Dimensions of Social Axioms and Alternative Country-Clustering Methods

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Social Axioms are defined as general beliefs that represent one's view about how the world functions and how two entities are related "in the universe". The Social Axiom dimensions as proposed by Leung & Bond are Social Cynicism, Social Complexity, Reward for Application, Fate Control, and Religiosity. The first aim of this study was to investigate how the Social Axiom dimensions are identified in Greece and in five more countries (N=1,375) that differ broadly in their ecological and religion characteristics (Hong-Kong, USA, UK, Spain, and India). The second aim was to enhance factor equivalence levels by forming homogeneous subsets of countries through the application of an alternative method on factor structure similarity among countries. For the Greek factor structure some emic characteristics are discussed in respect to the specific cultural setting. For all six countries, factor equivalence among countries was present to some extent for the initial factor structures. For cluster of countries though, almost maximum equivalence with the overall factor structure was reached. However, some inequivalence among clusters of countries for specific factors was still present and useful in describing diversity based on the specific cultural characteristics of the clusters of countries.

Beliefs have been used as an individual difference variable that encompasses a variety of aspects and domains. They can be different among individuals of a social group and among groups, they may be context-specific but also context-free (Chen, Bond, & Cheung, 2006). General beliefs seem to be useful in explaining cross-cultural differences and similarities in individual behavior (Leung, Bond & Schwartz, 1995). Social Axioms, which are defined as general beliefs, are used as guidelines of people's behavior in various situations and may interpret pancultural human difficulties that people deal with (Bond, Leung, Au, Tong & Chemonges-Nielson, 2004; Chen, Fok, Bond, & Matsumoto, 2006; Leung, Au, Huang, Kurman, Niit, & Niit, 2007; Leung & Bond, 2004; Leung, Bond, Carrasquel, Muñoz, Hernández, Murakami, Yamagushi, Bierbrauer & Singelis, 2002). Their axiomatic characteristic consists of their demanding of being true to one's personal experiences but not to a specific scientific validation (Leung et al., 2002). Such a characteristic makes Social Axioms possibly similar to Rokeach's faiths that refer to "beliefs accepted by an individual as true, good and desirable regardless of social consensus or objective evidence perceived as irrelevant" (Rokeach, 1968, p. 125).

A formal definition of Social Axioms argues that they are generalized beliefs or basic premises about oneself, the social and physical environment or the spiritual world, which have the form of an assertion about the relationship –causal or correlational– between pairs of entities or concepts, i.e. "Good health leads to success in work" (Leung et al., 2002, pp. 289). Unlike attitudes that are relatively enduring systems of beliefs that only prepare individuals to act in a certain society (Ajzen & Fishbein, 1980; Rokeach, 1968, 1973, 1979; Triandis, 1977) "social axioms are guiding principles employed in specific contexts, for specific actors and towards specific goals" (Leung et al., 2002, pp. 288), thus, they play an organizing role for the cognitive system of an individual and are related to a variety of social behaviors. One common characteristic between attitudes (Katz, 1960) and Social Axioms is at the functionalistic level, as Social Axioms promote the same functions as attitudes, that is, the instrumental function, the ego-

defensive, the value-expressive and the cognitive organization of the world functions within the individuals' belief system (Leung et al., 2002).

Multicultural studies in 41 countries (Leung & Bond, 2004) identified a five-factor structure of Social Axioms at the individual level- Social Cynicism, Social Complexity, Reward for Application, Fate Control, and Religiosity. These five social axioms dimensions, as "core etics" of general beliefs seem to be interpreted universally as types of general beliefs that individuals endorse, in various degrees within and across diverse cultural settings (Bond et al., 2004; Leung et al., 2002; Leung & Bond, 2004). In the 41 countries project an attempt has been made to describe the five social axioms dimensions for a large number of countries and, additionally, at a second level of analysis, to search for homogeneous subsets of countries in respect to levels of acceptance or rejection of these Social Axiom dimensions, that is, in respect to the country mean scores on each of the five Social Axioms. In order to arrive to such homogeneous subsets of countries, the statistical method of cluster analysis was employed.

The use of cluster analysis techniques in the quest for country sets in cross-cultural studies is a relatively new idea (Georgas & Berry, 1995) and has been applied to several psychological measures such as Hofstede's values (Merrit, 2000), family values (Georgas & Mylonas, 2006; Georgas, Mylonas, Gari & Panagiotopoulou, 2004) and the big-five personality factors (Allik & McCrae, 2004). Georgas and Berry (1995) proposed a method for clustering nations on the basis of a number of ecosocial indices. They justified the use of cluster analysis on the ecocultural indices (that is, country "mean" scores on the indices of affluence, mass communication, religion, education and population), in contrast to the factor analysis method as applied to country scores in order to determine dimensions of nations, a method that "does not appear to have been very successful" (pp. 128). They argued that "Factor analysis … was inappropriately applied to a concept such as dimensions of nations, which is so complex and undifferentiated and composed of so many interrelated variables that a clear factor solution is virtually impossible" (pp. 145). The implementation of cluster analysis techniques, based on the similarities of scores (actually on the distance matrix for these scores) is "a simple way to summarize similarities between cultures across a range of variables" (Allik & McCrae, 2004, pp. 18) and is quite capable of producing subsets of countries in respect to the variables used in the analysis. However, information regarding the factor structure at the individual level, that is in each of the countries involved in a cross-cultural study, might be further useful in summarizing similarities, if another way of collecting factor-similarity measures across countries could be devised.

The aims of the present study are two: the first is to investigate how the Social Axiom dimensions are identified in Greece and in five more countries that differ broadly in their ecological, social, and religion characteristics. The second aim of this study is the exploration of an alternative method for identifying homogeneous country subsets in order to gain in terms of explanatory power when referring to similarities and differences of the Social Axiom dimensions. This power should be enhanced by the levels of factor structure equivalence among these subsets or clusters of countries, clusters which would be formed by employing the information in the factor structure for each country and not through utilizing the country mean scores.

Method

The data used for this study (N=1,375) were derived from the initial data pool and consist of six countries: Greece (n=371), the United Kingdom (n=196), Spain (n=170), Hong-Kong (n=248), India (n=276) and the USA (n=114). This dataset is a part of the overall data pool available for the Social Axioms Survey, as employed and analyzed by Bond et al. (2004) and by Leung and Bond (2004). The participants were either university students (n=1,019) or adults (n=356), 517 males and 858 females; their age was below 20 years and between 21 and 30 years old, respectively. All samples were gender balanced.

By the selection of the above countries we attempted to explore the Social Axiom dimensions in countries that are different. Ecological, social and religious characteristics that have

been correlated with individual variables in the eco-cultural taxonomy conducted by Georgas and Berry (1995) was the basis for our selection of the six countries as broadly different ones. The six selected countries for this study have been included at least to four out of the five clusters of nations emerged through the employment of indices of ecology, affluence and mass communication, and at least to three out of the five different clusters of nations emerged based on population, education and religion indices. Thus, we selected, Greece as a Mediterranean European country of Orthodox Christians, and Spain as a south west European country of mainly Roman Catholics, along with the UK and the United States as western societies of Protestants but different in ecological factors and mass communication, Hong-Kong, as a western-type region of Buddhists and Taoists, and India, a traditional Asian country of primarily Hindus, broadly different from all the others (Gari, Panagiotopoulou, Mylonas, & Pavlopoulos, 2004, August).

The data have been analyzed with the permission of K. Leung and M. Bond. The Social Axioms Survey (SAS) version that was employed for the statistical analyses was the short 60-item version (Leung et al., 2002). The method of back-translation has been employed for the standard Social Axioms Scale in order to form the Greek SAS and the other countries' SAS versions, accordingly. All items were scored by the participants on a 5-point Likert scale, from "strongly believe" to "strongly disbelieve". According to the Social Axioms structure, the 60 items correspond to five factor dimensions as follows: Social Cynicism (18 items), Reward for Application (14 items), Social Complexity (12 items), Fate Control (8 items) and Religiosity (8 items).

