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A Test of the Reproducibility of the Clustering of Cultural Variables

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Abstract

Cultural variables from many different cross-cultural studies can be divided into two clusters of variables that are strongly correlated within each cluster. This is reflected in two factors that are found to be reproduced by independent sets of cultural variables and also reflected in several different cross-cultural studies. The first factor, called superfactor, reflects the combined effects of development and modernization, together with social-psychological effects such as collectivism, conservatism, regality, and tightness. The second factor, called East Asian factor, combines several effects related to East Asian cultures, and possibly also differences in response style. These two factors can be found in several previously published cultural maps, but rotated differently. The common practice of factor rotation has obscured similarities between many different cross-cultural studies. Many previously published cultural factors with different names are in fact differently rotated solutions reflecting the same or closely related underlying cultural differences.

Keywords

cultural differences, cultural variables, social development, modernization, collectivism, regality theory, tight and loose cultures, factor analysis, factor rotation

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Social scientists have applied many different approaches to describe cultural differences quantitatively. This has led to a variety of cultural variables, factors, and dimensions (The present article will use the term *cultural variables* to include factors and dimensions). The status of the field has been described as a rich, but somewhat disorderly variety of approaches and dimensions (Maleki & de Jong, 2014). There have been several attempts to establish an overview of these concepts of cultural variables based on theoretical criteria (Minkov, 2011, 2013; Nardon & Steers, 2009; Taras et al., 2009). These attempts to establish order in the confusing collection of variables are hampered by the fact that, in some cases, different authors have used the same name for variables that measured different things, while in other cases, different names have been applied to variables that measured the same or closely related cultural phenomena. It is necessary to use statistical analyzes to detect whether different cultural variables published by different scientists are closely related or not. An initial attempt to establish a general classification of the many cultural variables with the aid of statistics has been carried out by Maleki and de Jong (2014).

Maleki and de Jong gathered country scores from five major empirical studies comprising 21 cultural variables. These cultural variables were classified into seven factors and nine clusters of variables by a combination of theoretical criteria and statistical factor analysis. The nine clusters of cultural variables were named as follows (Maleki & de Jong, 2014):

1. Individualism versus collectivism
2. Power distance
3. Uncertainty avoidance
4. Mastery versus harmony
5. Traditionalism versus secularism
6. Indulgence versus restraint
7. Assertiveness versus tenderness
8. Gender egalitarianism
9. Collaborativeness

This is a laudable achievement, but in order to assess how useful this categorization is, we need to test if the clusters or categories are reproducible when applied to other studies than the five studies included in Maleki and de Jong's analysis. The reproducibility of the division of cultural variables into clusters or factors will be tested in the present study.

It is suspected that the number of clusters may be higher than necessary based on insights from a new theory called regality theory. This theory will be shortly explained here since it is not yet commonly known in the field of cross-cultural research.

Regality theory is a branch of evolutionary psychology that seeks to explain various psychological and cultural reactions to perceived collective danger (Fog, 2017). Regality theory is based on the assumption that war or intergroup conflict in prehistory has been a strong evolutionary force shaping human psychology. Imagine a conflict between two stone age tribes. The tribe that has the most fierce, brave, and well-organized warriors is likely to win over its enemy. But organized fighting involves a collective action problem. Each individual warrior can gain more reproductive fitness by free riding than by fighting for the benefit of his tribe, unless there is a high reward for fighting. This collective action problem can be overcome by having a strong leader who can reward brave warriors and punish cowards and defectors. A strong leader in this situation is a benefit for the whole group, and we can expect everybody to support such a leader. The warrior who supports a strong leader will not only suffer the costs of fighting. He will also reap his share of the group-level benefits that result from the fighting of all the other tribe members. This model allows us to explain collective action without resorting to the controversial theory of group selection. Regality theory predicts that people in the event of war or perceived collective danger will feel a need for having a strong leader and strict discipline. The opposite situation is seen in the case of peace and security. People in peaceful surroundings will see no need for a strong leader who is likely to be despotic and take advantage of everybody else. Instead, they will prefer an egalitarian society and ideology. The contrasting situations of war and peace are affecting the whole social structure and culture in opposite directions. The combined effect of the psychological preferences of all the members of a social group has emergent effects on the social and political structure of the whole society. Typically, a group under perceived collective danger will develop a hierarchical and authoritarian political structure, harsh discipline, xenophobia, strict religiosity, strict sexual morals, and a philosophy that the individual exists for the benefit of the tribe or state. Such a culture is called *regal*. The opposite situation is seen in social groups in an environment of peace and security. Such groups will develop in the opposite direction, called *kungic*. A kungic culture is typically egalitarian, tolerant, and peaceful. While the regal versus kungic dimension reflects a psychological and cultural flexibility that is derived from evolutionary pressures in a distant past, the strong effects of perceived collective danger can still be observed today. Modern culture is very different from stone age culture in many respects, yet the evolved psychological response patterns are still driving cultures in either authoritarian or egalitarian directions depending on the perceived level of collective danger. We can expect the level of regality to be relatively low in modern, highly developed countries because of a higher level of collective security, while conflict-ridden countries under unstable conditions are expected to be more regal (Fog, 2017).

The reason for introducing regality theory here is that this theory predicts correlations between most of the nine clusters of cultural variables listed above; and this inspired the present study. The first cluster, *individualism versus collectivism*, is clearly related to the regal versus kungic dimension because individualism is high in kungic societies, while collectivism is needed in regal societies. *Power distance* is high in regal societies because of a hierarchical social organization. *Uncertainty avoidance* may perhaps be related to collective fear which is high in regal cultures. The cluster of *mastery versus harmony* is expressing the relationship with nature, and also masculinity. This may be weakly related to regality. *Traditionalism versus secularism* is clearly related to regality. Traditional societies are often relatively regal, while secular societies are more kungic. *Indulgence versus restraint* is related to discipline. We will expect more restraint in regal societies because of their authoritarian discipline, while we will see more indulgence in kungic societies because of their higher level of tolerance. *Assertiveness versus tenderness* refers to communication styles in industrial organizations. This is not clearly related to regality, but individual assertiveness may be related to individualism and hence kungic tendencies. *Gender egalitarianism* is typical of kungic cultures. *Collaborativeness* is a requirement of regal societies, but the variable referred to in this category originally related to industrial organizations rather than to whole societies.

The theory outlined here indicates that a lot of the cultural variables and clusters mentioned above are likely to be correlated with each other because they are linked to the phenomena of hierarchy, discipline, and collaboration that characterize the regal versus kungic dimension. This leads to the prediction that it should be possible to isolate a statistical factor that combines the effects discussed here. The present study is mainly exploratory—exploring whether such a factor exists and what it may look like.

Quantitative cross-cultural studies have many problems relating to the construction of variables, linearity, sampling methods, representativeness, sample size, and whether cultural boundaries coincide with national boundaries. Similarities between different cultures may be due to cultural diffusion, common descent, similar environments, or random factors. These are all well-known problems subject to ongoing debate in the scientific community. The present study does not attempt to judge which of the available studies have the best methodology or the soundest results. The focus is, rather, whether there are statistical similarities between the results of different studies despite differences in methodology and theoretical foundation.

