



Cognitive dimension of culture and social axioms: using methods of multidimensional analysis to research Ukrainian cultural beliefs about success and inequality

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Abstract The significance of cultural factors in the context of surveying cognitive processes, perception, emotions and mental health has long been acknowledged by social scientists. Shared collective belief systems represent one of the long established research foci in the social sciences. Presently studying the large cultural dimensions in their connections to individual predispositions and behavior is one of the core interests in cultural psychology as well as cognitively-oriented anthropology and sociology. To explore the patterned collective agreement in belief systems quantitatively, data reduction techniques is the strategy used most often and most successfully. The present study is premised on the principles of culture consensus model and uses cultural models framework to explain how Ukrainians view success and understand its prerequisites. The analysis is anchored in the cognitive dimension of the Ukrainian cultural worldview, specifically in the intersubjectively shared cultural assumptions (social axioms) regarding the opportunities for social advancement

and their unequal distribution across different social groups. Based on the ISSP 2019 data set ($N = 2001$), the present study sought to uncover the content and organization of social axiomatic beliefs the Ukrainians have regarding the social characteristics facilitating self-advancement within a group, as well the degree of sharedness and homogeneity of these beliefs and their demographic correlates in the sample. The results converge on the four-factorial structure partitioning the “ingredients of success” into the categories of structural attributes, social capital, family background and individual agency.

Keywords Cultural beliefs · Inequality · Inter-informant agreement · Multidimensional scales · Quantitative methods

Intersubjective culture and social cognition

Cultural factors have long been studied by social scientists in connection with cognitive processes, perception, emotions and other aspects of human mental life (Bennardo & De Munck, 2013; Berger & Luckmann, 1966; Blount, 2011; Caulkins, 2004; Chentsova-Dutton, & Tsai, 2010; Chiu et al., 2010; D’Andrade, 1995, 2008; de Munck & Bennardo, 2019; Kashima, 2016; Oude Groeniger et al., 2019; Polavieja, 2015; Quinn & Holland, 1987; Quinn, 2018;

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Wang, 2016). Cultural influences in cognition are found in the manner individuals interpret the complex social world around them, including their assumptions and knowledge about the social world and how they construe their place in it relative to other individuals. Cultural meaning construction affects one's perception of situations, strategic thinking, motivation for actions, cause attribution and assessment of future prospects. As cognitive processes are connected to the analyzing, evaluating and predicting social situations and their outcomes, surveys into the interactions between the collective cultural knowledge and individual cognition are of particular interest for social scientists working in different fields (Charles, 2008; DiMaggio, 1997; Hunzaker & Valentino, 2019; Vaisey, 2009, 2010, 2014; Zerubavel, 1999).

Social interactions between individuals are enabled by the existence of intersubjective cultural sharing within a collectivity (Chiu et al., 2010). Intersubjectivity implies the presence of *mutual* understanding regarding the status of a particular attribute x within a social group. For example, as a course instructor I know that in order for a student to get a passing grade he or she is expected to participate in class discussions; the students are aware of this prerequisite, and I also am cognizant that the students know it as well. Intersubjectivity allows social groups to have social conventions, group norms, social institutions and similar social facts that, in their turn, underlie the functionality of social hierarchies that distinguish human societies. In this fashion members of a social group are able to coordinate their actions due to their shared understanding of purpose and its meaningful interpretation in different domains of life. Effective mutual understanding is facilitated by the shared cultural ideas (norms, values etc.) that legitimize and justify our actions and that are shared by individuals by virtue of their common socialization experiences (D'Andrade, 2008). This concerns simple things such as evaluations of situations, as well as more complex agglomerations of beliefs such as cultural worldviews.

Moreover, belonging to a cultural group typically implies that an individual develops a set of ideas, attitudes, norms and social axioms that are cultivated, circulated and inter-generationally transmitted within this group as part of life-long systematic enculturation. *Social axioms* are generalized beliefs about the world that are held within a cultural community (Leung & Bond, 2015; Leung et al., 2002). Social axioms are a

form of public collective knowledge and are independent of individually acquired knowledge that is contingent on the life trajectory of a specific individual. Social axioms are not identical to values¹; they may not coincide with personal values or personal beliefs that an individual holds (see Gilbert (2015) regarding the nature of collective beliefs). However, like values, they inform our understanding of the social world, and therefore can affect behavioral choices through interpretation of situations, evaluation of available strategies and predicting behavioral reactions of others.

Cultural models and social axioms

One of the products of the social way of living in a group is cognitive models of the world that are generated in the minds of individuals as intentional rational agents capable of intersubjectivity and living their lives fully integrated into their sociocultural worlds (Chirkov, 2020). *Cultural models* are systemic entities emerging in social interactions between individuals within structured social institutions infused with collectively shared cultural meaning (Chirkov, 2020; Gilbert, 1987, 1996). Cultural models also present ways of interpretation of events and situations that are collectively validated and shared by the group, and thus they determine which relevant emotional, cognitive or motivational scenarios these events and situations would elicit (Chirkov, 2020, c. 145). By so doing cultural models are also part of the behavior management mechanism within a group regulating group members' social transactions in various domains such as education system (Fryberg & Markus, 2007; Gee, 2012; Li, 2012); marriage (Dunn, 2004; Quinn, 2018); employment (Strauss, 2005); romantic relations (Bouchelnikova et al., 2016; de Munck, 2011; de Munck & Kronenfeld, 2016); parenting (Chao, 1995; Keller, 2007; Keller et al., 2006; Suizzo, 2002); relationship with nature (Bang et al., 2007; Ignatow, 2006; Paolisso et al., 2013); health care (Hickman, 2007; Jovchelovitch & Gervais,

¹ Social axioms are not the same as values despite the fact that they reflect their content, as social axioms code culture-specific understanding of relationships between various agents (Leung & Bond, 2015) and that is why sometimes referred to as "cultural cynicism".

1999; Kirmayer & Sartorius, 2007; Kleinman, 1978; Murray et al., 2003) and many other daily life activities.