Results

Three levels of statistical analyses were used in this study. The first level was an attempt to explore for a possible replication of the five SAS dimensions in the Greek data; that is, the aim was to describe the Greek SAS factor structure, describing the other five countries in the data as well, and based on the outcomes, to continue with the second level of analysis. This level involved factor equivalence testing for all six countries in the dataset on a country by country basis and in comparison to an overall factor structure for the six countries. Having described the factor equivalence levels, we could then, at the final level of analysis, attempt to identify homogeneous sets of countries that would enhance factor equivalence within these sets. Thus, we attempted to identify "clusters" of countries with possibly stronger similarities and homogeneity in their factor structures. Clustering of countries was based on the similarities of countries in respect to their factor structure and not on the factor mean scores per country; also, we did not employ cluster analysis as the statistical tool to analyze these similarities but we computed a multidimensional scaling solution instead, as "an alternative way of portraying relations between cultures" (Allik & McCrae, 2004, pp. 20).

Exploratory factor analyses

The initial exploratory factor analysis models (principal components analysis, orthogonal rotation solution) tested for the presence of 5 factors in the Greek data set but the first outcomes were rather unpromising with factors not clearly identifiable and with the indication of a sixth factor in the structure. A large amount of the error variance in these analysis models was due to ceiling effects and in some other cases floor effects present for the Social Flexibility and the Social Cynicism items for Greece. Therefore, items with extreme skewness were transformed for the Greek data only. Either squared values transformations or square root transformations were initially applied to these items. The transformed scores were then transformed back to the original SAS scoring scale, through the calculation of their *z*-scores followed by a scaling transformation. Then factor analysis was recomputed on the transformed values and the remaining original score values for all 60 items. The outcomes for this analysis of the Greek data were much more salient for at least two of the five factors, that is Fate Control, and Religiosity dimensions which were now formed by the main core of the original factor structure items (Leung et al., 2002). However,

the Social Cynicism, Reward for Application and Social Complexity factors still did not seem to be strongly identified in the structure. Finally, a sixth factor appeared and was comprised by some Reward for Application items ("Failure is the beginning of success", "Every problem has a solution", "The just will eventually defeat the wicked" and "Good deeds will be rewarded, and bad deeds will be punished"), and some Social Cynicism items ("People deeply in love are usually blind", "Old people are usually stubborn and biased", "Young people are impulsive and unreliable"). This sixth factor could be named "Socially Deterministic Cynicism" including stereotypic taxonomies and the "just world" belief, reflecting some specific socioeconomic characteristics of Greece since the 70's.

Similar exploratory factor analysis models were applied for the other 5 countries in the data. For the Hong-Kong data, the results were much closer to the original 5-factor structure, as it would be expected, but for the British, the Spanish, the Indian and the American data there were discrepancies in the structures. Specifically, large discrepancies were observed in the factor structures for UK, USA and India. An "overall" factor structure, for all six countries combined, was also computed. The outcomes for this structure were close to the original 5-dimensions with minor discrepancies and a small number of Fate Control items not loading on any factor. It has to be stressed that this was just an exploratory analysis which did not search for universal patterns but just aimed to generally describe the combined correlation matrix for all six countries. This factor structure would be further clarified at a later stage in the analysis, so this was not the final "overall" factor solution for the six countries and the same holds for each country's factor structure as well.

Target rotations of the factor structures

The factor structure outcomes for Greece and for the other five countries separately should be followed by a target rotation of their 5 factor structures on the respective 5-factor structure for the initially acquired Venezuelan and Hong-Kong data structure, as provided by Leung et al. (2002) in order to arrive into comparable solutions among countries. This target rotation was expected to further clarify the Greek factor structure, with 5 factors retained, and further strengthen the factor structures for the other five countries in order to be able to proceed to the next step of factor equivalence testing. Indeed, the target rotation solution for Greece resulted into 5 clearly salient factors. Religiosity was identified with all 8 items, Reward for Application with 10 out of 14 items, Social Cynicism with 14 out of 18 items, Social Complexity with 9 out of 12 items and Fate Control with 7 out of 8 items. The same improvement was true for Spain, UK and USA and, surprisingly, for India, although some minor discrepancies were still present for the UK and the USA factor structures. We also computed the target rotated solution for the "overall" factor structure on the Venezuelan and Hong-Kong factor structure. This solution, indicating the overall factor structure for all six countries combined in a comparable way to the other target rotated structures, was found to closely follow the original 5-factor Social Axiom structure (Leung & Bond, 2004) and was also retained for further comparisons later in the analysis. All target rotated solutions are presented in Table 1.

Testing for factor equivalence

The next stage of the analysis referred to factor equivalence testing. The method followed has been previously employed on a cross-cultural basis for factor structures of countries (Georgas et al., 2004; Georgas & Mylonas, 2006) to address the question of factor similarity across cultures. The question of factor universality, which can be addressed through methods such as the Van de

Table 1. Factor structures for each country and overall (target rotated on the Venezuelan & Hong-Kong solution)

