

# Social Values Are Significant Factors in Control of COVID-19 Pandemic – Preliminary Results

Andrzej Jarynowski<sup>1,2</sup>, Monika Wójta-Kempa<sup>3</sup>, Daniel Platek<sup>4</sup>, Vitaly Belik<sup>2</sup>

1 Interdisciplinary Research Institute, Wroclaw, Poland.

2 System Modeling Group, Institute for Veterinary Epidemiology and Biostatistics, Freie Universität Berlin, Germany, Email: [ajarynowski@interdisciplinary-research.eu](mailto:ajarynowski@interdisciplinary-research.eu)

3 Wroclaw Medical University, Faculty of Health Science, Department of Public Health, Poland, Email: [monika.wojta-kempa@umed.wroc.pl](mailto:monika.wojta-kempa@umed.wroc.pl)

4 Polish Academy of Sciences, Institute of Political Studies, Warsaw, Poland, Email: [dplatek21@gmail.com](mailto:dplatek21@gmail.com)

## Abstract

Registry and survey data gave an opportunity to compare possible roles of social attitudes and social values in control and limit the COVID-19 pandemic. We analysed social values and time series of daily R0 (reproduction rate) estimates for 27 European countries. Embedded and affective autonomy are significantly negatively associated (p-Value<0.05) with controlled R0. It could mean that well interconnected societies with high attention to maximize utilities are more likely to couple with COVID-19. Hierarchy is significantly positively associated (p-Value<0.05) with controlled R0. Thus, hierarchical structures could inhibits control of COVID-19. The results emphasize the need to pay more attention to social values context in evaluating the effectiveness of mitigation strategies internationally.

**Keywords:** COVID-19; social values; cross-cultural studies

## Problem Introduction

Registry and survey data gave an opportunity to compare possible roles of social attitudes and social values in control and limit the COVID-19 pandemic. Social norms are rules that define what people should and should not do in a social environment. People are instructed by norms that tell them to keep (or not) imposed mitigations like social distancing and precautions (e. g. hand hygiene and wearing a mask).

Disregarding medical and biological differences, we are trying to consider the relative cross-cultural differences to predict success of mitigation strategies for COVID-19 pandemic in European countries.

There were 2 attempts to connect COVID-19 with socio-cultural variables so far in searching engines:

- For 63 world countries, there was no significant relationship between social dimensions and COVID-19 case numbers (Pogrebna & Kharlamov 2020);
- For 93 countries (Messner 2020) epidemic growth rate was significantly explained by institutional context (negatively associated), education (positively associated), individualistic rather than collectivistic (negatively associated), power distance (negatively associated), Hedonistic values (positively associated).

However, these studies measure the starting phase of disease spread. In this paper we are targeting success by controlling strategies instead. We have previously compared Poland, Italy, South Korea, China and Iran to investigate the relationship between social dimensions and success in COVID-19 management without statistical testing (Jarynowski, et al. 2020).

## Methodology

We analysed social variables and time series of daily  $R_0$  (reproduction rate) estimates for 27 European countries from ECDC dataset (Kossakowski et al. 2020).

We define epidemiological variables:

- starting  $R_0$  - maximal observed  $R_0$  (proxy for natural epidemic pattern);
- controlled  $R_0$  - Mean  $R_0$  for each country is a proxy of effectiveness of mitigation strategies.

As a remark - lower controlled  $R_0$  is better, a country is more successful controlling epidemic in reducing  $R_0$ .

Schwartz (Schwartz 2006) social dimensions according to World Value Study 2005 (indexes in range 1-5) are the independent variable in our study. Every society may be described using mix of dimensions below:

- "harmony": people desire to fit into the environment without trying to alter it;
- "embedded": refers to the extent to which people are connected to each other's being a part of collective entity;
- "hierarchy": reliance on hierarchical systems;
- "mastery": people tendency to take control over the environment;
- "affective autonomy": the normative tendency for people to maximize their own utility;
- "intellectual autonomy": the normative desire for people to pursue intellectual ideas;
- "egalitarianism": a desire for people in the society to treat each other as moral equals.

## Results

We can see significant relationships in a linear multiple regression between controlled  $R_0$  and social dimensions (Tab. 1, Fig. 1).

	Estimate	Std. Err	t	p-Value
(Intercept)	2.84	3.72	0.77	0.45

harmony	-0.52	0.28	-1.89	0.07
embedded	-0.83	0.34	-2.41	0.03
hierarchy	0.52	0.20	2.64	0.02
mastery	0.32	0.34	0.96	0.35
affective autonomy	-0.63	0.20	-3.15	0.01
intellectual autonomy	0.50	0.26	1.96	0.07
egalitarianism	0.28	0.21	1.35	0.19

Tab 1. Multiple regression for 27 European Countries - dependent variable controlled  $R_0$ . (Adjusted  $R^2=0.52$ , 19 degrees of freedom)

Embedded and affective autonomy are significantly negatively associated ( $p$ -Value $<0.05$ ) with controlled  $R_0$ . It could mean that well interconnected societies with high attention to maximize utilities are more likely to couple with COVID-19. Hierarchy is significantly positively associated ( $p$ -Value $<0.05$ ) with controlled  $R_0$ . Thus, hierarchical structures could inhibit control of COVID-19.

