

Predicting Immigrant IQ from their Countries of Origin, and Lynn's National IQs: A Case Study from Denmark

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Many recent studies have corroborated Lynn and Vanhanen's worldwide compilation of national IQs; however, no one has attempted to estimate the mean IQ of an immigration population based on its countries of origin. This paper reports such a study based on the Danish immigrant population and IQ data from the military draft. Based on Lynn and Vanhanen's estimates, the Danish immigrant population was estimated to have an average 89.9 IQ in 2013Q2, and the IQ from the draft was 86.3 in 2003Q3 (against a 'Danish' IQ of 100). However, after taking account of two error sources, the discrepancy between the measured IQ and the estimated IQ was reduced to a mere 0.4 IQ. The study thus strongly validates Lynn and Vanhanen's national IQs.

Key Words: National IQ; Danish IQ; Intelligence; Immigrant IQ; Ethnic country of origin; Race.

Worldwide Intelligence Comparisons

Richard Lynn's worldwide compilations of “national IQ” (average IQ of the population, with the British as reference) has gathered much interest, and divided opinions among scholars. Despite initial skepticism, the general tendency among serious scholars is now that it is a useful research paradigm (Rindermann 2012). Even some of those previously critical of the idea seem to have come around to accepting it. Hunt and Sternberg (2006), for example, called it “technically inadequate... and meaningless” (quoted in Lynn and Vanhanen 2012, p. 7), but in 2012 Earl Hunt published a paper building on Lynn and Vanhanen's worldwide IQ data (Hunt 2012). Although he still does not agree with the hereditarian explanation that these differences in general cognitive ability (GCA) are partly due to genetics, he is now

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explicitly agnostic:

Future developments in molecular and behavior genetics may identify these genes, and at that time it will be possible to make a scientifically justifiable statement about international differences in the potential for intelligence. As of 2012, no such statement can be made. This does not mean that no such differences exist. It means that the extent of a genetic contribution to international differences in GCA is unknown at present. (Hunt 2012, pp. 293-4)

Probably the change of opinion is due to the many studies based on Lynn and Vanhanen's data that validate the importance of national IQ, reviewed in chapters 3-12 of Lynn and Vanhanen (2012). Especially salient is the finding that worldwide scholastic achievement tests are in near perfect agreement with Lynn and Vanhanen's estimated IQs. The correlations between the Lynn and Vanhanen IQs and PISA tests from 2000 and 2003 are an astonishing 0.86 and 0.87! The correlation is so strong that they can more or less be said to measure the same thing, and indeed using a sample of international scholastic tests and Lynn and Vanhanen's 2006 IQs, Rindermann (2007) found that a common factor accounts for 94-95% of the variance. Therefore IQ and scholastic achievement have been proposed as alternative measures of country-level "intelligence" (Lynn and Vanhanen, 2012; Meisenberg & Lynn, 2011).

The finding that different measurements strongly converge on a common factor is all the more impressive because the data come from two different theoretical research frameworks, one of them psychometric and the other educational. One is reminded of an analogous finding decades ago when researchers from the g-factor perspective and from non-g-factor perspectives both constructed IQ tests, and both ended up measuring more or less the same thing.

Indeed even researchers who were initially hostile to g-factor theory ended up constructing tests that are quite good measures of g, thus illustrating Spearman's "indifference of the indicator" (Dalliard 2013, Jensen 1998, p. 32).

Immigration in Denmark

With the above in mind, I wondered whether it was possibly to predict the average IQ of immigrants in a western country using Lynn and Vanhanen's national IQs. If the IQs are reasonably stable, either because differences are largely heritable or because the environmental effects act very slowly, it should be possible to predict the average immigrant IQs based on the immigrants' country of origin. A recent study has shown that the school performance of both first generation immigrants and second generation immigrants are below Danish standards, thus indicating that the difference is relatively stable (Winter and Vibeke, 2013).

Other correlates of population intelligence (see Gordon 1997), such as crime rates, also indicate that the effect is stable because rates of violent crimes have been relatively stable for immigrants for at least 8 years. This is known because the Danish statistical bureau publishes a yearly report on immigrants in Denmark, so one can follow the trend. There is no downward trend to be seen since at least 2004 (Plovsing 2004, Danmarks Statistik 2012). The crime index for violent crimes for 2nd generation immigrant males (including western) is 240 relative to a male population index of 100. If one looks at non-western 2nd generation immigrants only, the crime index is 257.

