indian children and the WISC. *Psychology in the Schools, 13,* 407-411.

Johnson, D. L., Johnson, C. A. & Price-Williams, D. (1967). The Draw-a-Man test and Raven Progressive Matrices performance of Guatemalan boys and Latino children. *Revista Interamericana de Psicologia, 1*, 143-157.

Johnson, P., & Holmes, M. (1988). *Effective secondary schooling: factors affecting academic achievement in the Commonwealth of The Bahamas.* Ph.D. thesis, University of Toronto.

Johnson, W., Deary, I. J. & Iacono, W. G. (2008). Genetic and environmental transactions underlying education attainment. *Intelligence, 37,* 466-478.

Jones, G. (2011). National IQ and national productivity: The Hive Mind across Asia. *Asian Development Review, 28,* 51-71.

Jones, G. & Podemska, M. (2010). IQ in the utility function. Cognitive skills, time preferences, and cross-country differences in savings rates. Retrieved 17 Dec. 2010 from http://mason.gmu.edu/-gjonesb/IQsavings.pdf

Jones, G. & Potrafke, N. (2014). Human capital and national institutional quality: Are TIMSS, PISA, and national average robust predictors? *Intelligence, 46,* 148-155.

Jones, G. & Schneider, W. J. (2006). Intelligence, human capital, and economic growth: A Beysian averaging of classical estimates (BACE) approach. *Journal of Economic Growth, 11*, 71-93.

Jones, G. & Schneider, W. J. (2010). IQ in the production function: Evidence from immigrant incomes. *Economic Inquiry, 48*, 743-755.

Jordheim, G. D., & Olsen, I. A. (1963). The use of a non-verbal test of intelligence in the trust territory of the Pacific. *American Anthropologist, 65,* 1122-1125.

Judge, T. A., Higgins, C. A., Thoresen, C. J. & Barrick, W. R. (1999). The big five personality test, general mental ability, and career success across the life span. *Personnel Psychology, 52*, 621-652.

Jukes, M. C. H., & Grigorenko, E. L. (2010). Assessment of cognitive abilities in multiethnic countries: The case of the Wolof and Mandinka in Gambia. *British Journal of Educational Psychology, 80,* 77-98.

Jukes, M. C. H., Pinder, M., Grigorenko, E. L., Smith, H. B., Walraven, G., & Bariau, E. M. (2006). Long-term impact of malaria chemoprophylaxis on cognitive abilities and educational attainment: Follow-up of a controlled trial. *PLoS Clinical Trials, 19,* 1-8.

Jyothi, K., Susheela, S., Kodaqli, V. R., Balakrishnan, S., & Seshaiah, V. (1993). Poor cognitive performance of insulin-dependent diabetic children in India. *Diabetes Research & Clinical Practice, 20,* 209-213.

Kabir, Z. N., & Herlitz, A. (2000). The Bangla adaptation of the Mini-Mental State Examination (BAMSE): an instrument to assess cognitive function in illiterate and literate individuals. *International Journal of Geriatric Psychiatry, 15,* 441-450.

Kacapyr, E. (2008). Cross-country determinants of satisfaction with life. *Journal of Social Economics, 35*, 400-416.

Kagitcibasi, C. (1972). Application of the D-48 test in Turkey. In L. J. Cronbach and P. J. D. Drenth (Eds) *Mental Tests and Cultural Adaptation.* The Hague: Mouton.

Kahn, H., Spears, J. S., & Rivera, L. V. (1977). *Applicability of Raven Progressive Matrices tests with school children in Puerto Rico.* Psycho Educational Associates.

Kalisch, T., Kattenstroth, J.-Ch., Kowalewski, R., Tegenthoff, M., & Dinse, H. R. (2012). Cognitive and Tactile Factors Affecting Human Haptic Performance in Later Life. *PLoS ONE, 7,* e30420.

Kalonda-Kanyama, I. K. (2014). Quality of institutions: Does intelligence matter? *Intelligence, 42*, 44-52.

Kanazawa, S. (2006). Mind the gap… in intelligence: re-examining the relationship between inequality and health. *British Journal of Health Psychology, 11,* 623- 642.

Kanazawa, S. (2008). Temperature and evolutionary novelty as forces behind the evolution of general intelligence. *Intelligence, 36*, 99-108.

Kanazawa, S. (2009). IQ and the values of nations. *Journal of Biosocial Science, 41,* 537-556.

Kanazawa, S. (2010). Evolutionary psychology and intelligence research. *American Psychologist, 65*, 279-289.

Kanazawa, S. (2010a). Why liberals and atheists are more intelligent. *Social Psychology Quarterly, 73*, 33-57.

Kanazawa. S. (2012). *The Intelligence Paradox. Why the Intelligent Choice Isn't Always the Smart One*. New York: Wiley.

Kanazawa, S. (2015). Breastfeeding is positively associated with child intelligence even net of parental IQ. *Developmental Psychology*, *51*, 1683-1689.

Kanyama, I. K. (2014). Quality of institutions: does intelligence matter? *Intelligence, 42*, 44–52.

Kandel, E., Mednick, S. A. and Kirkegaard-Sorensen, L. (1988). IQ as a protective factor for subjects at high risk for antisocial behaviour. *Journal of Consulting and Clinical Psychology, 56*, 224-226.

Kaniel, S., & Fisherman, S. (1991). Level of performance and distribution of errors in the Progressive Matrices test: a comparison of Ethiopian immigrant and native Israeli adolescents. *International Journal of Psychology, 26,* 25-33.

Kanyama, I.K. (2014). Quality of institutions: Does intelligence matter? *Intelligence, 42*, 44-52.

Kashala, E., Elgen, I., Sommerfeldt, K., Tylleskar, T., & Lundervold, A. (2005). Cognition in African children with attention-deficit hyperactivity disorder. *Pediatric Neurology, 33,* 357-364.

Kaufman, A. S., & Kaufman, N. L. (1983). *Kaufman Assessment Battery for Children.* Circle Pines, MN: American Guidance Service.

Kaufman, A. S., & Kaufman, N. L. (2004). *Kaufman Assessment Battery for Children Second Edition.* Circle Pines, MN: American Guidance Service.

Kaufman, A. S., McLean, J. E., Ishikuma, T., & Moon, S. B. (1989). Integration of literature on the intelligence of Japanese children and analysis of the data from a sequential-simultaneous perspective. *School Psychology International, 10,* 173-183.

Kaufmann, E. (2018). *Whiteshift.* London: Allen Lane.

Kazem, A. M., Al-Zubaidi, A. S., Alkharusi, H. A., Yousif, Y. H., Alsarmi, A. M., Al-Bulushi, S. S., Aljamali, F. A., Al-Mashhdany, S., Al-Busaidi, O. B., Al-Fori, S. M., Al-Bahrani, W. A., & Alshammary, B. M. (2009). A normative study of the Raven Coloured Progressive Matrices Test for Omani children aged 5 through 11 years. *Malaysian Journal of Education, 34,* 37-51.

Kazem, A. M., Alzubiadi, A. S., Yousif, Y. H., Aljamali, F. A., Al-Mashhdany, S. I., Alkharusi, H.A., Al-Busaidi, O. B., Alsarmi, A. M., Al-Bulushi, S. S., Al-Bahrani, W. A., & Al-Fori, S. M. (2007). Psychometric properties of the Raven's Coloured Progressive Matrices for Omani children aged 5 through 11 years. *Social Behavior & Personality, 35,* 1385-1398.

Kazue, S. (1995). Women rebuff the call for more babies. *Japan Quarterly*, January, 14-20.

Kazulin, A. (1998). Profiles of immigrant students' cognitive performance on Raven's Progressive Matrices. *Perceptual and Motor Skills, 87,* 1311-1314.

Keeves, J. P. (1992). *Learning science in a changing world. Cross-national studies of science achievement: 1970 to 1984.*International Association for the Evaluation of Educational Achievement Report No. ISBN-92-9121-001-3. Accessed 14 June 2009 at:
http://eric.ed.gov/ERICDocs/data/ericdocs2sql/contentstorage01/0000019b/80/15/ 2b/8d.pdf.

Kendall, I. M. (1976). The predictive validity of a possible alternative to the Classification Test Battery. *Psychologia Africana, 16*, 131-146.

Kenworthy, L. & McCall, L. (2008). Inequality, public opinion and redistribution. *Socio-Economic Review*, *6*, 35–68.

Kitsao-Wekulo, P. K., Holding, P. A., Taylor, H. G., Abubakar, Am., & Connolly, K. (2013). Neuropsychological testing in a rural African school-age population: Evaluating contributions to variability in test performance. *Assessment, 20,* 776-784.

Khaleefa, O., Ali, K. & Lynn, R. (2010). IQ and head size in a sample in Sudan. *Mankind Quarterly, 51*, 108-111.

Khaleefa, O., Al-Kurdi, K. & Lynn, R. (2012). Intelligence in Oman assessed by the Colored Progressive Matrices, *Mankind Quarterly, 53*, 238-244.

Khaleefa, O. & Gharaibeh, F. (2002). Gender differences in Standard Progressive Matrices and GPA in a Gulf country. *Journal of Social Sciences and Humanities, 5*, 5-18.

Khaleefa, O., & Lynn, R. (2008a). A study of intelligence in the United Arab Emirates. *Mankind Quarterly, 49,* 58-64.

Khaleefa, O., & Lynn, R. (2008b). Norms for intelligence assessed by the Standard Progressive Matrices in Qatar. *Mankind Quarterly, 49,* 65-71.

Khaleefa, O., & Lynn, R. (2008c). Normative data for Raven's Progressive Matrices in Yemen. *Psychological Reports, 103,* 170-172

Khaleefa, O., & Lynn, R. (2008d). Sex differences on the Progressive Matrices: Some data from Syria. *Mankind Quarterly, 48,* 345-352.

Khaleefa, O., Khatib, M. A., Mutwakkil, M. M., & Lynn, R. (2008). Norms and gender differences on the Progressive Matrices in Sudan. *Mankind Quarterly, 49,* 177-183.

Khaleefa, O., Lynn, R., Abulgasim, A. Dosa, M., & Abdulradi, F. (2010). Norms for the Standard Progressive Matrices for 9-18 year olds for Darfur. *Mankind Quarterly, 50,* 311-317.

Khaleefa, O., Sulman, A. &d Lynn, R. (2009). An increase of WAIS-R IQ in Sudan, 1987-2007. *Journal of Biosocial Science, 41*, 279-283.

Khatib, M., Mutwakkil, M. & Hussain, A. (2006). *Tagneen I′khtibar al-masfofat al-mutatabia′ al- mulawwan litalameez alhalaqa al-o'la bimarhalat al-asas biwilayat al-khartoum (Standardization of the Coloured Progressive Matrices to children in Khartoum State)*. Khartoum: Sharikat Matabi' al-Sudan lil-Omlah al-Mahdodahah.

Khosimov, A., & Lynn, R. (2017). A study of intelligence in Tajikistan. *Mankind Quarterly, 57,* 438-442.

Kirkegaard, E.O.W. (2017). Employment rates for 11 country of origin groups in Scandinavia. *Mankind Quarterly, 58*, 312-323.

Kirkegaard, E.O.W. (2018). Is national mental sports ability a sign of intelligence? The analysis of the top players in twelve mental sports. Paper presented at the Edinburgh Conference of the International Society of Intelligence Research.

Klingelhofer, E. L. (1967). Performance of Tanzanian Secondary School Pupils on the Raven Standard Progressive Matrices Test. *The Journal of Social Psychology, 73,* 205-215.

Knight, S., Singhal, A., Thomas, P., & Serjeant, G. (1995). Factors associated with lowered intelligence in homozygous sickle cell disease. *Archives of Disease in Childhood, 73,* 316-320.

Knoetze, J., Bass, N. & Steele, G. (2005). The Raven's Colored Progressive Matrices: pilot norms for Xhosa speaking primary school learners in part-urban Eastern Cape. *South African Journal of Psychology, 35*, 175-194.

Knowles, J. (2008). *Assessment of non-verbal intelligence in South African schools: Do language and gender bias performance on the Raven's Standard Progressive Matrices?* Master Thesis at the University of the Witwatersrand, Johannesburg.

Kodila-Tedika, O. (2014). Governance and intelligence: Empirical analysis from Africa data. *Journal of African Development*, *16*, 83-91.

Kodila-Tedika, O. & Asongu, S. A. (2015). The effect of intelligence on financial development: a cross-country comparison. *Intelligenc*e, *51*, 1-9.

Kodila-Tedika, O. & Simplice, A. (2016). Genetic distance and cognitive human capital: A cross-national investigation. *Journal of Bioeconomics, 18*, 33–51.

Kodila-Tedika, O. & Simplice, A. (2016a). Does intelligence affect economic diversification? *German Economic Review, 16*, 1-20.

Kodila-Tedika, O., Simplice, A. & Dimbu, F.A. (2017). Statistics and IQ in developing countries: A note. *Journal of Biosocial Science, 49*, 309-321.

Korsch, F., Petermann, U., Schmidt, S., & Petermann, F. (2013). Kognitive, sprachliche, motorische und sozial-emotionale Defizite bei verhaltensauffälligen Schulanfängern. *Prax. Kinderpsychol. Kinderpsychiat, 62,* 405-419.

Kovas, Y. N., Harlaar, S. A., Petrill, S. A. & Plomin, R. (2005). Generalist genes and mathematics in 7-year old twins. *Intelligence, 33,* 473-489.

Kozulin, A. (1998). Profiles of immigrant students' cognitive performance on Raven's Progressive Matrices. *Perceptual and Motor Skills, 87,* 1311-1314.

Kramer, M. S., Aboud, F., Mironova, E., Vanilovich, I., Platt, R. W., Matush, L., Igumnov, S., Fombonne, E., Bogdanovich, N., Ducruet, Th., Collet, J.-P., Chalmers, B., Hodnett, E., Davidovsky, S., Skugarevsky, O., Trofimovich, O., Kozlova, L., & Shapiro, S. (2008). Breastfeeding and Child Cognitive Development. New Evidence From a Large Randomized Trial. *Archives of General Psychiatry, 65,* 578-584.

Kratzmeier, H., & Horn, R. (1988). *SPM - Standard Progressive matrices.* Weinheim: Belz Test Gesellschaft.

Krebs, D. & Gillmore, J. (1982). The relationship among the first signs of cognitive development, role taking abilities and moral judgment. *Child Development, 53*, 877-886.

Kuhnen, U., Roeder, B. H. U., Ahah, A. A., Upmeyer, B. S. A. & Zakaria, S. (2001). Cross- cultural variations in identifying embedded figures. *Journal of Cross-Cultural Psychology, 32*, 365-371.

Kulivets, S. & Ushakov, D. (2016). Modeling relationship between cognitive abilities and economic achievements. *Psychology. Journal of Higher School of Economics*, *13*, 636-648

Kura, K., te Nijenhuis, J. & Dutton, E. (2015). Why do Northeast Asians win so few Nobel Prizes? *Comprehensive Psychology*, *4*, 15-28

Kurth, E. von. (1969). Erholung der leistungsnormen bei den farbigen Progressiv Matrizen. *Zeitschrift fur Psychologie, 177,* 85-90.

Kyöstiö, O. K. (1972). Divergence among school beginners caused by different cultural influences. In L. J. Cronbach & P. J. Drenth (Eds), *Mental Tests and Cultural Adaptation.* The Hague: Mouton.

Lahn, B. T. & Ebenstein, L. (2009). Let's celebrate human genetic diversity. *Nature, 46*, 8 October, 726-728.

Lai, T. J., Guo, Y. L., Guo, N. W., & Hsu, C. C. (2001). Effects of prenatal exposure to polychlorinated biphenyls on cognitive development in children: a longitudinal study in Taiwan. *British Journal of Psychiatry, 178,* 49-52.

Lancer, I., & Rim, Y. (1984). Intelligence, family size and sibling age spacing. *Personality and Individual Differences, 5,* 151-157.

Lange, R. T., Schoenberg, M. R., Woodward, T. S., & Brickell, T. A. (2005). Development of the WAIS-III estimate of premorbid ability for Canadians (EPAC). *Archives of Clinical Neuropsychology, 20,* 1009-1024.

Landman, J. (1988). *Appendix to the Manual of the Junior South African Individual Scales.* Pretoria: Human Sciences Research Council.

Lapatinas, A. & Litina, A. (2018). Intelligence and economic sophistication. *Empirical Economics*. doi:10.1007/s00181-018-1511-y

Lapointe, A. E. (1992). *Learning mathematics.* Educational Testing Service Report No. ETS-22- CAEP-01; ISBN-0-88685-120-3. Princeton (NJ): ETS. Accessed 16 June 2009 at: http://eric.ed.gov/ERICDocs/ericdocs2sql/content.

Laroche, J. L. (1959). Effets de répétition du Matrix 38 sur les résultats d'enfants Katangais. *Bulletin du Centre d'Etudes et Récherches Psychotechniques, 1*, 85-99.

Latifi, M., Soulaymani, A., Ahami, A. O. T., Mokhtari, A., Aboussaleh, Y., Rusinek, S. (2009). Comparaison des performances cognitives chez les adolescents consanguins et les non consanguins de la région nord Ouest marocain. *Antropo, 19,* 57-65.

Latouche, G. L. & Dormeau, G. (1956). *La formation professionelle rapide en Afique Equatoriale Français.* Brazzaville: Centre d'Etudes des Problems du Travail.