Cultural models have a complex social ontology and depend on our capacities for intersubjectivity and intentionality (Chirkov, 2020, c. 154–155). In that sense their existence is rooted in the *implicit* agreement between the individuals on culturally salient concepts (and consequently priorities and expectancies) and is therefore conventional as well as profoundly social (Leung et al., 2002; Searle, 1995, Searle, 2006; Tuomela, 2007; Tuomela, 2013; Tomasello, 1999; Tomasello, 2014; Tomasello, 2018). As an individual is not only aware of the content of the cultural model, but also knows that others in the group have and share this knowledge (and understand its implications in the same way) as well, the contents of the cultural model needs not be spelled out explicitly (D’Andrade, 1987). Social axioms are the implicit cultural generalizations in the form of assertions about the relationship between two concepts or entities (Leung et al., 2002). Coupled with the intersubjective nature of this understanding of a cultural model, social axioms allow for culture-specific “generalized expectancies” that infuse with meaning the relationships among the components of a cultural model (and, in a more psychological plane, are used to characterize such social psychological phenomena as locus of control when attributing causes to behavior (Leung et al., 2002)). This social *axiomatic* core of cultural models is essential to understanding how they work and how they are connected to behavior. Social axioms form the “door hinges” of the cultural models defining (1) how the meaningful logical connections within the model will further unfold to form the cognitive complexity associated with the agglomerations like cultural models, and (2) how these logical connections will branch out to tie together various different cultural domains to ensure the understanding of causality embedded within a cultural model.

Finally, cultural models represent generalized conventional culturally shared bodies of knowledge that are public (Gilbert, 1987, 1996) and can have multiple manifestations in a society including its mental world² (mental habits, values, norms, beliefs about origins of disease etc.) and material culture (technology,

nutrition, health behavior, fashion, rituals etc.). Thus what one has in one’s individual mental repertoire is partly due to one’s unique life trajectory and partly due to the internalized publicly available cultural models that offer some elements of the collective knowledge about the world. For our purposes it is important that cultural models organize axiomatic cultural knowledge about a cultural domain within an individual mind and guide individual interpretations of events, behavior and motivations based on the shared and mutually understood organizational principles of the cultural model. Cultural models are enclaves of values, social axioms and culturally normative beliefs that form an intersubjectively construed axiological hierarchy within a group. Familiarity with the contents of the cultural model translates into the cultural competence which reflects our ability to act in a culturally correct way (Romney, 1999; Romney et al., 1987).

Using multidimensional methods to research social reality

Researching shared collective belief systems is one of the central tasks of social sciences and one of the core elements of research design in anthropology, sociology and cultural psychology. There have been multiple productive attempts to survey various cultural dimensions and do cross-cultural comparisons. The most well-known are values studies using methodological principles developed by Shalom Schwartz (Schwartz & Bardi, 2001; Schwartz & Bilsky, 1987), values orientations in worldviews (Hofstede, 2001; Minkov & Kaasa, 2021; Saucier et al., 2015), cross-cultural research in personality dimensions (Saucier et al., 2015), associations between the dimensions of cultural and social capital and health (Oude Groeniger et al., 2019), and influence of culture on subjective well-being (Diener, 2000).

In the ethnographic context when the researcher does not have the correct answers in advance, culture consensus model allows to calculate the culturally correct response and to assess the interpersonal differences in cultural knowledge (Weller, 2007, c. 339–340). Culture consensus model represents a formalized mathematical model that involves asking questions and scoring answers. The classic form of this model relies on the inter-informant agreement and the

² Cultural models are often referred to as a “mental map of a society” or its “social mindscape”.

aggregated answers from the sample to quantitatively assess the degree to which the individual knowledge profile corresponds to the collective knowledge profile. This more formalized model of culture consensus analysis works on open format answers (fill-in-the-blanks) and categorical variables with answer format indicated as correct/incorrect. The operations for this analysis are embedded into ANTHROPAC as one of its functions (Borgatti, 1990). Less formalized model of culture consensus analysis that was used in this study employs evaluations of informant's responses reliability performed on the individuals using a factor-analyzing technique on the transposed matrix (Q-analysis) (Weller, 2007). It can process different response formats (including ordinal, interval and proportional/scalar variables) and is independent from the platform available in ANTHROPAC. To explore the contents of the cultural model and its consensual centers as reflected in the data R-analysis of the original (non-transposed) matrix can then be used. This technique is often employed by the researchers interested in health and illness (Chavez et al., 1995), social support (Dressler et al., 1997), personality (Furr, 2010), and social class (e.g., Magana et al., 1995). Among the more recent uses of culture consensus model jointly with cultural models reconstruction is the work on health care in Tanzania (Strong & White, 2020).

Although these two approaches differ in their degree of flexibility they have and the software they use, they do operate on similar mathematical principles and therefore share the same mechanics. Namely, based on the inter-informant agreement the researcher can compute each individual informant's degree of cultural knowledge ("cultural competence"), after which the culturally correct responses are obtained by means of weighing each individual response against the individual's cultural competence and aggregating the responses across all the informants (Weller, 2007, p. 340).

One of the most attractive features of the less formal model is its relatively relaxed requirements towards the sample size—given the high reliability of responses, surveying 50 individuals for informative and reliable results of consensus analysis is recommended (Weller, 2007). Presently more new methodological approaches to measure the amount of sharing due to culture are being developed (Weller, 2007, c.

366), chiefly based on factor analytic techniques (for example, Dressler et al., 2014).

Data reduction techniques (namely, factor analysis, principal component analysis, multiple correspondence analysis) represent one of the strategies employed most frequently. Data reduction is a reliable way of measuring shared collective knowledge that has a systematic organization of overarching worldview fragments or is aggregated into a cultural model (Maltseva, 2016, 2018; Saucier et al., 2015). For extraction of cultural dimensions of this sort factor analysis or principal component are typically used (Brown, 2006). It is often used by social scientists for detecting and evaluating the degree of similarities that are due to cultural sharing in the cognitive data (Handwerker, 2002). For example, in principal component analysis condensation of a dimension is achieved by reconstructing the associations between the variables and representing them in the form of new (latent) variables that 'summarize' the variation that exists in the matrix. The first two factors (principal components) are typically the most informative³ and are therefore used for interpretation of the resulting dimensions (latent variables). This procedure is suitable for researching cultural configurations of ideas, as it has the capacity to process the material of high complexity (informational saturation) and allows detecting courses of similarities or cultural origin in the data (Weller, 2007). Another important advantage of this data analytic procedure in researching complex cultural dimension is that it allows for direct and explicit testing of the cohesiveness of the distilled dimension (a factor or a principal component) rather than just assuming that the informants in the sample share cultural knowledge (Comrey & Lee, 1992; D'Andrade, 2008; Maltseva, 2018, pp. 5, 11–12; Nunnally, 1978). Demonstration of the similarities in data structure is a pivotal element in surveying cultural worldviews and their facets.