	Greece					UK					Hong-Kong					India					Spain					USA					'Overall'				
SC1	-.05	.09	**.45**	-.16	.16	-.02	**.42**	-.04	.22	.18	**.48**	-.08	0	-.02	.14	**.49**	.03	-.05	.09	.08	-.06	**.42**	.24	.14	-.04	-.08	.26	-.06	.28	.32	-.01	.03	**.47**	-.09	.18
SC2	.01	.15	**.61**	.07	-.01	.02	**.59**	.15	.02	.14	**.58**	-.01	.05	.24	-.01	**.48**	.08	-.03	0	**.39**	.02	**.63**	.04	.01	.01	-.05	**.39**	.16	.12	**.45**	.25	.07	**.57**	-.05	.01
SC3	.17	.13	**.53**	-.03	-.01	.18	**.52**	.06	.02	.16	**.54**	.14	.06	.11	-.01	**.47**	.06	.14	-.04	.29	.17	**.54**	.05	.10	-.02	.11	.34	.06	.10	**.43**	.14	.07	**.54**	.12	.01
SC4	-.05	.07	**.56**	.18	.04	-.06	**.56**	.18	.02	0	**.48**	-.04	-.02	.34	.04	**.38**	.04	-.08	.10	**.44**	-.03	**.57**	.05	-.14	-.02	-.10	.28	.27	.14	**.41**	**.35**	.00	**.47**	-.10	.05
SC5	-.09	.03	**.41**	-.13	.05	-.07	**.39**	-.07	.10	.15	**.43**	-.10	-.06	0	.03	**.42**	-.04	-.08	.01	.11	-.09	**.39**	.13	.13	-.09	-.12	.21	-.06	.17	.33	.00	-.03	**.42**	-.12	.07
SC6	0	-.08	.33	**-.40**	.21	.03	.30	-.32	.30	.17	**.42**	-.03	-.15	-.29	.19	**.50**	-.15	.04	.10	-.17	-.03	.24	**.35**	.31	-.22	-.03	.07	-.31	.33	.32	-.26	-.13	**.41**	-.02	.25
SC7	.03	.15	.33	-.10	.12	.06	.30	.04	.17	.16	**.36**	0	.09	0	.11	**.36**	.11	.03	.05	.07	.03	.32	.17	.12	.05	.03	.26	-.03	.20	.21	.01	.10	**.35**	.00	.13
SC8	-.18	-.13	**.45**	-.31	.29	-.15	**.43**	-.29	**.36**	.10	**.49**	-.19	-.24	-.17	.26	**.56**	-.19	-.13	.23	-.08	-.19	.34	**.41**	.18	-.26	-.21	.07	-.20	**.43**	**.39**	-.15	-.19	**.47**	-.19	.33
SC9	.03	.09	**.37**	.12	.05	.03	**.37**	.15	.04	.01	.33	.03	.04	.22	.05	.26	.08	.01	.07	.29	.05	**.39**	.06	-.08	.03	.01	.22	.19	.11	.26	.23	.05	.32	.00	.05
SC10	.03	.14	**.39**	-.06	.08	.05	**.37**	.05	.12	.15	**.41**	0	.07	.05	.08	**.39**	.09	.02	.03	.15	.03	**.39**	.14	.09	.03	.01	.28	.02	.18	.27	.07	.09	**.40**	-.01	.10
SC11	-.04	.19	**.45**	-.09	-.04	-.01	**.42**	.06	.03	.26	**.48**	-.07	.10	.05	-.05	**.44**	.09	-.07	-.10	.19	-.05	**.47**	.03	.16	.04	-.08	**.37**	-.02	.08	.31	.05	.12	**.47**	-.09	-.02
SC12	-.02	-.10	**.46**	-.07	.20	-.03	**.46**	-.10	.20	-.03	**.44**	-.02	-.18	.06	.19	**.43**	-.12	-.01	.21	.15	-.02	**.40**	.26	0	-.19	-.07	.09	.03	.30	**.40**	.09	-.15	**.43**	-.05	.22
SC13	.13	.03	**.39**	-.17	.05	.14	**.37**	-.10	.10	.15	**.43**	.11	-.02	-.06	.05	**.42**	-.03	.13	0	.09	.11	**.35**	.14	.18	-.10	.09	.19	-.10	.15	**.35**	-.04	-.02	**.43**	.10	.08
SC14	.14	.10	**.39**	-.21	.13	.17	**.36**	-.08	.19	.19	**.45**	.10	.04	-.10	.12	**.46**	.04	.14	.04	.03	.12	**.36**	.22	.21	-.04	.12	.24	-.12	.23	.31	-.07	.05	**.44**	.10	.16
SC15	-.13	.06	.26	**-.39**	.01	-.09	.22	-.24	.13	.33	**.36**	-.17	-.02	-.29	-.02	**.43**	-.07	-.10	-.11	-.17	-.16	.22	.14	**.38**	-.10	-.15	.20	-.34	.14	.21	-.30	.00	**.36**	-.15	.04
SC16	-.13	.02	.17	**-.37**	.22	-.09	.13	-.24	.32	.21	.26	-.17	-.05	-.30	.19	**.38**	-.05	-.09	.09	-.26	-.16	.10	.32	.28	-.09	-.12	.09	-.31	.32	.11	-.29	-.02	.25	-.14	.25
SC17	.14	.22	**.38**	-.29	.01	.18	.33	-.07	.12	**.36**	**.48**	.08	.16	-.18	0	**.50**	.11	.13	-.14	-.01	.11	**.37**	.12	**.36**	.04	.12	**.37**	-.22	.13	.28	-.16	.16	**.48**	.09	.03
SC18	.02	.16	**.35**	-.05	.01	.04	.33	.08	.06	.18	**.37**	-.01	.10	.06	.01	.34	.10	0	-.03	.15	.02	**.36**	.06	.10	.06	0	.29	.01	.10	.23	**.36**	-.02	.02			
RA1	.13	**.58**	-.04	.21	0	.18	-.08	**.55**	.03	.26	0	.05	**.61**	.18	.02	-.04	**.61**	.05	-.11	.12	.14	.11	-.08	-.01	**.60**	.21	**.48**	.20	-.03	-.29	.18	**.60**	-.01	.09	-.04
RA2	.10	**.49**	-.09	.03	.07	.16	-.13	**.36**	.12	.28	-.01	.02	**.51**	0	.07	.01	**.50**	.05	-.08	-.06	.09	.02	.03	.10	**.50**	.18	**.38**	.03	.04	-.29	.00	**.51**	-.02	.07	.04
RA3	.01	.34	0	.29	-.08	.02	-.01	**.43**	-.09	.08	-.02	-.02	**.35**	.28	-.06	-.10	**.36**	-.05	-.08	.23	.03	.12	-.16	-.15	**.37**	.05	.29	.28	-.11	-.16	.27	.34	-.03	-.01	-.11
RA4	.04	.28	0	**.47**	.07	.04	.02	**.53**	0	-.12	-.08	.03	.30	**.44**	.10	-.18	**.38**	-.02	.13	.33	.08	.12	-.06	**-.36**	**.38**	.09	.21	**.47**	.01	-.18	**.44**	.30	-.10	.02	.04
RA5	-.02	**.53**	.08	-.01	-.05	.05	.03	.34	.04	**.41**	.17	-.10	**.50**	.02	-.06	.16	**.46**	-.07	-.20	.03	-.03	.20	-.06	.18	**.46**	.03	**.51**	0	-.02	-.15	.00	**.51**	.16	-.06	-.07
RA6	.12	**.56**	-.16	.33	-.10	.16	-.18	**.61**	-.11	.18	-.15	.06	**.61**	.27	.08	-.23	**.60**	.03	-.17	.18	.14	.02	-.22	-.12	**.63**	.20	**.42**	.30	-.18	**-.38**	.26	**.59**	-.16	.09	-.16
RA7	.09	.33	.06	.03	.04	.12	.04	.24	.08	.20	.11	.03	.32	.04	.04	.10	.32	.05	-.05	.04	.08	.13	.03	.07	.30	.12	.31	.05	.05	-.08	.05	.32	.10	.06	.03
RA8	.04	**.49**	-.10	.17	-.04	.09	-.13	**.46**	-.01	.23	-.06	-.02	**.51**	.14	-.04	-.09	**.50**	-.02	-.14	.08	.05	.04	-.12	-.01	**.52**	.11	**.39**	.16	-.08	-.30	.13	**.51**	-.07	.02	-.08
RA9	.18	**.43**	-.23	.01	.25	.24	-.26	.31	.28	.17	-.14	.10	**.48**	-.08	.25	-.07	**.51**	.16	.08	-.20	.18	-.15	.20	.06	**.49**	.29	.24	.01	.18	**-.40**	-.05	**.48**	-.16	.17	.22
RA10	.04	**.45**	.05	.30	-.01	.07	.03	**.53**	-.01	.13	.04	-.01	**.46**	.30	.01	-.04	**.49**	-.03	-.05	.25	.06	.19	-.10	-.14	**.48**	.09	**.40**	.31	-.03	-.18	.30	**.46**	.02	.01	-.04
RA11	.27	**.45**	-.20	.02	.31	.33	-.23	.34	.33	.16	-.10	.18	**.52**	-.08	.31	-.03	**.55**	.24	.12	-.18	.27	-.11	.25	.06	**.51**	**.38**	.26	.03	.23	**-.38**	-.03	**.51**	-.12	.26	.27
RA12	.13	.30	.09	.12	-.02	.15	.07	.29	-.01	.14	.11	.09	.31	.13	-.01	.06	.30	.08	-.07	.15	.14	.17	-.05	0	.28	.15	.30	.13	-.02	-.04	.14	.30	.10	.10	-.04
