

# Adoption of measures to mitigate the impact of COVID-19: In search of a Hofstedian explanation for patterns among individual countries and country clusters

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## ABSTRACT

We consider multiple safety measures in relation to the COVID-19 virus and look at their adoption levels for a variety of 15 individual countries, based on data from Yougov.co.uk. Subsequently, we establish correlation coefficients between measure-specific uptake levels and Hofstede dimension scores for all countries considered. We notably find that Power Distance Index (PDI) and Individualism (IDV) have a considerable explanatory power.

In addition, we carried out a Principal Components Analysis (PCA) and a cluster analysis to see whether the behavioural patterns across countries can be grouped, and which Hofstede dimensions correlate strongest with the two main components that follow from the PCA. The PCA provides further confirmation of PDI and IDV being the most important explanatory factors for the uptake of measures across countries. The cluster analysis, in turn, reveals four broad groups, which only partly coincide with the way that the mental image clustering scheme by Wursten (2019) allots countries into its respective clusters. Hence, this provides a basis to suggest that data-driven exercises like the ones from our paper can serve to adjust Wursten's intuitive scheme.

## 1. Introduction

The COVID-19 pandemic hit the world by storm in 2020, and its rapid spread led to a global health crisis. As a consequence, different vaccines were developed and made available, and targeted hospital equipment (respirators, ventilators, etc.) was mobilized across the world to reduce the virus' impact (Bian et al., 2021; Nguyen et al., 2021).

At first sight, it would be logical to expect that those countries with higher healthcare expenditure levels and a more elaborated industrial texture (cfr. in terms of the economic complexity index: <https://oec.world/en/rankings/eci/hs6/hs96>) ought to be able to respond to the pandemic in a more timely and effective matter.

While the endowment and (technological) capacities of national healthcare systems and the level of economic development are certainly of influence on countries' abilities to deal with a health crisis (Erman and Medeiros, 2021, p. 2), when looking at data on health expenditure per capita and the economic complexity ranking, this does not seem to

explain why -for example- a country like the USA did not do better in combatting COVID-19 than Spain. I.e., healthcare expenditure per capita in the USA is 4 times higher than Spain's (<https://data.worldbank.org/indicator/SH.XPD.CHEX.PC.CD>), and its score on the economic complexity index doubles that of Spain. Still, in terms of death rate and reported infections per 100,000 citizens, the USA did worse than Spain as the pandemic rolled on (<https://ourworldindata.org/coronavirus/>).

Hence, it can be postulated that other variables must be in play to understand why the evolution of the pandemic follows one course or another in different countries (Erman and Medeiros, 2021; Rajkumar, 2021). One set of such variables can be sociological attributes or dimensions of national culture (Wang et al., 2021).

When wanting to assess whether socio-cultural habits interfere in the way that citizens respond to the measures that national authorities issued to fight the COVID-19 pandemic, several scholars (e.g. Bian et al., 2021; Biddlestone et al., 2020; Germani et al., 2020; Gupta et al., 2021; Huynh, 2020; Maaravi et al., 2021; Wang et al., 2021; Wang, 2021) have

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looked towards the 6 dimensions (6-D) model by Hofstede et al. (2010). They have typically examined whether the adoption of specific safety measures was more or less followed by citizens from specific countries, and whether the respective uptake levels show a correlation with the scores of these same countries on one or multiple Hofstede dimensions.

Our paper follows a similar approach, but goes beyond the current state-of-play in the sense that we consider multiple safety measures in relation to the COVID-19 virus. Moreover, we do not just look at a variety of individual countries, but we also try to discern groups of countries with common adoption patterns among them, and what Hofstedeian explanations can be found behind the clustering of these countries. For this purpose, we look at how the groups or clusters that emerge from our analyses hold against the mental image clusters by Wursten (2019). Also, in terms of statistical methods and techniques to analyse correlations between cultural values in different countries and the following of measures to curb the impacts of COVID-19, our paper provides additionalities. By establishing a Pearson correlation matrix and applying a Bartlett test of sphericity to it, confirmation was obtained that carrying out a Principal Components Analysis with regard to the adoption of anti COVID-19 measures across countries be indicated. This is a methodological novelty in the realm of the Hofstede model and the study of measures to reduce the COVID-19 pandemic, and subsequently allows revealing the most influential cultural dimensions behind the adoption of anti-COVID-19 measures across countries. In addition, a cluster analysis was conducted with regard to country-specific adoption of COVID-19 safety measures leading to a tree diagram (“dendrogram”), which allows discerning country clusters. This is another methodological novelty within the present research context. It shows how countries cluster hierarchically in function of their relationship to the adoption of anti-COVID-19 measures, and serves as a touch stone for assessing commonalities in terms of country scores on the Hofstede model dimensions. Applying these diverse techniques and analyses contributes to appraising the congruence and robustness of our findings.

In terms of the data we processed, firstly we sourced from Yougov: <https://yougov.co.uk/topics/international/articles-reports/2020/03/17/personal-measures-taken-avoid-covid-19>. This source provides information for a series of countries on how strictly citizens abided to measures that could curb the pandemic. Secondly, for those countries that provided sufficient numerical data on the respective measures that Yougov monitors, we establish their scores on the different dimensions of Hofstede’s 6-D model (see <https://www.hofstede-insights.com/fit/product/compare-countries/>). Thirdly, we look at the countries’ adherence to one or another mental image of Hofstede’s typology of national cultures (Wursten, 2019) and group them accordingly.

We notably find that Hofstede’s dimensions on Power Distance Index and Individualism have a considerable power to explain the considered countries’ following of the measures that Yougov reports on. Finally, the country clustering analyses on the adoption of safety measures reveal four broad groups, which only partly coincide with the way that the mental image clustering scheme by Wursten (2019) allots countries into its respective clusters. Hence, this provides a basis to suggest that data-driven exercises like the ones from the present paper can serve to make adjustments to this scheme.

The rest of the paper is structured as follows: section 2 provides a literature review; section 3 explains the methodology and data used to carry out our research; section 4 presents our results; section 5 discusses our findings, and section 6 closes with conclusions.

## 2. Literature review

As the COVID-19 pandemic spread across the world, one of the first measures applied in many countries was to wear a protective mask to lower the chance of spreading and contracting the virus. Various studies have shown that mask wearing does mitigate the spread of the virus (see Aravindakshan et al. (2020) for primary research in this regard, or Brooks and Butler (2021) for an overview of studies looking into the

relevance of this measure), though it remained a controversial measure in many countries. Practices such as social distancing have also been recommended by government officials, and they have likewise proven to be relevant in curbing the virus’ spread and contraction rates (Mahtani et al., 2020; Matrajt and Leung, 2020). Nevertheless, complying with this recommendation is not so self-evident in all places, as both demographic circumstances (population density across countries and locations) and socio-cultural habits (cfr. differences in preferred interpersonal distance or proxemics across culture – Hall, 1966; Hoft, 1996) influence cultural propensities to keep a distance.

