

Refining the Social Axioms Survey:

Development and Evaluation in Eleven Countries and its Relationship with
the Five-Factor Model of Personality

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Abstract

Based on a deductive, culturally decentered approach, new items were generated to improve the reliability of the original Social Axioms Survey. In Study 1, results from 11 countries support its original five-factor structure and achieve higher reliability of the axiom dimensions as measured by the new Social Axioms Survey (SAS II). Moreover, moderate but meaningful associations between axiom and Big-Five personality dimensions were found: Social cynicism was positively related to neuroticism, and negatively to agreeableness and extraversion; reward for application was positively related to conscientiousness and agreeableness; social complexity was positively related to intellect; religiosity was positively related to agreeableness. Temporal change of social axioms at the culture-level was also examined. In Study 2, additional new items were generated for social complexity and fate control and assessed in Hong Kong and the U.S.A. Reliability was improved further for both dimensions. Additionally, two sub-factors of fate control were identified: Fate determinism and fate alterability. Fate determinism related positively to neuroticism. Other relationships between the axiom dimensions and the Big-Five personality factors were similar to those reported in Study 1. The short forms of the axiom dimensions were generally reliable and correlated highly with the long forms.

Refining the Social Axioms Survey:

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Popularized by Kluckhohn and Strodtbeck (1961), the “value” construct is typically used to characterize different cultures in the world. In his now-classic study, Hofstede (1980) provided the foundational empirical basis for dimensionalizing cultures by using values. Schwartz (1994) took a theoretical approach and proposed seven, culture-level value types for classifying cultures. More recently, the GLOBE research team has identified nine dimensions of culture based on values and leadership behaviors (House, Hanges, Javidan, Dorfman, & Gupta, 2004). In the past several decades, these and other researchers have provided maps of culture based on value dimensions.

The Social Axioms Framework

To broaden the conceptual tools for understanding and analyzing cultures, Leung and Bond (2004) have turned to general, context-free beliefs, termed “social axioms.” As defined by Leung and Bond (2008):

Social axioms are generalized beliefs about people, social groups, social institutions, the physical environment, or the spiritual world as well as about categories of events and phenomena in the social world. These generalized beliefs are encoded in the form of an assertion about the relationship between two entities or concepts. (p. 198)

Social axioms may thus be viewed as “generalized expectancies”, a concept introduced by Rotter (1966) to characterize locus of control, but can be extended into other domains of belief about the nature of reality and how the world operates.

In the first study in this research program, Leung et al. (2002) identified five axiom

dimensions in Hong Kong, Venezuela, the U.S.A., Japan, and Germany. A subsequent large-scale study involving 40 cultural groups supported the universality of this structure (Leung & Bond, 2004). The same five factors emerged in an exploratory factor analysis that did not assume the a priori structure identified in Leung et al. (2002). Results of a multilevel factor analysis, a stringent statistical analysis that takes into account the two-level structure of the data (individual and culture), confirmed the robustness of this structure (Cheung, Leung, & Au, 2006). The 39 items defining this five-factor structure make up the Social Axioms Survey (SAS) used in many subsequent studies (Leung & Bond, 2004; 2009).

These five axiom dimensions are defined briefly here: *social cynicism* refers to a negative view of human nature and the social world; *reward for application* refers to the belief complex that people's use of effort, knowledge, careful planning and other resources will lead to positive outcomes; *social complexity* refers to beliefs that people's behavior may vary across situations and that problems have multiple solutions; *fate control* refers to the belief complex that life events are pre-determined by fatalistic forces, but that people may be able to predict and alter the decree of fate by various means; finally, *religiosity* asserts the existence of a supernatural being and the beneficial functions of religions.

The validity of the five axiom dimensions has been substantiated across diverse research domains. At the culture level, which involves average axiom scores of cultural groups (i.e., their citizens' scores), many meaningful relationships between axioms and various variables were found. For instance, Leung and Bond (2004) found that social cynicism is related to lower life satisfaction; that social complexity is related to stronger interest in politics; and that religiosity is related to higher agreeableness, a Big-Five personality dimension; Zhou, Leung, and Bond (2009) found that fate control is related to better academic performance, and that reward for application is related to stronger interest in studying.