To put things into perspective, the latest numbers (2013Q2) from *Danmarks Statistik* indicate that 10.88% of the population is now composed of immigrants and their children ("indvandrere" = 1st generation immigrants, "efterkommere" = later generation immigrants). About 2/3 of the immigrants are non-western. Immigration, particularly non-western, has

been on the rise since 1980. *Danmarks Statistik* (2012) writes that the number of 1st generation immigrants (“indvandrere”) from non-western countries is now almost 6 times as many as in 1980, and the number of 2nd or later generation immigrants is now about 15 times as many as in 1980 (see Graph 1).

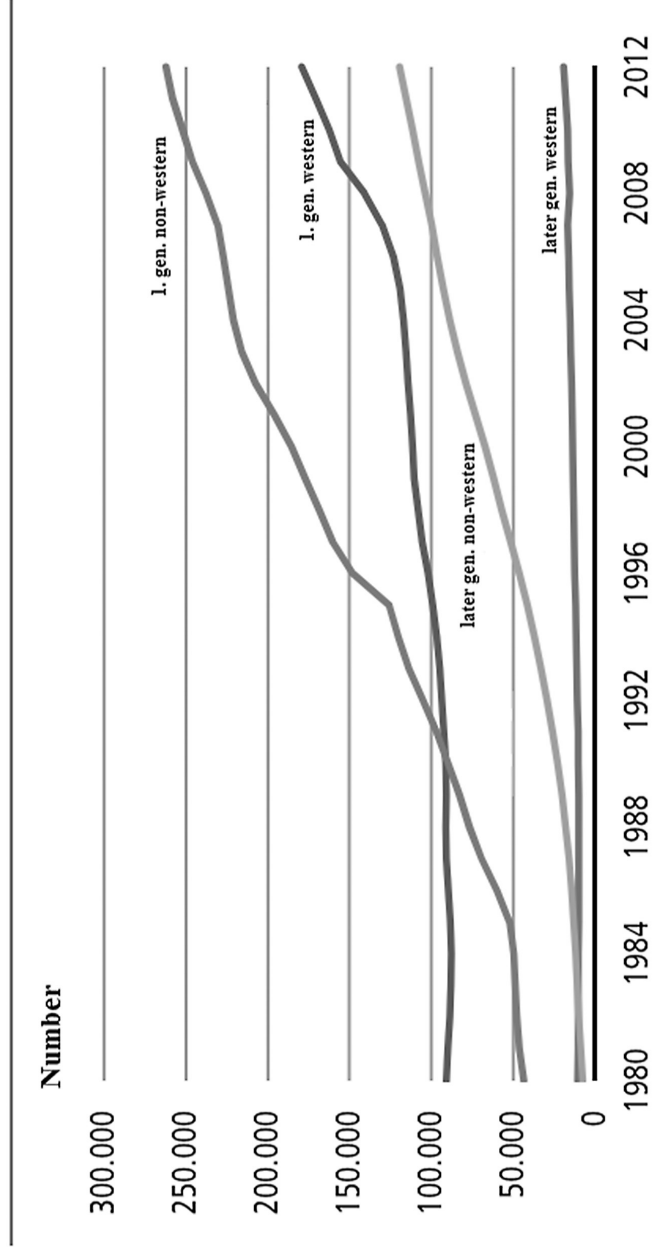
The above numbers are known to be underestimates due to the way *Danmarks Statistik* defines “immigrants”, see Nyborg (2012) for an attempt to correct these numbers. There is also the problem of illegal immigrants. I think Nyborg’s estimate may overpredict the number of immigrants and their descendants in the future because he does not adjust for the fact that the fertility of immigrants falls after their arrival in Denmark. Nyborg bases his estimate on fertility in the home countries of the immigrants.

However, the number of immigrants and their descendants in the population is still on the rise. Teasdale and Owen (2008) have proposed that this might be the cause of the recent reversal of the Flynn effect reported by the same authors. Nyborg (2012) has attempted to predict the long-term size of this influence from a hereditarian perspective. Since population intelligence is known to be important for many outcomes, it is desirable to follow ongoing changes, and even more to predict future changes from a public policy perspective.