In relation to the question whether socio-cultural dimensions have an impact on the acceptance of and compliance with pandemic-related measures (Sabat et al., 2020), several studies explored and tested its relevance. In the realm of social distancing, Baniamin et al. (2020) report that countries with sociable cultures such as Italy and Spain suffer more, while it is easier for a country like Japan to adopt such a measure due to a lesser affinity with close contact in Japanese culture. Accordingly, Huynh (2020) postulates that societies that are more risk-averse may embrace social distancing more easily. In a similar vein, Gelfand et al. (2021) found that “tighter cultures” (where members are more willing to make personal sacrifices for the benefit of the community) have been able to contain the spread of the virus more efficiently and effectively than “looser cultures”. Wang (2021, p. 12), in turn, establishes that it is government stringency that counts for social distancing, and consequently infers that national culture does not have that many impacts on social distancing during COVID-19.

To address the question whether cultural differences does lead to different attitudes of national populations towards pandemic-related measures, several scholars recurred to Hofstede’s 6-D model (like Bian et al., 2021; Biddlestone et al., 2020; Germani et al., 2020; Huynh, 2020; Wang et al., 2021).

Bian et al. (2021) looked at levels of individualism and correlated it to social distancing compliance during COVID-19 times. After controlling for several intervening variables, they found that higher levels of individualism reduced compliance with lockdown orders by 41 %. While their research focused mostly on the U.S., the authors noted that by using Google data on 83 countries they found the same pattern: more individualistic countries are less likely to engage in social distancing.

Biddlestone et al. (2021) investigated whether levels of individualism influences people’s intentions to engage in behaviour (i.e., social distancing and hygiene measures) that reduces the spread of COVID-19. Sourcing respondents chiefly from countries that score high on IDV (the UK and USA contributed two thirds of the sample), with the rest of the sample coming from countries with lower scores on the IDV dimension, they observed how individualism is positively correlated with a reduced willingness to adhere to social distancing measures. Also, support for the relationship individualism-social distancing was stronger than for individualism-hygiene intentions.

A study by Germani et al. (2020) departed from the assumption that concerns about COVID-19 and psychological maladjustment may be related to cultural factors, such as individualism. They surveyed a total of 1183 Italian emerging adults regarding their worries about the pandemic. Results showed that they were more anxious about their relatives, followed by general/social concerns, whereas they worried least about themselves. As the authors only focused on one Hofstede dimension, individualism, with Italy scoring relatively high on this dimension, the authors did not manage to give a conclusive explanation for their findings. Consequently, they provide ammunition for arguing that more if not all Hofstede dimensions should be considered to balance the books.

Huynh (2020) set out to determine whether UAI, PDI and IDV influence the mobility and following of preventive measures among citizens across 58 countries. Using data from Google Community Mobility Reports with regard to social distancing, he found that Hofstede’s UAI dimension had a clear inverse correlation with the frequency of people meeting in public. In other words, countries with a high UAI score were

less prone to move around and partake in social gatherings, therefore respecting social distances. This implies that populations that display high UAI scores tend to reduce the frequency with which they go to public spaces. Conversely, citizens from countries with high IDV scores are more likely to visit public areas.

Finally, a study carried out by [Gupta et al. \(2021\)](#) looks into the relationship between PDI and IDV and different countries' resistance and reluctance to accept digital technologies that can help attenuating the impact and spread of the pandemic. While they do not test whether country scores on PDI and IDV explain the level of willingness to adopt digital technologies, they hypothesize that Hofstede's dimensions can be used to predict the acceptance of such technologies. Basically, they foresee that countries with less aversion to social distancing are more likely to favour the use of digital technologies and, indirectly, with the following of other preventative measures in the wake of the pandemic.

### 3. Methods and data

Building upon the reviewed body of research that was reviewed in the previous literature section, this paper sets out to expand the understanding of the behaviour and response to pandemic-related measures of citizens from various countries. For that purpose, in terms of information sources, we recur to two datasets. The first one is the Yougov website. The second one is the Hofstede Insights website.

#### 3.1. Data

##### 3.1.1. Yougov data

The YouGov website contains data based on the surveying of citizens from 25 different countries since early 2020, asking them whether they are adopting specific measures to avoid contracting and spreading the COVID-19 virus.

The YouGov survey asks respondents about the following of 8 measures, from which we disregarded one (namely: the consumption of raw meat). Consequently, we considered the following measures<sup>1</sup>:

- avoiding crowded public places.
- wearing a mask in public places.
- avoiding going to work.
- stopping sending children to school or childcare.
- improving their personal hygiene.
- refraining from touching objects in public.
- avoiding physical contact with tourists.

The survey contains 'yes or no' questions, so the resulting data per country is presented as a percentage of the people that answered 'Yes' and thus declared that they were following one measure or another. The surveying activity started on the 20th of February 2020 and the last data sample we considered was the one from the 6th of June 2021.

##### 3.1.2. Hofstede 6-D model

[Hofstede \(1980, 1991\)](#) laid the basis for his cultural dimensions model during the late '60 s and early '70 s. At present, the most complete version of his model offers six dimensions ([Hofstede et al., 2010](#)) and we explain them succinctly below.

- PDI (Power Distance Index)

The PDI shows the degree with which a country's citizens accept the unequal distribution of power. Citizens in high power distance societies are more likely to accept differences in status and access to knowledge

<sup>1</sup> Take note that these are all non-pharmaceutical measures, and thus they do not include a pharmaceutical intervention like vaccination campaigns ([Nguyen et al., 2021](#)).

([Hofstede, 1983](#)). With this comes a predisposition to follow rules and orders. Conversely, subjecting oneself to others is deemed less appropriate in low power distance nations ([Hofstede, 2001](#)). In the same style, citizens from low PDI cultures consider themselves less obliged to follow instructions from authorities. Consequently, in low PDI societies more people will see governmental impositions as a restraint to their freedom.

- IDV (Individualism vs Collectivism)

IDV refers to whether a culture prioritizes independence or interdependence ([Hofstede, 2001](#)). The higher the score on this dimension, the more a country's citizens are inclined to look after themselves and their family first and/or primarily. With this comes a detachment towards caring for other members of society: it is every-one's own duty to make his or her own (e.g. health or safety) arrangements. Contrarily, collectivistic countries expose more societal glue and its members tend to look more after each other.

- MAS (Masculinity vs Femininity)

By masculinity, the Hofstede model refers to whether a society is focused on achievement and performance or on care and social goals ([Hofstede and Vunderink, 1994](#)). Whereas in masculine societies ego goals are prioritized ([Hofstede, 1998](#)), more feminine societies display a stronger interest in taking care of the disadvantaged. The credo of "leaving no-one behind" can be viewed as an expression of feminine society or leadership ([Sartori Falguera et al., 2021](#)).

- UAI (Uncertainty Avoidance Index)

This dimension measures the degree with which societies and countries feel uncomfortable with uncertainty or ambiguity. Countries with a high UAI score tend to recur to tried-and-true solutions to deal with uncertainty ([Newbury and Yakova, 2006](#)). High uncertainty avoidance nations tend to be more risk-averse as well and less likely to engage in experimentation than low uncertainty avoidance nations ([Ndubisi et al., 2012](#)). Similarly, [Borg \(2014\)](#) noted that high uncertainty avoidance nations are more averse to changes, in particular when information about new circumstances is deemed to be incomplete or ambiguous. Conversely, low uncertainty avoidance nations are more tolerant towards ambiguities. This makes it more likely that their citizens accept measures with unknown outcomes ([Lee et al., 2007](#)).