Laurendeau-Bendavid, M. (1977). Culture, schooling and cognitive development: a comparative study of children in French Canada and Rwanda. In P. R. Dasen (Ed.) *Piagetian Psychology.* New York: Gardner Press.

Lee, J. J., Wedow, R., Okbay, A., Kong, E., Maghzian, O., Zacher, M., … & Cesarini, D. (2018). Gene discovery and polygenic prediction from a 1.1-million-person GWAS of educational attainment. *Nature Genetics, 50,* 1112-1121.

Lee, R. B. (1968). What hunters do for a living. In R. B. Lee & I. Devore (Eds) *Man the Hunter.* Chigaco: Aldine Press.

Legatum Institute. (2009). *The Legatum Prosperity Index. An Inquiry into Global Wealth and Wellbeing.* Available at: http://www.prosperity.com.

Legatum Institute. (2010). *The 2010 Legatum Prosperity Index.* Available at: http://www.prosperity.com/rankings.aspx.

Leon, F.R. (2018). Boundary conditions and new directions for UVF theory: reply to comments. *Mankind Quarterly, 58*, 673-685.

Leon, C. A., Jaramillo, R., Martinez, S., Fernandez, F., Tollez, H., Lasso, B., & de Guzmdn, R. (1975). Sequelae of Venezuelan equine encephalitis in humans: a four year follow-up. *International Journal of Epidemiology, 4,* 131-140.

Lester, D. (2003). National estimates of IQ and suicide and homicide rates. *Perceptual & Motor Skills, 97*, 206.

Lepach, A. C., Reimers, W., Pauls, F., Petermann, F., & Daseking, M. (2015). Geschlechtseffekte bei Intelligenz und Gedächtnisleistungen. *Zeitschrift für Neuropsychologie, 26,* 5-16.

Li, X., Sano, H. & Merwin, J. C. (1996). Perception and reasoning abilities among American, Japanese and Chinese adolescents. *Journal of Adolescent Research, 11*, 173-193.

Lieblich, A., Ben-Shakhar, N., & Ninio, A. (1976). *WISC-R Hebrew Manual.* Jerusalem: Psychological Corporation and The Israeli Ministry of Education.

Lieblich, A., & Kugelmas, S. (1981). Patterns of intellectual ability of Arab school children in Israel. *Intelligence, 5,* 311-320.

Lim, T. K. (1994). Gender-related differences in intelligence: application of confirmatory factor analysis. *Intelligence, 19,* 179-192.

Linstrom, A., Raven, J. & Raven R. (2006). The Coloured Progressive Matrices in South Africa. In Raven, J. & Raven J. (Eds), *Uses and Abuses of Intelligence.* New York: Royal Fireworks Press.

Liporace, M. F., Ongarato, P., Saavedra, E., & Casullo M. M. (2004). El Test de Matrices Progresivas, Escala General: un análisis psicométrico. *Revista Evaluar, 4,* 50-69.

Liu, J., Raine, A., Venables, P. H., Dalais, C., & Mednick, S. A. (2003). Malnutrition at 3 years and lower cognitive ability at 11 years. *Archives of Pediatric Adolescent Medicine, 157,* 593-600.

Liu, X., Shi, Y., Niu, B., Shi, Zh., Li, J., Ma, Zh. Jian Wang, … & Zhang, K. (2016). Polymorphic variation in CHAT gene modulates general cognitive ability: An association study with random student cohort. *Neuroscience Letters, 617,* 122-126.

Llanos, Z. M. (1974). *El funcionamiento intelectuel de los niños en las zones marginales de Lima.* Montevideo, Uruguay: Instituto Americano de Niño.

Lloyd, F. & Pidgeon, D. A. (1961). An investigation into the effects of coaching on verbal and non-verbal tests with European, Indian and African children. *British Journal of Educational Psychology, 31*, 145-151.

Loy, T. (2018). Intelligence, institutions, a culture of secrecy and earnings management. *Corporate Ownership and Control*, *15,* 96-106.

Lugomer, G. & Zarevski, P. (1985). Intellectual functioning of elementary school pupils of different sex. *Studia Psychologica, 27,* 29-35.

Lv, Z. (2017a). Cross-country evidence on the link between intelligence and the environmental efficiency of well-being. *Journal of Individual Differences*, *38*, 125-131.

Lv, Z. (2017b). Intelligence and corruption: An empirical investigation in a non-linear framework. *Journal of Behavioral and Experimental Economics, 69*, 83–91.

Lv, Z., & Xu, T. (2016a). Does intelligence affect health care expenditure? Evidence from a cross-country analysis. *Intelligence*, *55*, 86–89.

Lv, Z. & Xu, T. (2016b). The impact of national IQ on longevity: New evidence from quantile regression. *Personality and Individual Differences, 101*, 282-287.

Lynn, R. (1977a). The intelligence of the Japanese. *Bulletin of the British Psychological Society, 30,* 69-72.

Lynn, R. (1977a). The intelligence of the Japanese. *Bulletin of the British Psychological Society, 30,* 69-72.

Lynn, R. (1977b). The intelligence of the Chinese and Malays in Singapore. *Mankind Quarterly, 18,* 125-128.

Lynn, R. (1977c). Selective emigration and the decline of intelligence in Scotland. *Social Biology, 24,* 173-182.

Lynn, R. (1982). IQ in Japan and the United States shows a growing disparity. *Nature, 297,* 222-223.

Lynn, R. (1990). The role of nutrition in secular increases of intelligence. *Personality and Individual Differences*, *11*, 273–285.

Lynn, R. (1991a). Race differences in intelligence: a global perspective. *Mankind Quarterly, 31,* 254-296.

Lynn, R. (1991b). The evolution of race differences in intelligence. *Mankind Quarterly*, *32*, 99-173.

Lynn, R. (1991c). Intelligence in China. *Social Behavior and Personality, 19*, 1-4.

Lynn, R. (1994). The intelligence of Ethiopian immigrant and Israeli adolescents. *International Journal of Psychology, 29,* 55-56.

Lynn, R. (1997). Intelligence in Taiwan. *Personality and Individual Differences, 22,* 585-586.

Lynn, R. *(*2001). *Eugenics: A Reassessment*. Westport, CT: Praeger.

Lynn, R. (2001). Intelligence in Russia. *Mankind Quarterly, 42,* 151-154.

Lynn, R. (2006). *Race Differences in Intelligence: An Evolutionary Analysis.* Augusta, GA: Washington Summit Publishers.

Lynn, R. (2007a). A study of the IQ in Bangladesh. *Mankind Quarterly, 48*, 117-121.

Lynn, R. (2007b). The IQ of Mongolians. *Mankind Quarterly, 48*, 91-97.

Lynn, R. (2007c). Race differences in intelligence, creativity and creative achievement. *Mankind Quarterly, 48*, 157-168.

Lynn, R. (2007d). Race differences in intelligence, creativity and creative achievement. *Mankind Quarterly*, *48*, 157-168.

Lynn, R. (2008). *The Global Bell Curve; Race, IQ, and Inequality Worldwide.* Augusta, Georgia: Washington Summit Publishers.

Lynn, R. (2009). Fluid intelligence but not vocabulary has increased in Britain, 1979-2008. *Intelligence, 37*, 249-255.

Lynn, R. (2009). What has caused the Flynn effect? Secular increases in the developmental quotients of infants. *Intelligence, 37,* 16-24.

Lynn, R. (2010a). Intelligence of the Batswana. *Mankind Quarterly, 51,* 93-96.

Lynn, R. (2010b). Consistency of race differences in intelligence over millennia: A comment on Wicherts, Borsboom and Dolan. *Personality and Individual Differences, 48*, 100-101.

Lynn, R. (2010a). Intelligence of the Batswana. *Mankind Quarterly, 51*, 93-96.

Lynn, R. (2011a). *The Chosen People: A Study of Jewish Intelligence and Achievements.* Augusta, GA: Washington Summit Publishers.

Lynn, R. (2011b). *Dysgenics: Genetic Deterioration in Modern Populations.* Second Revised Edition. London: Ulster Institute for Social Research.

Lynn, R. (2011c). The intelligence of the Pygmies. *Mankind Quarterly, 51*, 464-470.

Lynn, R. (2013). Rushton's r–K life history theory of race differences in penis length and circumference examined in 113 populations. *Personality and Individual Differences, 55,* 261-266.

Lynn, R. (2014). A study of intelligence in Cambodia. *Mankind Quarterly, 54,* 458-456.

Lynn, R. (2015). Selective emigration, Roman Catholicism and the decline of intelligence in Ireland. *Mankind Quarterly, 55,* 242-253.

Lynn, R. (2015). *Race Differences in Intelligence: An Evolutionary Analysis. Second Revised edition.* Augusta, GA: Washington Summit Publishers.

Lynn, R. (2018a). *Race differences in Psychopathic Personality*. Augusta, GA: Washington Summit Publishers.

Lynn, R. (2018b). Race differences in depression and mania. *Mankind Quarterly, 59*, 216-241.

Lynn, R. (2019). National differences in intelligence and approval of euthanasia. *Mankind Quarterly,* (in press).

Lynn, R., Abdalla, S. E. & Al-Shahomee, A. A. (2008a). Norms for the Progressive Matrices for Libya and Tunisia. *Mankind Quarterly, 49*, 71-77.

Lynn, R., & Abdel-Khalek, A. (2009). Intelligence in Jordan: Norms for the Advanced Progressive Matrices. *Mankind Quarterly, 50,* 114-119.

Lynn, R., Allik, J., Pullmann, H. & Laidra, J. (2002). A study of the IQ in Estonia. *Psychological Reports, 95,* 611-612.

Lynn, R., Backhoff, E., & Contreras, L. A. (2005). Ethnic and racial differences on the Standard Progressive Matrices in Mexico. *Journal of Biosocial Science, 37,* 107-113.

Lynn, R., & Chan, P. W. (2003). Sex differences on the Progressive Matrices: some data from Hong Kong. *Journal of Biosocial Science, 35,* 145-154.

Lynn, R., Chen, H-Y. & Chen, Y-H. (2011). Intelligence in Taiwan: Progressive Matrices means and sex differences in means and variances for 6-17 year olds. *Journal of Biosocial Science, 43*, 1-6.

Lynn, R., Cheng, H., & Wang, M. (2016). Differences in the intelligence of children across thirty-one provinces and municipalities of China and their economic and social correlates. *Intelligence, 58,* 10-13.

Lynn, R. & Dziobon, J. (1980). On the intelligence of the Japanese and other Mongoloid peoples. *Personality and Individual Differences, 1*, 95-96.

Lynn, R., El-Ghmary Abdalla, S. & Al-Shahomee, A. A. (2008b). Norms for the Verbal WISC-R for Libya. *Mankind Quarterly, 49*, 292-300.

Lynn, R., Fergusson, D. M. & Horwood, L. J. (2005). Sex differences on the WISC-R in New Zealand. *Personality and Individual Differences*, *39*, 103-114.

Lynn, R. & Hampson, S. L. (1986). The rise of national intelligence: evidence from Britain, Japan, and the USA. *Personality and Individual Differences, 7*, 23-32.

Lynn, R. & Hampson, S. (1986a). The structure of Japanese abilities: an analysis in terms of the hierarchical model of intelligence. *Current Psychological Research and Reviews, 4*, 309-322.

Lynn, R., & Hampson, S. (1987). Further evidence on the cognitive abilities of the Japanese: data from the WPPSI. *International Journal of Behavioral Development, 10,* 23-36.

Lynn, R., Hampson, S. & Bingham, R. (1987a). Japanese, British and American adolescents compared for Spearman's g and for the verbal, numerical and visuo-spatial abilities. *Psychologia, 30*, 137-144.

Lynn, R., Hampson, S. & Lee, M. (1988). The intelligence of Chinese children in Hong Kong. *School Psychology International, 9*, 29-32.

Lynn, R., Hampson, S. L. & Iwawaki, S. (1987b). Abstract reasoning and spatial abilities among American, British and Japanese adolescents. *Mankind Quarterly, 27*, 397-434.

Lynn, R., Hampson, S. & Magee, M. (1984). Home background, intelligence, personality and education as predictors of unemployment in young people. *Personality and Individual Differences, 5*, 549-558.

Lynn, R. & Harland, E.P. (1998). A positive effect of iron supplementation on the IQs of iron deficient children. *Personality and Individual Differences*, *24*, 883-887.

Lynn, R. & Harvey, J. (2008). The decline of the world's IQ. *Intelligence, 36*, 112-120.

Lynn, R., Harvey, J. & Nyborg, H. (2009). Average intelligence predicts atheism rates across 137 nations. *Intelligence, 37*, 1, 11-15.

Lynn, R. & Holmshaw, M. (1990). Black-white differences in reaction times and intelligence. *Social Behavior and Personality, 18*, 299-308.

Lynn, R., Hur, Y.-M., Hwang, S.-T., Park, K. B., & Kim, J-H. (2016). A strong Flynn effect in South Korea during the second half of the twentieth century. *Mankind Quarterly, 56,* 562-571.

Lynn, R., & Ja Song, M. (1994). General intelligence, visuospatial and verbal abilities of Korean children. *Personality and Individual Differences, 16,* 363-364.

Lynn, R., & Kazlauskaite, V. (2002). A Study of the IQ in Lithuania. *Perceptual and Motor Skills, 96,* 611-612.

Lynn, R., & Meisenberg, G. (2010). National IQs calculated and validated for 108 nations. Intelligence, *38*, 353-360.

Lynn, R. & Meisenberg, G. (2010). The average IQ of sub-Saharan Africans: Comments on Wicherts, Dolan & van der Maas. *Intelligence, 38*, 21-29.

Lynn, R., & Mikk, J. (2007). National differences in intelligence and educational attainment. *Intelligence, 35,* 115-121.

Lynn, R., Meisenberg, G., Mikk, J. & Williams, A. (2007). National differences in intelligence and educational attainment. *Journal of Biosocial Science, 39*, 861-874.

Lynn, R., & Mikk, J. (2009). National IQs predict attainment in math, science and reading across 56 nations. *Intelligence, 37,* 305-310.

Lynn, R. & Owen, K. (1994). Spearman's hypothesis and test score differences between whites, Indians and blacks in South Africa. *Journal of General Psychology, 121*, 27-36.

Lynn, R., Pagliari, C. & Chan, J. (1988). Intelligence in Hong Kong measured for Spearman's g and the visuospatial and verbal primaries. *Intelligence, 12*, 423-433.

Lynn, R., Plaspalanova, E., Stetinsky, D. & Tzenova. B. (1998). Intelligence in Bulgaria. *Psychological Reports, 82,* 912-914.

Lynn, R., Pullmann, H. & Allik, J. (2003). A new estimate of the IQ in Estonia. *Psychological Reports, 97*, 662-664.

Lynn, R. & Van Court, M. (2004). New evidence for dysgenic fertility for intelligence in the United States. *Intelligence, 32*, 193-201.

Lynn, R., & Vanhanen, T. (2002). *IQ and the wealth of nations.* Westport: Praeger.

Lynn, R. & Vanhanen, T. (2006). *IQ and Global Inequality.* Augusta, GA: Washington Summit Publishers.

Lynn, R., & Vanhanen, T. (2012). *Intelligence: A Unifying Construct for the Social Sciences.* London: Ulster Institute for Social Research.

Lynn, R., & Wilson, R. G. (1990). Reaction times, movement times and intelligence among Irish nine year olds. *Irish Journal of Psychology, 11,* 329-341.

Lynn, R. & Zietsman, G. (2013). The relation between intelligence and unemployment at the individual and national level. *Journal of Social, Political & Economic Studies, 38,* 141-147.

MacArthur, R. S., Irvine, S. H. & Brimble, A. R. (1964). *The Northern Rhodesia Mental Ability Survey.* Lusaka: Rhodesian Livingstone Institute.

Mackintosh, N. J. (1998). *IQ and Human Intelligence.* Oxford: Oxford University Press.

Mackintosh, N.J. (2011). *IQ and Human Intelligence. Second Edition*. Oxford, UK: Oxford University Press.

Macnamara, J. (1964). Zero error and practice effects in Moray House English quotients. *British Journal of Educational Psychology, 34,* 315-320.

Maddison, A. (2007). *Contours of the World Economy, 1-2030 AD: Essays in Macro-Economic History.* Oxford: Oxford University Press.

Maddison Project (2013). *New Maddison project database [horizontal-file_02-2010.xls].* Retrieved from http://www.ggdc.net/maddison/maddison-project/home.htm.

Maguire, M., Morgan, R. & Reiner, R. (1994). *Oxford Handbook of Criminology.* Oxford: Clarendon Press.

Majumdar, P. K. & Nundi, P. C. (1971). Raven's Standard Progressive Matrices in two different populations. *Journal of the Indian Academy of Applied Psychology, 8*, 30-33.

Malakul, S. (1957). Standardization of Progressive Matrices for Thai children. *Journal of the Psychiatric Association of Thailand, 2,* 7-25.

Malda, M., van der Vijver, F. J. R., & Temaine, Q. M. (2010). Rugby versus soccer in South Africa: Content familiarity contributes to cross-cultural differences in test scores. *Intelligence, 38,* 582-595.

Maller, J. B. (1933a). Economic and social correlatives of school progress in New York City. *Teachers College Record, 34*, 655-670.

Maller, J. B. (1933b). Vital indices and their relation to psychological and social factors. *Human Biology, 5,* 94-121.

Malloy-Diniz, L. F., Cardoso-Martins, C., Nassif, E. P., Levy, A. M., Leite, W. B., & Fuentes, D. (2008). Planning abilities of children aged 4 years and 9 months to 8 ½ years: Effects of age, fluid intelligence and school type on performance in the Tower of London test. *Dementia & Neuropsychologia, 2,* 26-30.