RA13	0	**.52**	.05	.11	-.13	.05	.01	**.42**	-.07	.34	.10	-.07	**.50**	.13	-.13	.05	**.47**	-.07	-.23	.13	0	.19	-.17	.08	**.48**	.04	**.49**	.11	-.12	-.17	.11	**.50**	.09	-.04	-.16
RA14	.20	**.35**	.01	.01	-.08	.24	-.02	.24	-.04	.24	.07	.15	**.37**	.01	-.07	.05	.33	.16	-.18	.05	.20	.09	-.09	.13	.32	.23	.32	.01	-.08	-.10	.01	**.36**	.08	.18	-.10
SCX1	-.04	.17	.18	**.42**	.01	-.05	.20	**.42**	-.06	-.12	.08	-.03	.15	**.45**	.03	-.04	.22	-.09	.10	**.41**	0	.26	-.08	-.34	.22	-.03	.20	**.44**	-.01	.02	**.45**	.16	.06	-.06	-.01
SCX2	.01	.19	.06	**.54**	-.01	-.02	.09	**.52**	-.11	-.20	-.07	.02	.21	**.53**	.02	-.20	.28	-.06	.11	**.44**	.06	.17	-.15	**-.44**	.29	.03	.16	**.54**	-.07	-.09	**.53**	.21	-.08	-.01	-.05
SCX3	.12	-.02	.23	**.53**	.03	.07	.27	**.37**	-.10	**-.35**	.06	.17	-.01	**.56**	.07	-.09	.09	.08	.21	**.53**	.18	.28	-.08	**-.48**	.06	.10	.03	**.56**	-.01	.16	**.58**	-.02	.05	.11	.01
SCX4	-.03	.12	-.07	.29	-.31	-.05	-.06	.27	**-.35**	-.02	-.14	-.01	.14	.28	-.29	-.25	.10	-.08	-.22	.27	-.01	.02	**-.38**	-.17	.16	-.04	.10	.24	**-.35**	-.09	.24	.12	-.13	-.04	-.33
SCX5	-.05	.26	.09	**.39**	.15	-.04	.10	**.47**	.09	-.09	.02	-.06	.25	**.40**	.17	-.05	**.35**	-.10	.19	.29	-.01	.19	.04	-.32	.33	0	.22	**.42**	.12	-.11	**.40**	.27	-.01	-.07	.12
SCX6	.03	.10	.12	.33	.03	.01	.13	.31	-.03	-.14	.03	.04	.10	.34	.05	-.05	.16	-.01	.11	.31	.06	.17	-.04	-.28	.15	.03	.11	**.35**	.01	.02	**.35**	.10	.02	.01	.01
SCX7	.10	.01	.23	**.54**	-.11	.05	.27	**.40**	-.23	-.29	.06	.15	.02	**.58**	-.07	-.12	.09	.04	.08	**.58**	.15	.30	-.21	**-.46**	.07	.06	.08	**.56**	-.14	.16	**.59**	.01	.06	.08	-.13
SCX8	.07	.20	.21	**.35**	-.21	.05	.22	**.38**	-.25	0	.13	.07	.19	**.41**	-.19	-.02	.20	0	-.13	**.45**	.09	.31	-.27	-.21	.20	.04	.27	**.36**	-.21	.10	**.39**	.18	.13	.03	-.23
SCX9	-.04	-.01	-.10	**.54**	-.24	-.10	-.06	**.37**	**-.36**	-.28	-.26	.02	.03	**.50**	-.21	**-.41**	.06	-.10	-.05	**.42**	0	-.01	**-.38**	**-.45**	.12	-.05	-.05	**.48**	-.33	-.11	**.47**	.02	-.25	-.04	-.28
SCX10	-.01	.10	.02	**.43**	.01	-.04	.04	**.38**	-.07	-.20	-.09	.01	.12	**.41**	.04	-.19	.19	-.06	.12	.32	.03	.09	-.10	**-.37**	.20	0	.07	**.42**	-.04	-.09	**.41**	.12	-.10	-.02	-.01
SCX11	**.35**	-.02	.23	**.40**	-.05	.31	.27	.27	-.17	-.27	.12	**.39**	.02	**.43**	-.02	-.04	.06	.31	.07	**.49**	**.39**	.27	-.13	-.32	.02	.31	.05	**.43**	-.10	.23	**.46**	-.01	.12	.33	-.07
SCX12	.02	.03	.12	.12	-.25	.01	.12	.09	-.26	.03	.08	.04	.02	.16	-.24	-.01	-.01	-.01	-.19	.24	.03	.16	-.25	-.04	0	-.02	.11	.11	-.23	.12	.14	.01	.09	.01	-.25
FT1	.10	-.04	.20	-.20	**.54**	.13	.20	-.14	**.56**	-.05	.26	.07	-.07	-.17	**.53**	**.37**	.03	.15	**.44**	-.19	.10	.12	**.60**	.06	-.07	.14	-.02	-.10	**.58**	.13	-.11	-.05	.23	.10	**.56**
FT2	.01	-.10	.17	-.03	**.66**	.03	.18	-.05	**.63**	-.22	.17	0	-.13	-.02	**.66**	.27	.04	.06	**.62**	-.12	.03	.09	**.67**	-.15	-.06	.06	-.11	.07	**.67**	.08	.05	-.09	.12	.02	**.67**
FT3	-.04	.09	.04	.11	**.55**	-.02	.04	.18	**.51**	-.15	.03	-.07	.08	.09	**.55**	.10	.23	-.02	**.50**	-.07	-.01	.03	**.50**	-.20	.17	.04	.02	.17	**.52**	-.13	.13	.12	-.02	-.04	**.54**
FT4	-.07	.11	.04	-.05	**.43**	-.04	.03	.08	**.45**	-.01	.08	-.11	.09	-.05	**.43**	.16	.19	-.05	**.35**	-.15	-.07	.03	**.43**	-.04	.14	-.01	.06	.01	**.44**	-.10	-.02	.12	.04	-.08	**.43**
FT5	**.41**	-.16	.16	-.05	**.40**	**.40**	.18	-.13	.34	-.22	.17	**.40**	-.12	-.06	**.41**	.20	-.04	**.44**	**.37**	-.03	**.41**	.08	**.42**	-.04	-.15	**.41**	-.14	.01	**.38**	.21	.02	-.13	.16	**.41**	**.41**
FT6	.06	.25	.08	-.25	.23	.12	.04	0	.32	.26	.20	-.01	.22	-.23	.22	.28	.23	.07	.06	-.22	.04	.08	.29	.25	.18	.11	.24	-.20	.28	-.04	-.20	.24	.18	.04	.24
FT7	.02	.09	.25	-.01	**.42**	.05	.24	.08	**.43**	-.02	.26	-.01	.05	.03	**.42**	.31	.16	.04	**.36**	0	.04	.22	**.44**	-.05	.08	.06	.13	.08	**.46**	.10	.08	.08	.23	.01	**.43**
FT8	.10	.01	.12	-.12	**.54**	.13	.11	-.04	**.55**	-.07	.16	.06	0	-.12	**.54**	.27	.11	.14	**.45**	-.18	.11	.06	**.57**	0	.02	.15	-.01	-.04	**.56**	.03	-.06	.02	.13	.10	**.55**
R1	**.64**	-.05	.11	.23	.11	**.61**	.14	.13	0	-.28	.06	**.65**	.04	.19	.15	-.03	.08	**.62**	.16	.26	**.66**	.10	.06	-.19	-.01	**.62**	-.06	.25	.03	.18	.27	-.01	.07	**.63**	.10
R2	**.67**	.14	-.03	-.21	-.07	**.69**	-.04	-.08	-.05	.16	.09	**.62**	.23	-.25	-.06	.09	.13	**.66**	-.21	-.09	**.64**	-.02	-.03	.31	.07	**.66**	.11	-.22	-.11	.08	-.19	.16	.12	**.66**	-.08
R3	**.44**	-.34	-.03	.26	.06	**.37**	.03	-.04	-.09	**-.48**	-.14	**.50**	-.24	.20	.10	-.22	-.20	**.45**	.21	.22	**.47**	-.08	0	-.31	-.24	**.40**	**-.36**	.25	-.04	.16	.26	-.29	-.13	**.46**	.05
R4	**.70**	.06	.06	.07	-.03	**.69**	.07	.07	-.09	-.08	.07	**.69**	.16	.03	0	0	.12	**.68**	-.06	.16	**.70**	.07	-.05	.03	.05	**.68**	.05	.07	-.10	.15	.10	.09	.10	**.69**	-.05
R5	**.64**	.05	.03	-.06	-.10	**.64**	.03	-.04	-.12	.02	.08	**.62**	.14	-.10	-.08	.03	.06	**.62**	-.16	.06	**.62**	.03	-.08	.16	0	**.61**	.04	-.07	-.14	.14	-.04	.07	.11	**.63**	-.10
R6	**.55**	.18	.11	-.16	-.11	**.57**	.09	-.02	-.08	.20	.20	**.50**	.23	-.16	-.10	.17	.14	**.53**	-.23	.01	**.53**	.12	-.06	.29	.08	**.53**	.21	-.16	-.11	.15	-.12	.18	.22	**.53**	-.11
R7	**.51**	-.15	-.32	.04	-.16	**.48**	-.29	-.10	-.24	-.19	-.32	**.53**	-.02	-.09	-.14	**-.35**	-.09	**.51**	-.13	-.05	**.50**	-.33	-.20	0	-.08	**.49**	-.27	-.04	-.29	-.09	-.05	-.09	-.28	**.54**	-.18
R8	**.42**	-.16	-.25	.16	-.03	**.38**	-.21	0	-.14	-.29	-.29	**.46**	-.04	.05	0	-.33	-.06	**.43**	.03	.04	**.44**	-.26	-.10	-.16	-.06	**.42**	-.28	.11	-.16	-.08	.09	-.10	-.27	**.45**	-.05