- LTO (Long-Term Orientation vs Short-Term Orientation)

The LTO dimension describes the degree with which countries plan ahead and think of the future. Countries with a high LTO score tend to take a pragmatic stance towards change and modernization of society. Countries that score low on this dimension, however, are more prone to stick to traditions and established norms. They also tend to be more reluctant to change and to embracing the latest advancements in knowledge or technology. Take note that the LTO dimension was added to the Hofstede model to make differences between Oriental and Occidental cultures more insightful ([Hofstede and Bond, 1984](#)). As such, it can cause problems when it is not applied for comparisons between Eastern and Western countries.

- IVR (Indulgence vs Restraint)

This dimension reflects a culture's ability or tendency to deprive itself of pleasures and, contrarily, its capacity to endure hardship or undergo a certain form of abstinence. The higher the IVR score, the more joys in life a given country's citizens "allow" or permit themselves. Conversely, countries with lower scores will display more restrictive behaviour, and will prioritize order and control over self-gratification.

CONTEST	NETWORK	MACHINE	SOLAR SYSTEM	PYRAMID	FAMILY
PDI IDV MAS UAI ↘ ↗ ↗ ↘	PDI IDV MAS UAI ↘ ↗ ↘ →	PDI IDV MAS UAI ↘ ↗ ↗ ↗	PDI IDV MAS UAI ↗ ↗ → ↗	PDI IDV MAS UAI ↗ ↘ → ↗	PDI IDV MAS UAI ↗ ↘ → ↘
USA UK Ireland Canada New Zealand Australia	Sweden Netherlands Baltics Norway Finland Denmark	Germany Switzerland (G.) Luxembourg Hungary Austria	France Spain Belgium Switzerland (Fr.) Italy (N.) Poland Czech Rep.	Guatemala Brazil Russia Turkey South Korea Portugal Thailand	Singapore Hong Kong China India Malaysia Indonesia

Fig. 1. Mental images of culture.

3.2. Frameworks for analysis

Apart from relating the Yougov data with regard to the adoption of individual measures in different countries to these countries' scores on the respective dimensions of the Hofstede 6-D model, we also try to put the measure adoption data into a more holistic Hofstedian perspective. That is: by looking at the degree with which different countries adopt the respective measures, and whether they can subsequently be grouped into clusters with related adoption patterns. Upon that basis, we will examine whether the group-specific countries show a coherence in terms of their scores on the Hofstede model dimensions. To this end, we also use the so-called "mental images of national culture" by Wursten (2019) as a point of reference. I.e., Wursten outlines six different mental image clusters: Contest, Network, Machine, Solar System, Pyramid and Family.<sup>2</sup>

Fig. 1 visualizes the scores (high, low, intermediate) per dimension that one can expect for each mental image cluster, while it also mentions several of the countries that pertain to each group. Afterwards, some further specifics per mental image cluster are presented.

Contest:

The core hypothesis of this cluster is that societies are free to compete and that something good will come out of it. People focus on being autonomous and seeking their personal fulfillment. The corresponding countries nurture citizens who like to face challenges.

When it comes to decision-making people have a tendency to think in

terms of majorities of votes and therefore the game of winning and losing is accepted. It is seen as a rule for individuals to say what they think clearly without fear of possible reprisals by superiors. The latter also accept this and are very accessible to the subordinates.

Network:

In cultures that correspond to this mental image, decision-making is based on finding consensus between superiors and subordinates, as well as between public and private stakeholders. This reflects the feminine character of these societies where caring and value for all is appreciated. If something is not in order, it is supposed to be brought into the open. The preferred leadership style is one that builds bridges among all stakeholders, acting as a coordinator and a facilitator.

Machine:

Order is an important aspect in these cultures. They have a liking for planning, structures, procedures and systems. In this cluster, the chief is a true recognized expert in his field. He is called upon exclusively when a situation cannot be resolved through established rules and procedures. These procedures are a way to rule out uncertainties, and if standing rules are unable to resolve a specific problem, this may create frustration among those involved. Instead of recurring to trial-and-error approach to seek a solution on one's one account, it is common practice that people then recur to more knowledgeable and distinguished people.

Solar system:

In these cultures, populations tend to feel a tension between what one thinks is best and what one is told to do. This tension is "solved" by avoiding a direct confrontation with superiors, while trying to do what one thinks is right when out of sight.

Pyramid:

In these cultures, there is a clear trend towards the centralization of

<sup>2</sup> Japan is considered as a stand-alone case, and forms as such a mental image group of its own according to Wursten (2019).

**Table 1**  
Median values for adoption of respective measures per country.

	Avoid contact with tourists	Avoid crowded public spaces	Avoid going to work	Improve personal hygiene	Refrain from touching objects	Stop sending children to school	Wearing a mask in public
Canada	48	76	23	71	60	14	60
Denmark	32,5	67,5	19,5	62,5	47,5	5,5	38,5
Finland	39	65,5	15,5	65	45	1	51
France	42	68	13	60	42	4	79
Germany	36	62	15,5	58,5	44	7	65,5
Indonesia	45	72	39	80	53	9	82
Italy	29	79	13	71	50	7	84
Malaysia	60	84	40	81	62	13	87
Norway	40	66,5	18	66,5	57,5	2	32
Singapore	40	72	23	79	51	3	89
Spain	43	79	15	80	55,5	3	87
Sweden	36,5	67,5	22	58,5	48	2	9
Thailand	52	76	34	79	62	8	84
UK	29	64,5	21	59	45	2,5	71
USA	37	64	17	59	44	10	75

Source: own elaboration based on Yougov.

authority and decisions are made at the top. Subordinates accept that priorities are set by superiors and that institutions can take decisions on their behalf. Similarly, they expect to be told clearly what to do and how to do it. Supervision by authorities is direct and subordinates are expected to wait for approval before taking actions.

Family:

Leaders or institutions set the rules in these cultures and subordinates obey them in a way that is beyond dispute. In return, there is a moral, paternalistic, obligation on the part of the leader to look after the welfare of his subordinates and the highest in rank will assume his responsibility to help in the resolution. The superior acts like a protective father, who foresees in solutions and resources.