Social axioms can be studied at the collective and individual levels by means of data reduction (factorization). At the cross-national macro-level social

³ The first factor (principal component) in Q-analysis is usually interpreted as a measure of inter-informant agreement that reflects the degree of consensus. The meaning of the second factor is not consistently theorized but the argument has been made that it shows the degree of variation (for example, Dressler, Balieiro, & dos Santos, 2014).

axiomatic beliefs form the opposition between beliefs about the external control (deterministic views) and individual agency; additional groups of variables describing religiosity and rewards for one's efforts. All in all there are five cultural dimensions were extracted: social cynicism, social complexity, reward for one's work, religiosity and control over the outcome (Leung & Bond, 2004). At the individual level of cross-cultural comparison such domains as social influence, job satisfaction, family business practices and personal achievements were proposed (Leung & Bond, 2015).

The present analysis focuses on the cognitive dimension of the Ukrainian culture, specifically on culturally shared axiomatic beliefs different groups of Ukrainians have regarding the prerequisites for successful social navigation within the Ukrainian society, and the demographic correlates of these beliefs. Based on the ISSP 2019 dataset the analysis sought to (1) explore the variation in the social axioms about success and inequality characteristic of the Ukrainian society in terms their content and organization; (2) evaluate the degree of sharedness (as reflected in the amount of inter-informant agreement across the attributes found in the data) of these beliefs; (3) establish consensual centers; and (4) explain their demographic correlates. The analysis uses scale making process based on data reduction techniques and indexing to test the following propositions:

Hypothesis 1: Social axioms of success will have a clear organization (which will be reflected in the factorial structure) and high level of inter-informant agreement in the sample, which will be reflected in the high magnitude of eigenvalues on the first principal component in principal component analysis performed on individuals (transposed matrix).

Hypothesis 2: As social axioms are collective constructs, social axioms of success will not have statistically significant predictors among the individual-level, life trajectory-specific demographic variables (age, gender, income, marital and reproductive status, family composition etc.) in regression analysis.

Methods

Participants and measures

Ukraine has asserted its political independence from the Soviet Union in 1991. Situated in Eastern Europe where it is the second largest country, historically the Ukrainian territory has been the center of the east Slavic culture. The state of Kievan Rus has also been a political, cultural and religious center of the Eastern European Christendom since 10 century, which accounts for much of the religious and cultural identities, as well as cultural values priorities in the country today. Modern day Ukraine shares borders with Belarus, Hungary, Moldova, Poland, Romania, Russian Federation and Slovakia; it has a coastline along the Black Sea and the Sea of Azov. Following the annexation of the Crimean peninsula from Ukraine by the Russian Federation in 2014 the two countries are at war over the territories in the south-eastern Ukraine (Donbas). Currently the Ukrainian population is 41.3 million. In 2021 the Ukrainian GDP per capita is estimated at \$4,380. In 2019 Ukraine had a high Human Development Index of 0.779 but the Gini coefficient (26.6) is still low in Ukraine suggesting higher levels of socio-economic inequality and unequal distribution of resources among different social groups of Ukrainians.

The International Social Survey Programme (ISSP) dataset ($N = 2001$, 64% females, 36% males) is based on a survey conducted in 2019 and included adult Ukrainians aged 18–92 years (mean = 51, mode = 63, SD = 17.52). A typical respondent had three years of college education after high school [min = 0 ($n = 30$, or 1.5%), max = 30 years ($n = 2$, or 0.1%)]. Modal income was 10,000 UAH [min = 0 UAH ($n = 169$, or 8.4%), max 16,000 UAH ($n = 2$, or 0.1%)]. The details of sample composition are offered in the frequency table in Appendix (Table Tables 6, 7, 8, 9, 10, 11 and 12).

For the analysis of social axioms 11 variables (Q1a–k) were selected from the ISSP 2019 dataset (Table 1). Demographic data available in the dataset included a standard set of demographic variables (age, gender, education, income, family composition, marital status, number of children, religiosity, type of residence etc.). Following data cleaning, this set of selected variables was subjected to a series of analytical procedures in SPSS (IBM SPSS Statistics for

Table 1 Descriptive statistics for worldview variables (Q1a–Q1k)

	Mean	Mode	SD
Q1g. How important is it to offer bribes?	4.17	5	1.03
Q1h. How important is one's ethnicity?	4.08	5	1.16
Q1i. How important is religion one is practicing?	4.04	5	1.18
Q1j. How important is it whether one is a man or a woman?	4.04	5	1.11
Q1f. How important is it to have connections in political circles?	3.56	4	1.19
Q1a. How important is wealthy family background?	3.30	4	1.29
Q1b. How important is it to have educated parents?	2.97	3	1.17
Q1e. How important is it to have personal connections with important people?	2.66	3	1.10
Q1k. How important is to have ambition?	2.54	3	1.08
Q1d. How important is it to work hard?	2.46	3	1.09
Q1c. How important is it to get a good education?	2.33	3	1.11

Windows 2017) and Microsoft Excel to test the hypotheses of the study. In addition to the descriptive statistics, the analyses performed on this set of variables further included (1) analysis of correlations to explore the relationships between the elements of the cultural model and later evaluate the reliability of the indexed metrics on the basis of multi-item scales, (2) principal component analysis, cluster analysis and factor analysis to create multi-item scales, and (3) regression analysis (linear and hierarchical regressions that included some of the standard demographic variables available in the dataset—age, gender, income, education, employment status, marital status, family size, children etc.) to explore the causal relationships between the different social axioms scales reflective of various aspects of the underlying cultural model of success and to establish the demographic determinants of different views of what constitutes a prerequisite for social advancement in Ukraine.

