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# Criminality and fertility among Danish immigrant populations

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**Abstract** Criminality rates and fertility vary wildly among Danish immigrant populations by their country of origin. Correlational and regression analyses show that these are very predictable (R's about .85 and .5) at the group level with national IQ, Islam belief, GDP and height as predictors.

**Keywords:** Crime, national IQ, group differences, country of origin

## 1 Introduction

The immigrant population in Denmark is composed of people from about 235 different countries in the world[1]. The official Danish statistics bureau (DST) tracks the country of origin for every citizen and makes some of this information freely available to the public. I have previously shown that one can use this information to successfully predict the mean immigrant IQ of conscription recruits to a high degree of certainty: the predicted IQ was 86.3 and the IQ estimated from an army study from 2005 was 86.7 – a mere 0.4 IQ points off[2].

Given the previous success and the fact that social outcomes are known to be predictable from IQ's within populations[3, 4] and between countries[5], I wanted to find out if these were also predictable between the Danish immigrant groups.

## 2 Data acquisition

I examined DST's databases to see if there were useful information. For a database to be useful, it must include statistically reliable data for at least 15 countries of origin or so. This search yielded one useful database, STRAFNA1[6], which concerns number of people found to be guilty of a crime per year. The database includes data from 71 countries of origin, sufficient for a statistical analysis.

Recently, I read a report by DST on immigration in Denmark[7]. In the report, fertility rates for a small numbers of countries are shown (p. 23, Table 6). From that I reasoned that they must have the data for the rest of them as well. I therefore contacted DST to inquire whether they would share the data with me. Luckily, they would.

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### 3 Methods

The crime data in STRAFNA1 are in absolute numbers. Since the immigrant groups are not of the same size, one must calculate the relative crime rate, for instance, per 100 persons. DST provides a database with the population sizes of the immigrants groups as well and data from it were used[1]. To increase the sample size, data were averaged for all the years data were available (2000, 2002, 2004-2012).

Data on three different crime categories were gathered: 1) all crimes (alle straffetslige), 2) violent crimes (voldsforbrydelser), 3) property crimes (ejendomsforbrydelser).

Since the immigrant groups were heterogeneous with respect to age, and it is known that most crime is committed by people in their second and third decades of life[8, p. 19], two separate datasets were created for age groups 15-19 and 20-29. Due to small samples, this was only done for the all crimes category.

After the relative crime rates per 100 persons per immigrant group were calculated, predictors were sought. Various predictors were tried: Lynn and Vanhanen[5]’s national IQs, percentage of the population in the home country who were adherents of Islam, mean height, murder rate and GDP per capita.<sup>2</sup>

The rationale for Islam% in home countries is that much public debate concerns whether belief in Islam has a causal relationship to crime rates, perhaps by creating distrust towards the local government, the judiciary system and the non-Muslims. The idea is that % of Islam believers at home is a proxy for the % of Islam believers in the immigrant groups in Denmark. Selective emigration due to (ir)religiousness might make this proxy less than ideal. The data are from a 2011 international Pew Research survey as listed by Wikipedia[12, 13].

The rationale for mean height was based on the pattern that east Asians have very low crime rates and are known to be less tall. Greater height might cause crime due to it being less risky for larger persons to use physical violence than for smaller persons. Mean height data is from Wikipedia, using the newest and best source by the authors non-systematic opinion[14].

The rationale for GDP was that sociologists and criminologists have long discussed social economic status and family wealth/income as a cause of crime (but see [15]). Since children tend to be alike their parents in these properties (for both genetic and environmental reasons[16]), it was conceivable that the poverty of their countries of origin had an enduring environmental effect. GDP data were from International Monetary Fund 2012 as given by Wikipedia[17, 18].

Murder rates were from United Nations Office on Drugs and Crime using the most recent year as listed by Wikipedia[19, 20].

Initial data calculations were done in Google Spreadsheets. Correlations and multiple regressions were performed in SPSS 22.

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<sup>2</sup>An earlier version of this paper used penis length data from[9] based on the idea that it might be a proxy for average testosterone[10, 11]. However, a reviewer pointed out the rather obvious inadequacy of the penis length data.

### 3.1 Fertility

The fertility rates (total fertility\*1000) given by DST were based on averages of the years 2008-2012. The trouble with using these data is that due to the rarity of births and heterogeneous age groups of the immigrant populations, the resulting fertility rates are heavily influenced by sampling error.

