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Does intelligence explain the association between generalized trust and economic development?

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ABSTRACT

Both generalized trust and intelligence are correlated with economic development. However, recent research has shown that trust and intelligence are themselves correlated, both across countries and among individuals. Theory suggests that causality runs from intelligence to trust at the individual level, which raises the possibility that the association between trust and development is explained by intelligence. Indeed, intelligence may cause both trust and development. Alternatively, development may lead to higher intelligence, which in turn gives rise to greater trust. Note that intelligence may cause trust not only because individuals with higher intelligence tend to report greater trust, but also because such individuals tend to be more trustworthy. This study analyzes data on trust, intelligence and economic development for 15 Spanish regions, 20 Italian regions, 50 US states, and 107 countries. In all four domains, there is a statistically significant positive relationship between trust and intelligence ($r = .74$, $r = .74$, $r = .72$ and $r = .50$, respectively). Moreover, partial correlations suggest that intelligence accounts for some or all of the association between trust and development in at least two out of the four domains.

1. Introduction

Generalized trust refers to trust in other citizens and members of the wider society (Putnam, 1993; Yamagishi & Yamagishi, 1994). In cross-national surveys such as the World Values Survey, it is assessed with the question: "Generally speaking would you say that most people can be trusted or that you can't be too careful in dealing with people?" A burgeoning literature in economics contends that generalized trust has a positive effect on economic development (Algan & Cahuc, 2010, 2013; Beugelsdijk, de Groot, & van Schaik, 2004; Bjornskov, 2012; Bjornskov & Meon, 2013; Guiso, Sapienza, & Zingales, 2011; Horvath, 2013; Knack & Keefer, 1997; Tabellini, 2010; Whitely, 2000; Zak & Knack, 2001; but see Roth, 2009). For example, Algan and Cahuc (2013) assert that "trust does indeed appear to constitute a decisive determinant of growth", while Bjornskov and Meon (2013) go so far as to claim that, "trust is the missing root relating education, institutions and economic development." There are several mechanisms by which trust is thought to promote economic growth, namely: lowering transaction costs, obviating the need for onerous regulations, and fostering norms of generalized morality (Algan & Cahuc, 2013; Guiso et al., 2011).

At the same time, a large literature in psychology has shown that intelligence is positively correlated with economic development (Lynn & Vanhanen, 2012a, 2012b; Meisenberg & Lynn, 2011; Rindermann, Woodley, & Stratford, 2012; Wicherts, Borsboom, & Dolan, 2010a; Woodley, Rindermann, Bell, Stratford, & Piffer, 2014). This is true not just across countries, but also among regions within a country (Dutton & Lynn, 2014; Kura, 2013; Lynn, 2010, 2012a; Lynn & Cheng, 2013; Pesta, McDaniel, & Bertsch, 2010). Some have argued that intelligence stimulates development via mechanisms such as scientific–technological accomplishment, and the adoption of capitalist institutions (Burhan, Mohamad, Kurniawan, & Sidek, 2014; Rindermann, 2012; Rindermann & Thompson, 2011). Others

Abbreviations: r_p, partial correlation.

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have asserted that, in fact, development enhances intelligence through pathways such as better nutrition and superior education (Daniele, 2013; Wicherts, Borsboom, & Dolan, 2010a, 2010b). Still others have suggested that both intelligence and development are influenced by a third factor, namely the incidence of infectious disease (Eppig, Fincher, & Thornhill, 2010, 2011).

However, recent research has shown that trust and intelligence are themselves correlated, both across countries and among individuals. Combining data on trust from Inglehart (1997) with data on intelligence from both Lynn and Vanhanen (2006) and several international student assessments, Rindermann (2008) reports a correlation between trust and intelligence of $r = .49$ in a sample of 41 countries. And at least four recent studies have documented an association between trust and intelligence among individuals. Sturgis, Read, and Allum (2010) report one in the United Kingdom; Hooghe, Marien, and de Vroome (2012) report one in The Netherlands ($r = .30$, $n = 1931$); Oskarsson, Dawes, Johannesson, and Magnusson (2012) report one in Sweden ($r = .25$); and Carl and Billari (2014) report one in the United States.