At the individual level, many meaningful relationships have also been reported. For instance, Leung, Ip, and Leung (2010) found that in China, social cynicism predicted low job satisfaction measured several months later. Singelis, Hubbard, Her, and An (2003) found that in the U.S.A., social complexity correlated positively with cognitive flexibility. Safdar, Lewis, and Daneshpour (2006) found that religiosity correlated positively with various well-being indicators in a group of Iranian immigrants in Canada. Fu et al. (2004) found that across several cultural groups, reward for application was related to influence tactics that involved non-coercive persuasion. Kuo, Kwantes, Townson, and Nanson (2006) found that fate control was positively related to stress in a group of ethnically diverse university students in Canada. For reviews of this growing literature, see Leung and Bond (2004, 2009).

The uniqueness of the construct of social axioms has been demonstrated in several studies. Social axioms show some low but predictable correlations with values (Leung et al., 2007) and with other well-established personality dimensions (e.g., Chen, Bond, & Cheung, 2006; Chen, Fok, Bond, & Matsumoto, 2006). Therefore social axioms can complement these well-known individual difference constructs for a better understanding and prediction of individual behaviors across diverse cultures.

A Deductive and Culturally Decentered Approach to Scale Development

In developing the SAS, an inductive approach was followed (Burisch, 1984), which relied on the inclusion of items from diverse sources and submitted the data collected to exploratory factor analysis. The five axioms described before were identified primarily through a data-driven approach. This inductive approach was most suitable because prior research and theorizing on social axioms were lacking. The strength of this approach is that no constraints are imposed on the items included and the factors identified. The weaknesses are that some facets of a construct may not be adequately captured by the items included, and

that some items may not be optimally worded to tap a construct. In fact, the internal consistency of two axiom dimensions, namely fate control and social complexity, was on the low side (the average alpha is below .60 across the societies studied). Although an alpha of .50-.60 is acceptable for newly developed scales (Nunnally, 1967), the reliability of these two scales needs to be improved to ameliorate the yield from subsequent research.

Two main strategies for developing a better instrument to measure social axioms are noteworthy. First, by now there is sufficient research on, and theoretical understanding of, the axiom constructs (Leung & Bond, 2009) to permit a rational or deductive approach to constructing a better instrument (Burisch, 1984; Wiggins, 1973). In this approach, items are developed based on construct definitions, which are then subjected to empirical scrutiny so that the best items can be selected. Many well-known scales have been developed with a deductive approach, such as the Self-Construal Scale (Singelis, 1994).

Second, to develop a reliable and valid scale for diverse cultural contexts, van de Vijver and Leung (1997) proposed the culturally decentered approach. Most scales in the literature are developed from a Western perspective, and then applied in non-Western cultural contexts. Major problems of this approach are that the imported scales may omit facets of a construct that are salient in the borrowing culture, and that the imported items may not capture the construct well in the local cultural context (Cheung, 2004). In contrast, the culturally decentered approach requires the generation of items from different cultural perspectives, so that important aspects of a construct from diverse cultural perspectives are more comprehensively covered. Furthermore, a multi-cultural assessment in the process of scale development can eliminate items that are sub-optimal for some cultural groups. A good example of this approach is given by the value survey developed by Schwartz (1992), which includes value items from Western as well as non-Western sources, and was validated in

diverse cultural groups. Likewise, the items used in the GLOBE project for measuring cultural dimensions were developed by a culturally diverse team of researchers and were then validated in diverse cultures (House et al., 2004).

The development of the new version of Social Axioms Survey (SAS II) follows the culturally decentered approach. Psychologists from ten countries were involved in generating pan-cultural items to measure the five axiom dimensions, and data from eleven countries were collected to assess the reliability and validity of the SAS II thereby produced.