Method

Immigrant composition data

The Danish statistical bureau (*Danmarks Statistik*) publishes data on the composition (by country of origin) of the Danish immigrants (*Danmarks Statistik*, 2013). Data was obtained about the number of immigrants from each country of origin using the latest numbers from 2013Q2.



Graph 1. Numbers of first-generation and later-generation immigrants in Denmark. From *Danmarks Statistik*.

Data from Lynn and Vanhanen (2012) was used for the national IQs (Final-IQ was used). A few countries did not have an IQ in Lynn and Vanhanen's data. I estimated the IQs for these countries using the same method as Lynn and Vanhanen, i.e. by averaging neighboring countries. See the data file for details. For the Soviet Union, the IQ of Russia was used.

To save time, only countries with >500 immigrants were included (>400 in the second analysis). Immigrants from these countries of origin are about 98% of the total immigrants. Weighted IQs were calculated based on the number of immigrants from the particular country.

Validation data

Data were sought against which to validate the prediction. Numbers were found from a 2005 army study of the test used for the draft. The army investigated whether the draft test was biased against immigrants. No, or only very slight, bias was found (Institut for Militærpsykologi, 2005). The method used to check for bias was not very powerful, but it could rule out strong bias. It consisted of comparing immigrants and Danes with the same total score on the four subtests of the test: 1) Letter matrices, 2) word relations, 3) number sequences, 4) figures. The most obvious bias to test for is language bias. However, the analysis indicates that holding immigrant and Danes' total scores constant, the difference on the verbal subtests (1-2) were very small and in two different directions, thus canceling each other out (0.30 and -0.37 in raw scores, respectively). For more about Danish draft testing, see various papers by Thomas W. Teasdale (e.g., Teasdale and Owen, 2008).

The reason this method of testing for bias is not very powerful is that it is possible that different human populations really do have different ability profiles (Lynn, 2006). Even Richard Nisbett, who is firmly opposed to the hereditarian

position on race differences in IQ, apparently agrees with a hereditarian position about the ability profile of the (mostly Ashkenazi) Jews in the US:

Before leaving the topic of Jewish IQ, I should note that there is an anomaly concerning Jewish intelligence. The major random samples of Americans having large numbers of Jewish participants show that whereas verbal and mathematical IQ run 10 to 15 points above the non-Jewish average, scores on tests requiring spatial-relations ability (ability to mentally manipulate objects in two- and three-dimensional space) are about 10 points below the non-Jewish average (Flynn, 1991a) . This is an absolutely enormous discrepancy and I know of no ethnic group that comes close to having this 20 to 25-point difference among Jews. I do not for a minute doubt that the discrepancy is real. I know half a dozen Jews who are at the top of their fields who are as likely to turn in the wrong direction as in the right direction when leaving a restaurant. The single ethnic difference that I believe is likely to have a genetic basis is the relative Jewish incapacity for spatial reasoning. I have no theory about why this should be the case, but I note that it casts an interesting light on the Jews' wandering in the desert for forty years! (Nisbett 2009, footnote 173)

But if immigrants and Danes with the same total score had raw score differences in the verbal subtests of say 10 points, this would be a very strong sign of test bias.

The army report did not contain explicit IQ data or standard deviations for the raw scores, but it did contain tables of the raw scores from the test (number of persons getting each total score). I used these tables to calculate means and standard deviations for three groups: 1) Danes, 2) immigrants, 3) combined group. I then set the native mean

score to $IQ = 100^2$, and calculated the difference from this mean in effect size units (Cohen's d), using the pooled standard deviation. Using this, one can calculate the mean of the immigrant by $100 - (\text{effect size} \times 15)$. Median scores were also calculated.

There were two problems in using these data to validate the immigrant IQ estimate.

First, the military data are from 2003Q3, while the immigrant composition data are from 2013Q2. If the immigrant composition has changed since 2003Q3, this introduces error into the estimate. Unfortunately, no immigrant composition data was available for 2003Q3, but I redid the analysis with the closest data, from 2003Q1.

