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Economic, educational, and IQ gains in eastern Germany 1990–2006

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ABSTRACT

Lynn and Vanhanen (2012) have convincingly established that national IQs correlate positively with GDP, education, and many other social and economic factors. The direction of causality remains debatable. The present study re-examines data from military psychological assessments of the German federal army that show strong IQ gains of 0.5 IQ point per annum for East German conscripts in the 1990s, after the reunification of the country. An analysis of IQ, GDP, and educational gains in 16 German federal states between 1990 and 1998 shows that IQ gains had a .89 correlation with GDP gains and a .78 correlation with educational gains. The short time frame excludes significant effects of biological or genetic factors on IQ gains. These observations suggest a causal direction from GDP and education to IQ.

1. Introduction

In their recent review article, Lynn and Vanhanen (2012) present evidence from a multitude of studies that convincingly show that national IQs, based on national standardization studies of intelligence tests, such as Raven's matrices, correlate with a wide range of economic, social, and political phenomena, such as GDP, educational output, economic and political freedom, health, and religiosity. Lynn and Vanhanen explain these observations with a causal model in which geographic and climactic factors are proposed to account for differences in national IQs while IQ differences are proposed to explain most of the cross-national differences in economic and social conditions. However, the authors concede that economic and educational factors might exert a reciprocal causal effect on national IQs.

An alternative model to explain the abovementioned correlations is that economic factors act as the primus motor that affects access to education and national IQ as the last link of the chain. Compared to poor societies, wealthy societies have more resources for education, which is known to correlate highly with IQ. For example, in a study by Longman, Saklofske, and Fung (2007), the mean IQ of Americans with eight-year education or less was 86 while the respective figure for those with at least 16 years of schooling was 112. One of the main arguments for this model comes from IQ gains over time, "the Flynn effect". For example, there has been a gain of 3 IQ points per decade in the mean IQ of Americans from 1932 to 2002 (Flynn & Weiss, 2007). Changes in mean IQ over a few decades are unlikely to be based on biological and genetic factors. Social factors, such as level of education that contribute to mean IQ, may change more rapidly. Other factors that are associated with economic development and that may affect average cognitive performance include urbanization, nutrition, trend toward smaller families and better healthcare (Wicherts, Dolan, Carlson, & VanDerMaas, 2010).

The period for economic and educational progress is short in comparison to biological evolution, but long enough to make the analysis of the relationship between IQ, economics, and education complicated. Significant economic and educational progress usually requires decades, and IQ gains are likewise slow. A great number of contaminating variables may affect the comparison of test scores collected from samples in 1950s and 2010s, for example.

In a remarkable 1999 study that has not received due attention, military psychologists of the German federal army, Bundeswehr, compared the IQs of conscripts from eastern and western Germany (Ebenrett & Puzicha, 1999). Rapid economic and social development took place in eastern Germany in the

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1990s after the unification of the country. Genetic factors should have limited effects on differences between East and West Germans, while there were great differences in the social, economic and educational systems between the eastern and western states pre-1990. In the present study, a re-examination of Ebenrett and Puzicha's data was performed. The relationship between IQ, GDP, education and other social variables up to year 2006 was analyzed.

2. Conscript assessment: samples and methods

Germany had conscription for male citizens between 1956 and 2011. The psychological assessment of conscripts included tests of scholastic skills, such as reading and writing, as well as an intelligence test that consisted of a 1) matrix reasoning test, 2) verbal reasoning (word analogy) test, and 3) test of arithmetic skills (Ebenrett & Puzicha, 1999; Bundeswehr, 2012; an online practice test is available at the Bundeswehr site). In the 1990s, the test was a pencil and paper test taken in groups. The intelligence test was scored on a scale from one (highest) to seven (lowest score), with the mean of 4 and standard deviation of 1.