To check the effect of sampling error on the correlation, the countries were first sorted according to the number of births. Then correlations were calculated for every incremental set of countries until an N of 93 was reached, which corresponded to having  $\lambda=10$  or more births per year. If simpling error was a factor, the correlations should decrease as sample size increases and smaller and smaller groups are added to the analysis.

Furthermore, data about fertility rates were added to the correlation matrix for the 71 countries in the main analysis. Fertility rates in home countries for all 71 countries were also gathered. This can be used to find out how much fertility among immigrant groups is predictable from their home fertility rates. Data are from CIA's World Fact Book via Wikipedia[21, 22]. Data from approximately 2013.

All calculations were done in Google Spreadsheets.

## 4 Results and further analysis

The correlation matrix for all variables correlates is shown in Table 1. As expected, correlates were found between national IQ's and crime rates (r's=-.467 to -.653) and fertility (r=-.514). Fertility and crime rates also correlated with each other (r's=.520 to .663). Surprisingly Islam was the best predictor of crime (r's .593 to .787). GDP was also a moderately good predictor, slightly worse than IQs (r's=-.371 to -.479). Also surprisingly, home murder rate did not predict crime very well (r's=.058 to .242). Penis length predicted slightly worse than GDP (r's=.269 to .418). Height did not predict at all.

Based on inspecting the correlation matrix, various multiple regression analyses were carried out. First a full model was tried with most of the predictors from before. Results are shown in Table 2. Multiple R was very high R=.877 but several predictors were non-significant at .05 level

In Model 2 the least significant predictor from Model 1 was dropped (home fertility). Results are shown in Table 3. Multiple R remained virtually the same R=.874 indicating that the dropped predictor was not important. Two predictors were still not significant.

In Model 3 the fertility was dropped from Model 2. Multiple R remained very high R=.867. Results are shown in Table 4. Home murder rate was not significant.

In Model 4 home murder rate was dropped. R remained very high at R=.858. Results in 5.

In model 5 murder rate was dropped. R remained very high, R=.858. Results in 6.

**Correlations**

	All_crime	Violent_crime	Property_crime	All_crime_age_15_19	All_crime_age_20_29	IQ	GDP	Islam	Height	Fertility	Fertility_home	Murder_rate
All_crime	1	.876**	.870**	.854**	.926**	-.487**	-.380**	.725**	-.093	.581**	.339**	.058
Pearson Correlation		.000	.000	.000	.000	.000	.002	.000	.509	.000	.005	.642
Sig. (2-tailed)		.71	.71	.71	.71	.71	.66	.68	.53	.71	.68	.67
N												
Violent_crime	.876**	1	.868**	.859**	.925**	-.663**	-.414**	.708**	-.218	.651**	.577**	.242**
Pearson Correlation		.000	.000	.000	.000	.000	.001	.000	.116	.000	.000	.048
Sig. (2-tailed)		.71	.71	.71	.71	.71	.66	.68	.53	.71	.68	.67
N												
Property_crime	.870**	.868**	1	.833**	.850**	-.467**	-.371**	.593**	-.095	.520**	.324**	.141
Pearson Correlation		.000	.000	.000	.000	.000	.002	.000	.497	.000	.007	.255
Sig. (2-tailed)		.71	.71	.71	.71	.71	.66	.68	.53	.71	.68	.67
N												
All_crime_age_15_19	.854**	.859**	.833**	1	.883**	-.468**	-.287**	.681**	-.036	.611**	.403**	.061
Pearson Correlation		.000	.000	.000	.000	.000	.020	.000	.900	.000	.001	.625
Sig. (2-tailed)		.71	.71	.71	.71	.71	.66	.68	.53	.71	.68	.67
N												
All_crime_age_20_29	.926**	.925**	.850**	.883**	1	-.529**	-.427**	.787**	-.194	.663**	.411**	.063
Pearson Correlation		.000	.000	.000	.000	.000	.000	.000	.165	.000	.001	.611
Sig. (2-tailed)		.71	.71	.71	.71	.71	.66	.68	.53	.71	.68	.67
N												
IQ	-.487**	-.663**	-.467**	-.468**	-.529**	1	.709**	-.473**	.511**	-.514**	-.779**	-.624**
Pearson Correlation		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Sig. (2-tailed)		.71	.71	.71	.71	.71	.66	.68	.53	.71	.68	.67
N												
GDP	-.380**	-.414**	-.371**	-.287**	-.427**	.709**	1	-.374**	.636**	-.316**	-.482**	-.469**
Pearson Correlation		.002	.002	.020	.000	.000	.000	.002	.000	.010	.000	.000
Sig. (2-tailed)		.66	.66	.66	.66	.66	.66	.66	.53	.66	.66	.65
N												
Islam	.725**	.708**	.583**	.681**	.787**	-.473**	-.374**	1	-.421**	.671**	.433**	-.090
Pearson Correlation		.000	.000	.000	.000	.000	.002	.000	.002	.000	.000	.470
Sig. (2-tailed)		.68	.68	.68	.68	.68	.66	.68	.53	.68	.68	.67
N												
Height	-.093	-.218	-.095	-.036	-.194	.511**	.636**	-.421**	1	-.181	-.424**	-.226
Pearson Correlation		.509	.497	.800	.165	.000	.000	.002	.195	.002	.002	.106
Sig. (2-tailed)		.53	.53	.53	.53	.53	.53	.53	.53	.53	.53	.52
N												
Fertility	.581**	.651**	.520**	.611**	.663**	-.514**	-.316**	.671**	-.181	1	.504**	.060
Pearson Correlation		.000	.000	.000	.000	.000	.010	.000	.195	.000	.000	.632
Sig. (2-tailed)		.71	.71	.71	.71	.71	.66	.68	.53	.71	.68	.67
N												
Fertility_home	.339**	.577**	.324**	.403**	.411**	-.779**	-.482**	.433**	-.424**	.504**	1	.535**
Pearson Correlation		.005	.007	.001	.000	.000	.000	.002	.002	.000	.000	.000
Sig. (2-tailed)		.68	.68	.68	.68	.68	.66	.68	.53	.68	.68	.67
N												
Murder_rate	.058	.242*	.141	.061	.063	-.624**	-.459**	-.090	-.226	.060	.535**	1
Pearson Correlation		.642	.255	.625	.611	.000	.000	.470	.106	.632	.000	.470
Sig. (2-tailed)		.67	.67	.67	.67	.67	.65	.67	.52	.67	.67	.67
N												