Note: The order of factors for each country and for the overall factor structure was not the same. *S(ocial) C(ynicism)* was the 3rd factor for the Greek factor structure but 2nd for Spain. For the overall factors *30.8% of total variance was explained: S(ocial) C(omple)X(ity)=7.1%, R(eward for) A(pplication)=6.9%, SC=6.3%, R(eligiosity)=6.1%, and F(a)T(e) Control=4.4%), KMO = .87, D = .0000031.*

Vijver and Poortinga method (2002), an extension of the Muthén method (1994) applied to factor analysis, was not a part of the research objectives, since previous research within nations describe the "pan-cultural" comparisons of Social Axioms based on data from 41 national-cultural groups (Leung & Bond, 2004; Leung et al., 2002) and have already established the validity of the five dimensions of Social Axioms and their universality.

For the six countries target rotated factor structures, Tucker Phi coefficients of congruence were computed on a country by country comparison level (Table 2); 25 congruence coefficients were computed for each pair of countries, in all 375 coefficients (25 coefficients times 15 pairs of countries), out of which, 75 should be larger than .90 in order to have absolute factor equivalence across all six countries. The results showed that 46 of them were larger than .90, indicating 61% of factor equivalence in these factor structures and some possibility of culture specificities that produced the percentage of inequivalence. Identical factor structures were present for the following comparisons: Greece vs. Spain, Greece vs. Hong-Kong, and Hong-Kong vs. India (20% of the country pairs). For 13% of the country comparisons closely similar factor structures emerged (Hong-Kong vs. Spain and Greece vs. USA). The remaining 10 country comparisons showed lower levels of factor equivalence with four or less identical or similar factors.

We also computed Tucker Phi indices comparing each country's factor structure (target rotated solution) with the overall (target rotated) factor structure. For Greece, all five factors were clearly identified in the overall structure, with Tucker Phi indices ranging from .94 to .99; since the overall factor structure seems to closely depict the 5 Social Axiom dimensions, one could argue that the Greek factor structure also follows the theoretical structure closely. The same holds for the Hong-Kong factor structure with Tucker Phi indices ranging from .98 to 1.00, as was expected. However, for the Indian factor structure, four factors were clearly identified in the overall structure with Tucker Phi indices ranging from .93 to .99. The Fate Control factor for India, although it is consisted of more or less the same items as the respective overall factor, did not reach levels of equivalence, but was just similar to the Fate Control factor in the overall solution (Tucker Phi=.88). For the Spanish factor structure, three factors were clearly the same with the respective ones in the overall structure (Tucker Phi indices ranging from .97 to .99), but the Religiosity and the Reward for Application factors for Spain reached only levels of similarity and not levels of equivalence with the respective overall factors (Tucker Phi indices .86 and .89, respectively). For the UK factor structure, three factors reached equivalence levels with the respective overall factors, namely Religiosity, Social Cynicism, and Fate Control (Tucker Phi indices ranging from .93 to .99). The other two factors, Reward for Application and Social Complexity were not even similar to any overall factor (Tucker Phi indices <.85). Finally, for the US factor structure three factors reached equivalence levels with the respective overall factors, namely Religiosity, Social Complexity, and Fate Control (Tucker Phi indices ranging from .97 to .99). The other two factors, Social Cynicism and Reward for Application were not even similar to any overall factor (Tucker Phi indices <.85). From these results, it was clear that some level of factor equivalence between each country and the overall solution existed in the data, but for the UK and the US data and to a lesser extent for the Indian and Spanish data, factor equivalence with the overall solution was far from perfect.

Searching for clusters of countries on the basis of their factor structures

With four –or even less– of these six factor structures being similar to the overall factor structure, one could argue that there is a large amount of similarity but there is some amount of dissimilarity as well. One might attempt to reach better levels of similarity and this way achieve better levels of explanatory power, by searching for homogeneous subsets of countries in respect to their factor structure. Identifying clusters of countries (Allik & McCrae, 2004; Georgas & Berry, 1995) and then treating these clusters as unified sets of countries with a possibly similar factor structure might enhance the procedures of comparing them to other clusters of countries and to the overall factor solution.

Table 2. Tucker's φ coefficients for the country by country comparisons for the five-factor target rotated structures

Greece (Gr) (columns)

F1	F2	F3	F4	F5	*with*
.99	.25	.05	.07	.08	*UK1*
.04	.08	**.99**	-.05	.29	*UK2*
.16	.77	.02	.82	-.11	*UK3*
-.07	.09	.35	-.47	**.96**	*UK4*
-.14	.62	.26	-.52	-.04	*UK5*

Hit ratio : **61%** (46 out of 75 Tucker Phi indices >|.90|)
Three identical factor structures
(Greece-Spain, Greece-Hong-Kong, Hong-Kong-India)
Two closely similar factor structures
(Greece-USA, Spain-Hong-Kong)

"Hit" matrix - number of 'equivalent' factors for each country comparison

	Gr	UK	USA	Es	Id	HK
Gr	5	3	4	5	3	5
UK	3	5	3	4	2	3
USA	4	3	5	3	2	3
Es	5	4	3	5	2	5
Id	3	2	2	2	5	5
HK	5	3	3	5	5	5

UK (Columns)

F1	F2	F3	F4	F5	*with*
.98	.26	-.06	.16	.10	*US1*
.08	**.90**	.53	.14	.04	*US2*
.14	.31	.09	**.98**	-.12	*US3*
-.09	.01	.51	-.41	**.96**	*US4*
.11	-.34	*.85*	-.29	.15	*US5*
.99	-.05	.25	.00	-.10	*US1*
.18	.47	.63	.16	.70	*US2*
.08	.14	.83	-.32	-.47	*US3*
-.03	.48	-.21	**.98**	.13	*US4*
.09	*.87*	-.39	.17	.01	*US5*

USA (Columns)

F1	F2	F3	F4	F5	*with*
1.00	.16	.02	.22	.02	*Es1*
.05	.38	**.96**	.09	.19	*Es2*
-.03	-.08	.40	-.51	**.95**	*Es3*
.00	.05	.14	**-.92**	.07	*Es4*
.16	**.94**	-.11	.49	-.02	*Es5*
.98	.05	.23	-.09	-.20	*Es1*
.09	**.95**	.30	.24	.32	*Es2*
.04	.38	-.34	**.98**	.11	*Es3*
.09	.06	-.59	.32	.76	*Es4*
.23	-.16	*.89*	-.01	.37	*Es5*
.98	.09	.23	-.10	.10	*Es1*
.00	.71	.28	.38	.70	*Es2*
.02	.03	-.36	**.98**	.32	*Es3*
-.01	.16	**-.91**	.24	.22	*Es4*
.29	.73	.49	-.11	-.57	*Es5*