In the 1990s, roughly half of the young men served in the military. The mean age for conscripts participating in the assessment was 18 years, but the assessment could be postponed for medical or other reasons and taken between the ages 18 and 22. There were 357,000 conscripts in the 1974 birth cohort, 266,000 were from western Germany and 92,000 were from the east. Out of these young men, 287,000 were assessed as able to serve in the military. In 1992, roughly 99,000 men served in the civilian service due to conscious objection, 18,000 men served in the east and 81,000 in the west (Bundestag, 2001; Tobiassen, 2005; Zivildienst, 2002). Conscious objection was slightly more popular in the west than in the east. In a Bundeswehr survey from 1993, attitudes toward the army were more positive among East German youth and those planning a career in practical vocations than among West German youth and those wishing to study further (Kohr, Lippert, Maier, & Sauter, 1993).

There were 403,000 men in the 1980 birth cohort, 277,000 from the west and 126,000 from the east. Out of these, 303,000 were assessed as healthy and able to serve. In 1998, 137,000 men served in the civilian service, out of which roughly 29,000 served in the east (Bundestag, 2001; Tobiassen, 2005; Zivildienst, 2002). Overall, 235,000 conscripts, roughly 50,000 from the east, and 185,000 from the west participated in the psychological assessment of the Bundeswehr in 1992. In 1998, 248,000 conscripts, roughly 80,000 from the east and 168,000 from the west were tested (Ebenrett & Puzicha, 1999). Persons that had been granted the status of conscious objector or exempted for medical reasons from the service did not participate. All testees were between the ages 18 and 22. Test score did not affect the length of service time. In 1992, roughly 73% of the eastern draftees had completed only the basic 10-year school, while the respective figure for western draftees was around 47%. By 1998 these figures had drastically changed, 28% of the East German and 42% of the West German draftees had completed the basic compulsory education only(Ebenrett & Puzicha, 1999).

3. Educational and economic development after reunification

The changes in the educational background of the conscripts reflect the radical changes in the educational system of East Germany after the reunification. The educational system in the former German Democratic Republic (GDR) was different from the West German system mainly in the sense that significantly fewer students graduated from theoretically oriented secondary schools aimed at preparing students to enter universities. In addition, students were admitted to this type of schools based both on academic and political merits, such as active membership in the communist youth league (Pannier, 2008). However, the western system was implemented shortly after the unification of the country. In 1992, 33% of West German youth between the ages of 18 and 21 had diplomas (Abitur or vocational Abitur certificate) from schools granting admittance to universities while the respective figure for eastern Germany was 23%. By 1995, this difference had practically disappeared, the figure for the western states and eastern states indicated 37.5% and 34%, respectively (Destatis, 2004). The East German economy was based on socialism until 1990, and the GDP per capita was estimated to be roughly one third of that of West Germany. After the unification, there was swift economic growth and by 1998, the GDP of the eastern states had risen to 56% of the West German GDP (Destatis, 2012a).

4. IQ, educational, and GDP gains 1990–2006

Table 1 shows the rise in mean IQ scores, GDP, and education in German states between 1990 and 1998. The IQ score is based on figures from Ebenrett and Puzicha (1999; Fig. 3), and the original test scores (mean = 4, SD = 1) have been converted to IQ points (mean = 100, SD = 15). The figures for education show the percentage of youth with an Abitur certificate (Destatis, 2004; Schmidt, 1990). The year 1990 was chosen for the educational data because of the transit period in the school system in the early 1990s.

The annual IQ gain rate was 0.66 for eastern Germany and −0.16 for western Germany. The correlation between IQ and GDP was .79 in 1992 and .27 in 1998. The correlation between education in 1990 and mean IQ in 1992 was .51 but the correlation for education and mean IQ was −.33 in 1998. The correlation between IQ gain and GDP gain was .89, between IQ gain and educational gain .78, and between GDP and educational gain .89. However, within western Germany, the correlation between IQ gain and GDP gain was .03 and between IQ gain and educational gain −0.12. Thus, the strong correlations based on calculations involving all states mainly reflect the east–west divide and its gradual narrowing.

The negative correlation between mean IQ and education in 1998 across states obviously contradicts the abovementioned strong correlations between IQ gains and educational gains and implies that there are cross-state differences between graduates. Education in Germany is controlled by the states and not by the federal government and there are some differences in academic standards between states (Prenzel et al., 2008). Ebenrett and Puzicha (1999) calculated the mean IQs of the conscripts that had completed only the basic school (10 years of education or less) and that of conscripts that had attended any type of secondary school (more than 10 years of education).