SAS II and the Five-Factor Model of Personality

Establishing the validity of the SAS II will require an extensive research program. As the first step, we rely on the five-factor model of personality to elucidate the meanings of the five social axioms. Five broad personality dimensions have been validated in diverse cultural contexts: Neuroticism, extraversion, agreeableness, openness to experience or intellect, and conscientiousness (McCrae & Costa, 1997). Chen, Fok et al. (2006) evaluated the relationships between social axioms and the five-factor personality model in Hong Kong with the SAS, and found that social cynicism was positively correlated with neuroticism, but negatively correlated with extraversion and agreeableness. Reward for application was positively correlated with extraversion, agreeableness, and conscientiousness. Social complexity was positively correlated with neuroticism and openness to experience. A positive, but non-significant correlation ($r = .15$) between religiosity and agreeableness was found, and small and non-significant correlations were also found between fate control and the five personality dimensions.

Note that Chen, Fok et al. (2006) studied one cultural group and the generalizability of their findings across cultures is untested. We endorse their theorizing and predict that social cynicism should be related positively to neuroticism and negatively to agreeableness because

the perception of a malevolent social world should be related to anxiety and defensiveness in dealing with people. Moreover, since social cynics are socially withdrawn, we also predict a negative relationship between social cynicism and extraversion.

We predict a positive correlation between reward for application and conscientiousness, because the emphasis on effort by people high on reward for application should be related to conscientiousness. We also expect to replicate the positive correlation between reward for application and agreeableness, because individuals high on reward for application should believe in the utility of effort in the interpersonal domain, leading to a relationship with agreeableness. In addition, we think that people high on reward for application are more likely to explore the social world because of their belief in human agency; hence we predict a positive correlation between reward for application and extraversion.

We predict that social complexity should be positively related to intellect, because individuals high on social complexity should be interested in variety and unconventional ideas. We also predict that individuals high on social complexity would be higher on neuroticism, because they are more likely to consider issues from diverse angles, which may be related to disturbing rumination and internal conflict. This reasoning suggests a positive association between social complexity and neuroticism.

Chen, Fok et al. (2006) did not find a significant correlation between religiosity and agreeableness, but Leung and Bond (2004) found that religiosity was related to agreeableness significantly at the societal level, a finding that involved the correlation of country means. We believe that people who view religions as beneficial to societies are likely to endorse a central element of probably all religious teachings, namely, showing care and concern for fellow human beings. This reasoning suggests a positive correlation between religiosity and agreeableness.

Leung and Bond (2004) found that fate control was negatively related to extraversion at the societal level, but Chen, Fok et al. (2006) did not find such a correlation. We have no strong reason to believe that fate control should be related to extraversion, and our research provides a more decisive evaluation of this possible relationship.

The Stability of Social Axioms in Societies

The data based on SAS (Leung & Bond, 2004) were collected about eight years before the current data collection, thus providing an opportunity to evaluate the temporal stability of social axioms. Social axioms involve beliefs induced by many years of socialization and personal experience. Unless there are abrupt societal changes, there should be stability in the way different generations are socialized, and we expect stability in the endorsement of social axioms across generations.

There is little research on the temporal stability of social axioms in societies, but a few studies provide indirect support for our conjecture. Leung, Hui, and Bond (2007) found in Hong Kong that the average test-retest reliability of social axioms is .74, a level comparable to that of personality measures (Bazana & Stelmack, 2004). Boehnke (2009) studied transmission of axioms from one generation to the next among university students in Germany. In terms of correlations between student (offspring) scores and parental scores, strong transmission was found only for religiosity. For social complexity, little intergenerational transmission was found, whereas for social cynicism, reward for application, and fate control, mother-student transmission was more evident than father-student transmission. More relevant to our research question, when mean scores of students were compared with those of their parents, the differences were not large (less than .3 on a five-point scale), except for fate control (.39 for student and mother and .50 for student and father). In a similar study in Spain, Ocejja (2009) found that in terms of

correlations between axioms of university students and parents, religiosity, fate control, and social cynicism showed some transmission. In terms of mean endorsement of social axioms, the differences between students and parents were not large (less than .3 on a five-point scale), with the exception of social complexity (.44). These results suggest that social axioms should be reasonably stable across time, with religiosity showing the highest temporal stability.