3.3. Analytical protocol

First, we processed the Yougov data in a spreadsheet. For each measure from the YouGov survey, we created a dedicated sheet with a longitudinal overview on how the percentages (of respondents declaring that they complied with the respective measures) evolved per country. Afterwards, we established both the mean value of all available data, as well as median and the peak value of said set of data, which would be the highest percentage of people which adopted the measure in question on a given date. At this point, we also assessed which countries provided sufficient numerical data on the respective measures that Yougov monitors to avoid that the subsequent correlation exercises would have to be done with missing values or with a varying number of countries

**Table 2**  
Country scores on dimensions from Hofstede 6-D model and country adherence to mental images of culture.

Country	Mental image cluster	PDI	IDV	MAS	UAI	LTO	IVR
Canada	Contest	39	80	52	48	36	68
UK	Contest	35	89	66	35	51	69
USA	Contest	40	91	62	46	26	68
Denmark	Network	18	74	16	23	35	70
Finland	Network	33	63	26	59	38	57
Norway	Network	31	69	8	50	35	55
Sweden	Network	31	71	5	29	53	78
Germany	Machine	35	67	66	65	83	40
France	Solar System	68	71	43	86	63	48
Italy	Solar System	50	76	70	75	61	30
Spain	Solar System	57	51	42	86	48	44
Thailand	Pyramid	64	20	34	64	32	45
Indonesia	Family	78	14	46	48	62	38
Malaysia	Family	100	26	50	36	41	57
Singapore	Family	74	20	48	8	72	46

Source: <https://www.hofstede-insights.com/product/compare-countries/> and Wursten (2019).

across different measures. Concretely, this meant that we withheld the following countries (in alphabetical order): Canada, Denmark, Finland, France, Germany, Indonesia, Italy, Malaysia, Norway, Singapore, Spain, Sweden, Thailand, UK and the USA. This resulted in Table 1, which is made up of 15 rows (countries) and 7 columns (anti-COVID measures), and the corresponding median values in the respective cells of the table.

We then took the scores for the retained countries on the six cultural dimensions from the Hofstede Insights website, which led to Table 2.

Based on the combination between compliance with the respective Yougov measures and country-specific scores on the cultural dimensions, we assessed the existence of correlations.

While we also processed the mean and peak values against the country scores on the six cultural dimensions, we decided to focus on the median values of the selected countries for our correlation exercises. The median values were preferred over the arithmetic mean and peak values, because of its greater robustness against the presence of outliers, which could lead to a lower representativeness of the calculated values.<sup>3</sup>

Consequently, for every measure we retained the median value of each of the countries, to subsequently correlate them with the country scores on each of the six Hofstede dimensions. In order to talk about meaningful correlations, we applied |0.6| as a correlation coefficient threshold. This value is considered a moderate to strong correlation in the usual interpretations of Pearson and Spearman correlation coefficients (Akoglu, 2018; Talyor, 1990).

To present the findings, we show tables with the correlation outcomes for all the “COVID-19 measures-Hofstede dimensions” combinations. I.e., at the level of all countries together (section 4.1). Afterwards, we checked whether a search after coherent country groupings as regards the adoption of COVID-19 safety measures could be worthwhile. To this end, firstly, a Pearson correlation matrix was drawn up. Secondly, to examine the existence of a linear relationship among the adoption of the anti-COVID measures on behalf of the countries considered (and thus whether some kind of alignment or convergence between the considered countries and their degrees of adopting the respective measures is plausible), a Bartlett’s test of sphericity was carried out. In function of its outcome, thirdly, we would proceed with a Principal Components Analysis (PCA) and a cluster analysis to see whether the behavioural patterns across countries could be grouped in a consistent (robust) manner, and, fourthly, whether these groups would show similarities with the mental image clusters that Wursten (2019) conceived on the basis of Hofstede’s 6-D model (section 4.2).

<sup>3</sup> We found the main correlations and findings to be fairly similar when considering peaks and means, but for the reason we indicated, we present results based on the median values.

#### 4. Results

After processing the gathered data, the calculations delivered a variety of results. In the present section we present those results. First of all, at the level of “safety measures versus individual Hofstede dimensions”, secondly in function of country classifications according to their PDI and IDV scores, and thirdly at the level of mental image clusters by Hofstede.

##### 4.1. Findings at the level of individual Hofstede dimensions

###### 4.1.1. Power distance (PDI)

When correlating the different countries’ PDI scores with each of the surveyed measures, we find that PDI has a moderate to strong correlation with all but two of the measures. That is, five of them show at least a correlation of |0.6|. This means that PDI seems to be a good indicator of how people reacted after the pandemic, and their uptake behaviour of measures to mitigate the impact of COVID-19.

Table 3 presents the complete set of correlations between the median value of the surveyed measures and the PDI scores. These correlations are all positive, meaning there is a linear relationship between the variables: the higher the PDI, the more likely it is that people are to adopt or follow the respective measures.

###### 4.1.2. Individualism vs Collectivism (IDV)

In a similar manner as for PDI, we have taken all surveyed questions and correlated them with the IDV scores of the monitored countries. Consequently, it turns out that various measures show a moderate to strong correlation with this Hofstede dimension.

Table 4 shows the correlations of the different COVID-19 measures in relation to the IDV values of the countries under consideration. As one can see, all of these correlations are negative, meaning the more individualist a country is, the less people take these precautionary measures.

###### 4.1.3. Masculinity vs femininity (MAS)

Table 5 reveals the correlations between the reviewed countries’ MAS scores and each of the measures monitored in the YouGov survey.

**Table 5**

Correlation coefficients between MAS and respective measures.

Measure	Correlation with MAS
Avoid contact with tourists	$r = -0.092$
Avoid crowded public spaces	$r = 0.153$
Avoid going to work	$r = -0.040$
Improve personal hygiene	$r = 0.076$
Refrain from touching objects	$r = -0.156$
Stop sending children to school	$r = 0.448$
Wearing a mask in public	$r = 0.744$

Source: own elaboration based on Yougov.

###### 4.1.4. Uncertainty avoidance index (UAI)

Table 6 displays the values of all the correlations between the UAI scores of the respective countries and the measures that the Yougov database monitored. Overall, they show rather weak and insignificant relations.

**Table 6**

Correlation coefficients between UAI and respective measures.

Measure	Correlation with UAI
Avoid contact with tourists	$r = 0.055$
Avoid crowded public spaces	$r = 0.156$
Avoid going to work	$r = -0.363$
Improve personal hygiene	$r = 0.015$
Refrain from touching objects	$r = -0.043$
Stop sending children to school	$r = -0.014$
Wearing a mask in public	$r = 0.309$

Source: own elaboration based on Yougov.

**Table 7**

Correlation coefficients between LTO and respective measures.

Measure	Correlation with LTO
Avoid contact with tourists	$r = -0.259$
Avoid crowded public spaces	$r = -0.113$
Avoid going to work	$r = -0.141$
Improve personal hygiene	$r = -0.024$
Refrain from touching objects	$r = -0.370$
Stop sending children to school	$r = -0.212$
Wearing a mask in public	$r = 0.237$

Source: own elaboration based on Yougov.

**Table 8**

Correlation coefficients between IVR and respective measures.

Measure	Correlation with IVR
Avoid contact with tourists	$r = -0.093$
Avoid crowded public spaces	$r = -0.343$
Avoid going to work	$r = -0.021$
Improve personal hygiene	$r = -0.501$
Refrain from touching objects	$r = -0.124$
Stop sending children to school	$r = -0.031$
Wearing a mask in public	$r = -0.641$

Source: own elaboration based on Yougov.

**Table 9**

Pearson correlation matrix.

Eigenvalue	Percentage of variance	Cumulative percentage of variance	
comp 1	4.31173330	61.596190	61.59619
comp 2	0.96689897	13.812842	75.40903
comp 3	0.77137147	11.019592	86.42862
comp 4	0.47751909	6.821701	93.25033
comp 5	0.27016123	3.859446	97.10977
comp 6	0.14143574	2.020511	99.13028
comp 7	0.06088019	0.869717	100.00000

Source: own calculations.