Malloy, J. (2004). *HVGIQ: Puerto Rico.* Retrieved from: http://humanvarieties.org/2014/03/13/hvgiq-puerto-rico-2/

Maqsud, M. (1997). Effects of metacognitive skills and nonverbal ability on academic achievement of high school pupils. *Educational Psychology, 17,* 387-397.

Maqsud, M. (1980). Personality and academic attainment of primary school children. *Psychological Reports, 46,* 1271-1275.

Mann, V. A., Sasanuma, S., Sakuma, N. & Masaki, S. (1990). Sex differences in cognitive abilities: a cross cultural perspective. *Neuropsychologia, 28,* 1063-1077.

Marincovich, R. I., Forno, H., Durán, M., Hazbún, J., Castro, C., & Ivanovic, D. (2000). Estudio de la capacidad intelectual (Test de Matrices Progresivas de Raven) en escolares chilenos de 5 a 18 años I. Antecedentes Generales, Normas y Recomendaciones. *Revista de Psicología General y Aplicada, 53*, 5-30.

Marmorale, A.M., & Brown, F. (1975). Comparison of Bender-Gestalt and WISC correlations for Puerto Rican, white and Negro children. *Journal of Clinical Psychology, 31*, 465-468.

Marmorale, A.M., & Brown, F. (1981). Constancy of WISC IQs of Puerto Rican, White and Black children. In L. L. Adler (Ed.), *Cross-cultural research at issue* (pp. 137-143). New York, USA: Academic Press.

Marshall, Monty G. (2010). Polity IV Project: Political Regime Characteristics and Transition, 1800-2009. Available at: http://www.systemicpeace.org/polity/polity4.htm.

Marshall, M. G. and Jaggers, K. (2010). Polity IV Country Reports 2008. Available at: http://www.systemicpeace.org/politypolity06.htm.

Martin, M. O., Mullis, I. V. S., Beaton, A. E., Gonzalez, E. J., Smith, T. A., & Kelly, D. A. (1997). *Science Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Martin, M. O., Mullis, I. V. S., Gonzalez, E. J., Gregory, K. D., Smith, T. A., Chrostowski, S. J., Garden, R. A., & O'Connor, K. M. (2000). *TIMSS 1999 International Science Report - Findings from IEA's Repeat of the Third International Mathematics and Science Study at the Eighth Grade.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Martin, M. O., Mullis, I. V. S., Gonzalez, E. J., & Chrostowski, S. J. (2004). *Findings from IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Martin, M. O., Mullis, I. V. S., & Foy, P. (2008). *TIMSS 2007 International Science Report: Findings from IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Martin, M. O., Mullis, I. V. S., Foy, P., & Stanco, G. M. (2012). *TIMSS 2011 International Results in Science.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Martinelli, V., & Lynn, R. (2005). Sex differences on verbal and non-verbal abilities among primary school children in Malta. *Journal of Maltese Educational Research, 3,* 1-7.

Martinelli, V., & Schembri, J. (2014). Dyslexia, spatial awareness and creativity in adolescent boys. *The Psychology of Education Review, 38,* 39-45.

Martorell, R. (1998). Nutrition and the worldwide rise in IQ scores. In U.Neisser (Ed.) *The Rising Curve*. Washington, DC: American Psychological Association.

Martorell, R., Behrman, J. R., Grajeda, R., & Hoddinott, J. (2005). The human capital 2002–04 study in Guatemala: A follow-up to the INCAP longitudinal study 1969–77. *Food & Nutrition Bulletin, 26,* 1-120.

Mathews, F., Johnson, P. J. & Neil, A. (2008). You are what your mother eats: evidence for maternal preconception diet influencing foetal sex in humans. *Proceedings of Biological Science, 275,* 1661-1668.

Matias Carrelo, L.E., & Zaidspiner, V. (1990). Comparación de los cocientes intelectuales obtenidos en el WISC y en el WISC-R por dos grupos de niños puertorriqueños. *Revista Puertorriqueña de Psicología,* 63-72.

McDaniel, M.A. (2005). Big brained people are smarter: a meta-analysis of the relationship between in vivo brain volume and intelligence. *Intelligence, 3*3, 337-346.

McDaniel, M.A. & Whetzel, D.I. (2006). Prediction of national wealth. *Intelligence, 34*, 449-458.

McIntyre, G. A. (1938). *The standardisation of Intelligence Tests in Australia.* Melbourne: University Press.

McKay, A. (2003). Inequality in Middle Income Countries: Key Conceptual Issues. Overseas Development Institute Occasional Paper XXX.

McKay, H., Sinisterra, L., McKay, A., Gomez, H., & Lloreda, P. (1978). Improving cognitive ability of chronically deprived children. *Science 200, 270,* 270-278.

Medrich, E. A. & Griffith, J. E. (1992). *International mathematics and science assessment: What have we learned?* National Center for Education Statistics Research and Development Report. Washington DC: U.S. Department of Education.

Mehryar, A. H., Shapurian, R. & Bassiri, T. (1972). A preliminary report on a Persian adaptation of Heim's AH4 test. *Journal of Psychology, 80*, 167-180.

Mehryar, A. H., Tashakkori, A., Yousefi, F. & Khajavi, F. (1987). The application of the Goodenough-Harris Draw-a-Man test to a group of Iranian children in the city of Shiraz. *British Journal of Educational Psychology, 57*, 401-406.

Meisenberg, G. (2004). Talent, character and the dimensions of national culture. *Mankind Quarterly, 45,* 123-169.

Meisenberg, G. (2006). Determinants of mental ability on a Caribbean island, and the mystery of the Flynn effect. *Mankind Quarterly, 46*, 273-312.

Meisenberg, G. (2007). Does multiculturalism promote income inequality? *Mankind Quarterly, 47,* 3-39.

Meisenberg, G. (2009). Wealth, intelligence, politics and global fertility differentials. *Journal of Biosocial Science, 41,* 519-536.

Meisenberg, G. (2010). The reproduction of intelligence. *Intelligence, 38,* 220-230.

Meisenberg, G. (2011). Secularization and desecularization in our time. *Journal of Social, Political & Economic Studies, 36*, 316-356.

Meisenberg, G. (2012a). National IQ and economic outcomes. *Personality and Individual Differences, 53,* 103-107.

Meisenberg, G. (2012b). Demography and modernization as the major determinants of religious belief. *Mankind Quarterly, 52,* 388-414.

Meisenberg, G. (2014). Cognitive human capital and economic growth in the 21st century. In T. Abrahams (Ed) *Economic Growth in the 21stCentury*. Hauppauge NY: Nova Publishers.

Meisenberg, G. (2018). Editorial: Cognitive human capital: Back to basics. *Mankind Quarterly*, *59*, 4-7.

Meisenberg, G. & Kaul, A. (2010). Effects of sex, race, ethnicity and marital status on the relationship between intelligence and fertility. *Mankind Quarterly, 50,* 151-187.

Meisenberg, G., Lawless, E., Lambert, E., & Newton, A. (2005). The Flynn effect in the Caribbean: generational change in test performance in Dominica. *Mankind Quarterly, 46,* 29-70.

Meisenberg, G. & Lynn, R. (2011). Intelligence: A measure of human capital in nations. *Journal of Social, Political & Economic Studies, 36*, 421-454.

Meisenberg, G. & Lynn, R. (2012). Cognitive human capital and economic growth: defining the causal paths. *Journal of Social, Political and Economic Studies, 37,* 141-179.

Meisenberg, G. & Lynn, R. (2013). Cognitive human capital and economic growth: defining the causal paths. *Journal of Social, Political & Economic Studies, 38,* 16-54.

Meisenberg, G. & Williams, A. (2008). Are acquiescent and extreme response styles related to low intelligence and education? *Personality & Individual Differences, 44*, 1539-1550.

Meisenberg, G. & Woodley, M.A. (2013). Global behavioural variation: A test of differential-K. *Personality and Individual Differences, 55, 273-278.*

Mellars, P. & Stringer, C. (1989). *The Human Revolution*. Edinburgh: Edinburgh University Press.

Merrill, M. A. (1938). The significance of IQ's on the revised Stanford-Binet scales. *Journal of Educational Psychology, 29,* 641–651.

Miller, E. M. (2002). Differential intelligence and national income. *Journal of Social, Political and Economic Studies, 27*, 513-522.

Miller, E. M. (2018). Geographical centrality as an explanation for regional differences in intelligence. *Mankind Quarterly, 58*, 419-465

Millones, D. M, Flores-Mendoza, C., & Millones Rivalles, R. (2015). Intelligence in Peru: Students' results in Raven and its relationship to SES. *Intelligence, 51,* 71-78.

Minde, K. & Kantor, S. (1976). Instructing Ugandan primary school children in the execution of an "intelligence" test: A controlled evaluation. *Journal of Cross Cultural Psychology, 7,* 209-222.

Minkov, M. & Bond, M. (2015). Genetic polymorphisms predict national differences in life history strategy and time orientation. *Personality and Individual Differences, 76*, 204-215.

Miron, M. (1977). A validation of a transferred group intelligence test. *International Journal of Psychology, 12*, 193-205.

Misawa, G., Motegi, M., Fujita, K. & Hattori, K. (1984). A comparative study of intellectual abilities of Japanese and American children on the Columbia Mental Maturity Scale. *Personality and Individual Differences, 5,* 73-181.

Modiano, N. (1962). *Mental testing among Tzeltal and Tzotzil children.* Proceedings of the 35th International Congress of Americanists. Mexico City.

Mogues, T. & Carter, M. R. (2005). Social capital and the reproduction of economic inequality in polarized societies. *Journal of Economic Inequality, 3,* 193–219.

Mohantu, A.K. & Babu, B. (1983). Bilingualism and metalinguistic ability among Kond tribals in Orissa, India. *Journal of Social Psychology, 121*, 15-22.

Montesquieu, C. (1748, 1961). *L'Esprit des Lois.* Paris: Editions Garnier Fréres.

Montiel-Naval, C., Montiel-Barbero1, I., & Peña1, J. A. (2005). Clima familiar en el trastorno por deficit de atentcion-hiperactividad. *Psicología Conductual, 13,* 297-310.

Montiel-Naval, C., Peña, J.A., & Montiel-Barbero, I. (2003). Datos epidemiológicos del trastorno por déficit de atención con hiperactividad en una muestra de niños marabinos. *Review of Neurology, 37,* 815-819.

Montiel-Naval, C., Peña, J. A., Montiel-Barbero, I., & Polanczyk, G. (2008). Prevalence rates of attention deficit/hyperactivity disorder in a school sample of Venezuelan children. *Child Psychiatry & Human Development, 39,* 311-322.

Morse, S. (2008). The geography of tyranny and despair: development indicators and the hypothesis of genetic inevitability of national inequality. *The Geographical Journal, 174,* 195-206.

Moyles, E. W. & Wolins, M. (1973). Group care and intellectual development. *Developmental Psychology, 4,* 370-380.

Mroz, T. A. & Savage, T. H. (2006). The long-term effects of youth unemployment. *Journal of Human Resources, XLI*, 259-293.

Mullis, I. V. S., Martin, M. O., & Foy, P. (2008). *TIMSS 2007 International Mathematics Report: Findings from IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Mullis, I. V. S., Martin, M. O., Beaton, A. E., Gonzalez, E. J., Kelly, D. A., & Smith, T. A. (1997). *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Mullis, I. V. S., Martin, M. O., Gonzalez, E. J., Gregory, K. D., Garden, R. A., O'Connor, K. M., Chrostowski, S. J., & Smith, T. A. (2000). *TIMSS 1999 International Mathematics Report - Findings from IEA's Repeat of the Third International Mathematics and Science Study at the Eighth Grade.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Mullis, I. V. S., Martin, M. O., Gonzalez, E. J., & Chrostowski, S. J. (2004). *Findings from IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Mullis, I. V. S., Martin, M. O., Foy, P., & Arora, A. (2012a). *TIMSS 2011 International Results in Mathematics.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Mullis, I. V. S., Martin, M. O., Gonzalez, E. J., & Kennedy, A. M. (2003). *PIRLS 2001 International Report: IEA's Study of Reading Literacy Achievement in Primary Schools.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Mullis, I. V. S., Martin, M. O., Kennedy, A. M., & Foy, P. (2007). *IEA's Progress in International Reading Literacy Study in Primary School in 40 Countries.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Mullis, I. V. S., Martin, M. O., Foy, P., & Drucker, K. T. (2012b). *PIRLS 2011 International Results in Reading.* Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M (2016a). *TIMSS 2015 - International Results in Mathematics.* Fourth Grade Mathematics. Boston: IEA.

Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M (2016b). *TIMSS 2015 - International Results in Science.* Fourth Grade Science. Boston: IEA.

Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M (2016c). *TIMSS 2015 - International Results in Mathematics. Eight Grade Mathematics.* Boston: IEA.

Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M (2016d). *TIMSS 2015 - International Results in Mathematics. Eight Grade Science.* Boston: IEA.

Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2017). *PIRLS 2016 International Results in Reading.* Retrieved from: http://timssandpirls.bc.edu/pirls2016/international-results/

Munck, G. L. (2009). *Measuring Democracy: A Bridge between Scholarship and Politics*. Baltimore: The Johns Hopkins University Press.

Murdoch, B. T., Fleming, J. H., Skuy, M., Pinter, A., Schmidt, L. & Schutte, E. M. (1994). *Neuropsychological performance of a group of selected asymptomatic black South African children*. Pretoria, South Africa: Human Sciences Research Council.

Murmane, R., Willett, J. B., Braatz, M. J. & Duhalteborde, Y. (2001). Do different dimensions of male high school students' skills predict labour market success a decade later? Evidence from the NLSY. *Education Economic Review, 20*, 311-320.

Murray, C. (1998*). Income inequality and IQ.* Washington, D.C.: AEI Press.

Murray, C. (2003). *Human Accomplishment*. New York: Harper-Collins.

Murray, L. S. (1983). Nutritional status and development of St. Lucian pre-school children. Sc. thesis, UWI, Mona.

Myers, G. J., Davidson, Ph. W., Cox, Ch., Shamlaye, C. F., Palumbo, D., Cernichiari, E., Sloane-Reeves, J., Wilding, G. W., Kost, J., Huang, L.-Sh., & Clarkson, Th. W. (2003). Prenatal methylmercury exposure from ocean fish consumption in the Seychelles child development study. *The Lancet, 361,* 1686-1692.

Mylotte, A. (1993). *The Intelligence of Twins.* University College, Galway: Ph.D. thesis.

Naglieri, J. A. (1997). *Naglieri Nonverbal Ability Test.* San Antonio, TX: Harcourt Brace.

Naglieri, J. A. (2003). *Naglieri Nonverbal Ability Test—Individual administration manual.* San Antonio, TX: Harcourt Assessment.

Naglieri, J. A. & Bardos, A. N. (1988). Canadian children's performance on the Matrix Analogies test. *School Psychology International, 9*, 309-313.

Nakano, S., & Watkins, M. W. (2013). Factor structure of the Wechsler Intelligence Scales for Children - Fourth Edition among referred Native American students. *Psychology in the Schools, 50,* 957-968.

Nankabirwa, J., Wandera, B., Kiwanuka, N., Staedke, S. G., Kamya, M. R., & Brooker, S. J. (2013). Asymptomatic plasmodium infection and cognition among primary school children in a high malaria transmission setting in Uganda. *American Journal of Tropical Medicine & Hygiene, 88,* 1102-1108.

NASA's Earth Observing System Data and Information System (EOSDIS) (2015). *Socioeconomic Data and Applications Center (sedac).* CIESIN at Columbia University. Retrieved from: http://sedac.ciesin.columbia.edu/maps/gallery/search?contains

Natalicio, L. (1968). Aptidao general, status social et sexo: um estudio de adolescentes Brasilieros e norte-Americanos. *Revista Interamericana de Psicologia, 2*, 25-34.

National Bureau of Statistics of China (2014). *Regional total residents of 2014.* Retrieved from: http://data.stats.gov.cn/english/easyquery.htm?cn=E0103

NCD Risk Factor Collaboration (2017a). *ADULT BODY-MASS INDEX Evolution of BMI over time.* Retrieved from: http://www.ncdrisc.org/data-downloads-adiposity.html

NCD Risk Factor Collaboration (2017b). *CHILD & ADOLESCENT BODY-MASS INDEX Evolution of BMI over time.* Retrieved from: http://www.ncdrisc.org/data-downloads-adiposity-ado.html

NCD Risk Factor Collaboration (2017c). *HEIGHT - Evolution of adult height over time.* Retrieved from: http://www.ncdrisc.org/data-downloads-height.html

Neal, D. A. & Johnson, W. R. (1996). The role of pre-market factors in balck-white wage differences. *Journal of Political Economy, 104,* 98-123.

Nechyba, T. (2004). Review of IQ and the Wealth of Nations. *Journal of Economic Literature, 42,* 220-221.

Nell, V. (2000). *Cross-Cultural Neuropsychological Assessment.* Mahwah, NJ: Lawrence Erlbaum.

Neubauer, A. C., Bauer, Ch., & Huller, G. (1992). Intelligence, attention, motivation and speed-accuracy trade-off in the Hick Paradigm. *Personality and Individual Differences, 13,* 1325-1332.

Neumann, C. G., Murphy, S. P., Gewa, C., Grillenberger, M., & Bwibo, N. O. (2007). Meat supplementation improves growth, cognitive, and behavioral outcomes in Kenyan Children. *Journal of Nutrition, 137,* 1119-1123.