To sum up, the present research aims to develop a new version of the SAS with a theory-based, culturally decentered approach, and to examine its reliability and validity in diverse cultural contexts. The five-factor model of personality was our first attempt to evaluate the validity of SAS II, and the temporal stability of social axioms was also assessed. In addition, we explored the possibility of creating a short form of SAS II.

Study 1

Method

Participants

Data from university students were collected in 11 cultural groups using the 125-item SAS II. Ten countries were involved in the development of the new items: Brazil, China, Germany, Ghana, Israel, Japan, Malaysia, Mexico, Russia, and the U.S.A. These ten countries are diverse with regard to traditional culture, religion, socio-economic development and political systems, thus facilitating the development of culturally balanced items for SAS II.

In the data collection phase, Norway and South Africa were included because of the opportunity to collect data in these two countries, but Japan was excluded because of the difficulty of collecting data in that specified time period. To cross-validate the results derived from the 11 countries, data were also collected in a private university in Germany that catered mostly for international students. This sample involved 171 students from over 40

cultural/national groups, with Romanians (18.7%), Germans (17.0%), and Bulgarians (12.9%) being the three major nationalities represented.

Twenty-four participants were discarded because there was more than 10% of missing items or problematic response sets were identified. The final sample consisted of 2,217 respondents from 11 cultural groups and a group of German and international students from diverse cultures.

Measures

Social axioms. Based on the meaning of the five axiom dimensions (Leung & Bond, 2004), new items were developed. The 39 pan-cultural items defining the five axiom dimensions in SAS were also used as a guide. Collaborators from the 10 participating countries were asked to generate 15-20 new items in their native language and English for each axiom dimension, resulting in a pool of 813 new items. This item pool was consolidated by the first and third authors, combining similar items and eliminating items that deviated from the meaning of the axiom dimensions. Some items were rephrased to improve their clarity. The consolidated items were then reviewed by the collaborators from the aforementioned countries, using the following criteria: (1) capturing the meaning of the axiom dimensions; (2) different from the existing items; (3) clear and understandable from their cultural perspective; and (4) easy to translate. They were asked to identify good items with regard to these criteria from their cultural perspectives, and items chosen by four collaborators or more were scrutinized by the first and third authors for a final decision. This process resulted in 143 selected items, which were polished by the first and third authors for greater clarity.

The 143 new items were added to the existing 39 pan-cultural items for a pilot study with a sample of American university students. The purpose was to reduce the length of the survey

for easy administration. We screened the new items by examining item-total correlations, dropping items with low item-total correlations. The logic is that items that do not perform well in an American sample cannot be used in the final version, because they are not reliable in a major country.

The final version included 125 items, with 86 new items and the 39 original items, which was then administered in other participating countries. The items were based on five-point Likert scales, with ends labeled as “strongly disbelieve” and “strongly believe”. Their reliabilities are reported in the results section.

Big-Five personality. To validate SAS II, the Mini-International Personality Item Pool (Mini-IPIP; Donnellan, Oswald, Baird, & Lucas, 2006) was administered to measure the five factors of personality. It is a 20-item short measure developed from the 50-item IPIP (Goldberg, 1999), and has been shown to have acceptable psychometric properties across studies (Donnellan et al., 2006). Each of the five personality factor was measured by 4 items. Respondent rated each personality description on a five-point Likert scale, ranging from “not at all describes me” to “describes me very well”. The average alpha coefficients for extraversion, agreeableness, conscientiousness, neuroticism, and intellect (or openness) were .66, .62, .65, .61, and .62, respectively. Their reliabilities are acceptable, given that there are only four items for each scale.

Procedure

Participants were mainly recruited from subject pools for course credit. The procedure of back translation was followed to translate the instrument, i.e., SAS II and Mini-IPIP, into local languages if needed. In each cultural group, the 125-item SAS II was distributed to participants in the local language, primarily in group settings. The Mini-IPIP was also administered to respondents from all cultural groups, except Israel. Demographic information,

such as age, gender and ethnicity, was collected. Details of the sample characteristics and recruitment procedures are summarized in Table 1.