Spain (Es) (Columns)

F1	F2	F3	F4	F5	*with*
-.04	.13	*.86*	-.56	.50	*Id1*
.25	**.96**	.04	.44	.12	*Id2*
.99	.02	.01	.01	.10	*Id3*
-.04	-.24	.26	.04	*.89*	*Id4*
.20	.27	.43	.81	-.30	*Id5*
.04	.82	-.27	.64	.53	*Id1*
.33	.00	*.87*	.13	.39	*Id2*
.97	.02	.00	.01	-.17	*Id3*
-.05	.30	-.07	.74	-.46	*Id4*
.15	.48	.69	-.43	-.28	*Id5*
-.08	.47	-.37	.72	.73	*Id1*
.38	.80	.48	.05	-.44	*Id2*
.96	-.04	.01	-.02	.16	*Id3*
-.01	-.21	.17	.80	.20	*Id4*
.15	.39	*.87*	-.29	.26	*Id5*
-.08	.75	.68	.56	-.17	*Id1*
.28	.29	-.04	-.16	**.98**	*Id2*
.97	-.01	.07	.08	.02	*Id3*
-.01	.15	.78	-.32	-.18	*Id4*
.27	.59	-.43	-.68	.31	*Id5*

India (Id) (Columns)

F1	F2	F3	F4	F5	*with*
.04	.21	**.96**	-.33	.36	*HK1*
.98	.01	-.02	.19	-.04	*HK2*
.29	**.97**	-.04	.35	-.05	*HK3*
.06	.30	.18	**.95**	-.22	*HK4*
.07	.03	.29	-.19	**1.00**	*HK5*
.10	**.93**	-.08	.47	.47	*HK1*
.95	.01	.11	-.17	-.28	*HK2*
.38	-.09	.81	-.01	.50	*HK3*
.00	.23	.81	-.39	-.41	*HK4*
.13	.29	-.06	**.93**	-.10	*HK5*
-.02	.58	-.14	.59	.80	*HK1*
.95	-.05	.18	-.17	.14	*HK2*
.41	.80	.36	-.11	-.47	*HK3*
.06	.30	**.98**	-.29	-.05	*HK4*
.15	.04	-.04	**.93**	.13	*HK5*
.02	**.90**	.51	.39	-.09	*HK1*
.99	.00	-.09	-.09	.04	*HK2*
.31	.21	-.18	-.03	**.97**	*HK3*
.15	.37	-.43	*-.87*	.45	*HK4*
.08	.20	**.93**	.00	.02	*HK5*
.96	.08	.05	.20	.21	**HK1*
-.13	.13	**.98**	-.03	.25	*HK2*
-.06	**.97**	.16	-.28	.27	*HK3*
-.31	.42	-.07	.08	**.93**	*HK4*
.46	.16	.14	**.91**	-.24	*HK5*

* **HK** = Hong-Kong

The method we followed in order to arrive at the country clusters was to analyze the square matrix of the Tucker Phi indices, or the "Hit" matrix (Georgas & Mylonas, 2006; Mylonas, 2009) with the number of rows and columns being the number of countries involved in the study. This matrix would include as data points the number of "hits" for each country comparison as denoted by the Tucker Phi indices. Thus, if four factors were identical for two countries, then number four would be inserted into the cell that corresponds to these countries' comparison. If zero equivalence was observed, that is, if none of the factors presented any similarity between two countries, then a zero would be the data point in the respective cell, etc. For the diagonal elements of the matrix, since each country's factors are equivalent to themselves, number five was inserted in the six cells as an indicator of maximum equivalence for the 5-factor solutions within each country. The main idea behind the formulation of such a matrix is that it consists of information regarding the level of similarity of factor structures between countries; however, it does not refer to which specific factors are identical or closely similar. One might argue that in order to take both levels of information into account (how many factors identical or closely similar and which ones) we should have employed the full Tucker Phi matrix by reproducing the indices above the diagonal and by employing identity matrices for the diagonal. Unhappily, such an approach does not yield meaningful solutions since it confounds the two levels of information. The figures analyzed, as contained in the "hit" matrix, are presented in Table 3.

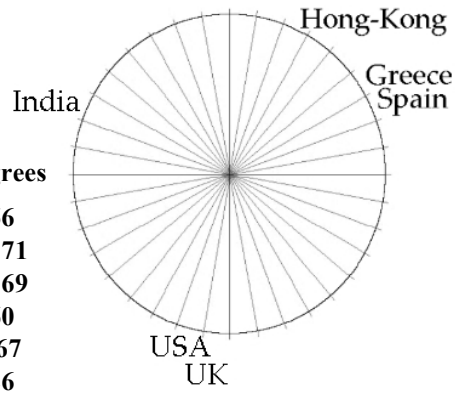
For this matrix we computed the dissimilarity matrix on the cases (six countries) by standardizing the measures on a –1 to +1 scale and then through non-metric multidimensional scaling we computed the Euclidean two-dimension solution. The outcomes were acceptable in terms of statistical power (Young's *Stress* = 0.06 and R^2 = 0.98), although the number of dimensions was partly responsible for this power. The standardized coordinates for the stimuli were trigonometrically transformed through an arctangent transformation and were then converted to degrees in order to plot them on the circumference (Mylonas, 2009; Sidiropoulou-Dimakakou, Mylonas, & Argyropoulou, 2008; Veligekas, Mylonas, & Zervas, 2007). This plot clearly identified a Hong-Kong, Greece, Spain cluster of countries, a UK and USA cluster of countries, with India being the "third cluster" (figure in Table 3).

Exploratory factor analyses and factor equivalence testing for clusters of countries

For each of these three clusters of countries, 5-factor structures were again computed. These three new factor structures were again target rotated on the Venezuelan & Hong-Kong structure and were then compared for their factor equivalence with the target rotated "overall" structure as computed for the total pool of the six countries in the previous stage of analysis. The results were extremely satisfactory in terms of equivalence, as the "overall" factor structure was identical to the factor structures of the Greece, Hong-Kong, Spain cluster and the UK, USA cluster with differences only in the order of factors within the structures. Minor discrepancies were present for the "cluster" of India, where 4 factors were identical, with its 4th factor just similar to the Fate Control "overall" factor (Table 3).

The three new factor structures for the clusters of countries were then compared to each other through the calculation of the Tucker Phi indices (Table 3). When comparing the clusters of countries to each other for their factor structures, a very interesting result referred to the Social Complexity Factor. For the Greece, Hong-Kong, Spain cluster, this factor emerged first, but is not clearly the same with the respective factor of the other two clusters, the India and the UK-USA clusters. Another important finding is that "Fate Control", the fifth UK-USA cluster factor, which also identically emerged second in the Greece, Hong-Kong, Spain cluster, was not the same with the respective factor for India, that is, although the factor is present in India as well, it does not reach factor equivalence levels when compared to the other two clusters' structures. A similar finding appeared for the fifth Greece, Hong-Kong, Spain factor, Reward for Application, which does not emerge as an identical factor in India.