New Zealand Statistical Office (2010). *National Ethnic Population Projections*. Wellington: New Zealand Statistical Office.

Nga, T.T., Winichagoon, P., Dijkhuizen, M.A., Khan, N.C., Wasantwisut, E., & Wieringa, F.T. (2011). Decreased parasite load and improved cognitive outcomes caused by deworming and consumption of multi-micronutrient fortified biscuits in rural Vietnamese schoolchildren. *American Journal of Tropical Medicine & Hygiene, 85,* 333-340.

Nichols, P. L., & Anderson, V E. (1973). Intellectual performance, race, and socioeconomic status. *Social Biology, 20,* 367-374.

Nikolaev, B. & McGee, J.J. (2016). Relative verbal intelligence and happiness. *Intelligence, 59*, 1-7.

Nikolaev, B. & Salahodjaev, R. (2016a). The role of intelligence in the distribution of national happiness. *Intelligence, 56*, 38-45.

Nissen, H. W., Machover, S. & Kinder, E. F. (1935). A study of performance tests given to a group of native African Negro children. *British Journal of Psychology, 25,* 308-355.

Nkaya, H. N., Huteau, M., & Bonnet, J.-P. (1994). Retest effect on cognitive performance on the Raven Matrices in France and in the Congo. *Perceptual and Motor Skills, 78,* 503-510.

Nokes, C., Grantham-Mcgregor, S. M., Sawyer, A. W., Cooper, E. S., & Bundy, D. A. P. (1992a). Parasitic helminth infection and cognitive function in school children. *Proceedings of the Royal Society, Biological Sciences, 247,* 77-81.

Nokes, C., Grantham-McGregor, S. M., Sawyer, A. W., Cooper, E. S., Robinson, B. A., & Bundy, D. A. (1992b). Moderate to heavy infections of Trichuris trichiura affect cognitive function in Jamaican school children. *Parasitology, 104,* 539-547.

Norris, P. & Inglehart, R. (2004). *Sacred and Secular: Religion and Politics Worldwide.* New York, NY: Cambridge University Press.

North, D. C. (2005). *Understanding the Process of Economic Change*. Princeton: Princeton University Press.

Notcutt, B. (1950). The measurement of Zulu intelligence. *Journal of Social Research, 1,* 195-206.

Nwuga, V. C. B. (1977). Effect of severe kwashiorkor on intellectual development among Nigerian children. *American Journal of Clinical Nutrition, 30,* 1423-1430.

Nyborg, H. (2012). The decay of Western civilisation: Double relaxed Darwinian selection. *Personality and Individual Differences, 53*, 118–125.

Nyborg, H. & Jensen, A. R. (2001). Occupation and income related to psychometric g. *Intelligence, 29*, 45-55.

Obydenkova, A. V., Nazarov, Z. & Salahodjaev, R. (2016). The process of deforestation in weak democracies and the role of intelligence. *Environmental Research, 148*, 484–490.

Obydenkova, A. V. & Salahodjaev, R. (2016). Intelligence, democracy, and international environmental commitment. *Environmental Research, 147*, 82–88.

Obydenkova, A.V. & Salahdjaev, R. (2017a). Government size and life satisfaction. *Intelligence, 61,* 85-91.

Obydenkova, A.V. & Salahodjaev, R. (2017b). Climate change policies: The role of democracy and social cognitive capital. *Environmental Research, 157*, 182-189.

O'Connor, J., Ruddle, H. & O'Ghallager, M. (1988). *Cherishes equally? Educational and behavioural adjustment of children.* Limerick: Limerick Social Research Centre, National Institute for Higher Education.

Odgerel, D., & Maekawa, H. (2003). A study on assessment of mental abilities of special children in Mongolia with Raven's Coloured Progressive Matrices. *Bulletin of Disablity Sciences, 27,* 1-27.

Odilova, S. (2017). Cognitive abilities, democracy and software piracy: A note. *Mankind Quarterly, 58*, 355-363.

Odilova, S. (2018). Intelligence and export sophistication: a cross country test. *Mankind Quarterly, 58*, 520-529.

Odilova, S. (2019). Cognitive abilities and sustainability: a cross country index. (Unpublished).

Odilova, S. & Gu, X. (2016). Patent protection, intelligence and economic growth: a cross country empirical investigation. Journal of Business, *Economics and Management, 6,* 708-803.

Odilova, S & Lynn, R. (2019). IQ and the wealth of nations: A quantification of reciprocal causation. *Mankind Quarterly*. (in press).

Odiliva, S. & Lynn, R. (2019). Cognitive abilities and incidence of corruption: a note. *Mankind Quarterly*. (in press).

Odilova, S. & Xiaomin, G. (2017). Intelligence and intellectual property rights protection: The global evidence. *Mankind Quarterly, 57*, 669-679.

OECD/UNESCO-UIS (2003). *PISA 2000 results.* Retrieved from: http://www.oecd.org/education/school/programmeforinternationalstudentassessmentpisa/33690591.pdf

OECD (2004). *Learning for Tomorrow's World First Results from PISA 2003.* Paris: OECD-Publishing.

OECD (2007). *PISA 2006 results.* Retrieved from: http://www.oecd.org/education/school/programmeforinternationalstudentassessmentpisa/pisa2006results.htm

OECD (2010). *PISA 2009 Results: What Students Know and Can Do – Student Performance in Reading, Mathematics and Science (Volume I).* Paris: OECD-Publishing. doi:10.1787/9789264091450-en

OECD (2015). *Note on PISA 2012 data for the United Kingdom.* Retrieved from: https://www.oecd.org/pisa/keyfindings/PISA%202012%20UK%20revised%20scores_for%20web_May15.xlsx

OECD (2016). *PISA 2015 Results (Volume I): Excellence and Equity in Education.* Paris: OECD-Publishing.

OECD/UNESCO-UIS (2003). *PISA 2000 results.* Retrieved from: http://www.oecd.org/education/school/programmeforinternationalstudentassessmentpisa/33690591.pdf

Oesterdiekoff, G.W. & Rinderman, H. (2007). The spread of AIDS in developing countries: A psychocultural approach. *Journal of Social, Political and Economic Studies, 32*, 201-222.

Okunrotifa, P. O. (1976). A comparison of the entry behaviours of Nigerian rural and urban children in geography. *West African Journal of Educational & Vocational Measurement, 3,* 1-6.

Omanbayev, B., Salahodjaev, R. & Lynn, R. (2018). Are greenhouse gas emissions and cognitive skills related? Cross-country evidence. *Environmental Research, 160*, 322–330.

Omanbayev, B., Tosheva, Sh., & Lynn, R. (2018). A New Study of Intelligence in Sri Lanka. *Mankind Quarterly, 58,* 501-504.

Ombredane, A., Robaye, F. & Plumail, H. (1956). Résultats d'une application répétée du matrix- couleur à une population de Noirs Congolais. *Bulletin du C.E.R.P., 5,* 129-147.

Ombredane, A., Robaye, F. & Robaye, E. (1957). Analyse des résultats d'une application expérimentale du matrix 38 à 485 noirs Baluba. *Bulletin Centre d'Etudes et Recherches Psychotechniques, 7,* 235-255.

Opper, S. (1977). Concept development in Thai urban and rural children. In P. R. Dasen (Ed.), *Piagetian Psychology*. New York: Gardner Press.

Osborne, R. T. (1975). Fertility, IQ and school achievement. *Psychological Reports, 37,* 1067-1073.

Orsini, B. (1974). *Intelligence testing and the culturally different: a comparison of Puerto Rican and black children.* Unpublished paper, City College of New York, USA.

Ortar, G. (1952). Standardization of the Wechsler Test for Intelligence for children in Israel. *Megamot, 4,* 87-100.

Ortega, S. C. (2011). *Factores de riesgo relacionados con la capacidad intelectual en niños escolarizados de 6 a 8 años pertenecientes a la comuna nororiental y noroccidental de la ciudad de Medellín*. Ph.D thesis, University of San Buenventura Medellin.

Ortiz Colón, R., Rosselló, J., Muñoz Vazquez, M., Maldonado Santiago, N., Suárez, N., & Donato Jímenez, L.J. (1993). Relación entre la exposición a sustancias tóxicas y el funcionamiento intelectual y afectivo de obreras textiles puertorriqueñas. *Revista Puertorriqueña de Psicología, 9,* 179-219.

Orylska, A., Brzezicka, A., Racicka-Pawlukiewicz, E., Albinski, R., & Sedek, G. (2016). Parent-teacher concordance in rating preschooler difficulties in behavioural and cognitive functioning and their dyadic predicting of fluid intelligence. *Polish Psychological Bulletin, 47,* 81-91.

Osman, H. A., Alahmadi, M. M. A., Bakhiet, S. F. A., & Lynn, R. (2016). The relation between intelligence and family size, position and income in adolescent girls in Saudi *Arabia. Psychological Reports, 119,* 783-786.

Osman, H. A., Bakhiet, S. F. A., Alnaier, N. A. G. & Lynn, R. (2017). A Study of the Intelligence of South Sudanese Refugee Children. *Mankind Quarterly, 57,* 585-589.

Osman, H. A., Bakhiet, S. F. A., Abduljabbar, A. S., Alnaier, N. A. G., & Lynn, R. (2018). A study of intelligence in the new nation of South Sudan. *Mankind Quarterly, in press.*

Otis, A. S., & Lennon (1979). *Otis-Lennon School Ability Test: Elementary Form R.* New York: Psychological Corp.

O'Toole, B. I. & Stankov, L. (1992). Ultimate validity of psychological tests. *Personality and Individual Differences, 13,* 699-716.

Oven, K. (1992). The suitability of Raven's Progressive Matrices for various groups in South Africa. *Personality and Individual Differences, 13*, 149-159.

Owen, K. (1992). The suitability of Raven's Progressive Matrices for various groups in South Africa. *Personality and Individual Differences, 13,* 149-159.

Pace, F. and Sprini, G. (1998). A proposito della "fairness" del Culture Fair di Cattell. *Bollettino di Psicologia Applicato, 227,* 77-85.

Pacheco, G., Hedges, M., Schilling, C. & Morton, S. (2013). Pre- and postnatal drivers of childhood intelligence: evidence from Singapore. *Journal of Biosocial Science, 45,* 41-56.

Palairet, M. R. (2004). Review of IQ and the Wealth of Nations. *Heredity, 92*, 361-262.

Panek, P.E., & Stoner, S.B. (1980). Age differences on Raven's Coloured Progressive Matrices. *Perceptual & Motor Skills, 50,* 977-978.

Parazzini, F., La Vecchia, C., Levi, F. & Franceschi, S. (1998). Trends in male:female ratio among newborn infants in 29 countries from five continents. *Human Reproduction, 13*, 1394-1396.

Paudel, R. C. (2014). Economic growth in developing vountries: Is landlockedness destiny? *Economic Papers: A journal of applied economics and policy, 33,* 339-361.

Pauls, K. (1994). *A correlational study among the Weschsler Adult Intelligence Scale - Revised, the Graduate Record Examination, and Grade Point Average.* A thesis presented to the Division of Psychology and Special Education, Emporia State University, USA.

Paz, C. A., Valenzuela, V. D., Rosales, J. H., & Goic, C. E. (2012). Estudio sobre la pertinencia del uso de las normas disponibles del Raven en adultos mayors Chilenos. *Psico-USF, Bragança Paulista, 17,* 387-395.

Peixoto, B., & Kalei, I. (2013). Neurocognitive sequelae of cerebral malaria in adults: a pilot study in Benguela Central Hospital, Angola. *Asian Pacific Journal of Tropical Biomedicine, 3,* 532-535.

Persaud, G. (1972). *The performance of two samples of primary school children on two culture free and two culture bound tests of intelligence.* University of Stockholm, Sweden: Institute of Applied Psychology.

Persaud, G. (1982). The relation of extraversion and neuroticism to non-verbal intelligence. *Caribbean Journal of Education, 9,* 32-43.

Persaud, G. (1987). Sex and age differences of Raven's Matrices. *Perceptual and Motor Skills, 65,* 45-46.

Petermann, F. (2016). *WAIS-IV - Wechsler Adult Intelligence Scale - Fourth Edition - Deutschsprachige Adaptation nach David Wechsler, Manual 1 - Grundlagen, Testauswertung und Interpretation, Übersetzung und Adaptation der WAIS-IV von David Wechsler.* Frankfurt am Main: Pearson Assessment.

Petermann, F., & Petermann, U. (2014). *Wechsler Intelligence Scale for Children - Fourth Edition, Manual 1 - Grundlagen, Testauswertung und Interpretation, Übersetzung und Adaptation der WISC-IV von David Wechsler.* Frankfurt am Main: Pearson Assessment.

Petrill, S. A. & Wilkerson, B. (2000). Intelligence and achievement: A behavioural genetics perspective. *Educational Psychology Review, 12,* 185-199.

Petrill, St. A., Lipton, P. A., Hewitt, J. K., Plomin, R., Cherny, St. S., Corley, R., & DeFries, J. C. (2004). Genetic and Environmental Contributions to General Cognitive Ability Through the First 16 Years of Life. *Developmental Psychology, 40,* 805-812.

Petrogiannis, K. S., Bardos, A. N. & Randou, E. (1999). Performance of Greek and American students on the Matrix Analogies Test. *School Psychology International, 20,* 233-238.

Pew Research Center (2016). A Wider Ideological Gap Between More and Less Educated Adults.

Philip's. (1996). *World Atlas*. London: Chancellor.

Phattharayuttawat, S., Sukhatunga, K., Chantra, J., Chaiyasit, W., Bunnagulrote, K., & Imaroonrak, S. (2000). The normative scores of the Standard Progressive Matrices for the Thai population. *Journal of the Psychiatric Association of Thailand, 45,* 45-57.

Phatthrayuttawat, S., Sukhatunga, K., Chantra, J., Chaiyasit, W., Bunnagulrote, K., & Imaroonrak, S. (2003). The normative scores of intelligence by Colored Progressive Matrices (CPM) in Thai population. *Journal of Thai Clinical Psychology, 34,* 58-70.

Pieke, F. N. (1988). The social position of the Dutch Chinese: an outline. *China Information, 3*, 12-23.

Pierre-Jacques, C. (1982). *Enfants des migrants haïtiens en Amérique du Nord.* Centre de Recherches Caraïbes, Université de Montréal.

Pietschnig, J., Penke, L., Wicherts, J.M., Zeiler, M. & Voracek, M. (2015). Meta-analysis of associations between human brain volume and intelligence differences: How strong are they and what do they mean? *Neuroscience and Biobehavioral Reviews, 57,* 411–432.

Pietschnig, J., & Voracek, M. (2015). One Century of Global IQ Gains: A Formal Meta-Analysis of the Flynn Effect (1909–2013). *Perspectives on Psychological Science, 10,* 282-306.

Piffer, D. (2013). Correlation of the COMT Val158Met Polymorphism with latitude and a hunter-gatherer lifestyle suggests culture-gene coevolution and selective pressure on cognition genes due to culture. *Anthropological Science, 121*, 161-171.

Piffer, D. (2015). A review of intelligence GWAS hits: Their relationship to country IQ and the issue of spatial autocorrelation. *Intelligence, 53,* 43-50.

Piffer, D. (2018a). Correlation between Edu PGS and IQ. https://rpubs.com/Daxide/395866

Piffer, D. (2018b) HGDP Lee et al. PGS. https://rpubs.com/Daxide/374949

Pind, J., Gunnarsdóttir, E. K., & Jóhannesson, H. S. (2003). Raven's Standard Progressive Matrices: new school age norms and a study of the test's validity. *Personality and Individual Differences, 34,* 375-386.

Polderman, T. J. C., Gosso, M. F., Posthuma, D., van Beijsterveldt, T. C. E. M., Heutnik, P., Verhulst, F. C., & Boomsma, D. I. (2006). A longitudinal twin study on IQ, executive functioning, and attention problems during childhood and early adolescence. *Acta Neurologica Belgica, 106,* 191-207.

Pollet, T. V. (2013). Much ado about p. What does a p-value mean when testing hypotheses with aggregated cross-cultural data in the field of evolution and human behavior? *Frontiers in Psychology, 4(734),* 1-3.

Pollet, T. V., Fawcett, T. W., Buunk, A. P. & Nettle, D. (2009). Sex-ratio biasing towards daughters among lower-ranking co-wives in Rwanda. *Biology Letters, 5,* 765-768.

Pollitt, E., Hathiral, P., Kotchabhakdi, N.J., Missell, L., & Valyasevi, A. (1989). Iron deficiency and educational achievement in Thailand. *American Journal of Clinical Nutrition, 50,* 687-697.

Pongcharoen, T., DiGirolamo, A. M., Ramakrishnan, U., Winichagoon, P., & Flores, R. (2011). Long-term effects of iron and zinc supplementation during infancy on cognitive function at 9 y of age in northeast Thai children: a follow-up study. *The American Journal of Clinical Nutrition, 93,* 636-643.

Pongcharoen, T., Ramakrishnan, U., DiGirolamo, A. M., Winichagoon, P., Flores, R., Singkhornard, J., & Martorell, R. (2012). Influence of prenatal and postnatal growth on intellectual functioning in school-aged children. *Archives of Pediatrics & Adolescent Medicine, 166,* 411-416.

Pons, A. L. (1974). *Administration of Tests Outside the Cultures of their Origin.* 26th Congress of the South African Psychological Association.