Results

Item Selection

For each of the 11 cultural groups, reliable items were first selected to enhance the internal consistency of each axiom dimension based on item-total correlations. That is, we dropped items for a particular axiom dimension that showed negative or low item-total correlations. This procedure had the benefit of reducing the number of items for subsequent confirmatory factor analysis, which would be problematic if a large set of items were involved. The 39, pan-cultural items identified in Leung and Bond (2004) were used as anchors, because they had previously been selected from a much larger sample of 40 cultural groups. To ensure a sufficient number of items for each dimension, we did not exclude items that were unreliable in some samples, as long as their presence did not lead to a low alpha for these samples. In other words, we tried to strike a balance between an acceptable level of alpha for all axiom dimensions in all samples and maintaining a reasonable number of items for each dimension.

Using this optimization procedure, 83 items, 44 of them new, were finally included for further analysis. Table 2 summarizes the information regarding the number of items in each axiom dimension at different stages of scale development. It is noteworthy that each axiom dimension comprises at least 8 new items except for fate control, which contains only 5 new ones. It is possible that our new items did not tap the construct of fate control very well despite our initial due diligence, a point that we will explore in more detail below.

Insert Tables 1 and 2 about here

Confirmatory Factor Analysis

Since the five-factor structure of social axioms is well-established (Leung & Bond, 2009), confirmatory factor analysis (CFA) was conducted to evaluate this structure with LISREL 8.80 (Jöreskog & Sörbom, 2006). Several commonly used goodness-of-fit indices were utilized to evaluate model fit: SRMR, RMSEA, NNFI, IFI, and CFI. To treat each cultural group in a culturally balanced way, the procedure for meta-analysis of factor analysis (Becker, 1996; Leung et al., 2002) was employed. A correlation matrix for each group was computed and then transformed by the Fisher z transformation. After averaging the 11 transformed matrices, a pooled correlation matrix was formed by transforming the average Fisher z scores back into correlations. The final pooled matrix thus weighted each cultural group equally regardless of its sample size, which was then used as the input for CFA.

The fit indices for the model were $\chi^2(3,310, N = 2,046) = 12,474, p < .001, \chi^2/df = 3.77, SRMR = .054, RMSEA = .043, NNFI = .88, IFI = .89, CFI = .89$. All factor loadings were significant at the .05 level. Given the very complex model we fit, the CFA results, especially SRMR and RMSEA, suggested a reasonably good fit (Bentler & Bonett, 1980; Hu & Bentler, 1998). Note that Cheung et al. (2006) argued that SRMR and RMSEA are appropriate for evaluating model fit when sample size is large and unique variance is small, as in our case. The correlations among the five latent factors were on the low side (mean = .19), except for the correlation between reward for application and social complexity ($r = .52$). Factor loadings of the items are presented in Table 3.

Insert Table 3 about here

Procrustes Rotation

In addition to CFA, Procrustes rotation was performed to check the similarity between the factor structure of each cultural group and the common factor structure described above. Factor structure of each cultural group, obtained by principal components analysis with varimax rotation, was target-rotated toward the common structure based on actual loadings, and congruence coefficients were calculated to indicate the factorial agreement attained (van de Vijver & Leung, 1997). Tucker's phi (Tucker, 1951) was used in our study; van de Vijver and Poortinga (1994) proposed a cutoff value of .90, while Ten Berge (1986) suggested earlier a lower value of .85.

Results of the Procrustes rotation are shown in Table 4. Social cynicism and religiosity showed good factorial agreement across cultures, average phi = .90 and .91, respectively. Reward for application and social complexity showed marginal factorial congruence, average phi = .85 and .84, respectively. Fate control (average phi = .78) did not meet the criterion of .85, but its low congruence resembled that found in prior studies (Leung & Bond, 2004; Leung et al., 2002). Given the complex model evaluated, we conclude that the five-factor structure is reasonably equivalent across the 11 cultural groups, except for fate control.