**Table 3**

Correlation coefficients between PDI and respective measures.

Measure	Correlation with PDI
Avoid contact with tourists	$r = 0.702$
Avoid crowded public spaces	$r = 0.664$
Avoid going to work	$r = 0.633$
Improve personal hygiene	$r = 0.735$
Refrain from touching objects	$r = 0.434$
Stop sending children to school	$r = 0.382$
Wearing a mask in public	$r = 0.722$

Source: own elaboration based on Yougov.

**Table 4**

Correlation coefficients between IDV and respective measures.

Measure	Correlation with IDV
Avoid contact with tourists	$r = -0.650$
Avoid crowded public spaces	$r = -0.507$
Avoid going to work	$r = -0.738$
Improve personal hygiene	$r = -0.829$
Refrain from touching objects	$r = -0.540$
Stop sending children to school	$r = -0.151$
Wearing a mask in public	$r = -0.446$

Source: own elaboration based on Yougov.

4.1.5. Long-Term orientation vs Short-Term orientation (LTO)

Table 7 displays the correlations between the reviewed countries' LTO scores and the surveyed precautionary measures by YouGov.

4.1.6. Indulgence vs restraint (IVR)

Table 8 presents the correlations between the reviewed countries' IVR scores and each of the surveyed measures by YouGov.

4.2. Findings from a holistic Hofstedian perspective

As a first step, we examined whether it would be worthwhile to submit our dataset to a principal component analysis in view of explaining country behaviour in relation to the adoption of anti COVID-19 measures.

Consequently, we drew up a Pearson correlation matrix with regard to the levels of adoption of measures to curb the spread of COVID-19 in the countries analysed. This led to Table 9.

In addition, to assess whether the data from this matrix provide evidence for the existence of a linear relationship between the variables considered, a Bartlett's test of sphericity was applied. This test led to an extremely low p-value (less than  $2.22e-16$ ), which provides indication of strong linear and direct relationships between the degree of measure uptake among the countries from the Yougov sample. This means that those countries whose populations have a high adoption rate of a certain measure to combat the COVID-19 virus, generally tend to display high adoption rates with regard to the rest of the anti COVID-19 measures as well. Similarly, countries with a low adoption rate regarding one of the measures tend to also adopt the other measures to a low extent.

Accordingly, these findings imply that it makes sense to carry out a

Principal Component Analysis as well as a Cluster analysis.

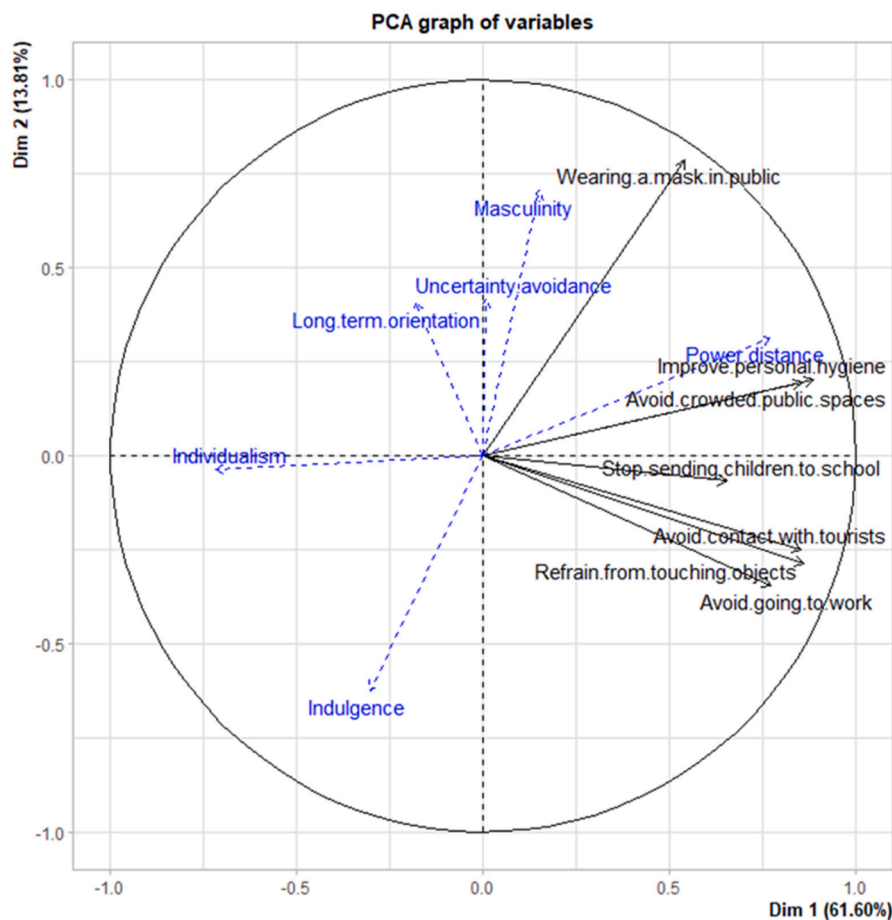
4.2.1. Principal components analysis

When carrying out a PCA with regard to the country data on the uptake of the different measures, we obtain the following insights:

The existence of a single component with an eigenvalue that is greater than 4 represents the first principal component that captures a large part of the overall variability of country behaviour as regards the adoption of the anti COVID-19 measures (61.6 % to be concrete).

In Graph 1, this component is visualized by the horizontal axis. Consequently, the graph shows how there is an interdependence between the uptake level of the measures concerned. In concreto, as all arrows point to the right, it follows that they all have positive coordinates and that their correlations to this first component are positive as well. These correlations are highest, the less distance there is between the arrows and the horizontal axis and the longer the arrows are: the less distance there is to the outer circle.

If we look at the second principal component, we see that its eigenvalue -although lower than 1- is still very close to this value, which means that it is still a strong (principal) component. This component is portrayed in the form of the vertical axis in the next graph, and we observe how the "wearing a mask" measure is the only one with a strong vertical orientation, and correlates thus strongly with this second component. In this case, however, there are not only arrows that have positive coordinates. In fact, only three display positive coordinates (wearing a mask, improving personal hygiene and avoiding crowded public spaces). The other measures thus correlate negatively with this second principal component. Moreover, except for "wearing a mask" all other measures correlate weakly with this component, since they all



Graph 1. Reviewed anti COVID-19 measures as opposed to Hofstede dimensions.



seems to be strongly and directly associated with the first principal component, unlike the “Individualism” variable. Therefore, it can be argued that countries characterized by greater power distance and less individualism tend to adopt most anti COVID-19 measures to a greater extent, and vice versa: citizens of countries with greater individualism and less power distance tend to adopt anti COVID-19 measures to a lesser extent. When looking at the second principal component, it can be argued that citizens from countries with higher masculinity, uncertainty avoidance and long term orientation tend to adopt the “wearing a mask in public”-measure more than average, while citizens from countries with high indulgence scores tend to wear a mask in public less than average.