Statistical Analyzes

Country data from all available studies of cultural variables were gathered for statistical analysis. This includes quantitative studies of cultural differences

that provide contemporary data for at least twenty different countries. The cultural variables were divided into three sets to be analyzed separately. Set 1 consists of the data that were used in Maleki and de Jong's study. Set 2 is a similar set that is independent of set 1. Set 3 consists of the remaining variables not included in set 1 and set 2.

The second set of variables, called set 2, is composed of studies that were not published by any of the authors behind set 1 and did not rely on the same data sources. It was necessary to exclude variables with many missing country values because the mathematical method used for dealing with missing data, described below, fails to reach convergence when there are too many missing values. Variables that covered less than 33 countries were excluded from set 2. Subsequently, it was necessary to remove variables that had more than 12 missing country values in the remaining set 2. It is worth emphasizing that the criteria for including variables in set 2 were merely technical. These criteria were necessary for avoiding overlap with set 1 and for reducing the number of missing values to a level that made the factor analysis possible. There were no selection criteria relating to the type or quality of variables or to the theoretical concept behind each variable. The absence of theory-related selection criteria has precluded expectation bias.

Set 1 and 2 were factor analyzed in the same way in order to test the reproducibility of the findings. Set 3, consisting of the remaining variables, had too many missing values for a factor analysis to be possible, while correlations could still be calculated for all three sets. A factor analysis of set 1 and 2 combined was also not possible because the two sets did not have enough countries in common to keep the number of missing values sufficiently low.

The studies and variables included in set 1, 2, and 3 are listed in Table 1. Many of the cultural variables in the literature are factors with subjective and unclear interpretations. In the words of Minkov and Hofstede (2012): "Naming dimensions is a form of art, not exactly science." The meanings or interpretations of each cultural variable are listed in an online supplement, as far as these have been explained in the original literature.

The present study is using the expectation maximization algorithm for dealing with missing data (Schafer, 1997). This method gives more accurate results than the often-used methods of replacement by the mean or random imputation. It is not clear what method Maleki and de Jong have used for dealing with missing data. The present analysis may therefore deviate slightly from Maleki and de Jong's.

There is no universal method for determining an appropriate number of factors in a factor analysis. A common method is to count the number of eigenvalues bigger than 1. This gives four factors for set 1, and three (almost four) factors for set 2, as shown in the scree plots in Figures 1 and 2. Another

Table 1. List of Cultural Variables.

Short name	Full name	Reference	Sample type	Countries	Respondents per country
Set 1					
Individualism	Individualism versus collectivism	Hofstede et al. (2010)	business	69	2,000
Power dist. H	Power distance	"	"	"	"
Uncertainty	Uncertainty avoidance	"	"	"	"
Masculinity	Masculinity versus femininity	"	"	"	"
Long term	Long term orientation	"	"	"	"
Exclusionism	Exclusionism versus universalism	Minkov (2011)	national statistics	86	n.a.
Indulgence M	Indulgence versus industry	"	WVS	43	>1,000
Monumentalism	Monumentalism versus flexumility	"	WVS	43	>1,000
Embeddedness	Embeddedness versus autonomy	Schwartz (2006); Maleki and de Jong (2014)	mixed	36	180–280
Hierarchy	Hierarchy versus egalitarianism	"	"	36	
Mastery	Mastery versus harmony	"	"	36	
Secular	Secular/rational versus traditional values	Inglehart and Welzel (2005)	WVS	97	>1,000
Self expression	Self-expression versus survival val.	"	"	97	>1,000
Performance	Performance orientation, as is	House et al. (2004)	business	58	>200
Future orientation	Future orientation, as is	"	"	"	"
Gender egal. H	Gender egalitarianism, as is	"	"	"	"
Assertiveness	Assertiveness, as is	"	"	"	"
Institutional coll.	Institutional collectivism, as is	"	"	"	"
In-group coll.	In-group collectivism, as is	"	"	"	"

(continued)

Table 1. (continued)

Short name	Full name	Reference	Sample type	Countries	Respondents per country
Power dist. G	Power distance, as is	"	"	"	"
Humane orient.	Humane orientation, as is	"	"	"	"
Set 2					
Nastiness	Nastiness	Stankov and Lee (2015)	SWV	33	250
Morality	Morality	"	"	"	"
Religiosity SL	Religiosity	"	"	"	"
Religiosity SS	Religiosity	Stankov and Saucier (2015)	SWV	33	>200
Complexity	Social complexity	"	"	"	"
Reward	Reward for Application	"	"	"	"
Cynicism	Social cynicism	"	"	"	"
Fate control	Fate control	"	"	"	"
Egalitarian	Egalitarian commitment versus conservatism	Smith et al. (1995), Minkov (2013)	student	43	>200
Loyal	Loyal versus utilitarian involvement	"	"	"	"
LOC political	Political-personal locus of control	"	"	"	"
LOC individual	Individual-social locus of control	"	"	"	"
Regality	Regality	Fog (2017)	SWV	33	>200
Discipline	Discipline versus violence	"	"	"	"
Sociosexuality	Sociosexuality	Schmitt (2005)	convenience	46	78–608
Set 3					
Conservatism	Conservatism versus liberalism	Stankov et al. (2014)	convenience	33	9–430
Harshness	Harshness versus softness	"	"	34	"

(continued)

Table 1. (continued)

Short name	Full name	Reference	Sample type	Countries	Respondents per country
Indulgence H	Indulgence versus restraint	Hofstede et al. (2010)	business	93	2,000
Tightness G	Tight versus loose cultures	Gelfand et al. (2011)	mixed	32	200
Tightness U	Cultural tightness, combined	Uz (2015)	WVS	68	>1,000
Secular W	Secular values	Welzel (2013)	WVS	94	>1,000
Emancipative	Emancipative values	"	"	96	"
Externality	Dynamic externality	Bond et al. (2004)	student	42	64–710
Cynicism B	Societal cynicism	"	"	"	"
Self-directed	Self-directedness versus other-directedness	Bond and Lun (2014)	WVS	55	>1000
Civility	Civility versus practicality	"	"	"	"
Integration	Integration	Chinese Culture Connection (1987)	student	22	>100
Confucian	Confucian work dynamism	"	"	"	"
Human	Human heartedness	"	"	"	"
Moral	Moral discipline	"	"	"	"
Individual B	Individualism versus collectivism	Beugelsdijk and Welzel (2018)	WVS	104	>1,000
Joy	joy versus duty	"	"	"	"
Trust	Trust versus distrust	"	"	102	"
Confidence	Support of central authority	Fischer (2013)	convenience	21	>100
Hierarchy F	Hierarchical dominance values	"	"	28	"
Individual M	Individualism versus collectivism	Minkov et al. (2017)	consumer panels	55	100–8,400

(continued)

Table 1. (continued)

Short name	Full name	Reference	Sample type	Countries	Respondents per country
Flexibility	Flexibility versus monumentalism	Minkov et al. (2018)	consumer panels	54	100–8,400
Polarization	Social polarization	Minkov (2009)	mixed	47	500–3,000
Long term MH	Long term orientation	Minkov and Hofstede (2012)	WVS	38	>1,000
Familialism	Familialism	Minkov (2013)	"	"	"
K factor	K factor and hypometropia	Minkov (2014)	WVS	71	>1,000
Conservatism S	Conservatism versus autonomy	Schwartz (1994)	convenience	31	>100
Pace	Pace of life	Levine and Norenzayan (1999)	observation	31	n.a.
Helping	Helping strangers	Levine et al. (2001)	observation	22	n.a.
Humane S	Humane orientation	Stankov (2015)	SWV	33	>200
Uncertainty S	Uncertainty avoidance and future orientation	"	"	"	"
Power dist. S	Power distance	"	"	"	"
Gender egal. S	Gender egalitarianism	"	"	"	"
Contextualism	Contextualism	Owe et al. (2013)	convenience	35	71–566
Autonomy O	Autonomy versus embeddedness	"	"	"	"
Independence	Independence versus interdependence	"	"	"	"
Background variables					
HDI	Human development index, 2018	United Nations Development Program (2018)	national statistics	123	

Note. WVS = world values survey (Inglehart & Welzel, 2005). SWV = survey of world views (Saucier et al., 2015). " means same as above.