Insert Table 4 about here

Reliability Analysis

As one major goal of this study is to address the low reliability of two axiom dimensions, we computed Cronbach alphas for each dimension (see Table 5). Twenty items defined social cynicism, and the reliability coefficients for all 11 cultural groups were higher than .70 (mean = .79). There were 17 items tapping reward for application, and all the alphas

were higher than or close to .70 (mean = .77). Eighteen items measured social complexity, and 4 out of the 11 alphas were below .65 (mean = .68). Eleven items measured fate control, and again 4 out of the 11 alphas were below .65 (mean = .68). Religiosity was measured by 17 items, and all alphas exceeded .70 (mean = .85).

Insert Table 5 about here

In sum, the reliability analysis shows that three axiom dimensions as measured by SAS II are internally consistent across cultures, but the reliability of social complexity and fate control, while improved, is still marginal.

Cross-validation with a Sample of German and International Students

The sample of German and international students collected in Germany was analyzed to establish the generalizability of the 83-item SAS II. The CFA results suggested a moderate fit: $\chi^2(3,310, N = 171) = 5,350, p < .001, \chi^2/df = 1.62, SRMR = .087, RMSEA = .053, NNFI = .78, IFI = .79, CFI = .79$, which seemed acceptable given that the sample was not large ($N = 171$), but culturally diverse.

Procrustes rotation was conducted to evaluate the factorial similarity between the structure of this sample and that derived from the common structure described before. High congruence was found in four dimensions: social cynicism ($\phi = .91$), reward for application ($\phi = .89$), social complexity ($\phi = .90$), and religiosity ($\phi = .93$). Again, fate control showed a low congruence ($\phi = .58$). Four dimensions showed good internal consistency: social cynicism ($\alpha = .79$), reward for application ($\alpha = .81$), social complexity ($\alpha = .78$), and religiosity ($\alpha = .89$). Again, the alpha of fate control was marginal ($\alpha = .61$). Overall, these results were similar to those reported before.

Correlations with the Big-Five Personality Dimensions

We first established the five-factor model of the Mini-IPIP. CFA was performed using the pooled correlation matrix derived from the 11 samples, and an acceptable fit was found: $\chi^2(160, N = 2,065) = 1,295, p < .001, \chi^2/df = 8.09, SRMR = .048, RMSEA = .062, NNFI = .85, IFI = .88, CFI = .88.$

Bivariate correlations were then computed for each sample to examine the hypothesized linkages between axioms and personality factors¹ (see Table 6). We looked for consistent patterns, both in size and sign, from the correlation results. Social cynicism was significantly and positively correlated with neuroticism in 7 out of the 11 samples. Only the correlation for Malaysia was negative in sign, with a small value of $-.05$. Social cynicism was significantly and negatively associated with agreeableness in 8 samples, and only the correlation for the U.S.A. was positive in sign, with a small correlation of $.01$. Social cynicism was significantly and negatively correlated with extraversion in 4 samples, and three other samples showed positive non-significant correlations. All three predictions concerning social cynicism were thus generally supported.

Reward for application was significantly and positively related to conscientiousness and agreeableness in 9 samples, and no correlation was opposite in sign. In contrast to our expectation, reward for application showed a significant, positive correlation with extraversion in 2 samples only, and 3 samples showed negative correlations. Two of the three predictions concerning reward for application were thus generally supported.

Social complexity was significantly and positively associated with intellect in all of the samples, except Norway; only three samples demonstrated significant positive relationships between social complexity and neuroticism, while two samples showed negative non-significant correlations. Religiosity was significantly and positively related to

agreeableness in 7 samples; only the international data showed a negative correlation with a value of $-.01$. Fate control was not significantly related to extraversion in most of the samples, except for the Malaysian sample.

Insert Table 6 about here

Among our nine predictions on the relationships between social axioms and personality dimensions, seven are generally supported by our results. The two remaining predictions receive mixed support, findings which will be discussed in a subsequent section.

Change of Axiom Means over Time

Data were collected with SAS about eight years before the current data collection, making it possible to evaluate whether the endorsement of social axioms showed any noticeable change in this period. Note that a period of eight years may not be long enough to detect significant cultural change. To this end, we calculated the correlations between the means computed from the present data and those reported in Leung & Bond (2004) using the 39 pan-cultural items. