Review of: "Cross-national associations of IQ and infectious diseases: Is the prevalence of Corona an exceptional case?"

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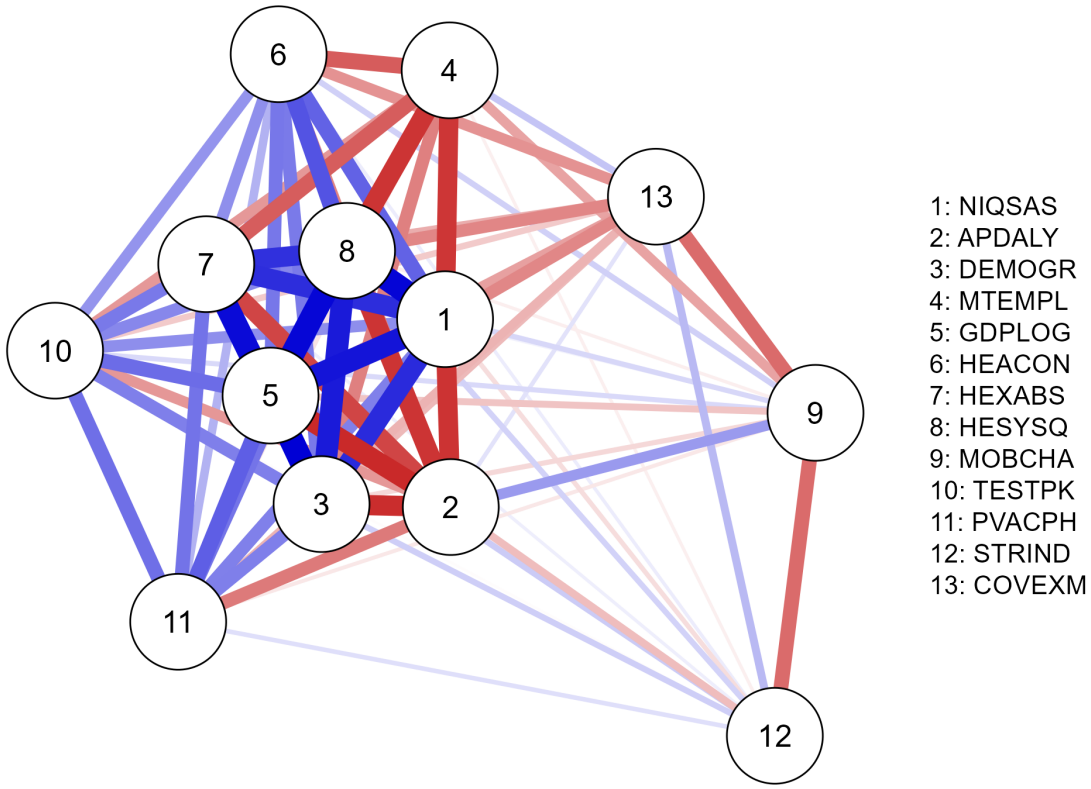
The article “Cross-national associations of IQ and infectious diseases: Is the prevalence of Corona an exceptional case? tries to find out which parameters of a country are associated with the recent COVID-19 pandemic. The authors set out a major task by collecting data from all countries on health and wealth, education, demographics, environmental factors and pandemic key variables. For a range of infectious diseases, countries with a better educational system do better. However, SARS-CoV-2 is a virus that is affected by sunlight and like the flue, thrives better in cold climates. Given the North-South difference in education and wealth (see Jared Diamonds work), one might wonder whether SARS-CoV-2 would be “exceptional” in the sense that countries in the northern hemisphere despite their citizens are higher educated would be affected more by the COVID-19 pandemic. If so, it would imply that higher education per se would not protect against infectious diseases. Thus, it rests on the assumption that higher education (the used data as proxy for intelligence do reflect the educational system and wealth) is related to more rational behaviour. Notably, the authors leave this assumption untouched. They rather focus on gathering data for all countries (see their table 1).

As the authors note, not all factors can be analysed, and they focused on the main ones. They gathered data on winter temperature and air pollution to address environmental factors relevant for infectious diseases. They gathered data on the health of the countries citizen, focusing on those known to be major players, e.g. cardiovascular diseases. They also gathered data on the health system, the wealth (GDP) of a country and vaccination.

Gathering all this data is impressive. Still, the authors' analysis rests on two unfounded assumptions. The first is that there is a linear relationship between the predictor and outcome variables. This might not be true. Not very educated and highly educated may show the same “rational ” behaviour but for different reasons. The ones with some education may appear as the least rational. The second is that all of the predictor variables are predictors but not confounders or colliders. This latter can be resolved by using a network (in R the package psychonetics). This is the more appropriate analysis method IMO anyway as a regression with more than 2 predictors requires a sample size of over 200 (see Brysbaert, https://journalofcognition.org/articles/10.5334/joc.72 and references therein).



Since the authors provide the data, above is a network plot for the main variables, e.g. NIQSAS, MTEMPL, APDALY, GDPLOG, DEMOGR, HEACON, HEXABSm HESYSQ, MOBCHA, TESTPK, PVACPH, STRIND, COVEXM (focusing on excess mortality, replace with one of the other outcome variables if desired). Blueish edges indicate positive correlations, redish edges indicate negative correlations, intensity of the colour indicates strength of the correlation. The above plot uses the 2020/2021 dataset provided by the authors.
Winter temperature (the higher the more excess mortality), education/intelligence (the higher the less excess mortality), mobility (the higher the less excess mortality), stringency (the higher the more excess mortality), and so on can be seen from the plot.

Minor issues: the authors could explicitly state what a strong test of the hypothesis IQ ~ infections disease would be, i.e., significant association in all subsamples and regressions, whereas a weak test would be if only around 50% of the regressions finds an association between IQ and infectious disease burden. This would be a robustness check.

The authors could be more explicit in stating that their variables are proxies for certain concepts, not least the catchy but problematic term of intelligence and it being different across nations (see Gould and mismeasure of man). Still, the authors' analysis tries to bridge individual, environmental and socio-economical factors. By allowing the interaction between those factors (network analysis), we can see that a cluster for demographics, GPD (wealth), health system, health condition and education/intelligence. Disease-related variables like vaccination, stringency and not change in

mobility are further apart and play less of a role.

Overall, the work, not least by providing the data and scripts, is impressive and will stimulate more research into this topic.