To conclude this part, [Graph 2](#) shows the scores of the sampled countries with regard to the two main components resulting from the PCA:

From [Graph 2](#) we can draw the following highlights:

- Malaysia, Thailand, Canada, Indonesia, and -to a lesser extent- Spain and Singapore, are countries with positive coordinates vis-à-vis the first principal component (Dimension 1; horizontal axis from [Graph 1](#)). In the light of the correlation circle, this implies that the populations of these countries have a relatively high tendency to adopt most of the anti COVID-19 measures.

Moreover, given the position of the Hofstede dimensions in the circle of correlations (see [Graph 1](#)), these should be countries with relatively high scores on the “Power distance” dimension and low scores on the “Individualism” dimension. While the four oriental countries indeed comply with this profile, it is a lot less applicable to Canada and to a lesser extent to Spain.

- UK, Sweden, Germany, Finland, Denmark, France and USA, and -to a lesser extent- Norway and Italy, are countries with negative coordinates in relation to the first principal component (Dimension 1; horizontal axis from [Graph 1](#)). Hence, we can posit that these are countries whose populations should show a relatively low tendency to adopt most of the anti COVID-19 measures.

Referring to the Hofstede dimensions in the circle of correlations, these countries should show high scores on the “Individualism” dimension and low values on the “Power distance” dimension (see also [Graph 1](#)). Except for Italy and particularly France, which do fit in as regards higher scores on individualism, but don’t display low values in terms of PDI, this is indeed largely the case.

- With regard to the vertical axis of [Graph 2](#) (which refers to the second principal component: Dimension 2; vertical axis from [Graph 1](#)) we can deduct that Italy, Spain, Singapore and France show a relatively high tendency to adopt “wearing a mask in public” measure, whereas the opposite applies to Norway and Sweden.

Similarly, the Hofstede dimensions from the circle of correlations (see [Graph 1](#)), insinuate that Italy, Spain, Singapore and France ought to be characterized by high scores on the “Masculinity” dimension and low values on the “Indulgence” dimension, while the opposite should be true for Norway and Sweden. Interestingly, only Italy displays a high score on masculinity, while all four countries from the first group rather show moderate scores on indulgence. As regards the second group, both countries score indeed low on masculinity, while Sweden scores high on indulgence and Norway does less so. The reason for a more reduced fit between the way that the countries are plotted in [Graph 2](#) and the country scores on the various Hofstede dimensions, is due to the fact that the second principal component (exemplified by the vertical axis) gathers just 13.8 % of total variability of the variables considered. Therefore, the position of the countries along this vertical axis has a lot less explanatory power than the first PC, along the horizontal axis, which explains 62 % of the overall variability.

#### 4.2.2. Cluster analysis

In furtherance to the results from the Bartlett test of sphericity, it also makes sense to try and see whether additional patterns can be revealed regarding the level of adoption of anti-COVID-19 measures by citizens in the sampled countries. That is: can the countries be sub-divided into groups that are internally rather homogeneous and therefore reflect similar patterns in terms of the adoption of anti-COVID-19 measures? To answer this question, we proceeded as follows:

- Typification of the set of values of the anti-covariance variables (to obtain Z-scores).
- Calculation of the Euclidean distance matrix between all possible pairs of countries.
- Application of a bottom-up hierarchical ranking algorithm (using the R command `hclust`).

The result of this hierarchical ranking procedure can be seen in a dendrogram or tree diagram, as shown in [Fig. 2](#).

Although there are other possible cut-off points in the dendrogram, it seems reasonable to establish the existence of 4 groups of countries with related behaviour in terms of the adoption of anti COVID-19 measures, namely:

- Group 1: Malaysia, Canada, Indonesia and Thailand.
- Group 2: UK, Denmark, Finland, France, Germany and USA.
- Group 3: Italy, Singapore, Spain.
- Group 4: Norway and Sweden.

When looking at the average median values for the adoption of anti COVID-19 measures (as well as scores on the Hofstede dimensions) on behalf of the countries that make up these four groups-see [Table 10](#), one appreciates the existence of notable differences between them:

Accordingly:

- Group 1 is the one that adopts the highest proportion of all anti COVID-19 measures with the exception of the one referring to “wearing a mask in public”. In terms of scores on Hofstede dimensions, it reveals low levels of “individualism” (with Canada as an exception) and a weak “long term orientation” (except for Indonesia). In addition, it reveals medium scores on masculinity and the uncertainty avoidance index (except for Thailand, which has a rather high score on UAI).

- Group 2 is the one that comparatively speaking adopts the different anti COVID-19 measures the least, with the exception of “wearing a mask in public”. From the Hofstede model point-of-view, these are countries with high scores on the “individualism” dimension and low scores regarding the “power distance index”. As regards “masculinity”, Denmark and Finland lower the average, as the other countries in this group score fairly high on this dimension. As regards the “uncertainty avoidance index”, France and Germany score high whereas the other countries display rather low scores in this regard.

- Group 3 stands out for a strong following of the measures “avoiding crowded public spaces”, “improving personal hygiene” and, above all, “wearing a mask in public”. As regards scores on different dimensions from the Hofstede model, these are countries with relatively high scores (compared to the other Groups) on the “power distance index” and the “masculinity”, “uncertainty avoidance” and “long term orientation” dimension, and a low score on “indulgence”. It has to be said, though, that particularly on uncertainty avoidance, the score of Singapore is much lower than those of Italy and Spain (and the same happens with Individualism, which drags down the overall average of the group on this dimension).

- Group 4 is characterized by low proportions of adherence to “avoiding crowded public spaces”, “improving personal hygiene”, “stopping sending children to school” and, in particular, “wearing a mask in public”. In terms of scores on the Hofstede dimensions, these countries stand out for their high levels of “individualism” and “indulgence” and low levels of “masculinity” and “uncertainty avoidance”.

**Table 10**  
Average median values per group of countries for adoption of anti COVID-19 measures, and their average scores on Hofstede dimensions.

	Avoid contact with tourists	Avoid crowded public spaces	Avoid going to work	Improve personal hygiene	Refrain from touching objects	Stop sending children to school	Wearing a mask in public	Power distance	Individualism	Masculinity	Uncertainty avoidance	Long-term orientation	Indulgence
Group 1	51,3	77,0	34,0	77,8	59,3	11,0	78,3	70,3	35,0	45,5	49,0	42,8	52,0
Group 2	35,9	65,3	16,9	60,7	44,6	5,0	63,3	38,2	75,8	46,5	52,3	49,3	58,7
Group 3	37,3	76,7	17,0	76,7	52,2	4,3	86,7	60,3	49,0	53,3	56,3	60,3	40,0
Group 4	38,3	67,0	20,0	62,5	52,8	2,0	20,5	31,0	70,0	6,5	39,5	44,0	66,5

Source: own elaboration.

## 5. Discussion

### 5.1. At the level of individual Hofstede dimensions

Generally, we find a significant correlation between PDI and the reviewed precautionary measures, implying that a high score on PDI is followed by a high adoption rate of the different measures. No less than five measures show a significant relationship with PDI. While “refrain from touching objects” and “stop sending children to school” don’t pass the significance threshold, the other measures do, with “wearing a mask in public” showing the highest *r*.