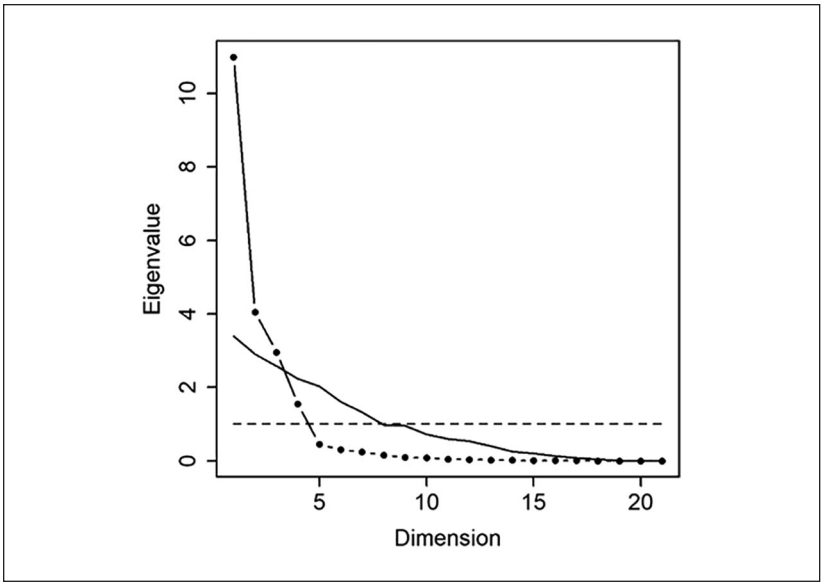

Figure 1. Scree plot for set 1.
The dots indicate eigenvalues. The solid line represents simulated randomness.

method is to compare with a line of simulated randomness. This method gives three factors for set 1 and one or two factors for set 2 (Figures 1 and 2). Results of factor analyzes with two to five factors are reported in the online supplement. It was decided to use four factors for set 1 because additional factors contributed only little to the total explained variance. There was no justification for using seven factors.

We notice from the scree plots that the first eigenvalue is much higher than the rest. This supports our prediction that it is possible to extract a factor that correlates with most of the variables. The common practice of factor rotation tends to divide the total variance more evenly between the factors than what the scree plot indicates. It is better to look at the unrotated solution if we want to explore the expected superfactor that may correlate with most or all of the variables. The result of an unrotated factor analysis of set 1 is shown in Table 2. The four factors are named F1–F4. The superfactor F1 accounts for 30% of the total variance. The remaining factors account for 14%, 13%, and 8% of the variance, respectively.

It was decided to use four factors for set 2 as well in order to facilitate comparison with set 1. Again, we see that the first eigenvalue is much higher

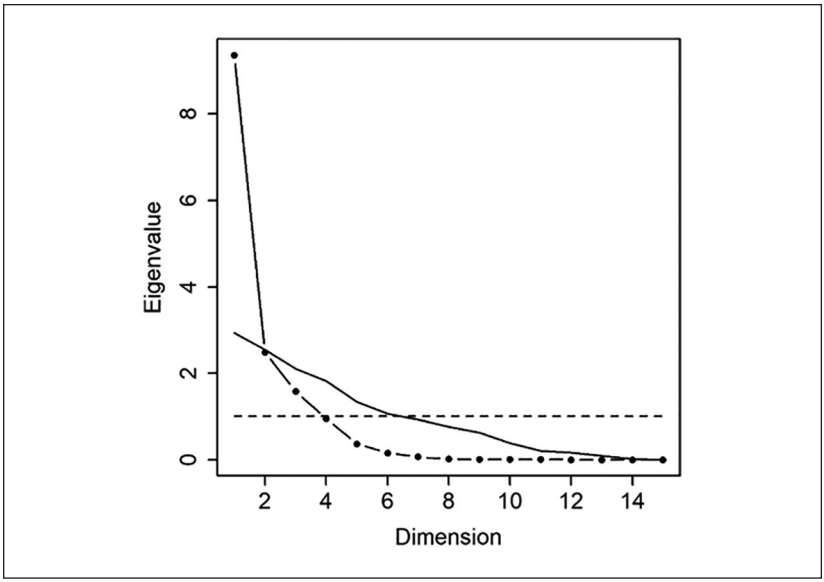

Figure 2. Scree plot for set 2.
The dots indicate eigenvalues. The solid line represents simulated randomness.

than the remaining values. The result of the factor analysis of set 2 is shown in Table 3. The four factors are named G1–G4.

The factors from set 1 are compared with the factors from set 2 in order to test the reproducibility of the supposed clustering of variables. Correlations between the factors from the two sets are listed in Table 4. Similar correlations for different numbers of factors and different rotation methods are listed in the online supplement. The first three factors for set 1 were significantly correlated with factors for set 2 in the unrotated solution. F1 is strongly correlated with G1 and also significantly correlated with G2. F2 is strongly correlated with G3, and F3 is significantly correlated with G4. The factors G1–G4 are named after their variance, rather than after their correspondence with similar factors in set 1. F1, G1, and G2 all have highly significant correlations with the human development index (HDI). The correlations of F1 with G1 and G2 are still moderately significant ($p < .05$) after controlling for HDI, while the correlation between F2 and G3 is highly significant ($p < .001$) after controlling for HDI (see Table 4).

Quartimax rotation produced a stronger variance for the G1 factor but somewhat lower correlations between the F factors and the G factors. Varimax and promax rotations produced still lower correlations between the factors

Table 2. Factor Analysis of Set 1, Unrotated.