Second, the military had used its own definition of "immigrant" which excluded various western countries (Switzerland, North America, and countries from the European economic area), but included as immigrants people from other western countries like New Zealand and Australia. The solution for this problem was to exclude the countries above for both the 2013Q2 and the 2003Q1 estimate. Note that these are the countries in the European economic area before the expansion.

Results

The results of the analyses are presented in Table 1. The calculated IQ from the army study is 86.3.

As can be seen, both methodological adjustments made

2 This is potentially problematic. Lynn and Vanhanen give Denmark a measured IQ of 98. I looked up his references (Buj, 1981; Vejleskov, 1968), and they do not make it clear whether they included immigrants in their samples or not. Lynn and Vanhanen also appear to have misreported one of the obtained IQs. The first study did not report an actual IQ score but only raw scores, which Lynn and Vanhanen must have converted into an IQ score using the test manual. The second study reported an IQ of 100.7, but Lynn and Vanhanen report it as 99.

the estimated IQ come closer to the measured IQ from the army study. It is possible that it would have come even closer if there were immigrant composition data from 2003Q3.

Using the medians (raw score 44, and 34) instead of the means changes things only a little and results in the difference between the Danish sample and the immigrant sample rising from 0.91 *d* to 0.98 *d*, or in standard IQ numbers: from 13.7 to 14.7 IQ points.

Discussion and Conclusion

It seems entirely possible to estimate average immigrant IQ based on their countries of origin. This finding fits very well with the hereditarian position: that the causes of ethnic/racial group differences in intelligence include genetics; but it is also compatible with the non-hereditarian position: that the causes of ethnic/racial group differences in intelligence do not include genetics. This position is also called “environmentalist” but it is a misleading name, for it seems to imply that the hereditarians do not consider environment to have any influence at all. This is patently false, as I know of no “hereditarian” scholar who does not believe that these ethnic/racial differences are caused by differences in both genes *and* environment (Snyderman and Rothman, 1988).

Both groups above, in my terms, acknowledge the existence of such ethnic/group differences, but (attempt to) explain them differently. It is also possible to deny the existence of the differences, typically by claiming that the tests are biased. Such a position would be called a non-realist position with regards to the differences in intelligence. It is not rationally possible to hold onto it any more, because the evidence clearly shows that at least some ethnic/racial differences in intelligence are not due to biased tests (Jensen 1980, Brown et al 1999).

Table 1: Estimated IQs

Source of estimation	Predicted IQ	Difference from army study (86.3)
2013Q2	89.9	3.6
2013Q2 excluding 'western countries'	87.4	1.1
2008Q1 excluding 'western countries'	86.7	0.4

The Hereditarian Interpretation

A hereditarian would probably see this result as expected (predicted even) from his premises. Finding that immigrant scores cannot be predicted at all from countries of origin would be very hard indeed to explain in that framework. It therefore increases the (Bayesian) posterior probability that the hereditarian position is true.

However, depending on how large a role a hereditarian assigns to environmental effects, he might be surprised to see that there has been so little improvement despite the presumably vast improvement in environment as a result of migration. Perhaps this will lead hereditarians to assign a smaller role to environment, or accept some of the non-hereditarian explanations below. It is of course possible that it is a combination of all the proposed explanations.

This thinking fits nicely with another study that found that PISA scores of immigrants are more similar to their home countries than the host country (Carabaña 2011, see also Levels and Dronkers 2008). Indeed, if this weren't the case, something would be seriously amiss since the PISA and measured national IQ correlations are so strong. Some of the differences between immigrant scores and natives continue to exist even if one controls for a host of environmental correlates (see Levels and Dronkers 2008). However, this is considered an over-adjustment from the perspective of hereditarians, since intelligence is known to cause these social environmental correlates, in which case controlling for them actually is controlling for intelligence to some degree. Chuck (2011) calls this the sociologist's first fallacy. The term "the sociologist's fallacy" also appears in various other writings. It seems to have originated from Jensen (1973 p. 235).

Lynn and Cheng (in press) studied children in the UK and found that racial rankings stay much the same even for those children living in the UK. They appeared even by age 5,

making certain non-hereditary theories implausible. They did not stay entirely the same, though, which may be due to some of the reasons mentioned below.