Pons, J. I., Matías-Carrelo, L., Rodríguez, M., Rodríguez, J. M., Leticia Herrans, L., Jiménez, M. E., Negrón, A., Flores, L., Mañón, Sh., Jiménez, K., Medina, G., Rosario, E., Ortiz Nolasco, N., & Yang, J. (2008). Estudios de validez de la Escala de Inteligencia Wechsler para Adultos Versión III, Puerto Rico (EIWA-III). *Revista Puertorriqueña de Psicología, 19,* 75-111.

Poon, P. W. F., Yu, W. Y., & Chan, J. W. C. (1986). Correlation between auditory reaction time and intelligence. *Perceptual & Motor Skills, 63,* 375-378.

Poppe, R. (2012). *Essays in Development Economics. Inauguraldissertation zur Erlangung des akademischen Grades eines Doktors der Wirtschaftswissenschaften.* University of Mannheim.

Posthuma, D., De Ceus, E. J. C., Baaré, W. F. C., Hulshoff Pol, H. E., Kahn, R. S. & Boomsma, D. I. (2002). The association between brain volume and intelligence is of genetic origin. *Nature Neuroscience, 5,* 83-84.

Potrafke, N. (2012). Intelligence and corruption. *Economics Letters, 114*, 109–112.

Preston, J. (1999). *An investigation of Hmong students' performance on four standardized cognitive ability measures.* Unpublished doctoral dissertation, Graduate College, University of Wisconsin-Stout, USA.

Prewitt Diaz, J.O., & Munoz, G. (1980). *A reliability study of the WISC with Puerto Rican children (grades K-9) in Puerto Rico.* Unpublished paper, Pennsylvania State University, USA.

Prifitera, A., Lawrence, L. G. & Saklofske, D. H. (1998). The WISC-111 in context. In A. Prifitera & D. H. Saklofske (Eds) *WISC-111 Clinical Use and Interpretation.* San Diego, CA: Academic.

Proctor, B. E., Kranzler, J. H., Rosenbloom, A. L., Martinez, V. & Guevara-Aquire, J. (2000). An initial investigation of validation of the Matrix Analogies Test-Expanded Form in Ecuador. *Psychological Reports, 86,* 445-453.

Proto, E., Rustichini, A. & Sofianos, A. (2014). Higher intelligence groups have higher cooperation rates in the repeated prisoner's dilemma. IZA Discussion Paper No. 8499.

Prozorovskaya, I., Grigoriev, I., & Lynn, R. (2010). Gender differences in means and variability on the Standard Progressive Matrices for 15 year olds in Ukraine. *Mankind Quarterly, 50,* 297-310.

Pruneti, C. (1985). Dati normativi del test P.M. 47 Coloured su un campione di bambini italiani. *Bolletino di Psicologia Applicata, 176,* 27-35.

Pruneti, C., Fenu, A., Freschi, G., & Rota, S. (1996). Aggiornamento della standardizzazione italiana del test delle Matrici Progressive Colorate del Raven. *Bolletino di Psicologia Applicata, 217,* 51-57.

Pullmann, H. Allik, J., & Lynn, R. (2004). The growth of IQ among Estonian schoolchildren from ages 7 to 19. *Journal of Biosocial Science, 36,* 735-740.

Rabinowitz, M. B., Wang, J.-D., & Soong, W.-T. (1991). Dentine lead and child intelligence in Taiwan. *Archives of Environmental Health, 46,* 351-360.

Rahman, A., Macbool, E., & Zuberi, H. S. (2002). Lead-associated deficits in stature, mental ability and behavior in children in Karachi. *Annals of Tropical Paediatrics, 22,* 301-311.

Rajabi, G. (2009). Normalizing the Raven Coloured Progressive Matrices Test on students of the city of Ahvaz. *Contemporary Psychology, 3,* 23-33 (in Farsi).

Rajatasilpin, A., Suepsaman, B., & Yamarat, V. (1970). Intellectual development and its relationship to the nutritional status among school children. *Journal of the Medical Association of Thailand, 53,* 788-793.

Ram, R. (2007). IQ and economic growth: Further argumentation of Mankiw-Romer-Weil model. *Economics Letters, 94*, 7-16.

Rao, S. N. & Reddy, I. K. (1968). Development of norms for Raven's Coloured Progressive Matrices on elementary school children. *Psychological Studies, 13*, 105-107.

Ratner, H. H., Chiodo, L., Covington, Ch., Sokol, R. J., Ager, J., & Delaney-Black, V. (2006). Violence Exposure, IQ, Academic Performance, and Children's Perception of Safety: Evidence of Protective Effects. *Merril-Palmer Quarterly, 52,* 264-287.

Raven, J. C. (1941). Standardization of Progressive Matrices 1938. *British Journal of Medical Psychology, 19,* 137-150.

Raven, J. (1981). *Irish and British Standardisations.* Oxford: Oxford Psychologist Press.

Raven, J. (2000). The Raven's Progressive Matrices: Change and Stability over Culture and Time. *Cognitive Psychology, 41,* 1-48.

Raven, J. (2008a). *Coloured Progressive Matrices and Crichton Vocabulary Scale.* London: Pearson.

Raven, J. (2008b). *Standard Progressive Matrices and Mill Hill Vocabulary Scale.* London: Pearson.

Raven, J., & Raven, J. C. (Eds) (2008). *Uses and Abuses of Intelligence. Uses and abuses of intelligence. Studies advancing Spearman's and Raven's quest for non-arbitrary metrics.* Unionville, NY: Royal Fireworks Press.

Raven, J., Raven, J. C., & Court, J. H. (1985). *Manual for Raven's Progressive Matrices and Vocabulary Scales.* London: H.K. Lewis & Co. Ltd.

Raven, J. & Court, J. H. (1989). *Manual for Raven's Progressive Matrices and Vocabulary Scales.* London: H.K. Lewis & Co. Ltd.

Raven, J. C., Court, J. H. & Raven, J. (1995). *Coloured Progressive Matrices.* Oxford, UK: Oxford Psychologists Press.

Raven, J., Raven, J. C., & Court, J. H. (1998). *Manual for Raven's Progressive Matrices and Vocabulary Scales.* Oxford: Oxford Psychologist Press.

Raven, J., Raven, J. C., & Court, J. H. (1999). *Manual zu Raven's Progressive Matrices und Vocabulary Scales* (German editing and norms by Bulheller, S., & Häcker, H.). Frankfurt: Swets & Zeitlinger B. V.

Raven, J., Raven, J. C. & Court, J. H. (2000). *Standard Progressive Matrices.* Oxford: Oxford Psychologists Press.

Raven, J., Raven, J. C., & Court, J. H. (2006*). Manual zu Raven's Progressive Matrices und Vocabulary Scales* (German editing and norms by Bulheller, S., & Häcker, H.). Frankfurt: Harcourt Test Services.

Raz, N., Torres, I.J., Spencer, W.D. et al. (1993). Neuroanatomical correlates of age-sensitive and age-invariant cognitive abilities: An in vivo MRI investigation. *Intelligence 17,* 407-422.

RD (1960). *Aqueducts.* Encyclopedia Britannica, 2, 160-162. Chicago: William Benton.

Redmond, M. & Davies, F. R. (1940). *The Standardisation of Two Intelligence Tests*. Wellington: New Zealand Council for Educational Research.

Reeve, C. I. (2009). Expanding the g-nexus: Further evidence regarding the relations among IQ, religiosity, and national health outcomes. *Intelligence, 37,* 495-505.

Reeve, C. & Basalik, D. (2010). Average state IQ, state wealth, and racial composition as predictors of state health statistics: Partial support for "g" as a fundamental cause of health disparities. *Intelligence, 38*, 282-289.

Reeve, C.L., Heeney, M.D. & Woodley of Menie, M.A. (2018). A systematic review of the literature relating general cognitive ability to number of offspring. *Personality & Individual Differences, 134*, 107-118.

Reid, N. & Gilmore, A. (1989). The Raven's Standard Progressive Matrices in New Zealand. *Psychological Test Bulletin, 2,* 25-35.

Relethford, J. H. (1988). Genetics of modern human origins and diversity. *Annual Review of Anthropology, 27*, 1-23.

Resing, W. C. M., Bleichrodt, N. & Drenth, P. J. D. (1986). Het gebruik van de RAKIT bij allochtoon etnische groepen. *Nederlands Tijdschrift voor de Psychologie, 41,* 179-188.

Richardson, K. (2004). Book review: IQ and the Wealth of Nations. *Heredity, 92,* 359-360.

Richardson, St. A. (1976). The relation of severe malnutrition in infancy to the intelligence of school children with differing life histories. *Pediatric Research, 10,* 57-61.

Richter, L. M., Griesel, R. D. & Wortley, M. E. (1989). The Draw-a-Man Test: A 50 year perspective on drawings done by black South African Children. *South African Journal of Psychology, 19,* 1-5.

Rijsdijk, F. V., Boomsma, D. I., & Vernon, P. A. (1995). Genetic Analysis of Peripheral Nerve Conduction Velocity in Twins. *Behavior Genetics, 25,* 341-348.

Rijsdijk, F. V., Vernon, P. A., & Boomsma, D. I. (2002). Application of Hierarchical Genetic Models to Raven and WAIS Subtests: A Dutch Twin Study. *Behavior Genetics, 32,* 199-201.

Rimoldi, H. J. (1948). A note on Raven's Progressive Matrices Test. *Educational and Psychological Measurement, 8,* 347-352.

Rindermann, H. (2006). Was messen internationale Schulleistungsstudien? Schulleistungen, Schülerfähigkeiten, kognitive Fähigkeiten, Wissen oder allgemeine Intelligenz? *Psychologische Rundschaw, 57*, 69-86.

Rindermann, H. (2007). The g-factor of international cognitive ability comparisons: The homogeneity of results in PISA, TIMSS, PIRLS and IQ-tests across nations. *European Journal of Personality, 21*, 667-706.

Rindermann, H. (2008a). Relevance of education and intelligence at the national level for the economic welfare of people. *Intelligence, 36,* 127-142.

Rindermann, H. (2008b). Relevance of education and intelligence for the political development of nations: Democracy, rule of law and political liberty. *Intelligence, 36,* 306-322.

Rindermann, H. (2011). Results in the International Mathematical Olympiad (IMO) as indicators of the intellectual classes' cognitive-ability level. In A. Ziegler & Ch. Perleth (Eds.). *Excellence. Essays in honour of Kurt A. Heller*. Münster: Lit.

Rindermann, H. (2013). African cognitive ability: Research, results, divergences and recommendations. *Personality and Individual Differences, 55,* 229-233.

Rindermann, H. & Becker, D. (2018). Flynn effect and economic growth: Do national increases in intelligence lead to increases in GDP? *Intelligence, 69*, 87-93.

Rindermann, H., Becker, D. & Thompson, J. (2018). Honesty, rule violation and cognitive ability: A reply to Gachter and Schmidt. *Intelligence, 68,* 66-69.

Rindermann, H. & Carl, N. (2018). Human rights: Why countries differ. *Comparative Sociology, 17*, 29-67.

Rindermann, H. & Ceci, S. J. (2009). Educational policy and country outcomes in international cognitive competence studies. *Perspectives in Psychological Science, 4,* 551-577.

Rindermann, H., Falkenhayn, L., & Baumeister, A. E. E. (2014). Cognitive ability and epistemic rationality: A study in Nigeria and Germany. *Intelligence, 47,* 23-33.

Rindermann, H., Flores-Mendoza, C. & Mansur-Alves, M. (2010). Reciprocal effects between fluid and crystallized intelligence and their dependence on parents' socioeconomic status and education. *Learning and Individual Differences*, 20, 544-548.

Rindermann, H. & Meisenberg, G. (2009). Relevance of education, intelligence, and knowledge at the national level for non-economic welfare: The case of HIV and AIDS. *Intelligence, 37*, 383-395.

Rindermann, H., Sailer, S. & Thompson, J. (2009). The impact of smart fractions, cognitive ability of politicians and average competence of peoples on social development. *Talent Development and Excellence, 1*, 3-25.

Rindermann, H., Stiegmaier, E.-M., & Meisenberg, G. (2014). Cognitive ability of preschool, primary and secondary school children in Costa Rica. *Journal of Biosocial Science, 46,* 1-30.

Rindermann, H., Stiegmaier, E-M. & Meisenberg, G. (2015). Cognitive ability of preschool, primary and secondary school children in Costa Rica. *Journal of Biosocial Science, 47,* 281-310.

Rindermann, H., & te Nijenhuis, J. (2012). Intelligence in Bali – A case study on problems of international IQ comparisons and possibilities to deal with them. *Intelligence, 40,* 395-400.

Rindermann, H. & Thompson, J. (2011). Cognitive capitalism: the effect of cognitive ability on wealth, as mediated through scientific achievement and economic freedom. *Psychological Science, 22,* 754–763.

Rindermann, H., & Thompson, J. (2016). The cognitive competences of immigrant and native students across the world: An analysis of gaps, possible causes and impact. *Journal of Biosocial Science, 48(1),* 66-93.

Rindermann, H., Woodley, M. A., & Stratford, J. (2012). Haplogroups as evolutionary markers of cognitive ability. *Intelligence, 40,* 362-375.

Risso, W. L. (1961). El test de Matrice Progressivas y el test Domino. Proceedings of the 1961 Conference of the Psychological Society of Uruguay. John Raven archive.

Roberts, N. (1989). Pleistocene environments in time and space. In R. Foley (Ed.). *Hominid Evolution and Community Ecology: Prehistoric Human Adaptation in Biological Perspective*. London: Academic Press.

Robin, R. W. & Shea, J. D. C. (1983). The Bender Gestalt visual motor test in Papua New Guinea. *International Journal of Psychology, 18,* 263-270.

Roca, P. (1955). *Problems of adapting intelligence scales from one culture to another.* Department of Education, Commonwealth of Puerto Rico.

Rodd, W. G. (1959). A cross cultural study of Taiwan's schools. *Journal of Social Psychology, 50,* 30-36.

Rodgers, J. L., Cleveland, H. H., van den Ord, E. & Rowe, D. C. (2000). Birth-order and intelligence: Together for the last time? *American Psychologist, 55,* 523-524.

Rodgers, J. L. (2001). What causes birth order-intelligence patterns? The admixture hypothesis, revived. *American Psychologist, 56,* 505-510.

Rodríguez, T. (2012). *Environmental pesticide exposure and neurobehavioral effects among children of Nicaraguan agricultural workers.* Ph.D thesis, University of Uppsala. Acta Universitatis Upsaliensis. Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Medicine 820.

Roe, A. (1965). *The Psychology of Occupations*. New York: Wiley.

Roid, G. H. (2003). *Stanford-Binet Intelligence Scales, Fifth Edition.* Itasca, IL: Riverside Publishing.

Roivainen, E. (2010). European and American WAIS 111 norms: Cross-national differences in performance subtest scores. *Intelligence, 38,* 187-192.

Rojahn, J., & Naglieri, J. A. (2006). Developmental gender differences on the Naglieri Nonverbal Ability Test in a nationally normed sample of 5-17 year olds. *Intelligence, 34,* 253-260.

Roselló, J., Hernández, J. J., Zayas, G., Ortiz, P., Matos, M., & Alvarez, L. (1988). Relación entre la contaminación con mercurio y el funcionamiento intelectual y afectivo en un grupo de niños de Humacao, Puerto Rico. *Revista Puertorriqueña de Psicología, 5,* 1-12.

Roth, P. L., Bevier, C. A., Bobko, P., Switzer, F. S. & Tyler, P. (2001). Ethnic group differences in cognitive ability in employment and educational settings: a meta-analysis. *Personnel Psychology, 54*, 297–330.

Rowe, D. C., Vesterdal, W. J. & Rodgers, J. L. (1998). Herrnstein's syllogism: genetic and shared environmental influences on IQ, education, and income. *Intelligence, 26,* 405-423.

Rushton, J. P. (1995). *Race, Evolution, and Behavior – a life history perspective.* New Brunswick: Transaction Publishers.

Rushton, J. P. (2000). *Race, evolution and behavior (3rd ed.).* Port Huron, MI: Charles Darwin Research Institute.

Rushton, J. P. (2004). Placing intelligence into an evolutionary framework or how g fits into the r-K matrix of life-history traits including longevity. *Intelligence, 32*, 321-328.

Rushton, J. P., & Bogaert, A. F. (1987). Race differences in sexual behaviour: Testing an evolutionary hypothesis. *Journal of Research in Personality, 21,* 529-551.

Rushton, J. P., & Čvorović, J. (2009). Data on the Raven's Standard Progressive Matrices from four Serbian samples. *Personality and Individual Differences, 46,* 483-486.

Rushton, J.P. & Templer, D. I. (2009). National differences in intelligence, crime, income and skin color. *Intelligence, 37*, 341-346.

Saddik, B., Williamson, A., Nuwayhid, I., & Black, D. (2005). The effects of solvent exposure on memory and motor dexterity in working children. *Public Health Reports, 120,* 657-663.

Sadek, A. A. M. (1972). A Factor Analytic Study of Musical Abilities of Egyptian Students Taking Music as a Special Subject. Ph.D Thesis, University of London.

Sahin, N. & Duzen, E. (1994). *Turkish standardisation of Raven's SPM*. Proceedings of the 23rd International Congress of Applied Psychology. Madrid.

Saks, K. (2013). *Open Learning Environment and Study Motivation. About the Research Conducted within Scope of Exhibition and Science Theatre Project "Discover Natural Phenomena".* Unpublished.