Variable	F1	F2	F3	F4
Individualism	−0.71	0.06	−0.06	0.12
Power dist. H	0.77	−0.04	0.06	−0.05
Uncertainty	0.28	0.01	−0.61	−0.38
Masculinity	0.13	−0.01	−0.20	0.34
Long term	−0.25	−0.87	−0.05	0.13
Exclusionism	0.88	0.06	−0.10	0.15
Indulgence M	−0.41	0.57	−0.08	−0.03
Monumentalism	0.34	0.86	0.03	0.16
Embeddedness	0.79	0.12	0.37	0.05
Hierarchy	0.54	−0.24	0.30	0.36
Mastery	0.32	0.06	0.44	0.34
Secular	−0.60	−0.71	−0.01	−0.05
Self expression	−0.83	0.50	−0.01	−0.05
Performance	−0.34	−0.12	0.33	0.55
Future orientation	−0.63	−0.03	0.26	0.50
Gender egal. H	−0.38	0.07	−0.24	−0.35
Assertiveness	−0.12	0.07	−0.71	0.54
Institutional coll.	−0.38	−0.34	0.61	0.07
In-group coll.	0.91	−0.06	−0.09	−0.06
Power dist. G	0.44	−0.06	−0.52	−0.12
Humane orient.	0.16	0.30	0.67	−0.14
Proportion of variance	0.30	0.14	0.13	0.08

Note. 8% missing values imputed by expectation maximization.

from the two sets. Tables for the different rotations are shown in the online supplement.

The correlations of the variables of set 1, 2, and 3 against the factors F1–F4 and G1–G4 were calculated using pairwise complete observations. The correlations were calculated with and without control for Human Development Index (HDI) because development is a likely confounding factor. These correlations are listed in Table 5.

Results and Discussion

The results are showing remarkably strong similarities between different studies carried out at different times using different variables and different methods. Different cultures often develop in the same direction. If there is a certain statistical relationship between two different cultures at a certain point

Table 3. Factor Analysis of Set 2, Unrotated.

Variable	G1	G2	G3	G4
Nastiness	0.62	0.11	−0.31	0.43
Morality	0.64	0.60	0.21	0.28
Religiosity SL	0.70	0.46	0.19	0.29
Religiosity SS	0.75	0.36	0.10	0.21
Complexity	−0.67	0.38	−0.31	0.51
Reward	0.40	0.57	0.19	0.33
Cynicism	0.41	0.49	−0.50	−0.38
Fate control	0.58	0.14	−0.57	0.15
Egalitarian	−0.09	−0.45	0.67	−0.16
Loyal	0.48	0.30	−0.09	−0.17
LOC political	−0.05	−0.04	0.18	−0.60
LOC individual	0.01	−0.75	0.66	0.01
Regality	0.94	0.25	−0.08	0.10
Discipline	0.01	−0.72	−0.69	0.00
Sociosexuality	−0.31	0.01	0.54	−0.19
Proportion of variance	0.28	0.19	0.17	0.09

Note. 10% missing values imputed by expectation maximization.

Table 4. Correlation of Factors Between Set 1 and Set 2, and Correlation of Factors With Human Development Index (HDI).

	G1	G2	G3	G4	HDI
F1	0.75***	0.57**	−0.15	0.34	−0.73***
	0.50*	0.47*	−0.52**	0.28	
F2	0.03	−0.08	0.80***	−0.16	−0.34*
	−0.13	−0.17	0.79***	−0.21	
F3	0.41*	0.18	−0.17	0.54**	−0.07
	0.42*	0.13	−0.21	0.53**	
F4	0.05	−0.3	−0.07	0.09	0.02
	0.18	−0.27	−0.04	0.12	
HDI	−0.78***	−0.64***	0.19	−0.32	1.00

Note. The second value in each cell is controlled for HDI.
Levels of significance: *$p < .05$, **$p < .01$, ***$p < .001$.

in time, then there is likely to be a similar relationship at a later time if the two cultures are following approximately parallel trajectories (Beugelsdijk & Welzel, 2018). This explains why different statistical variables measured 10 or 20 years apart are showing significant loadings on the same factors.

Table 5. Correlation of Variables With Factors From Tables 2 and 3 and With HDI.

Set 1	F1	F2	F3	F4	G1	G2	G3	G4	HDI
Individualism	−0.74***	−0.04	−0.05	0.17	−0.67***	−0.65***	0.49*	−0.49*	0.57***
	−0.58***	0.20	−0.02	0.19	−0.54**	−0.57**	0.68***	−0.45*	
Power dist. H	0.81***	0.04	0.05	−0.10	0.75***	0.60**	−0.13	0.48*	−0.62***
	0.66***	−0.24	0.00	−0.11	0.53**	0.49*	−0.39	0.47*	
Uncertainty	0.32*	0.07	−0.70***	−0.57***	−0.20	0.00	−0.08	−0.35	−0.11
	0.35*	0.03	−0.72***	−0.57***	−0.30	−0.02	−0.09	−0.37	
Masculinity	0.15	−0.01	−0.17	0.40**	−0.07	−0.28	0.02	−0.04	0.00
	0.21	−0.01	−0.17	0.40**	−0.06	−0.29	0.02	−0.04	
Long term	−0.27	−0.93***	−0.01	0.18	−0.14	0.03	−0.75***	0.14	0.42**
	0.08	−0.92***	0.03	0.19	0.12	0.19	−0.74***	0.23	
Exclusionism	0.92***	0.20	−0.12	0.09	0.76***	0.56**	−0.15	0.25	−0.79***
	0.79***	−0.07	−0.23	0.13	0.55**	0.55**	−0.45*	0.27	
Indulgence M	−0.39**	0.57***	−0.09	−0.05	−0.37	−0.18	0.37	−0.07	0.07
	−0.52***	0.64***	−0.08	−0.05	−0.13	−0.01	0.52**	0.02	
Monumentalism	0.33*	0.89***	−0.05	0.12	0.20	−0.14	0.71***	−0.28	−0.45**
	−0.04	0.88***	−0.06	0.11	−0.01	−0.28	0.69***	−0.36	
Embeddedness	0.77***	−0.03	0.28	0.10	0.66**	0.68***	−0.23	0.63**	−0.55***
	0.65***	−0.08	0.29	0.17	0.57**	0.61**	−0.26	0.55*	
Hierarchy	0.59***	−0.43**	0.44**	0.43**	0.51*	0.47*	−0.56**	0.60**	−0.58***
	0.29	−0.58***	0.50**	0.59***	0.21	0.06	−0.70***	0.44	
Mastery	0.23	−0.04	0.57***	0.59***	0.29	−0.01	−0.08	0.51*	−0.22
	0.10	−0.06	0.57***	0.62***	0.24	−0.18	−0.08	0.49*	
Secular	−0.63***	−0.77***	0.05	0.03	−0.40*	−0.23	−0.56**	−0.11	0.67***
	−0.24	−0.76***	0.13	0.00	−0.09	−0.04	−0.54**	0.00	

(continued)

Table 5. (continued)