Table 3. Multidimensional scaling outcomes and factor equivalence testing for clusters of countries



Countries	MDS Coordinates		Arctangent transformation	**Degrees**
Greece	.57	.85	.97652	**56**
UK	–1.50	–.24	–2.98434	**–171**
USA	–1.46	–.27	–2.95782	**–169**
Spain	.53	.93	1.045082	**60**
India	.74	–1.79	–1.17542	**–67**
Hong-Kong	1.10	.53	.446621	**26**

Young's *Stress* = .06 R^2 = .98

Factor equivalence testing within clusters of countries

GHS1	*GHS2*	*GHS3*	*GHS4*	*GHS5*	***with***
.23	.06	**.98**	.23	–.04	UU1
–.14	.58	.09	.19	**.92**	UU2
.59	–.04	.01	**.93**	.04	UU3
.89	.00	.06	–.01	.40	UU4
–.35	**.94**	–.16	–.26	.08	UU5

GHS1	GHS2	GHS3	GHS4	GHS5	***with***
–34	.79	–.06	–.04	.77	Id1
.57	.09	.18	**.93**	.15	Id2
.04	.08	**.99**	.07	.01	Id3
.19	.73	–.03	–.35	–.08	Id4
.85	–.26	.16	.13	.51	Id5

UU1	UU2	UU3	UU4	UU5	***with***
–.09	**.92**	–.15	–.02	.65	Id1
.31	.20	**.97**	.28	–.14	Id2
.97	.12	–.06	–.01	–.06	Id3
.06	.01	–.13	.34	.79	Id4
.16	.19	.31	**.92**	–.46	Id5

Factor equivalence testing for each cluster of countries with the overall factor solution

F1	F2	F3	F4	F5	***with***
.98	.44	–.14	.14	–.14	GHS1
–.22	.02	.64	–.03	**.94**	GHS2
.13	.14	.04	**1.00**	.00	GHS3
.19	**.99**	–.01	.13	–.14	GHS4
.24	.17	**.92**	–.04	.04	GHS5

F1	F2	F3	F4	F5	***with***
.19	.25	–.01	**.98**	.09	UU1
–.05	.24	**.98**	.04	.29	UU2
.45	**.96**	–.10	.02	–.06	UU3
.95	.14	.19	.04	.00	UU4
–.38	–.21	.43	–.17	**.96**	UU5

F1	F2	F3	F4	F5	***with***
–.26	.00	**.95**	–.11	.56	Id1
.44	**.98**	.05	.18	.04	Id2
.03	.07	.07	**.99**	.08	Id3
.15	–.23	.16	–.04	*.88*	Id4
.93	.25	.21	.14	–.33	Id5

Key:
GHS = Greece, Hong-Kong, Spain Cluster of countries structure
UU = UK, USA Cluster of countries structure
Id = India's structure

These findings may suggest that India probably is the culture that mostly differs in the meaning assigned to the five Social Axiom dimensions, in respect to the other two clusters of countries, and that the Social Complexity, Reward for Application and Fate Control factors may be the Social Axiom dimensions that are mainly conceptualized in different ways in these clusters of countries.

Discussion

Following the evidence, we arrived at a rather clear structure of five salient factors for Greece and this is true for the other five countries in the data. However, the sixth factor which initially emerged for Greece and was named "Socially Deterministic Cynicism" needs some further attention. By combining some Reward for Application issues with some Social Cynicism items, this factor may be related to the Greeks' high levels of Religiosity, the difficult socio-economic conditions throughout the 20th century economic development of the country, and the significant role of the in-group in social life (Leung & Bond, 2004; Vassiliou, & Vassiliou, 1973). Specifically, until 1990, the vast majority of the Greek population shared a common ethnic heritage. Even after that, the majority of the population (>90%) are still Christian Orthodox (http://www.adherents.com) who share traditional values on the importance of family bonds (Georgas, 1989, 1993) and educational goals (Gari & Kalantzi, 1998) that refer to the academic success and high acquisition of knowledge, primarily for males. These dimensions of religion, traditional family, and educational values, along with the highest percentage of three-generation households (20%) within the EU (Eurostat-European Community Household Panel, 1995) may determine some general axiomatic beliefs of social life such as the "age stereotypes" and the conflict between the good and evil or between social reward and punishment. Such a "Socially Deterministic Cynicism" factor for the Greek sample implied the need for identifying new items, as emic or culture-specific items, for use under the scope of future research in Greece. Further research that has been conducted in regard to such an emic dimension with the employment of the 60 items SAS questionnaire and a set of 20 additional Greek "emic items" highlighted this sixth factor under the title of "cynicism and competition" as a social cynicism "sub-dimension" (Gari, Panagiotopoulou, & Mylonas, 2009) and satisfied the demand for an emic exploration of the initial social axioms five dimensions in order to expand and enrich them.

One of the most encouraging result was that the final overall factor structure seemed to be powerful and coherent for all six countries, supporting the universal character of the five dimensions of Social Axioms (Leung & Bond, 2004). Of course, we did not attempt to verify or falsify the original structure (Leung & Bond, 2004; Leung et al., 2002) our overall intention was to achieve acceptable levels of statistical justification and congruence in order to be able to apply our "exercise" on the use of the alternative clustering technique (Mylonas, 2009). Despite the overall universality though, by comparing each country to another and each country with the overall structure, discrepancies were present which seemed to be major for the UK and USA factor structures. More meaningful information was apparent after forming clusters of countries, since the cluster factor structures were quite close to the overall structure of these six countries and also presented strong similarities in pairs. The similarities among the three sets of countries and of these sets of countries with the overall factor structure that produced satisfactory results in terms of factor structure equivalence seem to enrich our understanding of these similarities among cultures in respect to the Social Axioms dimensions and the psychological space they convey. Specifically, the Social Cynicism and the Religiosity dimensions, which are the most identical structures for the three clusters of countries compared in pairs and with the "overall" factor structure, seem to echo effects of power and authority derived from wealth, age, gender and the best intentions of human behavior, as well as influences of religious beliefs of monotheistic religions to individuals and social groups, regardless of the culture-specific religious activities or practices (Leung & Bond, 2004).

On the other hand, the diversity that seems to exist between clusters of countries may reflect a variety of conceptualizations of the Social Axiom dimensions across the six countries. Such a diversity seems to be mostly present between India and subsets of western-type cultures; specifically it seems to separate the Indian Social Axiom structure from the other two sets of western type structures, as well as the UK and USA structure from another set of western type countries, namely Greece, Spain and Hong-Kong structure. Additionally diversity seems to appear larger for the Reward for Application dimension, and mostly for the Fate Control and Social Complexity dimensions. This might be associated with the extent that fatalistic thoughts and beliefs for supernatural entities, as expected parts of the Fate Control dimension, influence the conceptualization of other Social Axiom dimensions such

as Reward for Application and Social Complexity. Diversity might also be associated with the Protestant work ethic function that is a part of the Reward for Application dimension and its influences on the understanding of general social rules and various social behaviors within specific societies (Furnham, 1990). One way of explaining this diversity though, would be to understand these cluster differences as "modal" differences of the same factors within each cluster, that is as differences that do not refer to the presence or the absence of the factor in each cluster but to the way this factor is conceptualized and implemented in guiding behavior.

In general, the nature of the above diversity in Social Axioms structures is not yet clear and needs larger clusters with more countries in each cluster. Our study employed only a small part of the large (41 countries) Social Axioms database and simply described an alternative method for country clustering. The clustering method among 41 nations that was employed by Leung & Bond (2004) in their search of homogeneous country subsets based on the mean scores for each country, revealed some expected parameters of similarities among cultures, such as neighbouring in language (i.e. between the Brazilians and the Portuguese), neighbouring in geographical space (i.e. the Czechs and the Hungarians), and combined types of neighbouring –in respect to both language and geographical space (i.e. the Canadians and the Americans), or neighbouring in respect to religion (i.e. the Muslim group of nations), but it also revealed some unexpected parameters of similarities that may imply some unknown dynamics in culture relationships, related not only to religion or language but also to other social phenomena such as diaspora or immigration (Leung & Bond, 2004). Despite the difficulty for understanding clustering of cultural groups on Social Axioms dimensions, one thing issue is clear: diversity does not lessen the strength of similarity of Social Axiom dimensions across the six cultures of the present study nor their universality (Leung & Bond, 2004). Thus, similarities and differences among sets of countries for the Social Axiom structures seem to determine a basis for supporting the existence of a coherent structure of five dimensions, but they also seem to indicate other levels of approaching diverse conceptualizations of them, especially of those Social Axiom dimensions that refer to the "just world beliefs" (Reward for Application), the level of "fatalism" in individuals' activities (Fate Control) and the rules that guide individuals' daily and social life (Social Complexity).