Salahodjaev, R. (2015a). Democracy and economic growth: The role of intelligence in cross-country regressions. *Intelligence, 50*, 228-234.

Salahodjaev, R. (2015b). Intelligence and shadow economy: A cross-study empirical analysis. *Intelligence, 49,* 129-133.

Salahodjaev, R. (2016). Intelligence and finance. *Personality and Individual Differences, 86,* 282-286.

Salaodjaev, R. (2016a). Intelligence and deforestation: International data. *Forest Policy and Economics, 63*, 20-27.

Salaodjaev, R. (2018). Is there a link between cognitive abilities and environmental awareness? Cross-national evidence. *Environmental Research, 66,* 86-90.

Salahodjaev, R. (2019). National IQs and tolerance. *Personality and Individual Differences* (in press).

Salahodjaev, R. & Azam, S. (2015a). IQ and the weight of nations. *Personality and Individual Differences, 87,* 105-109.

Salahodjaev, R. & Azam, S. (2015b). Intelligence and gender (in)equality: Empirical evidence from developing countries. *Intelligence, 52*, 97-103.

Salahodjaev, R. & Kanazawa, S. (2018). Why do societies with higher average cognitive ability have lower income inequality? The role of redistributive policies. *Journal of Biosocial Science, 50,* 347-364.

Salahodjaev, R. & Yuldashev, O. (2016). Cognitive abilities and air pollution. *Business and Economic Horizons, Prague Development Center, 12*, 178-185.

Salgado, J. S., Anderson, N., Moscoso, S., Bertua, C., de Fuyt, F. & Roland, J. P. (2003). A meta-analytic study of general mental ability validity for different occupations in the European community. *Journal of Applied Psychology, 88,* 1068-1081.

Salkind, N. J., Kojima, H. & Zelniker, T. (1978). Cognitive tempo in American, Japanese and Israeli children. *Child Development, 49*, 1024-1027.

Samms-Vaughan, M. (2005). *Profiles: the Jamaican pre-school child: the status of early childhood development in Jamaica.* Kingston, Jamaica: Planning Institute of Jamaica.

San Miguel Montes, L.E., Allen, D.N., Puente, A.E., & Neblina, C. (2010). Validity of the WISC–IV Spanish for a clinically referred sample of Hispanic children. *Psychological Assessment, 22,* 465-469.

Sandiford, P., Cassell, J., Sanchez, G., & Coldham, C. (1997). Does intelligence account for the link between maternal literacy and child survival? *Social Science & Medicine, 45,* 1231-1239.

Sandoval, J., Zimmerman, I. L., & Woo-Sam, J. M. (1983). Cultural differences on WISC-R verbal items. *Journal of School Psychology, 21,* 49-55.

Savage, S. W. (1946). Intelligence and infant mortality in problem families. *British Medical Journal, 19*, Jan., 86-87.

Sbaibi, R., Aboussaleh, Y., & Ahamim, A. O. T. (2014). Sex differences in means and variance among middle school children in the rural commune of Sidi El Kamel (North-Western Morocco). *Asian Journal of Scientific Research, 7,* 376-385.

Scarr, S., & Weinberg, R. A. (1976). IQ Test Performance of Black Children Adopted by White Families. *American Psychologist, 1976,* 726-739.

Scarr, S., & McCartney, K. (1988). Far from home: An experimental evaluation of the Mother-Child Home Program in Bermuda. *Child Development, 59,* 531-543.

Scarr, S., McCartney, K., Miller, S., Hauenstein, E., & Ricciuti, A. (1994). Evaluation of an island-wide screening, assessment and treatment program. *Early Development and Parenting, 3,* 199-210.

Schmitt, D. P., Allik, J., McCrae, R. R., & Benet-Martínez, V. (2008). The Geographic Distribution of Big Five Personality Traits: Patterns and Profiles of Human Self-Description Across 56 Nations. *Journal of Cross-Cultural Psychology, 38,* 173-212.

Scottish Council for Research in Education. (1933). *The Intelligence of Scottish Children.* London: University of London Press.

Scottish Council for Research in Education. (1949). *The Trend of Scottish Intelligence*. London: University of London Press.

Segal, N.L. (2012). *Born Together-Reared Apart.* Cambridge, Mass: Harvard University Press.

Sellami, K., Infanzón, E., Lanzón, T., Díaz, A., & Lynn, R. (2010). Sex differences in means and variance of intelligence: Some data from Morocco. *Mankind Quarterly, 51,* 84-92.

Shamama-tus-Sabah, S., Gilani, N., & Wachs, Th. D. (2011). Relation of home chaos to cognitive performance and behavioral adjustment of Pakistani primary school children. *Behavioral Development, 35,* 507-516. doi:10.1177/0165025411406852

Shamosh, N. A. & Gray, J. R. (2008). Delay discounting and intelligence: a meta-analysis. *Intelligence, 36*, 289-305.

Shatz, S. M. (2008). IQ and fertility: A cross national study. *Intelligence, 36*, 109-111.

Shayer, M. & Ginsburg, D. (2009). Thirty years on-a large ant-Flynn effect? 11, 13-and 14- year olds. Piagetian tests of formal operations norms 1976-2006/7. *British Journal of Educational Psychology, 79*, 409-418.

Shea J. & Sisk M. (2010). Complex projectile technology and Homo sapiens dispersal into western Eurasia. *PaleoAnthropology,* 100–122.

Shibaev, V., & Lynn, R. (2017). The Intelligence of Yakuts and Ethnic Russians in Yakutia. *Mankind Quarterly, 57,* 680-686.

Shigehisa, T., & Lynn, R. (1991). Reaction times and intelligence in Japanese children. *International Journal of Psychology, 26,* 195-202.

Simeon, D. T. & Gratham-McGregor, S. (1989). Effects of missing breakfast on the cognitive functions of school children of differing nutritional backgrounds. *American Journal of Clinical Nutrition, 49*, 646-653.

Simoes, M. M. R. (1989). Un estudo exploratorio com o teste das matrizes progressivas de Raven para criancas. Proceedings of the Congress of Psychology. Lisbon.

Sinclair, R. D. (1928). A comparative study of those who report the experience of the divine presence with those who do not. University of Iowa Studies of Character, 2, No. 3.

Singapore Ministry of Health (1994). Report: Government Printing Office.

Singh, S., & Ray, J. J. (1980). Modernization and development among Indian farmers: a modern proof of some old theories. *Economic Development & Cultural Change, 28,* 509-521.

Sinha, U. (1968). The use of Raven's Progressive Matrices in India. *Indian Educational Review, 3,* 75-88.

Siripitayakunkit, U., Visudhiphan, P., Pradipasen, M., & Vorapongsathron, T. (1999). Association between chronic arsenic exposure and children's intelligence in Thailand. In W.R. Chappell, C.O. Abernathy & R.L. Calderon (Eds.), *Arsenic exposure and health effects (pp. 141-150)*. New York, USA: Elsevier.

Sisto, F. F., Bartholomeu, D., Rueda, F. J. M., dos Santos, A. A. A., & Noronha, A. P. P. (2008). Relações entre os Testes de Bender e Matrizes Progressivas Coloridas de Raven na Avaliação da Inteligência. *Interação em Psicologia, 12,* 11-19.

Skandinaviska Testforlaget. (1970). *Manual of the Swedish WISC.* Stockholm: Skandinaviska Testforlaget.

Skuy, M., Schutte, E., Fridjhon, P., & O'Carroll, S. (2001). Suitability of published neuropsychological test norms for urban African students in South Africa. *Personality & Individual Differences, 30,* 1413-1425.

Smith, Adam (1776/1977). *An Inquiry into the Nature and Causes of the Wealth of Nations.* Chicago: University of Chicago Press.

Smith, C. L. & Beals, K. L. (1990). Cultural correlates with cranial capacity. *American Anthropologist, 92*, 193-200.

Smith, D.K., Wessels, R.A., & Riebel, E.M. (1997). Use of the WISC-III and K-BIT with Hmong students. Paper presented at Annual Meeting of the American Psychological Association, Chicago, USA, August 1997.

Smith, S. (2018). *La ruée vers l'Europe.* Paris: Grasset.

Soemantri, A. G. (1989). Preliminary findings on iron supplementation and learning achievement of rural Indonesian children. *American Journal of Clinical Nutrition, 50,* 698-702.

Soewondo, S., Husaini, M. & Pollitt, E. (1989). Effects of iron deficiency on attention and learning processes in preschool children: Bandung, Indonesia. *American Journal of Clinical Nutrition, 50,* 667-674.

Solon, I. (2014). How intelligence mediates liberalism and pro-sociality. *Intelligence, 47*, 44-53.

Solon, O., Riddell, T. J., Quimbo, S. A., Butrick, E., Aylward, G. P., Bacate, M. L., & Peabody, J. W. (2007). Associations between Cognitive Function, Blood Lead Concentration, and Nutrition among Children in the Central Philippines. *The Journal of Pediatrics, 152,* 237-243.

Sonke, C. J. (2000). *Cross-cultural differences on simple cognitive tasks: a psychophysiological investigation*. Tilberg: University Press.

Sorokin, P. (1954). Standardisation of the Progressive Matrices text. Unpublished Report. John Raven archive.

Soto, B. I. C., Ramírez, F. Z., & Tomasini, G. A. (2014). Quienes son los alumnus con aptitud sobresaliente? *Revista Actualidades Investigativas en Educación, 14,* 1-32.

Souza, T.C. & Cribari-Neto, F. (2015). Intelligence, religiosity and homosexuality non-acceptance: Empirical evidence. *Intelligence, 52,* 63-70.

Spanoudis, G., Natsopoulos, D., & Lynn, R. (2016). Sex Differences for 10 to 17 Year Olds on the Standard Progressive Matrices in Cyprus. *Mankind Quarterly, 57,* 283-290.

Spearman, C. (1904). General intelligence, objectively determined and measured. *American Journal of Psychology, 15,* 201-293.

Spicher, P. (1993). *Nouvel étalonnage du SPM.* Fribourg, Switzerland: University of Fribourg.

Sroythong, W. (2008). The validity study of the Test of Nonverbal Intelligence, Third Edition: TONI-3. Unpublished master's thesis, Mahidol University, Thailand.

Stack, S. (2011). College student suicide risk. In D. A. Lamis & D. Lester (Eds) *Understanding and preventing college student suicide.* Springfield, IL: Charles C. Thomas, pp. 33-46.

Stanczak, D., Stanczak, E. & Awadalla, A. (2001). Development and initial validation of an Arabic version of Expanded Trail Making Test: Implications for cross-cultural assessment. *Archives of Clinical Neuropsychology, 16*, 141-149.

Stankov, L. (2009). Conservatism and cognitive ability. *Intelligence, 37*, 294-304.

Stankov, L. & Lee, J. (2018). Conservatism syndrome and the understanding of the negative correlation between religiosity and cognitive ability. *Personality and Individual Differences, 131*, 21-25.

Sternberg, R. J., Grigorenko, E. L., Ngorosho, D., Tantufuye, E., Mbise, A., Nokes, C., Jukes, M. & Bundy, D. A. (2002). Assessing intellectual potential in rural Tanzanian school children. *Intelligence, 30,* 141-162.

Stein, A. D., Behrman, J. R., DiGirolamo, A., Grajeda, R., Martorell, R., Quisumbing, A., & Ramakrishnan, U. (2005). Schooling, educational achievement, and cognitive functioning among young Guatemalan adults. *Food and Nutrition Bulletin, 26,* 46-54.

Sternberg, R. (2018). *The Nature of Human Intelligence.* Cambridge: Cambridge University Press.

Sternberg, R. J., Nokes, C., Geissler, P. W., Prince, R., Okatcha, F., Bundy, D. A., & Grigorenko, E. L. (2001). The relationship between academic and practical intelligence: a case study in Kenya. *Intelligence, 29,* 401-418.

Stevenson, H. W., Stigler, J. W., Lee, S., Lucker, G. W., Kitaanawa, S. & Hsu, C. (1985). Cognitive performance and academic achievement in Japanese, Chinese and American children. *Child Development, 56*, 718-734.

St. George, A. (1974). Cross-cultural ability testing. Unpublished.

Stolarski, M., Zajenkowski, M. & Meisenberg, G. (2013). National intelligence and personality: Their relationships and impact on national economic success. *Intelligence, 41*, 94-101.

Stinissen, J., Willems, P. J., Coetsier, P., & Hulsman, W. L. L. (1970). *Manual for the Dutch translated and adapted version of the Wechsler Adult Intelligence Scale (WAIS).* Lissi: Swets & Zeitlinger B.V.

Stolarski, M., Jasijelska, D. & Zajenkowski, M. (2015). Are smart nations happier? Country aggregate IQ predicts happiness, but the relationship is moderated by individualism-collectivism. *Intelligence, 50*, 153-158.

Stolarski, M., Zajenkowski, M. & Meisenberg, G. (2013). National intellgence and personality: Their relationships and impact on national economic success. *Intelligence, 41*, 94-101.

Strauss, M. A. (1954). Sub-cultural variation in Ceylonese mental ability: a study in national character. *Journal of Social Psychology, 39*, 129-141.

Strenze, T. (2007). Intelligence and economic success: A meta-analytic review of longitudinal studies. *Intelligence, 35*, 401-426.

Stroebe, W. (2010). The graying of academia. *American Psychologist, 65,* 660-673.

Sturgis, P., Reid, S. & Allum, N. (2010). Does intelligence foster generalized trust? An empirical test using the UK birth cohort studies. *Intelligence, 38,* 45-54.

Sukhatunga, K., Kowasint, C., Phatthrayuttawat S., Chantra, J., Chaiyasit, W., Bunnagulrote, K., & Imaroonrak, S. (2006). Norms of the Coloured Progressive Matrices (CPM) in Thai students age 6-11 years old. *Journal of Thai Clinical Psychology, 37,* 9-22.

Sukhatunga, K., Kowasint, C., Phatthrayuttawat S., Chantra, J., Chaiyasit, W., Bunnagulrote, K., & Imaroonrak, S. (2006). Norms of the Advanced Progressive Matrices (APM) in Thai students age 12-18 years old. *Journal of Thai Clinical Psychology, 37,* 1-10.

Sun, Sh., & Heitman, J. (2012). Should Y stay or should Y go: The evolution of non-recombining sex chromosomes. *Bioessays, 34,* 938-942.

Sundberg, N. & Ballinger, T. (1968). Nepalese children's cognitive development as revealed by drawings of man, woman and self. *Child Development, 39*, 969-985.

Sungthong, R., Mo-Suwan, L. & Chongsuvivatwong, V. (2002). Effects of haemoglobin and serum ferritin on cognitive function in school children. *Asia Pacific Journal of Clinical Nutrition, 11*, 7-12.

Suwartono, Ch., Amiseso, C. P., & Handoyo, R. T. (2017). Uji Reliabilitas dan Validitas Eksternal The Raven's Standard Progressive Matrices. *Humanistas (Jurnal Psikologi Indonesia), 14.*

Takeuchi, M. & Scott, R. (1992). Cognitive profiles of Japanese and Canadian kindergarten and first grade children. *Journal of Social Psychology, 132*, 505-512.

Talapat, N., & Suwannalert, S. (1966). Standardization of Progressive Matrices Test for Thai children. *Journal of the Psychiatric Association of Thailand, 11,* 123-136.

Tamaoka, K., Saklofske, D. H. & Ide, M. (1993). The nonverbal reasoning ability of Japanese children measured by Naglieri's matrix analogies test-short form. *Psychologia, 36,* 53-60.

Tambs, K. Sunder, J. M., Magnus, P. & Berg, K. (1989). Genetic and environmental contributions to the covariation between occupational status, educational attainment, and IQ: a study of twins. *Behavior Genetics, 19,* 209-222.

Tan, U., Tan, M. et al. (1999). Magnetic resonance imaging brain size/IQ relations in Turkish university students. *Intelligence, 27*, 83-92.

Tarnopol, L. & Tarnopol, M. (1980). Arithmetic ability in Chinese and Japanese children. *Focus on Learning Problems in Mathematics, 2,* 29-48.

Taylor, J. M. & Radford, E. J. (1986). Psychometric testing as an unfair labour practice. *South African Journal of Psychology, 16*, 79-86.

Teasdale, T. W. & Owen, D. R. (2008). Secular declines in cognitive test scores: a reversal of the Flynn effect*.* *Intelligence, 36*, 121-126.

Teeter, A., Moore, C. L., & Petersen, J. D. (1982) WISC-R verbal and performance abilities of Native American students referred for school learning problems. *Psychology in the School, 19,* 39-44.

Tellegen, P. J., & Laros, J. A. (2004). Cultural bias in the SON-R test: Comparative study of Brazilian and Dutch children. Psicologia: *Teoria e Pesquisa Mai-Ago, 20,* 103-111.

Tellegen, P. J., Winkel, M., Wijnberg-Williams, B. J., & Laros, J. A. (1998). *Snijders-Oomen Nonverbal Intelligence Test, SON -R 2½-7, Manual & Research Report*. Lisse: Swets & Zeitlinger.

Te Nijenhuis, J. (1997). *Comparability of Test Scores for Immigrants and Majority Group Members in the Netherlands*. Enschede, Netherlands: Ipskamp.

Te Nijenhuis, J. & van der Flier, H. (1997). Comparability of GATB scores for immigrant and majority group members: Some Dutch findings. *Journal of Applied Psychology, 82,* 675-685.

Templer, D. I. (2008). Correlational and factor analytic support for Rushton's differential K life history theory. *Personality & Individual Differences, 45*, 440-444.