Set 1	F1	F2	F3	F4	G1	G2	G3	G4	HDI
Self expression	−0.80***	0.41**	−0.01	−0.01	−0.55**	−0.38	0.51**	−0.27	0.46**
	−0.78***	0.70***	0.02	−0.03	−0.36	−0.24	0.70***	−0.20	
Performance	−0.38**	−0.23	0.45***	0.72***	−0.02	−0.37	−0.07	0.10	0.35*
	−0.20	−0.12	0.51***	0.76***	0.25	−0.29	−0.01	0.17	
Future orientation	−0.65***	−0.15	0.35*	0.58***	−0.15	−0.29	0.04	0.02	0.39**
	−0.58***	−0.02	0.41**	0.62***	0.14	−0.17	0.13	0.11	
Gender egal. H	−0.42**	0.08	−0.34*	−0.49***	−0.36	−0.08	0.29	−0.17	0.33*
	−0.27	0.22	−0.33*	−0.52***	−0.28	0.01	0.36	−0.13	
Assertiveness	−0.14	0.06	−0.62***	0.33*	−0.49*	−0.57**	0.41*	−0.67***	0.07
	−0.14	0.09	−0.62***	0.33*	−0.44*	−0.52**	0.49*	−0.65***	
Institutional coll.	−0.42**	−0.45***	0.65***	0.28*	0.10	−0.15	−0.40*	0.24	0.32*
	−0.28*	−0.38**	0.72***	0.29*	0.33	−0.07	−0.38	0.31	
In-group coll.	0.90***	0.06	−0.11	−0.16	0.70***	0.54**	−0.19	0.32	−0.58***
	0.86***	−0.18	−0.18	−0.17	0.44*	0.40*	−0.47*	0.24	
Power dist. G	0.46***	−0.01	−0.59***	−0.27	0.22	−0.02	0.06	−0.23	−0.33*
	0.34*	−0.13	−0.65***	−0.28*	0.01	−0.16	0.00	−0.32	
Humane orient.	0.16	0.34*	0.69***	−0.01	0.41*	0.09	0.34	0.24	−0.29*
	−0.08	0.26	0.70***	0.00	0.20	−0.09	0.28	0.17	
Set 2									
Nastiness	0.46*	−0.31	0.40*	0.07	0.74***	0.54**	−0.51**	0.74***	−0.52**
	0.27	−0.43*	0.37	0.13	0.62***	0.32	−0.48**	0.71***	
Morality	0.65***	0.29	0.38	−0.13	0.81***	0.78***	−0.10	0.63***	−0.73***
	0.23	0.22	0.39	−0.06	0.58***	0.59***	0.06	0.60***	
Religiosity SL	0.64***	0.25	0.32	−0.10	0.85***	0.70***	−0.10	0.65***	−0.71***
	0.30	0.17	0.29	−0.02	0.67***	0.46**	0.06	0.63***	

(continued)

Table 5. (continued)

Set 1	F1	F2	F3	F4	G1	G2	G3	G4	HDI
Religiosity SS	0.60**	0.25	0.48*	0.06	0.85***	0.61***	−0.12	0.53**	−0.66***
	0.28	0.18	0.49*	0.16	0.72***	0.32	0.02	0.45**	
Complexity	−0.30	−0.28	0.12	−0.11	−0.36*	0.22	−0.35*	0.36*	0.37*
	0.05	−0.23	0.20	−0.19	−0.13	0.65***	−0.46**	0.55**	
Reward	0.33	0.32	0.19	−0.24	0.60***	0.71***	−0.06	0.64***	−0.44**
	0.09	0.28	0.15	−0.21	0.45**	0.62***	0.03	0.58***	
Cynicism	0.33	−0.25	−0.27	−0.34	0.57***	0.69***	−0.64***	0.11	−0.54**
	0.32	−0.29	−0.30	−0.32	0.27	0.53**	−0.65***	−0.08	
Fate control	0.45*	−0.62***	0.44*	0.18	0.68***	0.53**	−0.70***	0.48**	−0.49**
	0.54**	−0.67***	0.43*	0.21	0.56***	0.32	−0.71***	0.39*	
Egalitarian	−0.71***	0.61***	−0.07	−0.01	−0.38	−0.42	0.75***	−0.44*	0.31*
	−0.65***	0.78***	−0.03	−0.03	−0.34	−0.39	0.74***	−0.39	
Loyal	0.35*	0.12	0.08	0.29	0.50*	0.37	−0.26	0.20	−0.28
	0.33	0.08	0.07	0.30	0.57**	0.38	−0.25	0.15	
LOC political	−0.18	0.13	−0.38*	−0.39*	−0.47*	−0.27	0.42*	−0.75***	0.15
	−0.12	0.17	−0.37*	−0.40*	−0.55**	−0.26	0.41	−0.81***	
LOC individual	−0.59***	0.37*	0.14	0.08	−0.39	−0.68***	0.60**	−0.29	0.44**
	−0.53**	0.48**	0.19	0.07	−0.25	−0.67***	0.59**	−0.16	
Regality	0.75***	0.04	0.40*	0.04	0.96***	0.64***	−0.29	0.50**	−0.76***
	0.43*	−0.14	0.43*	0.19	0.91***	0.31	−0.23	0.42*	
Discipline	−0.21	−0.68***	0.23	0.40*	−0.18	−0.43*	−0.42*	−0.14	0.35*
	0.11	−0.67***	0.31	0.38	0.15	−0.29	−0.53**	−0.03	
Sociosexuality	−0.48**	0.50**	−0.13	−0.16	−0.60**	−0.50*	0.86***	−0.53*	0.35*
	−0.69***	0.57**	−0.14	−0.18	−0.67***	−0.45*	0.89***	−0.50*	

(continued)

Table 5. (continued)

Set 1	F1	F2	F3	F4	G1	G2	G3	G4	HDI
Set 3									
Conservatism	0.85***	0.47*	0.38	−0.15	0.75***	0.47*	0.18	0.32	−0.80***
	0.63***	0.19	0.27	−0.33	0.55*	0.37	0.02	0.28	
Harshness	0.16	−0.54**	0.63***	0.42*	0.44	0.18	−0.52*	0.41	−0.01
	0.17	−0.64***	0.64***	0.42*	0.58*	0.20	−0.52*	0.43	
Indulgence H	−0.39**	0.56***	−0.09	−0.04	−0.41*	−0.26	0.39*	−0.16	0.22*
	−0.52***	0.61***	−0.08	−0.04	−0.17	−0.03	0.37*	−0.04	
Tightness G	0.38	−0.33	0.40*	0.31	0.65**	0.36	−0.32	0.44	−0.29
	0.28	−0.40*	0.39	0.39	0.66**	0.34	−0.33	0.42	
Tightness U	0.75***	0.03	0.26	0.29	0.70***	0.30	−0.24	0.19	−0.60***
	0.53**	−0.21	0.25	0.24	0.38	−0.16	−0.18	−0.01	
Secular W	−0.45**	−0.65***	−0.09	−0.18	−0.48**	−0.25	−0.15	0.03	0.60***
	−0.03	−0.60***	−0.07	−0.23	−0.06	0.13	−0.30	0.27	
Emancipative	−0.91***	−0.15	−0.10	−0.08	−0.70***	−0.52**	0.19	−0.38*	0.67***
	−0.80***	0.16	−0.08	−0.13	−0.46*	−0.26	0.12	−0.25	
Externality	0.64***	0.28	0.47**	0.16	0.81***	0.74***	0.16	0.69***	−0.70***
	0.38*	0.15	0.49**	0.21	0.71***	0.57*	0.11	0.55*	
Cynicism B	0.37*	−0.50**	−0.15	−0.07	0.26	0.35	−0.57**	0.14	−0.23
	0.46**	−0.53**	−0.16	−0.07	0.21	0.35	−0.60**	0.07	
Self-directed	−0.72***	−0.45**	−0.05	−0.03	−0.38	−0.34	−0.35	−0.11	0.75***
	−0.31	−0.49**	0.26	0.04	0.08	−0.09	−0.40	0.07	
Civility	−0.44*	0.67***	−0.21	−0.10	−0.37	−0.34	0.62***	−0.33	0.22
	−0.40*	0.75***	−0.16	−0.09	−0.29	−0.26	0.66***	−0.29	
Integration	−0.73***	0.03	−0.31	0.00	−0.85***	−0.83***	0.54*	−0.79***	0.69***
	−0.56*	0.33	−0.41	−0.07	−0.68**	−0.61*	0.68**	−0.63*	