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 1: Correlation matrix for all variables.

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.003	2.536		3.156	.003
	IQ	-.056	.025	-.367	-2.218	.032
	GDP	-4.125E-5	.000	-.426	-3.262	.002
	Islam	.023	.005	.503	4.868	.000
	Height	.870	.159	.575	5.465	.000
	Fertility	.000	.000	.109	1.068	.292
	Fertility_home	.181	.179	.136	1.012	.317
	Murder_rate	-.048	.024	-.272	-2.052	.046

a. Dependent Variable: All\_crime

Table 2: Full model.

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.919	2.370		3.764	.000
	IQ	-.065	.024	-.424	-2.723	.009
	GDP	-3.903E-5	.000	-.403	-3.133	.003
	Islam	.024	.005	.510	4.935	.000
	Height	.838	.156	.553	5.370	.000
	Fertility	.000	.000	.141	1.464	.150
	Murder_rate	-.039	.022	-.217	-1.795	.079

a. Dependent Variable: All\_crime

Table 3: Model 1 without home fertility.

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.466	2.147		4.874	.000
	IQ	-.075	.023	-.487	-3.213	.002
	GDP	-3.870E-5	.000	-.399	-3.069	.004
	Islam	.027	.004	.583	6.387	.000
	Height	.885	.155	.585	5.726	.000
	Murder_rate	-.041	.022	-.229	-1.872	.068

a. Dependent Variable: All\_crime

Table 4: Model 2 without fertility.

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.396	1.450		5.099	.000
	IQ	-.044	.017	-.282	-2.507	.016
	GDP	-3.926E-5	.000	-.401	-3.179	.003
	Islam	.030	.004	.643	7.630	.000
	Height	.871	.149	.578	5.855	.000

a. Dependent Variable: All\_crime

Table 5: Model 3 without home murder rate.

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.396	1.450		5.099	.000
	IQ	-.044	.017	-.282	-2.507	.016
	GDP	-3.926E-5	.000	-.401	-3.179	.003
	Islam	.030	.004	.643	7.630	.000
	Height	.871	.149	.578	5.855	.000

a. Dependent Variable: All\_crime

Table 6: Model 4 without home murder rate.

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.819	.272		14.046	.000
	GDP	-5.854E-5	.000	-.599	-5.756	.000
	Islam	.031	.004	.656	7.413	.000
	Height	.851	.156	.565	5.444	.000

a. Dependent Variable: All\_crime

Table 7: Model 5 without IQ.