Templer, D. I. (2010). IQ and skin color: The old world re-examined and the new world. *Mankind Quarterly, 51*, 3-11.

Templer, D. I. (2010a). The comparison of mean IQ in Muslim and non-Muslim countries. *Mankind Quarterly, 50,* 188-209. .

Templer, D. I. (2013). Suicide rates in Italian regions related to IQ, murder rates, and biological variables. *Mankind Quarterly, 54,* 26-48.

Templer, D. I. & Arikawa H. (2006). Temperature, skin color, per capita income and IQ: an international perspective. *Intelligence, 34*, 121-140.

Templer, D. I., Connelly, H. J., Lester, D., Arikawa, H. & Mancuso, L. (2007). Relationship of IQ to suicide and homicide rate: An international perspective. *Psychological Reports, 100*, 108-112.

Templer, D. I. & Stephens, J.S. (2014).The relationship between IQ and climatic variables in African and Eurasian countries. *Intelligence, 46,* 169-178.

Terman, L. M. (1916). *The measurement of intelligence: An explanation of and a complete guide for the use of the Stanford revision and extension of the Binet-Simon Intelligence Scale.* Boston: Houghton Mifflin.

Terman, L. M., & Merrill, M. A. (1937). *Measuring intelligence.* Boston: Houghton Mifflin.

Terman, L. M., & Merrill, M. A. (1960). *Stanford-Binet Intelligence Scale: Manual for the Third Revision Form L-M.* Boston: Houghton Mifflin.

Terman, L. M., & Merrill, M. A. (1973). *Stanford-Binet Intelligence Scale: Manual for the Third Revision Form L-M (1972 Norm Tables by R. L. Thorndike).* Boston: Houghton Mifflin.

Tesi, G. & Young, B. H. (1962). A standardisation of Raven's Progressive Matrices. *Archive di Psicologia Neurologia e Psichiatrica, 5,* 455-464.

Tewes, U. (1985). *HAWIK-R - Hamburg-Wechsler Intelligenztest für Kinder - Revision 1983. Handbuch und Testanweisung. 2. korrigierte Auflage* (German manual and norms of the WISC-R). Bern, Stuttgart, Toronto: Verlag Hans Huber.

Tewes, U. (1994). *HAWIE-R - Hamburg-Wechsler Intelligenztest für Erwachsene - Revision 1991. Handbuch und Testanweisung. 3. korrigierte Auflage* (German manual and norms of the WAIS-R). Bern, Gottingen, Toronto, Seattle: Verlag Hans Huber.

Thavornsuwanchai (2008). The psychometric properties of the development test of visual motor integration 4th edition, revised (VMI4R) in primary school students Cholburi province. Master Thesis at the Faculty of Graduate Studies at Mahidol University.

The Found For Peace (2017). *Fragile State Index.* Retrieved from: http://fundforpeace.org/fsi/excel/

The Heritage Foundation (2017). *2017 Index of Economic Freedom.* . Retrieved from: https://www.heritage.org/index/download

Thienpont, K. & Verleye, G. (2003). Cognitive ability and occupational status in a British cohort. *Journal of Biosocial Science, 36*, 333-349.

Thiers, C. (2018). GMAT scores by country with implications for MBA programs. *Journal of the Academy of Business Education.* (in press).

Thompson, P. M., Cannon, T. D., Narr, K. L., van Erp, T. & Poutanen, V. P. (2001). Genetic influences on brain structure. *Nature Neuroscience, 4,* 1253-1258.

Thomas, R. M. & Shah, A. (1961). The Draw-a-Man Test in Indonesia. *Journal of Educational Psychology, 32,* 232-235.

Thorndike, R. L., Hagen, E. P., & Sattler, J. M. (1986). *Stanford-Binet Intelligence Scale: Fourth Edition.* Itasca, IL: Riverside Publishing.

Tooby, J. & De Vore, I. (1989). The reconstruction of hominid behavioral evolution through strategic modelling. In W. G. Kinzey (Ed.) *The Evolution of Human Behavior: Primate Models.* Albany, NY: State University of New York Press.

Tooley, J., Dixon, P., Shamsan, Y., & Schagen, I. (2010). The relative quality and cost-effectiveness of private and public schools for low-income families: a case study in a developing country. *School Effectiveness and School Improvement: An International Journal of Research, Policy and Practice, 21,* 117-144.

Toppen, J. T. (1971). Unemployment: Economic or psychological? *Psychological Reports, 28*, 111-122.

Tovar, M.E.L., Anaya, A.A.A. & Burhan, N.A.S. (2017). The cognitive wealth of nations: A cross-country analysis of entrepreneurial abilities, innovation in STEM, and competitiveness in education. *Psychology and Education: An Interdisciplinary Journal, 54,* 93-106.

Torres Díaz, P., García, I. R., Irizarry, W. R., & Fernández, C. R. (2009). Validación concurrente de la Wechsler Intelligence Scale for Children-Fourth

Edition, Spanish con la Escala de Inteligencia Wechsler para inos-Revisada de Puerto Rico. *Revista Puertorriqueña de Psicología, 20,* 83-102.

Transparency International. (2010). Corruption Perceptions Index 2009. Available at: http://www.transparency.org/

Trivers, R. L. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology, 46,* 35-57.

Tuan, T., Lan, P. T., Harpham, T., Huong, N. T., Thach, T. D., Tod, B., Thi, T., & Ha, N. T. V. (2003). *Young Lives Preliminary Country Report: Vietnam*. London UK: Young Lives.

Tynes-Jones, J. (2005). Applying the bio-ecological model of intelligence to the Wechsler Scales in the Bahamas. *College of the Bahamas Research Journal, 13,* 68-80.

Tzuriel, D., & Caspi, N. (1992). Cognitive modifiability and cognitive performance of deaf and hearing preschool children. *Journal of Special Education, 26,* 235-252.

Tzuriel, D., & Kaufman, R. (1999). Mediated learning and cognitive modifiability. Dynamic assessment of young Ethiopian immigrant children to Israel. *Journal of Cross Cultural Psychology, 30,* 359-380.

Ucman, P. (1972). A normative study of the Goodenough-Harris test on a Turkish sample. In L. J. Cronbach & P. J. D. Drenth (Eds), *Mental Tests and Cultural Adaptation.* The Hague: Mouton.

UNDP (United Nations Development Programme). (2006). Human Development Report 2006. *Beyond scarcity: Power, poverty and the global water crisis.* New York: Palgrave Macmillan.

UNDP. (2009). Human Development Report 2009. *Overcoming barriers: Human mobility and development.* New York: Palgrave Macmillan.

UNDP. (2010). Human Development Report 2010.*The Real Wealth of Nations: Pathways to Human Development.* New York: Palgrave Macmillan.

UNESCO. (1998). *Primero estudio internacional comparativo*. Santiago, Chile: UNESCO.

United Nations, Department of Economic and Social Affairs (2013). *Trends in International Migrant Stock: The 2013 revision (United Nations database, POP/DB/MIG/Stock/Rev.2013).* Retrieved from: https://esa.un.org/unmigration/TIMSA2013/Data/subsheets/

United Nations Development Programme (2017). *Human Development Reports.* Retrieved from: http://hdr.undp.org/en/composite/HDI4

Uno, A., Shinya, N., Haruhara, N., & Kaneko, M. (2005). Raven's Coloured Progressive Matrices in Japanese Children - As a Screening Intelligence Test for Children with Learning Disorder and Acquired Childhood Aphasia. *The Japan Journal of Logopedics and Phoniatrics, 46,* 185-189.

Uppu, B., Devi, V., Anitha, N., & Radhika Rani, K. C. (2015). Gender Performance on Intelligence Quotient Test among Medical Students in a Government Medical College. *IOSR Journal of Dental and Medical Sciences, 14,* 17-21.

Valcarcel, E. C., Matrinez, E. C., Bouza, C., & Solozabal, T. P. (2000). Algunuas characteristicas y possibilidades del test de matrices progressivas de Raven. *Revista Cubana de Psicologia, 17,* 95-105.

Valencia, R. R., Rankin, R. J., & Livingston, R. (1995). K-ABC and content bias: Comparisons between Mexican American and White children. *Psychology in the Schools, 32,*153-169.

Valencia, R. R., & Suzuki, L. A. (2001). *Intelligence Testing and Minority Students. Foundations, Performance, Factors, and Assessment Issues.* Thousand Oaks, London, New Delhi: Sage Publications Inc.

Valentine, M. (1959). Psychometric testing in Iran. *Journal of Mental Science, 105,* 93-107.

Van Court, M. & Bean, F. D. (1985). Intelligence and fertility in the United States: 1912-1982. *Intelligence, 9*, 23-32.

Van der Linden, D., Dunkel, C. S. & Madison, G. (2017). Sex differences in brain size and general intelligence (g). *Intelligence, 63*, 78-88.

Van der Linden, D., Dutton, E. & Madison, G. (2018). National-level Iindicators of androgens are related to the global distribution of scientific productivity and Science Nobel Prizes. *Journal of Creative Behavior* (currently in pre-print). doi:10.1002/jocb.351

Van de Vijfeijken, K., Vedder, P. & Kook, H. (1997). Draw-a-Man and cognitive development in Curaçao. Nederlands Tijdschrift voor Opvoeding, *Vorming en Onderwijs, 13*, 262-274.

Van de Vliert, E. (2013). Climato-economic habitats support patterns of human needs, stresses and freedoms. *Behavioral & Brain Sciences, 36*, 465-479.

van der Sluis, S., Derom, C., Thiery, E., Bartels, M., Polderman, T. J. C., Verhulst, F. C., Jacobs, N., van Gestel, S., de Geus, E. J. C., Dolan, C. V., Boomsma, D. I., & Posthuma, D. (2008). Sex differences on the WISC-R in Belgium and The Netherlands. *Intelligence, 36,* 48-67.

Van der Vijver, F. J. R., & Brouwers, S. A. (2009). Schooling and basic aspects of intelligence: a natural quasi experiment in Malawi. *Journal of Applied Developmental Psychology, 30,* 67-74.

Vanhanen, T. (2003). *Democratization: A comparative analysis of 170 countries*. London and New York: Routledge.

Vanhanen, T. (2009). *The Limits of Democratization: Climate, Intelligence, and Resource Distribution*. Augusta, Georgia: Washington Summit Publishers.

Vanhanen, T. (2012). *Ethnic Conflicts: Their Biological Roots in Ethnic Nepotism.* London: Ulster Institute for Social Research.

Vanhanen, T. (2014). *Global Inequality as a Consequence of Human Diversity: A New Theory Tested by Empirical Evidence.* London: Ulster Institute for Social Research.

Vanhanen, T., & International Peace Research Institute, Oslo (PRIO) (2000). *Vanhanens-index-of-democracy.* Retrieved from: https://www.prio.org/Data/Governance/Vanhanens-index-of-democracy/

van Haassen, P. P., De Bruyn, E. E. J., Pijl, Y. J., Poortinga, Y. H., Lutje-Spelberg, H. C., Van der Steene, G., Coetsier, P., Spoelders-Claes, R., & Stinissen, J. (1986). *Wechsler Intelligence Scale for Children-Revised, Dutch Version.* Lisse: Swets & Zetlinger B.V.

van Haassen, P. P., De Bruyn, E. E. J., Pijl, Y. J., Poortinga, Y. H., Lutje-Spelberg, H. C., Van der Steene, G., Coetsier, P., Spoelders-Claes, R., & Stinissen, J. (2006). *Wechsler Intelligence Scale for Children—revised, Dutch version.* Lisse: Swets & Zetlinger B.V.

Van Wieringen, J.C. (1978). Secular growth changes. In F. Falkner & J.M.Tanner (Eds) *Human Growth, vol 2*. New York: Plenum Press.

Vass, V. (1992). Standardisation of Raven's Standard Progressive Matrices for Secondary School African pupils in the Grahamstown Region. MA Thesis, Rhodes University, Grahamstown.

Vazquez, C.D. (1989). A comparison of Puerto Rican children's performance on the Spanish version of the Wechsler Intelligence Scale for Children-Revised (WISC-R) and the Kaufman Assessment Battery for Children (K-ABC). Unpublished doctoral dissertation, University of Massachusetts, USA.

Vedder, P., Van de Vijfeijken, K., & Kook, H. (2000). Borrowing norms for the Human Figure Drawing Test: how to validate this practice? *Scandinavian Journal of Educational Research, 44,* 393-404.

Veenhoven, R. (2004). World Database of Happiness. Distributional Findings in Nations. Available at: www.eur.nl/fsw/research/happiness.

Veenhoven, R. (2007). Measures of Gross National Happiness. Presentation at OECD Statistics, Knowledge and Politics, Roundtable on "Measuring Happiness and Making Policy", Istanbul, Turkey, June 27-30, 2007.

Veenhoven, R. (2009). World Database of Happiness. Distributional Findings in Nations. Erasmus University, Rotterdam, Available at: http:// worlddatabaseofhappiness.eur.nl.

Veenhoven, R. (2010). World Database of Happiness. Continuous register of scientific research on subjective appreciation of life. Available at: http://www1.eur.nl/fsw/happiness.

Veenhoven, R & Choi, Y. (2012). Does intelligence boost happiness? *International Journal of Happiness and Development, 1*, 5-27.

Veii, K., (2003). Cognitive and linguistic predictors of literacy in Namibian Herero-English bilingual school children. Thesis submitted for the degree of Doctor of Philosophy to the Department of Psychology of the School of Human Sciences of the University of Surrey in Guildford, Surrey, United Kingdom, 2003.

Veii, K. & Everatt, J. (2005). Predictors of reading among Herero-English bilingual Namibian school children. *Bilingualism, Language & Cognition, 8,* 239-254.

Vejleskov, H. (1968). An analysis of Raven Matrix responses in fifth grade children. *Scandinavian Journal of Psychology, 9*, 177-186.

Verhage, F. (1964). Intelligence and religious persuasion. *Nederlands tijdschrift voor de psychologie en haar grensgebieden, 19,* 247-254.

Verhagen, P. (1956). Utilité actuelle des tests pour l'étude psychologique des autochtones Congolais. *Revue de Psychologie Appliquée, 6*, 139-151.

Vernon, P. E. (1969). Intelligence and Cultural Environment. London: Methuen.

Vernon, P. E. (1982). *The Abilities and Achievements of Orientals in North America.* New York: Academic Press.

Vernon, P. A., Wickett, J. C., Bazana, P. G. & Stelmack, R. M. (2000). The neuropsychology and neurophysiology of human intelligence. In R. J. Sternberg (Ed.). *Handbook of Intelligence*. Cambridge, UK: Cambridge University Press.

Vining, D. R. (1982). On the possibility of the re-emergence of a dysgenic trend with respect to intelligence in American fertility differentials. *Intelligence, 6*, 241-264.

Vining, D. R. (1995). On the possibility of the re-emergence of a dysgenic trend: An update. *Personality and Individual Differences, 19*, 259-265.

Vinogradov, E. & Kolvereid, L. (2010). Home country national intelligence and self-employment rates among immigrants in Norway. *Intelligence, 38*, 151-159.

Virués-Ortega, J., Bucks, R., Kirkham, F. J., Baldeweg, T., Baya-Botti, A., & Hogan, A. A. on behalf of Bolivian Children Living at Altitude project (BoCLA 06) (2011). Changing patterns of neuropsychological functioning in children living at high altitude above and below 4000 m: a report from the Bolivian Children Living at Altitude (BoCLA) study. *Developmental Science, 14,* 1185-1193.

Vista, A. D., & Grantham, T. C. (2010). Effects of Parental Education Level on Fluid Intelligence of Philippine Public School Students. *Journal of Psychoeducational Assessment, 28,* 236-232.

Vista, A. & Care, E. (2011). Gender differences in variance and means on the Naglieri Non-verbal Ability Test: Data from the Philippines. *British Journal of Educational Psychology, 81,* 282-308.

von Aster, M., Neubauer, A., & Horn, R. (2006). *Wechsler Intelligenztest für Erwachsene WIE: Manual, Übersetzung und Adaption der WAIS-III von David Wechsler.* Frankfurt am Main: Harcourt Test Services.

Volken, T. (2003). IQ and the Wealth of Nations: A critique of Richard Lynn and Tatu Vanhanen's recent book. *European Sociological Review, 19*, 411-412.

von Grebmer, K., Bernstein, J., Brown, T., Prasai, N., Yohannes, Y., Towey, Foley, O. C., ... & Hossain, N. (2017). *Welthunger-Index - Wie Ungleichheit Hunger schafft.* Washington, DC / Bonn / Dublin: Welthungerhilfe / International Food Policy Research Institute / Concern Worldwide.

Voracek, M. (2004). National intelligence and suicide rate: an ecological study of 85 countries. *Personality and Individual Differences, 37,* 543-553.

Voracek, M. (2005). National intelligence and suicide rate in the elderly and a threshold intelligence for suicidality: an ecological study of 48 Eurasian countries. *Journal of Biosocial Science, 37*, 721-740.

Voracek, M. (2006). Social ecology of intelligence and suicide in the United States. *Perceptual and Motor Skills, 102*, 767-775.

Voracek, M. (2008). Cross national social ecology of intelligence and suicide prevalence: integration, refinement and update of studies. *Perceptual and Motor Skills, 106*, 550-556.

Voracek, M. (2009). National intelligence, suicide rate and subjective well-being. *Perceptual and Motor Skills, 109*, 718-720.