(continued)

Table 5. (continued)

Set 1	F1	F2	F3	F4	G1	G2	G3	G4	HDI
Confucian	0.34	−0.74***	0.11	0.14	0.19	0.23	−0.65**	0.32	0.35
	0.62**	−0.75***	0.10	0.12	0.23	0.31	−0.65**	0.38	
Human	−0.21	0.19	0.22	0.30	−0.36	−0.62*	0.30	−0.46	0.29
	−0.08	0.30	0.22	0.29	−0.09	−0.52	0.30	−0.28	
Moral	0.61**	−0.38	−0.11	0.01	0.38	0.33	−0.40	0.38	−0.15
	0.60**	−0.55*	−0.10	0.04	0.34	0.28	−0.39	0.32	
Individual B	−0.91***	−0.26	−0.07	−0.13	−0.78***	−0.55**	0.13	−0.39*	0.67***
	−0.80***	−0.04	0.02	−0.20	−0.51**	−0.23	0.01	−0.26	
Joy	−0.56***	0.47***	0.04	0.04	−0.53**	−0.39*	0.43*	−0.17	0.42***
	−0.48***	0.64***	0.08	0.06	−0.14	−0.07	0.42*	0.02	
Trust	−0.34*	−0.35*	0.59***	0.46**	0.31	0.17	−0.31	0.26	0.10
	−0.29	−0.31*	0.62***	0.48***	0.42*	0.18	−0.31	0.26	
Confidence	0.29	−0.49*	0.40	0.37	0.51	0.33	−0.66**	0.72**	−0.42
	0.02	−0.51*	0.42	0.30	0.40	0.10	−0.71**	0.67*	
Hierarchy F	0.51**	−0.31	0.50**	0.47*	0.65**	0.47	−0.64**	0.64**	−0.58**
	0.18	−0.30	0.62***	0.53**	0.46	0.04	−0.74**	0.48	
Individual M	−0.83***	−0.22	−0.16	−0.04	−0.82***	−0.81***	0.07	−0.56**	0.87***
	−0.60***	−0.02	−0.20	−0.13	−0.62***	−0.50**	0.19	−0.40*	
Flexibility	−0.29	−0.70***	0.29	0.18	−0.15	−0.31	−0.64***	0.05	0.57***
	0.23	−0.71***	0.41**	0.20	0.37	0.19	−0.74***	0.37	
Polarization	0.02	0.41*	0.14	0.14	0.25	0.26	0.09	−0.25	−0.35*
	−0.14	0.39*	0.11	0.10	−0.11	0.02	0.19	−0.41	
Long term MH	−0.19	−0.84***	0.31	0.29	0.02	0.16	−0.76***	0.51*	0.17
	0.11	−0.83***	0.35	0.38	0.38	0.38	−0.80***	0.58*	

(continued)

Table 5. (continued)

Set 1	F1	F2	F3	F4	G1	G2	G3	G4	HDI
Familialism	0.83***	0.11	0.00	0.44	0.89***	0.52*	−0.16	0.24	−0.67***
	0.68**	−0.10	−0.03	0.48*	0.70**	0.13	−0.16	0.19	
K factor	−0.04	−0.70***	0.21	0.02	0.21	0.13	−0.63***	0.29	0.40***
	0.43**	−0.65***	0.29	0.03	0.39*	0.20	−0.63***	0.33	
Conservatism S	0.63***	0.06	0.35	−0.05	0.73**	0.66**	−0.18	0.75***	−0.38*
	0.57**	−0.01	0.41*	0.06	0.69**	0.62*	−0.22	0.72**	
Pace	0.64***	0.29	−0.05	−0.15	0.38	0.48	0.13	0.34	−0.77***
	0.20	0.16	0.04	0.23	0.01	0.02	0.16	0.15	
Helping	0.05	0.05	−0.29	−0.32	−0.28	0.06	−0.02	−0.17	−0.36
	−0.39	−0.04	−0.29	−0.31	−0.76*	−0.47	−0.14	−0.65*	
Humane S	0.29	0.33	0.47*	0.13	0.57***	0.34	−0.02	0.31	−0.38*
	0.12	0.30	0.45*	0.17	0.48**	0.14	0.06	0.21	
Uncertainty S	−0.14	−0.01	0.63***	0.53**	0.40*	0.20	−0.09	0.39*	−0.08
	−0.18	0.00	0.64***	0.53**	0.53**	0.20	−0.08	0.39*	
Power dist. S	0.57**	0.05	−0.19	−0.51**	0.34	0.68***	−0.33	0.41*	−0.37*
	0.48*	−0.02	−0.27	−0.50*	0.09	0.63***	−0.28	0.33	
Gender egal. S	−0.65***	0.10	−0.16	−0.25	−0.65***	−0.45**	0.40*	−0.16	0.70***
	−0.37	0.26	−0.09	−0.41*	−0.24	0.00	0.38*	0.10	
Contextualism	0.46*	0.23	0.35	0.24	0.70**	0.67**	−0.06	0.68**	−0.46**
	0.26	0.19	0.29	0.24	0.49	0.43	−0.05	0.56*	
Autonomy O	−0.51*	0.23	−0.13	−0.18	−0.44	−0.36	0.17	−0.34	0.43*
	−0.37	0.32	−0.04	−0.17	−0.27	−0.15	0.17	−0.19	
Independence	−0.36	0.11	−0.40	−0.02	−0.43	−0.55*	0.16	−0.36	0.19
	−0.18	0.18	−0.35	0.01	−0.28	−0.44	0.16	−0.24	

Note. The second value in each cell is controlled for HDI.
Levels of significance: *$p < .05$, **$p < .01$, ***$p < .001$.

The first factor from set 1, F1, is strongly correlated with the first factor from set 2, G1 (see Table 4). This shows that the existence of a superfactor is indeed a reproducible finding. The superfactor F1 or G1 is significantly correlated with more than half of all the cultural variables in Table 5. This is an important discovery.

The superfactor captures several aspects of cross-cultural differences that happen to be correlated with each other for a number of reasons. This includes economic, technological, and institutional aspects commonly described as development, as well as cultural factors related to modernization, and psychological factors that we may describe with the regal versus kungic dimension. Many of the correlations of cultural variables with the superfactor remain significant when we control for the confounding influence of HDI (Table 5). This means that the superfactor cannot be explained by development effects alone.