Results and discussion

Descriptive statistics

The descriptive statistics present some of the central tendencies and illustrate the distribution of responses to survey items regarding the importance of various social attributes/qualities/resources as perceived by the Ukrainians (Q1, a–k) (Table 1). The moderate range of standard deviations coupled with high

endorsement of the items regarding bribes, ethnicity, religion and gender (items at the top of the list of sorted mean ratings) indicate high level of intra-group agreement regarding those attributes as salient in the Ukrainian cultural worldview in the context of requisites of success.

Consensus analysis is typically used to estimate the degree of sharing of a cultural trait (Romney, 1999). One of the suitable procedures to measure inter-informant agreement on a set of items involves using factor analysis or principal component analysis performed on individuals (Q-analysis) and analyzing the factorial structure of the first factor (first principal component in principal component analysis) by computing the average of the factor loadings on the first factor (Weller, 2007). Given that in Q-analysis individual factor loadings represent each informant's correlation with the latent variable (i.e. the first principal component), and higher averages are created by the prevalence of high positive factor loadings, higher average score is an index of higher inter-informant agreement and thus would be indicative of its shared consensual nature of the set of attributes (Weller, 2007, pp. 338–340). Therefore, principal component analysis was performed and the first principal component was analyzed to estimate the degree of sharing due to culture as discussed in Weller (2007). Figure 1 illustrates the results of principal component analysis performed on the transposed matrix (Q-analysis). The shape of the data on the diagram is indicative of a high inter-informant agreement as represented by a reasonably strong first

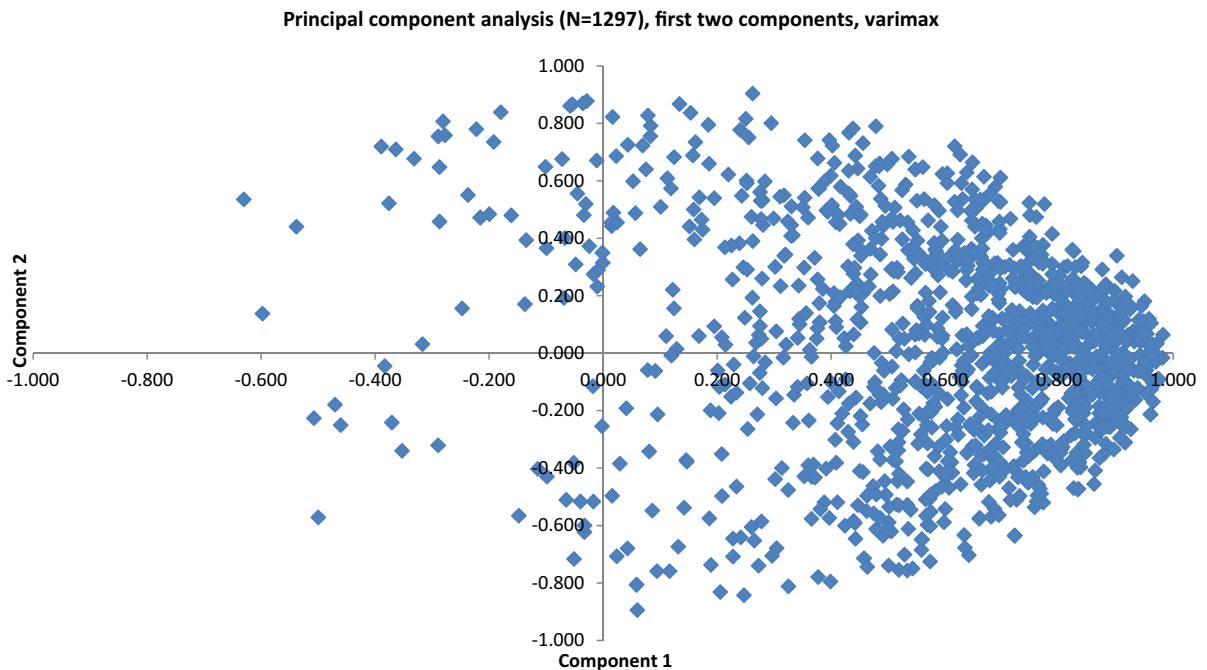


Fig. 1 Inter-informant agreement on collective beliefs about prerequisites of success

principal component accounting for 44% of variance, with the second and third principal components accounting for 12.3% and 8.3%, respectively (cf. Romney, 1999; Weller, 2007). Sharing due to culture as computed based on the factor loadings magnitude approximated 78%, suggesting high level of inter-informant agreement in the data. The algorithmic principles and steps of the procedure are explained above in the rubric “[Using multidimensional methods to research social reality](#)”. For those readers who wish to know more about the mechanics of the following analytical procedures, the technical details are further specified in Maltseva (2016) and Maltseva (2018) where visualizations such as step-by-step schemas are provided. Further recommendations on using these procedures, including the overview of multiple correspondence analysis, can be found in Cronbach and Gleser (1953), Romney and Weller (1990), and Furr (2010) contains a very helpful discussion.

Analysis of correlations

The next step after the means analysis and the assessment of general sharing due to culture was to analyze the correlations existing among the 11 worldview items. The inter-item associations are

presented in Table 2. The highest correlations were registered among those variables that had to do with the importance of family background and parental education, as well as the importance of social connections and knowing the influential people. In this context it is also important to register the negative sign of correlations between the perceived importance of items such as ethnicity, gender, religious affiliation and bribes, on the one hand, and the necessity to work hard in order to succeed, on the other.

Cluster analysis

The 11 worldview items describing the Ukrainian social axioms of success were then subjected to cluster analysis by inter-group correlation method. The resulting dendrogramme was clearly structured and consisted of several hierarchical clusters (Fig. 2). The first division into two major clusters split the analyzed set of variables into two groups, one grouping together structural social characteristics and ascribed social statuses (e.g. gender, religion and ethnicity) together with practice of resorting to bribes and having useful connections. The remaining items formed the second group of variables centering around individual achievement, motivation and family background.