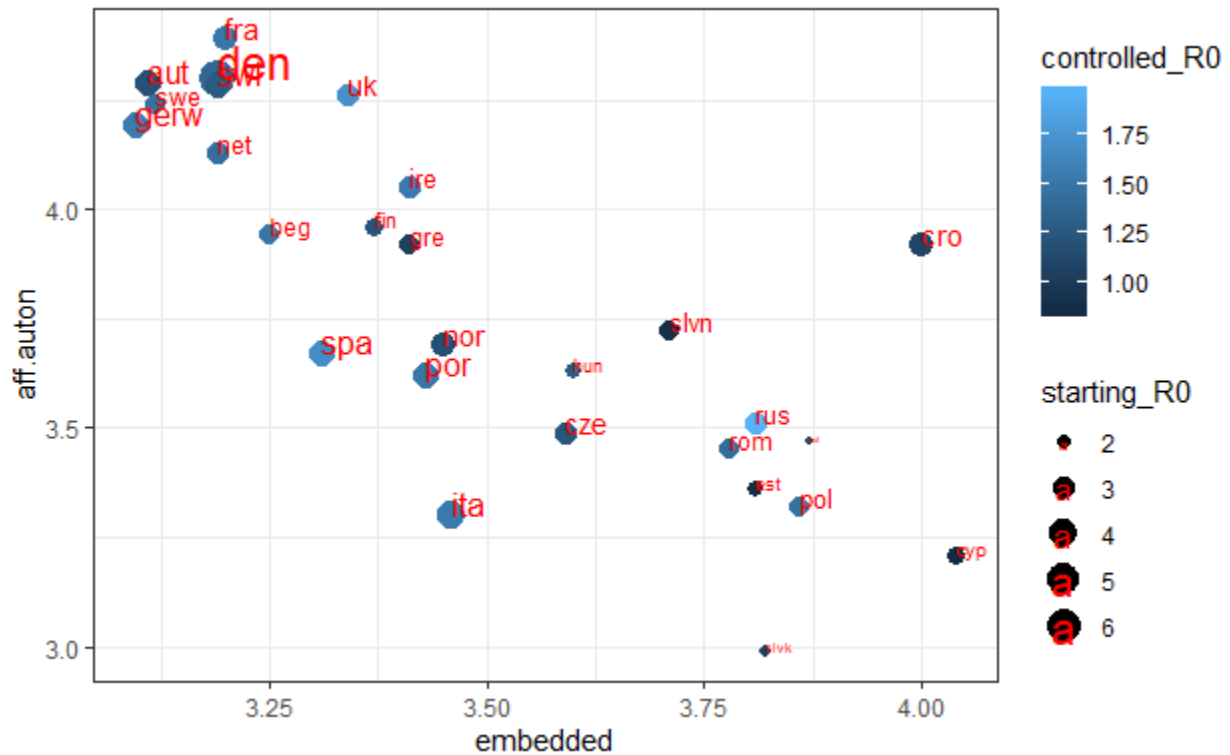


Fig 1. Visualisation of two the strongest and the most significant social dimensions (affective autonomy, embedded) and controlled/starting  $R_0$  for 27 European countries.

## Conclusions

Many factors may have contributed to deal with the consequences of pandemic COVID-19, but we show that social values have a statistically significant impact on disease control in Europe.

The results emphasize the need to pay more attention to social values context in evaluating the effectiveness of mitigation strategies internationally. However, the causation mechanisms could be more complex (e.g. by additional confounding variables as health care capacity). With some precautions, comparing outbreak dynamics in different countries could give the opportunity not only to explain why some countries are better than others, but also show how to inhibit the disease spread in future.

## Literature

Jarynowski A, Wójta-Kempa M, Piatek D, Czopek K. (2020) Attempt to understand public health relevant social dimensions of COVID-19 outbreak in Poland. *Society Register*, 4(3), 7-44.

Kossakowski, G at al., (2020). Rt Covid-19 Europe. <https://github.com/gkossakowski/covid-19>

Pogrebna, G., & Kharlamov, A. (2020). The Impact of Cross-Cultural Differences in Handwashing Patterns on the COVID-19 Outbreak Magnitude.

Messner, W. (2020). The Institutional and Cultural Context of Cross-National Variation in COVID-19 Outbreaks. medRxiv.

Schwartz SH. (2006). A Theory of Cultural Value Orientations: Explication and Applications. *Comparative Sociology* 5(2), 137– 182.