We may improve the understanding of the superfactor by looking at some of the variables that have strong correlations with F1 and G1. A low value of F1/G1 indicates high development, modernization, and low regality, while a high value of F1/G1 is seen in cultures with less development, less modernization, and high regality. This is evident from many of the correlations shown in Table 5. Some notable examples are worth mentioning here: *Individualism versus collectivism* is connected with modernization and low regality, as reflected in a negative correlation with F1 and G1. The variable named *In-group collectivism* is the opposite. *Power distance* is a measure of hierarchy which is a typical indicator of regality, reflected by a positive correlation. *Secular versus traditional values, self-expression versus survival values*, and *emancipative values* are all connected with modernization and low regality, reflected by a negative correlation with F1 and G1. *Exclusionism versus universalism* is connected with traditionalism versus modernization, reflected by a positive correlation. The variable named *Embeddedness versus autonomy* is similar to collectivism versus individualism, reflected by a positive correlation with the superfactor. *Hierarchy* is similar to power distance, reflected by a positive correlation. The variable named *regality* has a positive correlation with the superfactor as expected. Strict *religiosity* is connected with regality, reflected by a positive correlation. *Egalitarian* values are typical of kungic cultures (low regality), reflected by a negative correlation. *Sociosexuality* has a negative correlation as predicted by regality theory. The concept of cultural *tightness* is similar to regality since both are reactions to fear and danger. The measure of tightness by Uz has stronger correlations than Gelfand's tightness when HDI is not controlled. The connection between these different variables and their relationship with development and modernization has been studied thoroughly by Inglehart and Welzel (Inglehart, 2018; Inglehart & Welzel, 2005; Welzel, 2013).

The correlation between the dominating factors F1 and G1 was predicted by our theory, but there are more correlations between the factors of set 1 and 2 that were not predicted in advance. Most notable is the strong correlation between factors F2 and G3 (see Table 4). This means that there is a second dimension of cultural differences that has been captured by multiple studies. We may explore this second dimension by looking at the variables that have strong correlations with F2 and G3 in Table 4. The F2/G3 factor has a strong negative correlation with *long term orientation*. This means that cultures high in this factor are less interested in long term planning while cultures low in F2/G3 are able to delay gratification. Minkov's variables named *monumentalism versus flexumility* and *flexibility versus monumentalism* have strong correlations with F2/G3. This means that countries high in this dimension have strong pride and immutable identities, while a low score indicates flexibility and humility (Minkov, 2011; Minkov et al., 2018). The variable named *Confucian work dynamism* has a negative correlation with F2/G3. This variable is the result of a search for East Asian perspectives and values as an alternative to the research dominated by Western philosophies. Cultures low in F2/G3 can be expected to exhibit thrift, persistence, and sense of shame (Chinese Culture Connection, 1987). We can therefore expect East Asian or Confucian cultures to be found in the low end of the F2/G3 dimension. A closely related variable is Minkov's *K factor* (Minkov, 2014), which is negatively correlated with F2/G3.

All of these variables are known to be related to aspects that are characteristic of East Asian cultures, but the theoretical concepts appear to be incoherent (Fang, 2003), and scientists have problems explaining why they are related to each other (Minkov et al., 2018). It is important to notice that cultural differences in response style may account for some of the differences between East Asian and other countries, as East Asians tend to give less extreme and less negative answers to surveys (Guo & Spina, 2019; Harzing, 2006).

No theoretical explanation has been found for the somewhat weaker correlation between the factors F3 and G4. This third correlation pair is only observed in the unrotated four-factor solution.

It is illustrative to plot the countries of the world along the two main dimensions that have been identified here. Figure 3 shows a map of countries along the dimensions of F1 and F2 from set 1. Figure 4 shows a similar plot of countries along G1 and G3 for set 2. The latter plot has fewer countries, but the similarity between the two plots is clear. The X-axis, representing the superfactor F1/G1, has the rich North European welfare states in the low end, while less developed and more war-torn countries are found in the high end. This confirms that the superfactor is negatively related to development and modernization, and positively related to regality.

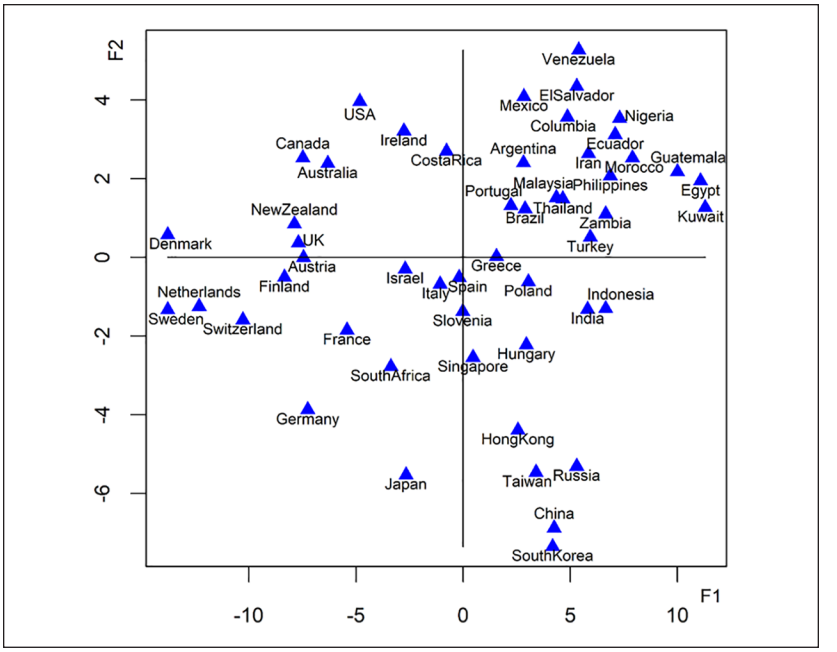

Figure 3. Map of countries on factors F1 and F2.

The Y-axis has the East Asian countries in the low end, in accordance with the negative correlations of F2/G3 with Confucian work dynamism and long-term orientation. The high end of the Y-axis includes several Latin American countries. We may also expect to find African countries here, according to Minkov's interpretation of the K factor (2014), but few African countries are included in the samples.

If the meanings of variable names such as *Confucian work dynamism* and *Monumentalism versus flexumility* is not quite clear, we may gain more understanding from a more qualitative study aimed specifically at finding cultural differences between East and West (Nisbett, 2004). Nisbett's study found that East Asian people have a more holistic way of understanding the world, while people in the Western cultures tend to focus on simple deterministic relationships that avoid contradictions. The social relations in East Asia are more interdependent and collectivistic than in the West, in agreement with this holistic world view. More research is needed to find ways to measure these cultural differences and possibly relate them to the second dimension in Figures 3 and 4. It would be premature to name this second dimension

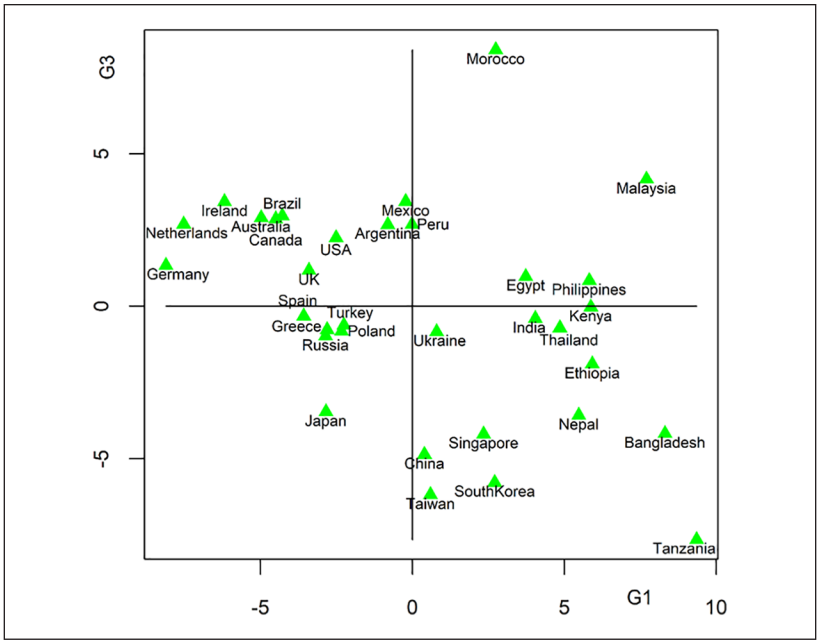

Figure 4. Map of countries on factors G1 and G3.

after a particular effect as long as we do not fully understand how the different social, cultural, and psychological effects interact to produce this factor. Instead, we will use the preliminary name *East Asian factor*, for the factor represented by F2 and G3.