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.670	1.374		7.038	.000
	Islam	.032	.004	.680	7.483	.000
	Height	.681	.148	.452	4.591	.000
	IQ	-.078	.015	-.505	-5.266	.000

a. Dependent Variable: All\_crime

Table 8: Model 5 without GDP.

All remaining predictors were now significant at the .05 level. IQ has lowest beta and highest  $p$ -value and so was a candidate to be dropped. But from previous studies it is known that IQ correlates strongly with GDP[5], and therefore an alternate model with GDP dropped were also tried. Results are shown in 7 and 8.

Both models still had very high R's at  $R=.837$  and  $R=.824$  without IQ and GDP respectively.

Further analyses showed that dropping either of the remaining three predictors led to markedly lower R's all in the .6-.75 range (results not shown).

## 4.1 Fertility

Although fertility did show the expected correlation with IQ, it is heavily attenuated due to sampling error. The results of the analysis described earlier is shown in Figure 1. A logarithmic curve fit the data best ( $r^2=.619$ ). It is clear that the correlation decreases as sample number increases as predicted from the deteriorating quality of the added samples. It appears however that there is a flooring out after about  $K=35$  such that while new and smaller samples are added, it isn't enough to throw the correlation off.

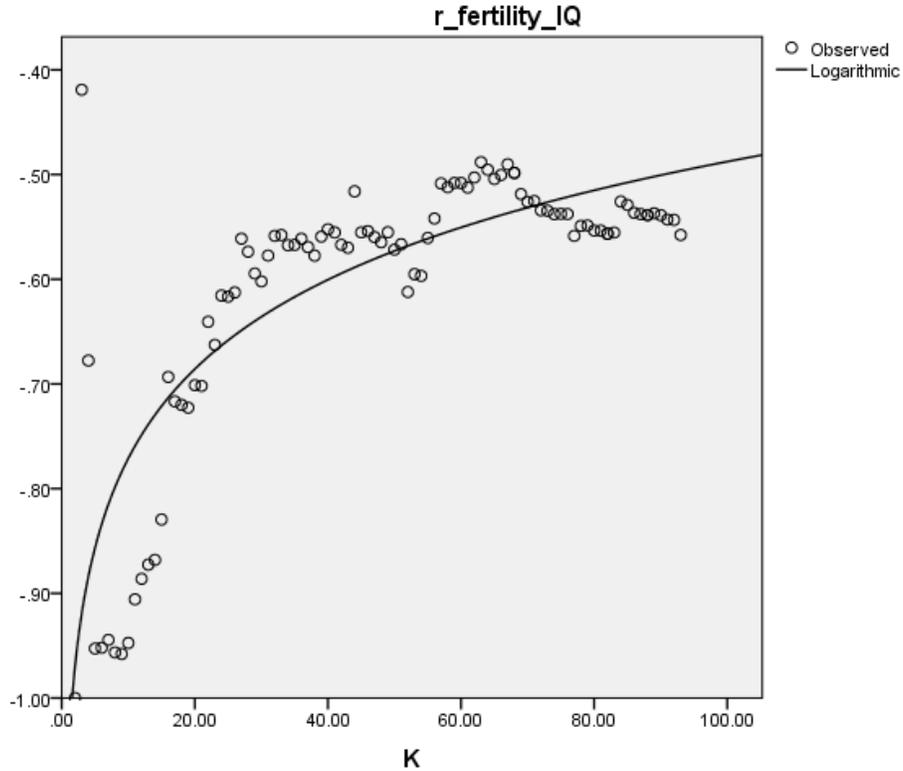


Figure 1:

As expected, there was a correlation ( $r=.504$ ) between home country fertility and fertility in Denmark. This correlation is also attenuated due the inclusion of countries with small samples, so the construct level correlation is likely substantially higher[23].

## 5 Discussion and conclusion

As far as I know, this is the paper first to analyze criminality at the level of specific countries of origin rather than groups of countries in Denmark. In all other analyses of the Danish immigration that I have found, all of them involved dividing the countries of origin into either developed/developing, or western vs. non-western (see a selection here[24]). This is not a good idea as countries in the non-western group do not have much in common. Why group countries as different as Peru, China, and South Africa?

While IQs an individual level are only weak predictors of crime at about .20, they are surprisingly good predictors at the group level. This is probably

because at the individual level many factors are relevant for whether an individual commits crime. If these other factors are uncorrelated with  $g$  it means that they will balance out in a group level comparison, which will increase the correlations with  $g$  substantially, in theory to 1.0[25].