Non-Hereditary Interpretations

One non-hereditary interpretation is that the immigrants did see an improvement in IQ from living in Denmark due to a better environment, but that this is masked by biased sampling in the military study. The idea is that the military oversampled the less smart immigrants and/or undersampled the smart immigrants.

There is some evidence for this, because the raw score distribution is a bit skewed to the left as can be seen in Figures 1 and 2. However, skewness is seen in both samples, so it seems an unlikely explanation for the difference between the scores of the Danish and the immigrant sample. If there is sampling bias lowering the scores in the army test, this is the case for immigrants and Danes alike. This would mean that the difference in the army study is still a roughly correct estimate, but also that the distance to the Danish general population is even greater.

However, the skewness in the raw score frequency distribution might also be due to how the test is constructed, as one can change the distribution of the raw score frequency plot by changing the item composition of the test (Jensen 1980 chapter 4).

Another non-hereditary interpretation is that the immigrants really did see an improvement, but the improvement is not seen at the aggregate level because the immigrant sample is non-representative due to selective emigration from their home countries. The idea is that those who are less smart than the average of their home country are more likely than others to migrate to Denmark. However, since the immigrants come from many different countries, any random selectivity in emigration would cancel each other

out. Selective migration has to be non-random and be in effect for most of the more important sending countries. Perhaps one reason is that many of the migrants are refugees. I did not find anything in the data to contradict or confirm this explanation.

Another possibility is that many of the first generation immigrants suffered harsh environmental conditions before coming to Denmark, and that this effect persists even after their environment has improved in Denmark. To test this one could look at first versus later generation immigrants. Unfortunately, the military draft data do not distinguish between these two categories. It is most likely composed primarily of second generation immigrants due to the early age at which men are tested (age 18), so such effects should not be large.

However, there are comparative data from Holland (Jan te Nijenhuis et al, 2004). They looked at how well first and second generation non-western immigrants did. Summarizing their findings, they write:

Summarizing all studies of nationally and locally representative samples, of complete, specific populations, and of haphazardly collected samples, using effect sizes corrected for language bias, per generation the weighted averages computed on all studies are for the Turks and Moroccans 1.29(1), 1.14(1/2), and 0.83(2), for the Surinamese and Antilleans 1.06(1), 0.60(1/2), and 0.77(2), for the various group 1.13(1) and 0.47(2), for the South-East Asians +0.67 higher, for the mixed group 0.29(1) and 0.08(2); and for the Moluccans 0.40 (2/3). These data again show that group differences in g are diminishing over time.

In other words, the difference between immigrants and natives is smaller with second generation immigrants than with first generation immigrants, thus being evidence that environment does have an effect, even if it did not completely remove the discrepancy.

Final Comments

The discrepancy that remains between predicted IQ and the measured IQ in the army sample is so small that it might just be due to various small errors, such as slight imperfections in Lynn and Vanhanen's IQs or small sampling bias in the present study. There is also the problem that the data from the army are 5 years older than the data from the earliest composition data.

Still, this study represents a striking validation of Lynn and Vanhanen's national IQs. Future studies should try to replicate the results of this Danish study in other countries with an immigrant population with known countries of origin. It should also be replicated for Denmark using newer data from the army, and with results reported separately for 1st generation and later generation immigrants and for different countries of origin.

All data and calculations from the study are available here for independent scrutiny:

http://emilkirkegaard.dk/Den_danske_indvandring_oprindelse_og_intelligens

Acknowledgement

Thanks to anonymous reviewers whose comments greatly improved this paper.

References

- Brown, Robert T., Cecil R. Reynolds & Jean S. Whitaker
 (1999) Bias in mental testing since *Bias in Mental Testing*. *School Psychology Quarterly* 14: 208-238.
- Buj, Vinko.
 (1981) "Average IQ values in various European countries." *Personality and Individual Differences* 2.2 (1981): 168-169.
- Carabaña, Julio
 (2011) Why do the results of immigrant students depend so much on their country of origin and so little on their country of destination? In: Miguel A. Pereyra, Hans-Georg Kotthoff &

Robert Cowen (eds): *Pisa Under Examination: Changing Knowledge, Changing Tests, and Changing Schools*, pp. 207-221. Rotterdam: Sense Publishers.