The two plots are based on two independent samples of cultural variables. The striking similarity between these two plots indicates that the two dimensions are reproducible. If this is true, then we may be able to find similar patterns in other published cultural maps. The most well-known cultural map is Inglehart and Welzel's map of cultural values (World Values Survey, 2019). This map has a dimension called *self-expression versus survival values* on the X-axis and *secular/rational versus traditional values* on the Y-axis. Inglehart and Welzel's map is actually quite similar to the maps in Figures 3 and 4 if we rotate it. The North European welfare states are placed in the upper right corner with high self-expression values and high secular/rational values, while the opposite corner representing survival values and traditional values includes less developed African and South Asian countries. The superfactor of the present study thus corresponds to a diagonal line from the upper right to the lower left corner of

Inglehart and Welzel's map. The East Asian factor of the present study corresponds to a vertical line on Inglehart and Welzel's map with Confucian countries at the top and Latin American and African countries at the bottom.

The geometric distortion that transforms one cultural map to the other is due to the factor rotation that was used in the construction of Inglehart and Welzel's map. The factor rotation has divided the total variance more evenly between the factors. This hides the fact that it is possible to extract a superfactor that accounts for a large fraction of the total variance. Small differences in the variables included in a factor analysis can result in different factor rotations that obscure similarities between different studies.

A recalculation based on the same data as Inglehart and Welzel's factor analysis has led to the conclusion that a single-factor solution is more appropriate (Beugelsdijk & Welzel, 2018; Li & Bond, 2010). Welzel (2013) points out some problems with factor analysis, and suggests that secular values and emancipative values can be combined under a common framework of human empowerment. Ronald Inglehart (2018) has made a similar observation in connection with his modernization theory. Inglehart finds that a single factor combining *survival versus self-expression values, individualism versus collectivism*, and *autonomy versus embeddedness* accounts for 81% of cross-national variation in these variables. Inglehart's modernization dimension is similar to the superfactor identified in the present study, with opposite sign.

Several other studies have produced two-factor models of cultural differences and two-dimensional cultural maps along their two factors (Fog, 2017; Minkov, 2011; Schwartz, 2006; Smith et al., 1995; Stankov et al., 2014). These cultural maps are all different, but they have important features in common. A line that corresponds to the superfactor identified in the present study can be drawn on all of these maps, though rotated differently. At an angle to this line appears another dimension that tends to have the East Asian cultures clustering in one end. There is less agreement on what comes at the opposite end of this second line, but at least the last three of these studies have some Latin American countries here.

If we return to the study by Maleki and de Jong (2014) and their arrangement of cultural variables into clusters, we find that the superfactor (F1/G1) of the present study is related to cluster 1 and 2, while the East Asian factor (F2/G3) correlates with the variables in cluster 5 and 9. The remaining clusters have no clear parallel in the present study, and the seven-factor solution could not be reproduced on different data sets.

Conclusion

The present study has identified two important factors or dimensions of culture that can be found in the data from many different cross-cultural studies.

The strongest factor, or superfactor, is significantly correlated with more than half of all cultural variables in all available quantitative cross-cultural studies of contemporary cultures. The existence of this superfactor was predicted on the basis of regality theory—a new theory based on evolutionary psychology. The superfactor captures a number of important cultural phenomena that happen to be correlated with each other for a number of reasons. This includes physical and economic factors that can be subsumed under the category of development, as well as cultural values and institutions representing modernization, and also social-psychological factors reflecting collectivism, regality, and tightness.

The second factor, tentatively named East Asian factor, taps several aspects of culture that are characteristic of East Asian countries, including long-term orientation, thrift, flexible self-perception, sense of shame, and possibly also spurious effects of differences in response style. The existence of the second factor was not predicted at the start of the present study.

The finding of these two factors is highly reproducible. The existence of these main factors has been obscured by the common practice of factor rotation. The most commonly used methods of factor rotation tend to divide the total variance more evenly between factors than what a scree plot shows. This is hiding the existence of a dominating factor that accounts for a large fraction of the total variance. Cultural maps published by different authors appear to be approximately equivalent, but differently rotated, skewed, or mirror imaged due to the different rotations of factors. There has been a tendency for every new cross-cultural study to produce a new differently rotated factor solution. The authors of these studies have often invented new names for the factors they discovered, without recognizing that they were similar to previously published factors, except for a different rotation. Unrotated solutions or quartimax rotation makes the similarity between different studies more easily discernible.

It is observed that different kinds of studies using different statistical methods and different theoretical concepts, including collective values and norms as well as individual preferences, have produced results that are highly correlated with each other. Obviously, not every random set of cultural variables will generate the same two factors. The point here is to show that there are more similarities between the results of different cross-cultural studies that what appears from the many rotated factors with different names.

The finding of two main factors in the present study does not mean that culture can be described exhaustively with just two factors. A more appropriate interpretation is that a large number of the variables that social scientists have decided to study are correlated with each other in ways that can be represented by these two factors. It is quite possible that more common factors can be found in future studies.

Maleki and de Jong (2014) proposed that cultural variables can divided into nine clusters. This number of clusters appears to be excessive, but at least two clusters of cultural variables are found to be reproducible. The first cluster of cultural variables includes all variables that are strongly correlated with the superfactor identified here. This includes variables such as individualism versus collectivism, power distance, egalitarian values, religiosity, tightness, regality, self-expression versus survival values, and secular-rational versus traditional values. This group of variables corresponds to cluster 1 and 2 in Maleki and de Jong's classification. The second group includes variables that are strongly correlated with the East Asian factor of the present study. This includes long-term orientation, Confucian values, flexibility versus monumentalism, and Minkov's K factor. This corresponds to cluster 5 and 9 in Maleki and de Jong's classification.

The fact that so many cultural variables are correlated with just two factors has important consequences for cross-cultural research. The risk of spurious correlation between any too variables is obvious, and it is important to control for confounding influences.

Finally, we must recognize that not all cultural differences can be expressed in quantitative terms. Categorical variables such as religion, language, and subsistence pattern are not easily included in linear statistical models. A cluster analysis of cultures including qualitative traits may purvey useful information that is not found in factor analyzes of cultural variables (Inglehart & Welzel, 2005; Ronen & Shenkar, 2013).

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Supplemental Material

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