There are two main, related explanations for the association between trust and intelligence among individuals (Cosmides, Barrett, & Tooby, 2010; Yamagishi, 2001; Yamagishi, Kikuchi, & Kosugi, 1999). First, individuals with higher intelligence may be better at evaluating others' trustworthiness, meaning that they tend to have relationships with people who are unlikely to betray their trust. Second, they may be better at identifying when any particular person has a strong incentive not to reciprocate trust, based on the characteristics of the prospective interaction. Another possibility is that they are simply more likely to interact with people who have less to gain from acting untrustworthily. Yet this seems unlikely given that the association between trust and intelligence persists after controlling for many different indicators of socio-economic position (Carl & Billari, 2014; Sturgis et al., 2010).

The finding that individuals with higher intelligence are more trusting, and the existence of plausible explanations for why, raises the possibility that previous studies have overestimated the effect of trust on development. In particular, the association between trust and development may be confounded by intelligence (see Lynn, 2010). Holding the level of trustworthiness constant, if individuals with higher intelligence tend to have their trust betrayed less often, a population with higher average intelligence should have greater average trust. And this should be true irrespective of whether intelligence causes development, development causes intelligence, or there is bi-directional causality between intelligence and development. Another mechanism through which intelligence might explain the association between trust and development is the tendency for individuals with higher intelligence to behave less selfishly in strategic encounters and to be more norm-abiding in general (Chen, Chiu, Smith, & Yamada, 2013; Frisell, Pawitan, & Langstrom, 2012; Jones, 2008; Segal & Hershberger, 1999). Specifically, if individuals with higher intelligence tend to betray one another's trust less often, a population with higher average intelligence should again have greater average trust.[1] An alternative hypothesis, which has been advanced by Bjornskov (2012), is that greater trust leads to higher intelligence through better schooling. Using data on 15 Spanish regions, 20 Italian regions, 50 US states, and 107 countries, this study presents preliminary evidence as to whether the association between trust and development is in fact explained by intelligence.

2. Method[2]

2.1. Data for Spanish and Italian regions

Data on intelligence in 15 Spanish regions and 20 Italian regions were taken from the 2009 and 2012 PISA tests (OECD, 2010, 2014). In particular, each region's average intelligence was obtained by first averaging scores across the three components (mathematics, reading and science) within each year, and then averaging across the two years (2009 and 2012). These data are very similar to the ones used by Lynn (2010, 2012b), who investigated the socio-economic correlates of intelligence among the regions of Italy. Lynn (2010) used data from the 2006 PISA tests, which were available for only 12 Italian regions, while Lynn (2012b) used data from the 2009 PISA tests. Because Lynn's data (2010, 2012b) have been subjected to a number of criticisms (Beraldo, 2010; Felice & Giugliano, 2011; Cornoldi, Giofre, & Martini, 2013; but see Piffer & Lynn, 2014), I check the robustness of my results for Italy against an alternative dataset that was compiled by Templer (2012) from a nationwide IQ survey[3]; to my knowledge, no alternative dataset exists for Spain. Encouragingly, the Pearson correlation between Templer's (2012) measure of intelligence and the measure calculated from the 2009 and 2012 PISA tests is very high, namely $r = .88$ ($p < 0.001$). Data on trust were taken from Tabellini (2007), who calculated the average trust in a large number of European regions using the World Values Survey. Data on economic development were taken from Eurostat (2014). Specifically, each region's GDP per capita at PPP over the years 2000–2011 was obtained from the database. 2000–2011 was the longest time range on which GDP data were available for all four domains (Spanish regions, Italian regions, US states, and countries).

2.2. Data for US states

Data on intelligence were taken from McDaniel (2006a), who computed the average intelligence in all 50 states using scores from the National Assessment of Educational Progress. This measure has been shown to have greater validity than alternative measures based on scores from the SAT or ACT (Kanazawa, 2006; McDaniel, 2006b). Data on trust were taken from Fairbrother and Martin (2013), who calculated the average trust in all 50 states for 1980, 1990 and 2000, using the General Social Survey. Values were averaged across the three time-points, yielding a single value for each state. This was done on the basis that the Pearson correlation between trust in 1980 and trust in 2000 is extremely high, namely $r = .97$ ($p < 0.001$). Indeed, previous studies have found that the average trust in a country is highly stable over time (Bjornskov, 2006; Uslaner, 2008). Data on economic development were taken from the U.S. Department of Commerce (2014).

[1] I owe this point to an anonymous reviewer.

[2] The data used in this study are available in an online Appendix.

[3] This dataset comprises 19 Italian regions.