Voracek, M. (2009a). Suicide rates, national intelligence estimates, and differential K theory. *Perceptual and Motor Skills, 109*, 733-736

Voracek, M, (2009b). Regional intelligence and suicide rate in Italy. *Psychological Reports, 105,* 1023-1026.

Voracek, M. (2013). National intelligence estimates and the failed state index. *Psychological Reports, 113*, 519-524.

Waber, D. P., Bryce, C. P., Fitzmaurice, G. M., Zichlin, M. L., McGaughy, J., Girard, J. M., & Galler, J. R. (2014). Neuropsychological outcomes at midlife following moderate to severe malnutrition in infancy. *Neuropsychology, 28,* 530-540.

Wachs, T. D., Bishry, Z., Moussa, W., Yunis, F., McCabe, G., Harrison, G., Sweifi, E., Kirksey, A., Galal, O., Jerome, N., & Shaheen, F. (1995). Nutritional intake and context as predictors of cognition and adaptive behavior of Egyptian school children. *International Journal of Behavioral Development, 18,* 425-450.

Wainwright, M. A., Wright, M. J., Geffen, G. M., Luciano, M. & Martin, N. G. (2005a). The genetic basis of academic achievement on the Queensland Core Skill Test and its shared genetic variance with IQ. *Behavior Genetics, 35*, 133-145.

Wainwright, M. A., Wright, M. J., Geffen, G. M., Luciano, M. & Martin, N. G. (2005b). The genetic basis of academic achievement on the Queensland Core Skill Test and its shared genetic variance with IQ. *Behavior Genetics, 35*, 133-145.

Waldron, L. A. & Gallimore, A. J. (1973). Pictorial depth perception in Papua New Guinea, Torres Straits and Australia. *Australian Journal of Psychology, 25*, 89-92.

Walker, S.P., Chang, S.M., Younger, N., & Grantham-McGregor, S.M. (2010). The effect of psychosocial stimulation on cognition and behaviour at 6 years in a cohort of term, low-birthweight Jamaican children. *Developmental Medicine & Child Neurology, 52,* e148-e154.

Walker, S. P., Grantham-McGregor, S. M., Powell, Ch. A., & Chang, S. M. (2000). Effects of growth restriction in early childhood on growth, IQ, and cognition at age 11 to 12 years and the benefits of nutritional supplementation and psychosocial stimulation. *Journal of Pediatrics, 137,* 36-41.

Walker, S. P., Thame, M. M., Chang, S. M., Bennett, F., & Forrester, T. E. (2007). Association of growth in utero with cognitive function at age 6–8 years. *Early Human Development, 83,* 355-360.

Waller, J. H. (1971). Achievement and social mobility: Relationships among IQ score, education, and occupation in two generations. *Social Biology, 18,* 252-259.

Wang, M., Fuerst, J. & Ren, J. (2016). Evidence of dysgenic fertility in China. *Intelligence, 57*, 15-24.

Wang, M. & Lynn, R. (2018). Intelligence in the People's Republic of China. *Personality and Individual Differences, 134*, 275-277.

Wang, D., & Qian, M. (1997). *The Combined Raven's Test for Children (CRT-C2) (2nd ed.).* Tianjin: Tianjin Institute of Endocrinology (in Chinese).

Warrag, H., Khaleefa, O., Al-Thani, A. & Lynn, R. (2018). An increase of intelligence in Qatar from 1986 to 2011. *Mankind Quarterly, 59,* 115-120.

Waschl, N. A., Nettelbeck, T., Jackson, S. A., & Burns, N. R. (2016). Dimensionality of the Raven's Advanced Progressive Matrices: Sex differences and visuospatial ability. *Personality and Individual Differences, 100,* 157-166.

Wasserman, G. A., Liu, X., Lolacono, N. J., Factor-Litvak, P., Kline, J. K., Popovac, D., Morina, N., Musabegovic, A., Vrenezi, N., Capuni-Paracka, S., Lekic, V., Preteni-Redjepi, E., Hadzialievicj, S., Slavkovich, V., & Graziano, J. H. (1997). Lead exposure and intelligence in 7-year-old children: The Yugoslavia prospective study. *Environmental Health Perspectives, 105,* 956-962.

Wasserman, G. A., Liu, X., Parvez, F., Ahsan, F., Factor-Litvak, P., Kline, J., van Geen, A., Slavkovich, V., LoIacono, N. J., Levy, D., Cheng, Zh., & Graziano, J. H. (2007). Water arsenic exposure and intellectual function in 6-year-old children in Araihazar, Bangladesh. *Environmental Health Perspectives, 115,* 285-296.

Watanabe, K., Flores, R., Fujiwara, J., & Tran, L.T.H. (2005). Early childhood development interventions and cognitive development of young children in rural Vietnam. *Journal of Nutrition, 135,* 1918-1925.

Webb, R. T., Långström, N., Runeson, B., Lichtnstein, P. & Facel, S. (2011). Violent offending and level as predictors of suicide in schizophrenia: National cohort study. *Schizophrenia Research, 130*, 143-147.

Webb, R. T., Långström, N., Runeson, B., Lichtenstein, P. (2011). Violent offending and IQ level as predictors of suicide in schizophrenia: National cohort study. *Schizophrenia Research, 130*, 143–147.

Wechsler, D. (1947). *Wechsler intelligence scale for children.* New York: Psychological Corporation.

Wechsler, D. (1955). *Wechsler adult intelligence scale (WAIS).* New York: Psychological Corporation.

Wechsler, D. (1967). *Manual for the Wechsler Preschool and Primary Scale of Intelligence.* New York: Psychological Corporation.

Wechsler, D. (1974). *Manual for the Wechsler Intelligence Scale for Children–Revised.* San Antonio, TX: Psychological Corporation.

Wechsler, D. (1981). *Wechsler adult intelligence scale (WAIS-R).* San Antonio, TX: Psychological Corporation.

Wechsler, D. (1989). *The Wechsler Preschool and Primary Scale of Intelligence-Revised.* San Antonio, TX: The Psychological Corporation.

Wechsler, D. (1991a). *Wechsler intelligence scale for children (3rd ed.).* San Antonio, TX: Psychological Corporation.

Wechsler, D. (1991b). *Manual for the Wechsler Intelligence scale for children. Third edition UK.* London: The Psychological Corporation Europe.

Wechsler, D. (1997a). *Wechsler adult intelligence scale (3rd ed.).* San Antonio, TX: Psychological Corporation.

Wechsler, D. (1997b). *Wechsler Adult Intelligence Scale (3rd ed.), Dutch version.* Lisse, Netherlands: Swets & Zeitlinger B.V.

Wechsler, D. (1999). *WASI: Wechsler abbreviated scale of intelligence.* San Antonio, TX: Psychological Corporation.

Wechsler, D. (2001). *Wechsler Adult Intelligence Scale—third edition: Canadian Technical Manual.* Toronto, ON: Harcourt Canada.

Wechsler, D. (2002). *Wechsler preschool and primary scale of intelligence (3rd ed.).* San Antonio, TX: Psychological Corporation.

Wechsler, D. (2003). *Wechsler intelligence scale for children (4th ed.).* San Antonio, TX: Psychological Corporation.

Wechsler, D. (2004). *Wechsler intelligence scale for children - Fourth UK Edition (WISC-IV UK).* London: Pearson Assessment.

Wechsler, D. (2008). *Wechsler Adult Intelligence Scale-Fourth Edition (WAIS-IV).* San Antonio, TX: Psychological Corporation.

Wechsler, D. (2005a*). WAIS III Käsikirja.* Helsinki: Psykologien kustannus OY.

Wechsler, D. (2005b). *Wechsler Intelligence Scale for Children-Fourth Edition Spanish.* San Antonio, TX: Harcourt Assessment.

Wechsler, D. (2010). *Wechsler Adult Intelligence Scale - Fourth UK Edition (WAIS-IV UK).* London: Pearson Assessment.

Wechsler, D. (2011). *Wechsler Abbreviated Scale of Intelligence–Second Edition (WASI-II).* San Antonio, TX: NCS Pearson.

Wechsler, D. (2013). *WAIS-IV - Wechsler Adult Intelligence Scale - Deutschsprachige Adaptation der WAIS-IV von D. Wechlser. Ed. by F. Petermann. & U. Petermann.* Frankfurt am Main: Pearson Assessment.

Wechsler, D. (2014). *Wechsler Preschool and Primary Scale of Intelligence - III Deutsche Version. Ed. by F. Petermann. G. Ricken, A. Fritz, K. D. Schuck, U. Preuss.* Frankfurt am Main: Pearson Assessment.

Weede, E. & Kämpf, S. (2002). The impact of intelligence and institutional improvements on economic growth. *Kyklos, 55*, 361-380.

Wein, N. & Stevenson, B. (1972). *Pre-school education programme - Dominica: Pilot evaluation of 3 & 4 year olds*. Jamaica: Bernard Van Leer Foundation UWI, Mona.

Weiss, R. H. (1971). *Grundintelligenztest Skala 3 - CFT 3. Handanweisung für Durchführung, Auswertung und Interpretation.* Braunschweig: Westermann.

Weiss, R. H. (1972). *Grundintelligenztest Skala 2 - CFT 2. Handanweisung für Durchführung, Auswertung und Interpretation.* Braunschweig: Westermann.

Weiß, R. (1980). *Grundintelligenztest Skala 3 - CFT 3. Handanweisung für Durchführung, Auswertung und Interpretation.* Braunschweig: Westermann.

Weiß, R. (1987). *Grundintelligenztest Skala 2 - CFT 2. Handanweisung für Durchführung, Auswertung und Interpretation.* Götting, Bern, Toronto, Seattle: Hogrefe.

Weiß, R. (2006). *CFT 20-R Grundintelligenztest, Skala 2 Revision.* Götting, Bern, Wien, Toronto, Seattle, Oxford, Prag: Hogrefe.

Weiß, R., & Osterland, J. (1980). *Grundintelligenztest Skala 1 - CFT 1. Handanweisung für Durchführung, Auswertung und Interpretation.* Braunschweig: Westermann.

Weiß, R., & Osterland, J. (1997). *Grundintelligenztest Skala 1 - CFT 1. Handanweisung für Durchführung, Auswertung und Interpretation.* Götting, Bern, Toronto, Seattle: Hogrefe.

Weiß, R., & Osterland, J. (2013). *CFT 1-R Grundintelligenztest, Skala 1 Revision.* Götting, Bern, Wien, Paris, Oxford, Prag, Toronto, Camebridge, MA, Amsterdam, Kopenhagen, Stockholm, Florenz: Hogrefe.

Wendt, H., Bos, W., Selter, Ch., Köller, O., Schwippert, K., & Kasper, D. (Ed.) (2016). *TIMSS 2015 - Mathematische und naturwissenschaftliche Kompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich.* Münster, New York: Waxmann.

Westermeyer, J. F., Harrow, M. & Marengo, J. T. (1991). Risk for suicide in schizophrenia and other psychotic and nonpsychotic disorders. *Journal of Nervous and Mental Diseases, 179,* 259-266.

Whetzel, D. L., & McDaniel, M. A. (2006). Prediction of national wealth. *Intelligence, 34,* 449-458.

White, K. R. (1982). The relation between socio-economic status and academic achievement. *Psychological Bulletin, 91*, 461-481.

Whitmeyer, J. M. (1997). Endogamy as a basis for ethnic behavior. *Sociological Theory, 15,* 162-178.

Wicherts, J.M., Boorsboom, D. & Dolan, C.V. (2010). Why national IQs do not support evolutionary theories of intelligence. *Personality and Individual Differences,48,* 91-96.

Willerman, L, Shultz, R. Rutledge, J.N. & Bigler, E. (1991). In vito brain size and intelligence. *Intelligence, 15*, 223-228.

Wilson, J. Q. & Herrnstein, R. J. (1985). *Crime and Human Nature*. New York: Simon and Schuster.

Winkelman, W. von. (1972). Normen für den Mann-Zeichen-Test von Ziler und die Coloured Progressive Matrices von Raven für 5-7 jahrige kinder. *Psychologische Beitrage, 17,* 80-94.

Witkowska, E. (2014). Secular score gains on Raven's Progressive Matrices in a population of Polish adolescents. *Polish Psychological Bulletin, 45,* 142-146.

Vejleskov, H. (1968). An analysis of Raven Matrix responses in fifth grade children. *Scandinavian Journal of Psychology, 9,* 177-186.

Wober, M. (1969). The meaning and stability of Raven's matrices test among Africans. *International Journal of Psychology, 4,* 229-235.

Wolff, P. H., & Fesseha, G. (1999). The orphans of Eritrea: A five-year follow-up study. *Journal of Child Psychology & Psychiatry, 40,* 1231-1237.

Wolff, P. H., Tesfai, B., Egasso, H., & Aradom, T. (1995). The orphans of Eritrea: A comparison study. *Journal of Child Psychology and Psychiatry, 36,* 633-644.

Wood, G. M. O., Carvalho, M. R. S., Rothe-Neves, R., & Haase, V. G. (2001). Validação da bateria de avaliação da memória de trabalho (BAMT-UFMG). *Psicologia: Reflexão e Crítica, 14,* 325-341.

Woodley, M. A. (2009). Inbreeding depression and IQ in a study of 72 countries. *Intelligence, 37*, 268-276.

Woodley, M.A. (2012). Corrigendum to "Inbreeding depression and IQ in a study of 72 countries" *(Intelligence, 37 (3)*, 268-276). *Intelligence, 40*, 639-641.

Woodley M.A., & Figueredo, A.J. (2013). *Historical Variability in Heritable General Intelligence: Its Evolutionary Origins and Socio-Cultural Consequences.* Buckingham, UK: Buckingham University Press.

Woodley, M. & Fernandes, H.B.F (2014). Strategic and cognitive differentiation-integration effort in a study of 76 countries. *Personality and Individual Differences, 57,* 3-7 Supplement.

Woodley, M. A., Piffer, D., Peñaherrera, M. A. & Rindermann, H. (2016). Evidence of contemporary polygenic selection on the big G of national cognitive ability: A cross-cultural sociogenetic analysis. *Personality and Individual Differences, 102,* 90–97.

Woodley, M. A., Rindermann, H., Bell, E., Stratford, J. & Piffer, D. (2014). The relationship between Microcephalin, ASPM and intelligence: A reconsideration. *Intelligence, 44*, 51-63.

Woodley, M.A., te Nijenhuis, J. & Murphy, R. (2013). Were the Victorians cleverer than us? The decline in general intelligence estimated from a meta-analysis of the slowing of simple reaction time. *Intelligence, 41*, 843-850.

Woodley of Menie, M. A., Peñaherrera-Aguirre, M., Fernandes, H. B. F. & Figueredo, A.-J. (2017). What causes the Anti-Flynn Effect? A data synthesis and analysis of predictors. Evolutionary Behavioral Sciences. http://dx.doi.org/10.1037/ebs0000106

World Bank. (2002-2010). *World Development Indicators.* Washington, DC: The World Bank.

World Bank. (2009). *World Development Report 2009: Reshaping Economic Geography.* Washington, DC: The World Bank.

The World Bank. (2010). *World Development Report 2010: Development and Climate Change*. Washington, DC: The World Bank.

World Values Survey (2005). Official Data File. (2009). World Values Survey Association, Madrid. Available at: www.worldvaluessurvey.org.

WVS 2005 Codebook (2009). Produced by the WVS Data Archive for the WVS2005 v. 20090415. Available at: http://www.worldvaluessurvey.com.

Wynn, T. (2002). Archaeology and cognitive evolution. *Behavioral Brain Sciences, 25,* 389-438.

Y Chromosome Consortium (2002). A nomenclature system for the tree of human Y-chromosomal binary haplogroups. *Genome Research, 12,* 339-348.

Yale, W., Gold, R. D. & Busch, C. (1982). Long-term predictive validity of the WPPSI: An 11-year follow-up study. *Personality and Individual Differences, 3,* 65-71.

Yunis, F. A., Khalifa, A. G., Moner, Z. M., Ayad, A. A., Gaber, S. A., & Mohamed, N. H. (1995). Physical growth, nutritional status and intellectual performance among school students in a rural village. *Medical Journal of Cairo University, 63,* 971-980.

Zajonc, R.B. (2001). The family dynamics of intellectual development. *American Psychologist, 56*, 490-496.

Zajenkowski, M.., Stolarski, M. & Meisenberg, G. (2013). Opennesss, economic freedom and democracy moderate the relationship between national intelligence and GDP. *Personality and Individual Differences, 55,* 391-398.

Zakharov, I. M., Voronin, I. A., Ismatullina, V. I., & Malykha, S. B. (2016). The relationship between visual recognition memory and intelligence. *Procedia - Social and Behavioral Sciences, 233,* 313-317.

Žebec, M., Demetriou A., & Kotrla-Topić, M. (2015). Changing expressions of general intelligence in development: A 2-wave longitudinal study from 7 to 18 years of age. *Intelligence, 49,* 94-109.

Zhang,X., Chen, X. and Zhang, X. (2018). The impact of exposure to air pollution on cognitive performance. PNAS https://doi.org/10.1073/pnas.1809474115

Ziada, Kh. E., Metwaly, H. A. M., Bakhiet, S. F. A., Cheng, H., & Lynn, R. (2017). A New Study of Intelligence in Egypt. *Mankind Quarterly, 58,* 307-311.

Zuckerman, M., Silverman, J. & Hall, J. A. (2013). The relation between intelligence and religiosity: a meta-analysis and some proposed explanations. *Personality and Social Psychology Review, 17*, 325–340.

Index