Table 2 Analysis of correlations (Q1a–Q1k): correlation matrix

	Q1a	Q1b	Q1c	Q1d	Q1e	Q1f	Q1g	Q1h	Q1i	Q1j	Q1k
Q1a. How important is wealthy family background?	1.000	0.430	0.140	0.030	0.335	0.356	0.249	0.120	0.118	0.186	0.101
Q1b. How important is it to have educated parents?	0.430	1.000	0.385	0.143	0.286	0.231	0.046	0.081	0.110	0.165	0.139
Q1c. How important is it to get a good education?	0.140	0.385	1.000	0.330	0.174	0.081	−0.042	0.025	0.044	0.013	0.170
Q1d. How important is it to work hard?	0.030	0.143	0.330	1.000	0.183	0.086	−0.012	−0.021	−0.012	−0.032	0.215
Q1e. How important is it to have personal connections with important people?	0.335	0.286	0.174	0.183	1.000	0.485	0.221	0.090	0.084	0.121	0.256
Q1f. How important is it to have connections in political circles?	0.356	0.231	0.081	0.086	0.485	1.000	0.295	0.097	0.093	0.162	0.174
Q1g. How important is it to offer bribes?	0.249	0.046	−0.042	−0.012	0.221	0.295	1.000	0.094	0.010	0.119	0.058
Q1h. How important is one's ethnicity?	0.120	0.081	0.025	−0.021	0.090	0.097	0.094	1.000	0.610	0.320	0.058
Q1i. How important is religion one is practicing?	0.118	0.110	0.044	−0.012	0.084	0.093	0.010	0.610	1.000	0.333	0.071
Q1j. How important is it whether one is a man or a woman?	0.186	0.165	0.013	−0.032	0.121	0.162	0.119	0.320	0.333	1.000	0.075
Q1k. How important is to have ambition?	0.101	0.139	0.170	0.215	0.256	0.174	0.058	0.058	0.071	0.075	1.000

Thus cluster analysis accommodated the division of the variables of interest into two large dimensions: (1) stable classificatory characteristics that describe social identity, with a hint of cultural cynicism, and (2) individual agency and active position in life, predicated on the availability of cultural, social and economic capitals and one's willingness to cultivate them.

Factor analysis

Following the oblimin test to eliminate the possibility of non-orthogonality in factor extraction, factor analysis (maximum likelihood method) followed by varimax rotation was performed on the set of 11 worldview items (Q1, a–k) in SPSS (Table 3, Fig. 3). Four latent variables were extracted that corresponded to the following interpretable dimensions: (1) the importance of gender, ethnicity, and religion; (2) the importance of having useful connections, knowing

people from political elite, and bribes; (3) the importance of parental education; and (4) ambition, coming from a wealthy family, and individual's level of education. All four factors were unipolar and had high positive factor loadings. The first four factors accounted for 24.5%, 15.6%, 12.4% and 9.4% of the variance, correspondingly (Table 4).

Based on the results of factor analysis, the social axioms surrounding the Ukrainians' beliefs about prerequisites of success have yielded a four-factor structure that lent itself to meaningful interpretation and resembled the output of cluster analysis in terms of its internal organization. The first factor contained the attributes that, in the eyes of a regular citizen, pertained to the stable social structure/social institution (religion) and characteristics of an ascribed status (gender, ethnicity). Thus, the latent variable behind the first factor included structural features that are impossible or difficult to change, which, in the informants' view, defined the individual's position in

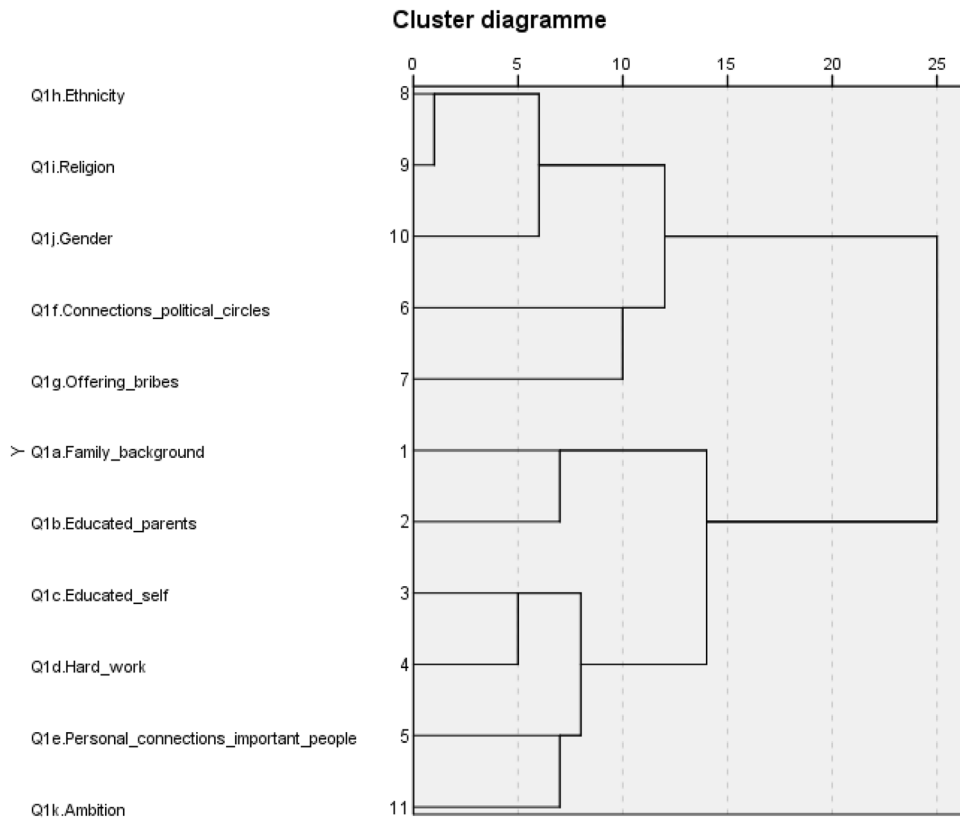


Fig. 2 Cluster analysis

Table 3 Factor analysis: rotated factor matrix

	Factors			
	1	2	3	4
Q1i. How important is religion one is practicing?	0.807			
Q1h. How important is one’s ethnicity?	0.754			
Q1j. How important is it whether one is a man or a woman?	0.411			
Q1f. How important is it to have connections in political circles?		0.686		
Q1e. How important is it to have personal connections with important people?		0.597		
Q1a. How important is wealthy family background?		0.452		
Q1g. How important is it to offer bribes?		0.444		
Q1b. How important is it to have educated parents?			0.860	
Q1d. How important is it to work hard?				0.601
Q1c. How important is it to get a good education?				0.516
Q1k. How important is to have ambition?				0.354