Chuck

- (2011) The sociologist's first and second fallacies. In *The Occidental*. URL = <https://occidentalscent.wordpress.com/2011/01/06/the-sociologists-first-and-second-fallacies/>

Dalliard

- (2013) Is psychometric g a myth? Human Varieties (group blog), April 03, 2013. URL = <http://humanvarieties.org/2013/04/03/is-psychometric-g-a-myth/>

Danmarks Statistik

- (2012) *Indvandrere i Danmark 2012*. URL = <http://www.dst.dk/da/Statistik/Publikationer/VisPub.aspx?cid=16601>

Danmarks Statistik.

- (2013) To replicate, use the FOLK2 database. Mark both "Indvandrere" (first generation immigrants) and "Efterkommere" (later generation immigrants), choose all the countries of origin, and choose the year+quarter of interest. Data gathered in November 2013. URL = <http://www.dst.dk>

Gordon, Robert A.

- (1997) Everyday life as an intelligence test: effects of intelligence and intelligence context. *Intelligence* 24: 203-320.

Hunt, Earl

- (2012) What makes nations intelligent? *Perspectives on Psychological Science* 7: 284-306.

Hunt, Earl & Sternberg, Robert J.

- (2006) Sorry, wrong numbers: an analysis of a study of a correlation between skin color and IQ. *Intelligence* 34: 131-139.

Institut for Militærpsykologi (Institute for Military psychology)

- (2005) Rapport om undersøgelse af eventuelle barrierer i den skriftlige sessionsprøve for "nydanskere" aftjening af værnepligt. URL = http://forsvaret.dk/fak/documents/fak/publikationer/rapport_om_nydanskere_og_session.pdf

Jan te Nijenhuis, Mart-Jan de Jong, Arne Evers and Henk van der Flier.

- (2004) Are cognitive differences between immigrant and majority groups diminishing?. *European Journal of Personality* 18: 405-434 (2004)

Jensen, Arthur R.

- (1973) *Educability and Group Differences*. London: Methuen.

Jensen, Arthur R.

- (1980) *Bias in Mental Testing*. London: Methuen.

- Jensen, Arthur R.
 (1998) *The g factor: The science of mental ability*. Westport, CT: Praeger.
- Levels, Mark & Jaap Dronkers
 (2008) Educational performance of native and immigrant children from various countries of origin. *Ethnic and Racial Studies* 31: 1404-1425.
- Lynn, Richard.
 (2006) *Race differences in intelligence: An evolutionary analysis*. Washington Summit Publishers.
- Lynn, Richard & Tatu Vanhanen
 (2012) *Intelligence: A Unifying Construct for the Social Sciences*. London: Ulster Institute for Social Research.
- Lynn, Richard & Helen Cheng
 (2013) Recent data for majority and racial minority differences in intelligence of 5 year olds in the United Kingdom. *Intelligence*, in press.
- Nisbett, Richard E.
 (2009) *Intelligence and How to Get It: Why Schools and Cultures Count*. New York: Norton & Co.
- Nyborg, Helmuth.
 (2012) The decay of Western civilization: Double relaxed Darwinian selection. *Personality and Individual Differences* 53.2 (2012): 118-125.
- Plovsing, Jan.
 (2004) *Tørre tal om indvandrere og kriminalitet*. Berlingske, december 12th, 2004.
- Rindermann, Heiner
 (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, Heiner
 (2013) The intelligence of nations: a productive research paradigm—comment on Hunt (2012). *Perspectives on Psychological Science* 8: 190-192.
- Snyderman, Mark & Stanley Rothman
 (1988) *The IQ Controversy, the Media and Public Policy*. New Brunswick, NJ: Transaction Books.
- Søren C. Winter & Vibeke
 (2013) Lærere, undervisning og elevpræstationer i folkeskolen. URL = <http://www.sfi.dk/rapportoplysninger-4681.aspx?Action=1&NewsId=3891&PID=9267>
- Teasdale, Thomas W. & David R. Owen
 (2008) Secular declines in cognitive test scores: a reversal of the Flynn Effect. *Intelligence* 36: 121-126.

Vejleskov, Hans.

(1968) "An analysis of raven matrix responses in fifth grade children. I."
Scandinavian Journal of Psychology 9.1 (1968): 177-186