

SOCIAL VALUES ARE SIGNIFICANT FACTORS IN CONTROL OF COVID-19 THE FIRST PHASE PANDEMIC

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ABSTRACT

Introduction. This study examines the relationship between social values and the control of the COVID-19 pandemic in selected European countries during the early months of 2020.

Methods. Utilizing epidemiological data, including starting and controlled reproduction rates ($R(t)$), and social values' dimensions based on Schwartz's framework, we uncover significant associations by linear regressions.

Results. Our findings reveal that highly hierarchical societies with a strong focus on maximising individual utility (affective autonomy) are less successful in controlling the spread of the virus. Conversely, societies with interconnected (embedded) structures appear to be more effective in disease control. Our discussion acknowledges the complexity of distinguishing between natural disease patterns and control efforts. Interactive dashboard is available: <https://infodemia-koronawirusa.shinyapps.io/culture/>

Conclusions. This study underscores the substantial influence of social values on disease control in Europe. It emphasises the need to consider social contexts when evaluating the effectiveness of mitigation strategies on an international scale. While recognising the potential role of confounding variables such as healthcare capacity, our research suggests that analysing outbreak dynamics across countries can provide insights into not only why some nations fare better but also how to combat future disease spread effectively.

Keywords: social values, covid-19, infection control, social epidemiology

INTRODUCTION

Values (according to Schwartz definition (Schwartz, 2006)) play a significant role in shaping behaviour, especially during times of crisis. Some societal properties can embrace practices to establish or reinforce behaviour and values that can support their organisations and communities during a crisis such as the coronavirus outbreak (D'Auria & De Smet, 2020). There is the hierarchy of stability of given state from the most fundamental to the most varying Beliefs, Attitudes/Values, Norms, Opinions. Thus, values are deeply ingrained rules principles that guide individuals and communities in making decisions and taking actions in dimensions as (according to Schwartz among others): i) Compassion and Solidarity (prioritising societal over the individual utilities); ii) Responsibility and Duty (tendency to respect guidelines); iii) Trust in government in healthcare professionals (willingness to follow the experts); iv) Resilience and Adaptability (problem-solving attitude); v) Ethical Decision-Making (prioritising health over freedom).

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 i.e. in context of an epidemic. For behavioural decision (i.e. covering mouth as nose) can influence values, emotional and cognitive context.

RELATED WORKS

People are instructed by norms that tell them to keep (or not) imposed mitigations like physical distancing and precautions (e.g. hand hygiene and wearing a mask). Human behaviour toward measures was predicted by personality and social traits, rather than fear and anxiety (Di Crosta, et al., 2021).

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 $R(t)$ (reproduction rate) estimates for 27 European countries from ECDC dataset (Kossakowski, et al. 2020) on 30.01-28.04.2020.

We define epidemiological variables:

- starting R_t - maximal observed daily $R(t)$ (proxy for natural epidemic pattern) - first week after disease introduction to a given country;
- controlled R_t - Mean daily $R(t)$ for each country is a proxy of effectiveness of mitigation strategies - the disease dynamics a week after disease introduction to a given country.

As a remark - lower controlled $R(t)$ is better, a country is more successful controlling epidemic in reducing $R(t)$.

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 maximise 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_t and social dimensions (Tab. 1, Fig. 1).

Table 1

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

controlled R_t	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

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

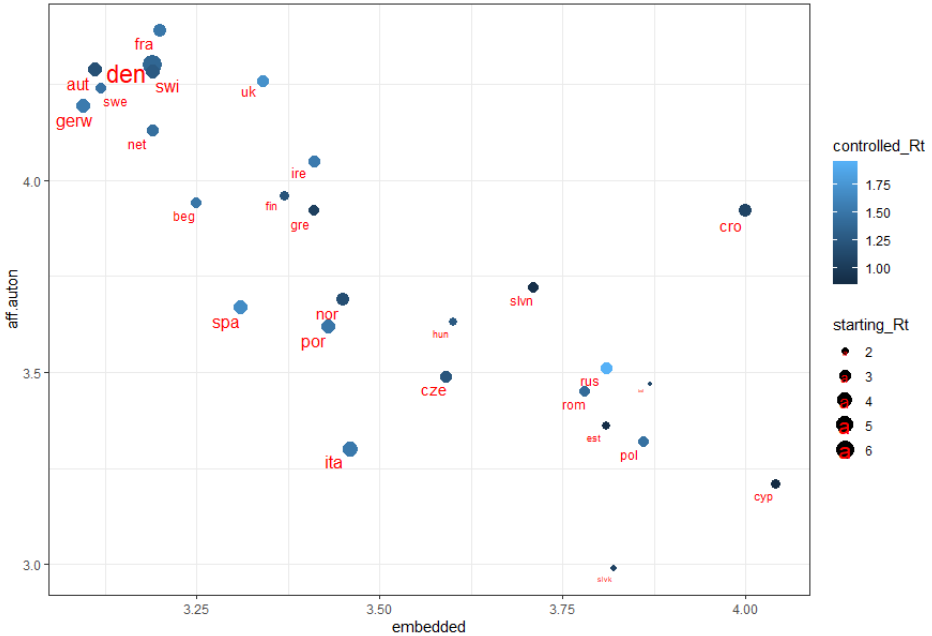


Fig 1. Visualisation of two the strongest and the most significant social dimensions (affective autonomy, embedded) and controlled/starting R_t for 27 European countries. Source: Own Research

DISCUSSION

In the context of infectious disease outbreaks, understanding whether the observed trends are a result of natural progression or effective control measures is a complex challenge. Our ability to accurately differentiate between these two factors can be clouded by various variables and circumstances. Due to epidemiological paradox (both surveillance and people behaviour are moderated by social values) direct causal statements are allowed (Hernán, Robins, 2020).

When we examine the dynamics of an infectious disease outbreak, such as the COVID-19 pandemic, it often appears that control measures such as DDM (distance, disinfection, masks) have a substantial impact. This is particularly true when public health initiatives including testing, contact tracing, epidemiological surveillance, quarantine, and vaccination campaigns, are effectively implemented. These measures can significantly alter the course of the outbreak and reduce transmission rates.

Furthermore, the concept of “embedding” or networking, which refers to the interconnectivity and communication within communities, plays a pivotal role in controlling epidemics. Strong social networks and effective information dissemination can facilitate the rapid spread of vital information, promote adherence to preventive measures, and encourage collective action (Stochmal, et al., 2021). On the other hand, pathogens spread faster in better networked societies, and one

of the propositions of non-pharmaceutical intervention was discontinuing. For instance, psychological differences in terms of trust in government, citizens, and in particular toward science predicted individuals' behavioural intentions across countries during pandemic (Pagliaro, et al., 2021).

In essence, our intuition suggests that during a crisis like a pandemic, it is the proactive control measures and the strength of our interconnectedness as a society that predominantly influence the course of the infectious process. While natural factors certainly play a role, our ability to respond effectively and collectively is the key to mitigating the impact of infectious diseases. This underscores the importance of public health preparedness, timely interventions, and community cooperation in managing and ultimately overcoming epidemics.

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 emphasise the need to pay more attention to social values context in evaluating the effectiveness of mitigation strategies internationally. However, the causal 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 spread of disease in future. In very probable scenario of future (re)-emerging epidemics, the discovered pattern may return. Thus, more social embedded and harmonic societies would control infection better than more hierarchical and individualist ones.

Visualization: <https://infodemia-koronawirusa.shinyapps.io/culture/>

Code: <https://github.com/ajarynowski/values/>

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