Method of maximum likelihood

Varimax rotation

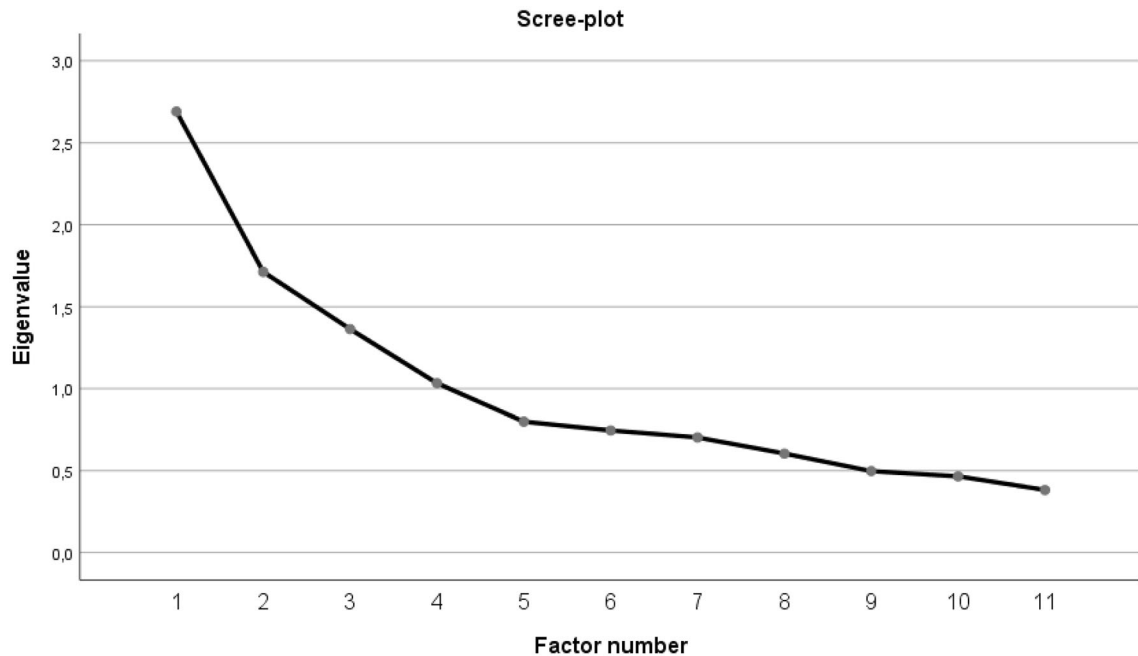


Fig. 3 Factor analysis (scree plot)

Table 4 Scale composition, reliability and scale correlation ($N = 2001$)

	Scale 1	Scale 2	Scale 3	Scale 4
Scale 1 «Ethnicity, religion, gender» ($\alpha = 0.67$)	1	0.140**	0.146**	0.058**
Q1h. How important is one's ethnicity?		(0.122**)	(0.141**)	(0.022)
Q1i. How important is religion one is practicing?				
Q1j. How important is it whether one is a man or a woman?				
Scale 2 «Knowing important people, having connections in political circles, bribes» ($\alpha = 0.61$)	0.140**	1	0.317**	0.161**
	(0.122*)		(0.327*)	(0.160**)
Q1e. How important is it to have personal connections with important people?				
Q1f. How important is it to have connections in political circles?				
Q1g. How important is it to offer bribes?				
Scale 3 «Wealthy family background, educated parents» ($\alpha = 0.61$)	0.146**	0.317**	1	0.249**
	(0.141**)	(0.327**)		(0.239**)
Q1a. How important is wealthy family background?				
Q1b. How important is it to have educated parents?				
Scale 4 «Hard work, ambition, education» ($\alpha = 0.46$)	0.058**	0.161**	0.249**	1
	(0.022)	(0.160**)	(0.239**)	
Q1d. How important is it to work hard?				
Q1k. How important is to have ambition?				
Q1c. How important is it to get a good education?				

The table shows Pearson's r and Spearman's rho (in parentheses)

Correlations are shown for the entire scales

**Correlation is significant at $p \leq 0.01$ (two-tail)

the social world. This conclusion is also supported by the results from the analysis of descriptive statistics where these items had high means and modest standard deviations. The second factor was formed by the attributes that can be generalized as ‘cultural cynicism’: perceiving the practice of offering (and accepting) bribes, knowing people in political circles and having access to the “useful people” as key factors of success in Ukraine. The third factor focused on the parental education and consisted of this one variable. The last, fourth factor contained the elements of the factorial structure that described individual agency and individual’s willingness to engage into pursuit of long-term goals, including one’s striving to bring one’s dreams to life by means of hard work, having ambition and acquiring education. Hence, the results of cluster analysis and factor analysis yield support to the proposition in the Hypothesis 1.

Scale development and index construction

Scale development and using multi-item scales offers a convenient route for studying collective aggregates such as worldviews due to its many methodological advantages. While principal component analysis and factor analysis of single items allows the researcher to extract latent dimensions embedded in the data matrix, these techniques do not possess the means of visualization that would enable presenting the evidence of cultural sharing of an entity so complex as a cultural model (Maltseva, 2018). Scale development, in its turn, is premised on grouping together sets of inter-correlated variables that conceptually cover and quantitatively measure one integral dimension that can be meaningfully interpreted. Scale development techniques are closely connected to the long-standing tradition of factor-analytical studies of personality traits in social sciences and are well-known to cognitive scientists, anthropologists and psychologists (Comrey & Lee, 1992; Neuman, 2011; Nunnally, 1978). Values studies have been one of the avenues where these methodological tools have been used in cognitive ethnographic research (for example, D’Andrade, 2008; Maltseva & D’Andrade, 2011).