In conclusion, in our search for similarities and diversities, the general idea for country clustering can be approached via different, although parallel routes with the method of country score means analysis. The information needed to arrive at meaningful and useful country clusters may be of different nature, although it basically reflects the same principle of homogeneity. Thus, our method implemented the element of the factor structures involved the latent trait information for each country when searching for homogeneous subsets of countries. It is evident that country clustering based on the country means for the dimensions involved is also a necessary step to take, having arrived at a universal factor structure for a theory; however, it involves information that presupposes the existence of such a universal factor structure. If we accept that within the general universality of latent traits there is some amount of diversity, then we also need to employ the structural information given by the similarity or identity of country factor structures in our quest for country clusters. Such an approach might enable not only the power for explaining similarities but also our power to explore for differences in the conceptualization of the latent variables. Under this rationale, analyses of the present study have served in both ways: first, as a way of arriving to a large amount of similarity and be able to describe this similarity among countries, and second, as a testing for the discriminant power of the SAS between factor structures, between countries and across clusters of countries.

A further advantage of the method employed in this study is that it still does not require a large number of countries in order to arrive to meaningful clusters of countries, as is true for the "country means" approach. However, the information about the factor elements in each of the countries involved would be greatly enhanced if the clusters consist of many countries (in contrast to our India "cluster"). Thus, for any set of latent variables and of course for the five Social Axioms dimensions, a further implementation of the method including the respective multidimensional scaling solution, might reveal sets of countries that share common aspects on these dimensions, even if these dimensions in their universality contain some parts of cultural diversity.

References

Ajzen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, N. J.: Prentice-Holt.

Allik, J. & McCrae, R. R. (2004). Toward a geography of personality traits: Patterns of profiles across 36 cultures. *Journal of Cross-Cultural Psychology, 35*, 1, 13-28.

Bond, M. H., Leung, K., Au, A., Tong K., & Chemonges-Nielson, Z. (2004). Combining social axioms with values in predicting social behaviours. *European Journal of Personality, 18*, 3, 177-191.

Chen, S. X., Bond, M., & Cheung, F. M. (2006). Personality correlates of social axioms: Are beliefs nested within personality? *Personality and Individual Differences, 40,* 509-519.

Chen, S. X., Fok, H. K., Bond, M., & Matsumoto, D. (2006). Personality and beliefs about world revisited: Expanding the nomological network of social axioms. *Personality and Individual Differences, 41*, 201-211.

Eurostat (1995). *European Community Household Panel*. Luxemburg.

Furnham, A. (1990). *The Protestant Work Ethic: The psychology of work related beliefs and behaviours*. London: Routledge.

Gari, A., & Kalantzi-Azizi, A. (1998). The influence of traditional values of education on Greek students' real and ideal self-concepts. *Journal of Social Psychology, 138*, 1, 5-13.

Gari, A., Mylonas, K., & Karagianni, D. (2005). Political and religious group membership, value priorities and educational values. *Journal of Beliefs and Values, 26*, 3, 301-311.

Gari, A., Panagiotopoulou, P., Mylonas, K., & Pavlopoulos, V. (2004, August). Dimensions of Social Axioms: A cross-cultural perspective. In M. H. Bond (Chair), *The functioning of Social Axioms in various nations.* Symposium conducted at the 17th International Congress for Cross-Cultural Psychology, Xi'an, China.

Gari, A., Panagiotopoulou, P., & Mylonas, K. (2009). Social axioms in Greece: Etic and emic dimensions and their relationships with locus of control. In K. Leung & M. H. Bond (Eds.), *Psychological Aspects of Social Axioms. Understanding global belief systems,* (pp. 197-216). New York: Springer Science.

Georgas, J. (1989). Changing family values in Greece: From collectivist to individualist. *Journal of Cross-Cultural Psychology, 20*, 80-91.

Georgas, J. (1993). Ecological-social model of Greek psychology. In U. Kim & J. W. Berry (Eds.), *Indigenous psychologies: Research and experience in cultural context,* (Vol. 17, pp. 56-78). Beverly Hills, CA: Sage.

Georgas, J. & Berry, J. (1995). An ecocultural taxonomy for cross-cultural psychology. *Cross-Cultural Research, 29*, 2, 121-157.

Georgas, J. & Mylonas, K. (2006). Cultures are like all other cultures, like some other cultures, like no other culture. In U. Kim, K. S. Yang, & K. K. Hwang (Eds.), *Scientific Advances in Indigenous Psychologies: Philosophical, Cultural and Empirical Contributions,* (pp. 197-221). London: Sage Inc.

Georgas, J., Mylonas, K., Gari, A., & Panagiotopoulou, P. (2004). Families and values in Europe. In W. Arts and L. Halman (Eds.), *European values at the turn of the millennium,* (pp. 167-204). Leiden: Brill.

http://www.adherents.com

Katz, D. (1960). The functional approach to the study of attitudes. *Public Opinion Quarterly, 24*, 163-204.

Leung, K., & Bond, M. H. (2004). Social Axioms: A model of social beliefs in multi-cultural perspective. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology*, (Vol. 36, pp. 119-197), San Diego, CA: Elsevier Academic Press.

Leung, K., Bond, M. H., & Schwartz, S. H. (1995). How to explain cross-cultural differences. Values, valences, and expectancies? *Asian Journal of Psychology, 1*, 70-75.

Leung, K. Au, A., Huang, X., Kurman, J., Niit, T., & Niit, K.-K. (2007). Social axioms and values: A cross-cultural examination. *European Journal of Personality, 21,* 91-111.

Leung, K., Bond, M. H., De Carrasquel, S. R., Muñoz, C., Hernández, M., Murakami, F., Yamaguchi, S., Bierbauer, G., & Singelis, T. M. (2002). The search for universal dimensions of general beliefs about how the world functions. *Journal of Cross-Cultural Psychology, 3,* 286-303.

Merrit, A. (2000). Culture in the cockpit: Do Hofstede's dimensions replicate? *Journal of Cross-Cultural Psychology, 31*, 3, 283-301.

Muthén, B. O. (1994). Multilevel covariance structure analysis. *Sociological Methods & Research, 22*, 376-398.

Mylonas, K. (2009). Statistical analysis techniques based on Cross-Cultural research methods: cross-cultural paradigms and intra-country comparisons. To appear in *Psychology, The Journal of the Hellenic Psychological Society;* Special Issue: *Cross-Cultural Psychology.*

Rokeach, M. (1968). *Beliefs, Attitudes and Values: A theory of organization and change*. San Francisco: Jossey Bas, Inc.

Rokeach, M. (1973). *The Nature of Human Values*. The Free Press.

Rokeach, M. (1979). *Understanding Human Values*. New York: The Free Press.

Sidiropoulou-Dimakakou, D., Mylonas, K., & Argyropoulou, K. (2008). Holland's hexagonal personality model for a sample of Greek university students. *International Journal of Educational and Vocational Guidance, 8*, 111-125.

Triandis, H. C. (1977). *Interpersonal behavior*. Monterey: Brooks/Cole.

Van de Vijver, F. J. R., & Poortinga, Y. H. (2002). Structural equivalence in multilevel research. *Journal of Cross-Cultural Psychology, 33*, 2, 141-156.

Vassiliou, V. & Vassiliou, G. (1973). The implicative meaning of the Greek concept of philotimo. *Journal of Cross-Cultural Psychology, 4,* 326-341.

Veligekas, P., Mylonas, K., & Zervas, Y. (2007). Goal orientation and beliefs about the causes of success among Greek track and field athletes. *Perceptual and Motor Skills, 105*, 927-938.