The considerable association between PDI and adoption of the considered safety measures aligns with findings from cross-cultural research suggesting that high power distance societies are more likely to display obedience and docility towards authorities and the rules they lay down (Ji et al., 2015). It also explains why societies that are culturally less attuned to following directions and displaying obedience may find it harder to accept limits to free movement and the right to argue, as became evident in Germany, where people protested against social mitigation (Nienaber and Chambers, 2020). Similarly, it resonates with the claim of Chen et al. (2020, p. 3) that “a higher level of power distance could make it easier for a government to introduce stringent measures without worrying too much about compliance and resistance.” As such, this connects with indices of government stringency and firmness of political regimes that certain scholars have related to compliance with anti COVID-19 measures (Wang, 2021; Nguyen et al., 2021), and which can be likened to Hofstede’s PDI dimension.

The IDV results reveal a moderate correlation with the measures to combat the spread of the COVID-19 virus. Three out of the seven measures show a significant relationship with this dimension from the Hofstede model, whereas four don’t. In this case, the values of the correlation are negative, which means that the higher the IDV, the lower the percentage of people that adopt the considered measures, and vice versa. This aligns with Maaravi et al. (2021), who found individualism to be associated with a lower adherence to epidemic control measures during the pandemic. In a similar vein, it connects with the finding of Lazarus et al. (2020) that while collectivistic nations complied with severe government measures, several individualistic nations criticized them as being too interventionist.

In addition, our finding of a significant, yet negative, correlation between IDV and personal hygiene and avoiding contact with tourists aligns with findings from Fincher et al. (2008), who found that low IDV societies have a stronger inclination to reduce contact with people outside of their own community, such as tourists. Similarly, Biddlestone et al. (2020) find that low IDV correlates with the intent to follow social distancing and hygienic measures during the COVID-19 pandemic. In addition, Dheer et al. (2021) report that a country like Taiwan, with a very low IDV score, practiced social distancing, self-isolation, and wearing masks, even when the government did not declare absolute lockdowns or imposed related measures.

Overall, the MAS dimension displays a limited correlation with the measures considered. In fact, only “wearing a mask in public” shows a significant positive relation with this dimension. For the rest, this dimension fails to produce neither significant results with the other measures, nor does it entertain a uniform relationship with the different measures. In the sense that there are three measures with which MAS holds a negative correlation, whereas there are four with a positive correlation. Hence, we must conclude that this dimension has an inconsistent impact on the following of pandemic-curbing measures across nations, something that Dheer et al. (2021) also asserted.

Based on our dataset we found no strong correlations between UAI and the adoption of measures in different countries. In concreto, we see mixed (negative and positive) correlations of a generally weak nature. Just two measures show a reasonable relationship with UAI. I.e., being “avoid going to work” (negative) and “wearing a mask in public (positive). An explanation for the first, negative, association could be that

people in high UAI societies consider the workplace to be a comfort zone and thus not risky, whereas they may consider approaching public spaces and tourists to be liabilities. Accordingly, wearing a mask will increase their feelings of safety. Contrary to our own findings, [Huynh \(2020\)](#) found much closer ties between UAI scores and cross-country differences in terms of gathering in public spaces.

As regards LTO, our study did not find significant correlations between citizens' behaviour and country scores on this dimension. Only "refrain from touching objects" reveals a moderate (negative) relationship with this dimension. Moreover, we find both negative and positive correlations implying a lack of direction and predictive value of this dimension within the context of the pandemic. [Erman and Medeiros \(2021\)](#) also found a weak correlation between LTO and most of the pandemic-related variables they considered.

While the IVR dimension does not show too much of a correlation with the majority of the surveyed measures, it does show a very significant negative correlation ( $r = -0.696$ ) with the wearing of masks in public, and a reasonably strong correlation with improving personal hygiene and avoiding crowded places. Interestingly, all the results show negative correlations, which makes sense as the more restraint a population is, the more the usage of social mitigation can be expected ([Hofstede and Minkov, 2010](#); [Piet, 2017](#)); with people being more willing to subordinate their feelings of personal gratification to a common cause.

In accordance with the above analyses, the PCA shows how PDI and MAS coincide most with the two principal components and can thus be attributed with the strongest explanatory power regarding the behaviour of citizens across countries within the context of measures to combat COVID-19. As such, the Principal Components Analysis lends further robustness to the results from the correlation exercises under section 4.1.

## 5.2. At a holistic Hofstedian level

If we refer to Wursten's mental image clusters and the countries they are made up of, the PCA shows how particularly countries from the family cluster (Indonesia, Singapore, Malaysia) have a tendency to adopt the entire range of anti COVID-19 measures. Contrarily, countries from the network cluster (Scandinavian countries) act a lot looser when it comes to adopting these measures. This part of our findings thus align with the Wursten scheme.

However, when looking at the composition of the four groups that our cluster dendrogram distinguishes, we observe that our results do not endorse the way that Wursten distributes countries across his mental images of culture. First of all, only Group 4 provides alignment with the scheme of Wursten as it is the only one that is made up of countries that adhere to one of Wursten's mental images, namely the network cluster. Meanwhile, all other groups are assemblies of different clusters that Wursten forwarded.

More concretely, Group 1 contains countries from the family cluster (Indonesia and Malaysia), from the pyramid cluster (Thailand) and the contest cluster (Canada). This group can be considered to represent the most cautious countries. While cautiousness would resonate with high UAI, the fact is that both the family and the contest cluster predict low UAI scores. In principle, the former complicates this group's fit with the Wursten scheme and from the Hofstede 6-D model in general. In "defense" of the combination found, we can argue that Thailand used to form part of the family cluster ([Wursten, 2000](#)), while [Dheer et al. \(2014\)](#) delve into the pluriformity of Canada. The latter does not imply a similarity with the Asian countries in this group, but it does reveal Canada's heterogeneous character.

Group 2 is made up of countries from the contest cluster (UK and USA), the network cluster (Denmark and Finland) and the machine and the solar system cluster (resp. Germany and France). What they all have in common is a high score on IDV. As regards PDI, the group members reveal low scores, except for France. Nevertheless, as Hofstede (2010, pp. 104–105) explains by means of "*la logique de l'honneur*", in the case

of France this may still lead to behaviour that is more in line with a low PDI score. Consequently, this renders some coherence to this group.

Group 3 consists of two countries from the solar system cluster (Italy and Spain) and one from the family cluster (Singapore). A reason that Spain, Italy and Singapore gravitate together could be due to Spain and Italy's high score on UAI, and Singapore's high score on LTO, and the connection between these two dimensions ([Hofstede and Bond, 1988](#); [Hofstede, 2001](#); [House et al., 2002](#)). One of the characteristics of high UAI cultures like Italy and Spain is the anguish and anxiety caused by the unknown, like a virus. That is, the uncertainty of not knowing what one is facing. Also, in these cultures there is a great respect for subject matter experts, and their advices. Similarly, Singapore's high LTO score fuels a civil tendency to be obedient and respectful towards authorities. In addition, all three countries are among those with the lowest IVR scores. Finally, while Spain and Italy do not score so high on PDI as Singapore does, from a (Western) European perspective these two countries do present pronounced scores on this dimension.