Home murder rate was not a very good predictor. The significant  $r$  for violent crime is probably a fluke ( $p=.048$ ). It suggests that whatever causes differences between countries in murder rates, it is not something the immigrants bring with them to Denmark. Other the other hand, international murder rate correlates strongly with national IQ's (-.624).

I have shown that criminality is surprisingly predictable at the group level using only three variables: belief in Islam in home country, height, and either IQ or GDP. The fact that criminality is very predictable at the group level makes it possible to implement group level policies to reduce crime (or avoid increasing crime). Although such group level policies will necessarily target many individuals who would not have become criminals but rather productive citizens.

A previous study by Nyborg[26] attempted to model the future population structure of Denmark based on current immigration, emigration and fertility rates. In his study, Nyborg used birth rates from the UN for the home countries to model the immigrants fertility in Denmark. He has been heavily criticized for this. The purpose of Nyborg's study was to show how this differential fertility rate by IQ groups in Denmark would be expected to lower the average IQ in the future. Assuming that immigrant groups in Denmark score similar to their home country as is the most plausible interpretation of my earlier study[2] (not necessarily for solely genetic reasons), then this study has shown Nyborg's general claim to be correct, namely that there is a negative correlation between subgroup IQ and fertility. Consequently, the average IQ of Denmark will decrease if nothing else changes.

Height turned out to be a useful predictor for crime, but only in multiple regression. The reason it does not work alone might be that it is correlated with other variables, especially IQ and GDP ( $r$ 's ). If the direct effect of height predicts crime, but it is indirectly associated with variables that predict non-crime, then the combined effect can be about zero.

Perhaps height only predicts lower crime due the inclusion of East Asian countries with low crime rates (Philippines, Indonesia, Japan, China, Burma, Thailand). One can test this by running the regression without the East Asian countries. Running Model 5 without the East Asian countries in fact increased the R value somewhat (from .858 to .889), and height remained a good predictor. Results in Table 9.

Sometimes a cause that is relevant within a population is not relevant or might have the opposite sign in a cross-population study. This seems to be the case for height here. A very large Swedish study recently studied the relationship between height and crime and found it to be negative, not positive (except in their full model, and here it was very slightly positive)[27].

What causes the low Asian crime rate? Of the bottom 5 countries of origin for crime rates, 4 of them are Asian. It must be a strong force. Consider

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.085	1.600		3.803	.000
	Islam	.032	.004	.685	8.255	.000
	Height	.557	.174	.321	3.199	.003
	IQ	-.029	.020	-.189	-1.430	.160
	GDP	-3.845E-5	.000	-.400	-3.014	.004

a. Dependent Variable: All\_crime\_no\_asian

Table 9: Model 5 without East Asian countries

Indonesia with a crime rate of 1.19. It has an IQ of 85.8 (similar to Algeria, crime rate 5.16), a GDP of 4923.00\$ (similar to Morocco, crime rate 5.7), and an Islam% of 88.1% (similar to Egypt, crime rate 5.57) and still immigrants from Indonesia have about half the crime rate of Danish citizens (2.45). Whatever cause it is, it is counteracting these other forces and overpowering them. Is height the explanation or a mere proxy for something else?

### 5.1 Future studies

This study only analyzed fertility and crime rates because no further data is available for Denmark. However, I have contacted DST and asked if they can release data for immigrant groups by country of origin for other known correlates of IQ, namely educational attainment, income, and being on social benefits. For policy makers, the outcome of future studies examining the predictability of these variables is highly relevant.

Other studies should replicate this study in other countries to further test the findings. Optimal countries are the other Nordic countries and in general other western countries with large immigrant populations from a diverse set of countries.

Selective immigration policies based on non-perfect group level correlations necessarily cause collateral damage in that they restrict access for people who would have become good citizens and fails to restrict others that will later become bad citizens. For this reason it is better to focus on individuals and future studies should use individual variables (IQ, educational attainment, language ability in the local language) to try and predict socially important variables like crime, fertility, income, educational attainment, and use of social benefits.

### 5.2 Error sources

None of the analyses in this paper have been corrected for statistical errors, but artifacts are known to be found in virtually every study[23]. Lynn and

Vanhanen's national IQ's perhaps have a reliability of .90, which attenuates the correlations. The crime rate is based on people actually caught and punished for crimes, which might include various biases of the justice system and further sampling errors. The height data were gathered haphazardly and don't come from the same year (there is a global increase in height similar to the Flynn effect) and have unknown reliability. The true effect of the variables examined in the analyses above are therefore very likely to be larger than estimated.

## 6 Detailed methods and data

Detailed methods and data can be found in the supplementary material.

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