Comparing the factorial structure derived from factor analysis with the hierarchical clusters obtained from cluster analysis and interpreting the overlapping portions of the groups of variables the following four multi-item scales were constructed: Ethnicity,

religion, gender ($\alpha = 0.67$), Knowing useful people, having connections in political circles, bribes ($\alpha = 0.61$), Wealthy family, educated parents ($\alpha = 0.61$) and Dedicated work, good education, ambition⁴ ($\alpha = 0.46$). The technical details of the procedure of scale making can be found in Maltseva (2016) and Maltseva and D’Andrade (2011) where the process of scale making is visualized in a series of schemas and several ethnographic examples are provided. The scale embracing the importance of ethnicity, gender and religion had the highest alpha, suggesting that this set of variables produces the strongest dimensionality and reliably measures the construct behind it. Thus this scale also sends the strongest signal in the data, which is indicative of the general salience of this dimension in the mind-world of the surveyed Ukrainians. However, all alphas are not very high, which may indicate that (1) the wording of the survey questions did not capture all the nuances of this cultural domain, or that (2) the Ukrainians are not very certain about their beliefs about the road to success, or that (3) these beliefs are changing (Table 4).

Regression analysis

Based on the results of the analysis of correlations among the scales and demographic variables (Table 5) a set of items with significant correlations with the four scales was selected. These items formed a set of independent variables. The four scales were then converted into additive indices and regressed on the demographic variables in a series of simple and hierarchical regressions. Given the markedly collective (consensual) nature of the constructs in question, and the logical dependence of collective beliefs on a complex cumulative mechanism for their transmission (including family and schooling), it would be plausible that major predictors of such collective scales would be equally collectively-flavoured demographic items, such as family composition (e.g., number of generations residing under one roof etc.), education system (e.g., years of education, parental education levels etc.) (Maltseva, 2013). However none of these parameters had statistically significant impact on the

⁴ Due to this scale’s low alpha in the regression analysis that follows instead of converting this scale to the Index its composing variables were used separately.

Table 5 Correlations of scales with demographic variables

	Place of residence	Residence / household type	D1. Gender	D3. How many years of education have you completed?	D4. what is the highest level of education you have achieved?	D14. What kind of training is necessary to do your job?	D15. do you have a wife/husband/partner, and do you live together?	D16. What is the highest level of education achieved by your wife/husband/partner?	D26. How often do you attend religious services?
Ethnicity, religion, gender	r	- 0.106**	0.119**	0.018	0.071**	0.106**	- 0.024	0.067*	0.212**
Knowing important people, having connections in political circles, bribes	ρ	- 0.106**	0.119**	0.018	0.071**	0.106**	- 0.024	0.067*	0.212**
	r	- 0.029	- 0.065**	0.030	- 0.018	- 0.033	- 0.038	- 0.071*	- 0.071**
Wealthy family background, educated parents	ρ	- 0.030	- 0.079**	0.036	- 0.027	- 0.029	- 0.037	- 0.073*	- 0.053*
	r	- 0.062**	- 0.015	- 0.046*	0.011	0.037	- 0.047*	0.071*	- 0.030
Hard work, ambition, education	ρ	- 0.065**	- 0.028	- 0.044	0.013	0.025	- 0.047*	0.058*	- 0.026
	r	- 0.069**	- 0.088**	- 0.050*	- 0.065**	- 0.078**	- 0.025	- 0.067*	- 0.071**
ρ	- 0.078**	- 0.084**	- 0.044*	- 0.088**	- 0.083**	- 0.092**	- 0.016	- 0.061*	- 0.055*
Ethnicity, religion, gender	r	- 0.014	- 0.067**	- 0.024	0.011	0.033	0.033	0.033	- 0.025
	ρ	- 0.014	- 0.067**	- 0.024	0.011	0.033	0.033	0.033	- 0.025
Knowing important people, having connections in political circles, bribes	r	0.065**	0.034	0.010	0.026	- 0.008	- 0.008	0.006	- 0.036
	ρ	0.065**	0.034	0.010	0.026	- 0.008	- 0.008	0.006	- 0.036
									0.051*
									- 0.146**
									- 0.146**
									0.051*

Table 5 continued

	D30. How many people live in your household, including children?	D31. You included, how many adults over 18 years of age reside together in your household?	D32. How many children of 6–17 years of age live in your household?	D33. How many children of under 6 years of age reside in your household?	D34. What is your own monthly income after tax?	D35. What is your family's net monthly income before tax?	D36. What is your marital status?	D39. Please indicate where you live...
	rho	0.067**	-0.003	0.021	-0.020	-0.009	-0.036	0.052*
Wealthy family background, educated parents	r	0.086**	0.016	0.036	0.034	.050*	-0.031	0.016
	rho	0.090**	0.026	0.050*	0.005	0.027	-0.022	0.017
Hard work, ambition, education	r	0.050*	0.041	-0.032	-0.014	-0.012	-0.025	0.079**
	rho	0.038	0.040	-0.033	-0.030	-0.033	-0.016	0.073**

* $p \leq 0.05$, ** $p \leq 0.01$

scales in question, nor did the income parameters (formulated both as individual income and family income before and after tax) formed regression models that explained more than 10% of variance. All in all, none of the demographic variables available in the dataset was a reliable predictor of the worldview scales. The strongest predictors (although mathematically small in magnitude) were religiousness (service attendance) and the informant's area of residence. However, due to multicollinearity problems these items had to be excluded from the analysis. Therefore, the cultural dimensions embedded into the social axiomatic scales were independent of the standard demographic characteristics (age, gender, income, education, marital status, reproductive status, family size etc.) in the sample, offering support to the Hypothesis 2.

Conclusions and limitations

The results of the Ukrainian study yielded a structure of axiomatic beliefs about the social world that allows inferring the outlines of the underlying axiomatic cultural assumptions about the requisites for success. The results converge on the four-partite structure folding the collectively agreed-upon ingredients of success into the following categories: structural attributes such as ethnicity, gender and religion (indicating relatively fixed social characteristics that yield themselves easily for essentializing and stereotyping), social capital (emphasizing the differences in one's ability to recruit people from various networks to obtain the necessary resources), family background (focusing on the variation in availability of resources such as wealth and education in the family of origin) and individual agency (stressing the significant role of psychological traits and predilections that are instrumental in achieving success). The factorial structure obtained in this study does not contradict previously published results from similar studies performed on the data from multiple nations (for example, Leung & Bond, 2004), although the present results do not replicate all the cross-cultural dimensions perfectly. The first factor reflects structural characteristics such as gender, religious affiliation and ethnicity that are considered by the Ukrainian participants the most salient features recommending an individual for success. All the remaining factors but one dealt with

the unequally distributed resources while the factor emphasizing the individual agency had weak dimensionality. It therefore stands to reason that the Ukrainian informants appear to take stock in social resources such as family wealth and social capital linked to it rather than in individual will and hard work to change one's social position. It also seems that overall among the Ukrainian participants of the ISSP study the beliefs about the unequal opportunities took up an important part in thinking about social advancement.

Although the results of the analysis are interesting, the study has several limitations. First, the ISSP sample consisted mostly of individuals of female gender and older age groups and therefore may underrepresent the worldviews of the younger people who are in their formative years. It would decrease the informativeness of the results and generalizing the results of this analysis on the entire Ukrainian population is probably inadvisable.

Second, in-depth research of collective constructs was not the goal of the ISSP study. As the questionnaire was not designed and developed with explicitly

phrased questions for collective entities, we cannot claim their collective nature beyond available evidence (Maltseva, 2014; see also Gilbert, 2015). We can only evaluate the degree to which they are widespread in individual worldviews and find demographic correlates of particular sections of the worldviews to link them to particular social categories. Yet in order to study collective beliefs it is better to include this consideration at the stage of phrasing survey items. That said, the data analysis offered sufficiently informative results as well as a possibility to entertain alternative explanations.

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Declarations

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Appendix

Frequency tables (see Tables 6, 7, 8, 9, 10, 11 and 12).

Table 6 Worldview variables and demographics

	Q1a. How wealthy family background?	Q1b. How important is it to have educated parents?	Q1c. How important is it to get a good education?	Q1d. How important is it to work hard?	Q1e. How important is it to have personal connections with important people?	Q1f. How important is it to have connections in political circles?	Q1g. How important is it to offer bribes?	Q1h. How important is one's ethnicity?	Q1i. How important is religion one is practicing?	Q1j. How important is it whether one is a man or a woman?	Q1k. How important is to have ambition?
	Freq %	Freq %	Freq %	Freq %	Freq %	Freq %	Freq %	Freq %	Freq %	Freq %	Freq %
1	249 12.4	266 13.3	561 28.0	469 23.4	345 17.2	125 6.2	42 2.1	104 5.2	104 5.2	75 3.7	369 18.4
2	266 13.3	367 18.3	537 26.8	479 23.9	471 23.5	223 11.1	91 4.5	116 5.8	132 6.6	104 5.2	492 24.6
3	455 22.7	687 34.3	606 30.3	684 34.2	744 37.2	400 20.0	292 14.6	261 13.0	284 14.2	376 18.8	720 36.0
4	581 29.0	431 21.5	192 9.6	245 12.2	273 13.6	579 28.9	440 22.0	491 24.5	478 23.9	479 23.9	164 8.2
5	378 18.9	205 10.2	77 3.8	64 3.2	112 5.6	445 22.2	901 45.0	957 47.8	931 46.5	887 44.3	108 5.4
n/a	72 3.6	45 2.2	28 1.4	60 3.0	56 2.8	229 11.4	235 11.7	72 3.6	72 3.6	80 4.0	148 7.4
Total	2001 100.0	2001 100.0	2001 100.0	2001 100.0	2001 100.0	2001 100.0	2001 100.0	2001 100.0	2001 100.0	2001 100.0	2001 100.0

Table 7 D4. What is the highest level of education you have achieved?

		Frequency	Percent
NO answer	No answer	30	1.5
	No education (never went to school)	1	0.0
	1–4 years of schooling	19	0.9
	7–9 years of schooling	101	5.0
	10–11 years of schooling (high school graduate)	308	15.4
	Technical education (no high school diploma)	205	10.2
	Technical education (high school diploma)	295	14.7
	Some years at college or university	375	18.7
	University degree (BA)	137	6.8
	Postgraduate degree (MA)	530	26.5
	Total	2001	100.0

Table 8 D5. Which if the following best fits your current employment situation?

	Frequency	Percent
Gainfully employed	827	41.3
Unemployed/Looking for a job	156	7.8
Student	55	2.7
Apprentice	5	.2
On sick leave	30	1.5
Retired	720	36.0
Homemaker	184	9.2
Other	24	1.2
Total	2001	100.0

Table 9 D15. Do you have a husband, a wife or a partner, and do you live together?

	Frequency	Percent
Yes I have a wife/husband/partner and we live together	1145	57.2
Yes I have a wife/husband/partner but we do not live together	43	2.1
No I do not have a wife/husband/partner	813	40.6
Total	2001	100.0

Table 10 D25. Are you religious, and what is your religious affiliation?

	Frequency	Percent
Atheist	297	14.8
Catholicism	159	7.9
Protestantism	35	1.7
Orthodox	1436	71.8
Other Christian faith	35	1.7
Judaism	1	0.0
Islam	1	0.0
Hinduism	1	0.0
Other oriental religions	1	0.0
Other religions	35	1.7
Total	2001	100.0

Table 11 D29. How do you self-identify in terms of ethnicity?

	Frequency	Percent
Ukrainian	1739	86.9
Russian	146	7.3
Both Ukrainian and Russian	42	2.1
Belorussian	5	0.2
Moldavian	1	0.0
Crimean Tatar	4	0.2
Bulgarian	1	0.0
Hungarian	16	0.8
Romanian	11	0.5
Polish	8	0.4
Jewish	22	1.1
Other	6	0.3
Total	2001	100.0

Table 12 D36. What is your marital status?

	Frequency	Percent
Married	1125	56.2
Cohabiting	53	2.6
Separated	26	1.3
Divorced	204	10.2
Widowed	379	18.9
Single	214	10.7
Total	2001	100.0

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