As stated, only Group 4 shows alignment with the [Wursten \(2019\)](#) mental image cluster scheme, although it is also the smallest one, with both Norway and Sweden pertaining to the network cluster. This is a set of countries whose citizens act rather loosely with regard to the different measures. This can arguably be explained through the fact that they represent high trust societies in which people act responsibly and reliable, show a cooperative spirit (cfr. femininity) and behave according to social ethics ([Sperre Saunes et al., 2021](#)).

As a last observation, while the results from our Principal Components and Cluster Analyses do not back up the Wursten scheme entirely, it is worthwhile pointing out that both the PCA and Cluster Analysis findings reveal a considerable coherence. In the sense that both techniques bring a similar country division to the front (compare [Graph 2](#) with the country groups presented under section 4.2.2) based on the YouGov data. As such, this provides internal robustness to the insights we come up with.

## 6. Conclusions, implications, limitations and suggestions for future research

Our research provides insight into the explanatory power that Hofstede's 6-D model has when relating cultural values to the adoption of anti COVID-19 measures across countries. With regard to the measures under consideration, certain dimensions demonstrated to be of stronger influence than others. Particularly PDI and IDV reveal significant correlations with the measures under consideration. As such, our analyses add to the body of literature that demonstrate the usefulness of Hofstede's framework to explain how cultural values have an impact on the conduct of citizens per country.

However, when comparing the country groupings that followed from our PCA and Cluster analyses with those from the mental images of culture by [Wursten \(2019\)](#), we see considerable discrepancies. That is, our analyses lead to clusters of countries that do not show a real fit with Wursten's mental image scheme.

This lack of a match does obviously not grant more credibility to the country groups that we came up with in comparison to Wursten's scheme. To start with, because the sample of countries that we worked with is too small for that. Moreover, our research only studied social conduct in relation to one "event", i.e., the pandemic, and -clearly- the pigeon-holing of countries into behaviourally similar groups should be based on broader investigation.

It is worthwhile, though, to point out that while Wursten's classification is fruit of a rather intuitive way to gather countries together, and thus a top-down approach, we followed a bottom-up and a data-driven approach. As such, the exercises and techniques that we unfold in the present paper can certainly contribute to a science-based way to come to country classifications that depart from the Hofstede model.

More importantly, our PCA and Cluster Analyses have shown statistical ways to group countries together based on revealed behavioural

patterns and scores on dimensions from the Hofstede 6-D model. As such, it provides a basis for further quantitative tests to examine whether, based on analyzing conduct of citizens in different countries and taking country scores on the Hofstede model into account, coherent groups of countries can be formed in a scientific and data-driven manner.

In this regard, it is worth highlighting that whereas the Hofstede 6-D model has proven its validity through numerous applications, the framework by Wursten counts with less endorsement, and can thus benefit from further probing. In fact, Wursten himself has reallocated several countries over time. For example, the Czech Republic was considered part of the “machine cluster” for 20 years, but forms at present part of the “solar system” cluster. Also, the Baltic countries switched place as well as Thailand, Argentina and Poland, to name some other countries to which this happened. Against this backdrop, it is logical to think that further fine-tuning of his scheme is possible, and that the boundaries of the different mental image clusters, and the countries they include, are still open for debate.<sup>4</sup> Consequently, the approach and methods displayed in the current article can serve to refine Wursten’s countries typology.

In terms of the posture that policy makers or authorities should adopt, e.g. amidst a crisis and in function of the mental image clusters to which their countries belong, or the groups that followed from our cluster analysis, our findings have clear implications. Countries from the Pyramid and Family cluster typically count with rule-abiding populations (low IDV, as per our Group 1), that are open to follow norms dictated from higher hand (high PDI, as per our Groups 1 and 3). Consequently, strict government measures will go down in such societies. The opposite applies to countries from the Network and the Contest clusters. These countries are characterized by low PDI and high IDV (this applies to our Groups 2 and 4). As a consequence, harsh measures could lead to societal opposition, implying that governments should show more recognition of individual freedom and personal trade-offs, and consult with social partners (Westjohn et al., 2019).<sup>5</sup> It is trickier to give policy advice on countries that pertain to the Solar System cluster. While these are characterized by considerable PDI scores, they also show high IDV scores (our Group 3 resembles this profile most clearly). This means that resolute government action is not unusual in these countries. However, government needs to explain well the utility of their measures as these societies are characterized by a culture of *res publica*, and citizens contest if the value of policies is not made clear and acceptable to them. Interestingly, Sabat et al. (2020, p. 911) found that approval of more rigorous containment policies was higher in countries that pertain to the Solar System cluster than in those from the Network of Machine cluster.

Clearly, the choice of policy options should take cultural traits and collective mental schemes of the population (Hofstede, 1980; Hofstede et al., 2010) into account. Certainly, (safety) measures that are successful (in lowering casualties) in one place, need not be successful in another if the sociocultural premises are different. In other words, one-size-fits-all thinking is deemed to be unsuccessful, as it is not so much the intervention that counts, but its acceptability that must be culture-“proof”.

In terms of limitations of our study and suggestions for future research, in the first place there is the small sample constraint that ought to be overcome in future research. In addition, adding control variables to Hofstede – COVID-19 studies is a recommendable practice. Having

<sup>4</sup> Take note that also the GLOBE project (House et al., 2001) encountered significant difficulties in bringing countries together in coherent groups, ending up with an overly straight-forward division based on linguistic and geographical proximity (Anglo-Saxon world, Germanic and Scandinavian world, Latin Europe, Latin America, East Asia, the Arab world and Eastern Europe).

<sup>5</sup> This also applies to countries from the Machine cluster, who also count with low PDI and high IDV scores.

said that, and acknowledging that this is one of the virtues in studies like the ones by Wang (2021) or Ngo et al. (2021), we also think that these should be carefully selected. The government stringency index from OxCGRT or the EIU’s democracy index, for example, is one that can interfere with the PDI dimension from the Hofstede model. In the sense that high PDI often coincides with strict government intervention. Hence, controlling for government stringency could hamper appraising the effect of national PDI scores on the way that country-specific citizens react to the pandemic. Put differently, government stringency or level of democracy itself can be seen as a result of national culture as understood by Hofstede and his model. Conversely, controlling for national GDP levels, education, population density or degree of urbanization, could be worthwhile in future research. Furthermore, we reckon that it is worthwhile to look at vaccination ratios (or acceptance of vaccination campaigns) across countries over time, and submit those data/evolutions to the same type of Hofstedian analyses as we have done for the 7 measures retained from the YouGov database. Finally, we suggest further scrutiny on Wursten’s mental image clusters. I.e., analyze other global events or processes to assess the tenability of the way that countries are currently allotted across his scheme, and do so by means of quantitative and statistical analyses as deployed in the present article to make the Wursten scheme and its country allocations more robust.

### CRedit authorship contribution statement

**Bart Kamp:** Conceptualization, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Juan José Gibaja:** Methodology, Formal analysis. **Javier San Martín:** Writing – review & editing. **Ignacio Turiel:** Data curation.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

Data will be made available on request.

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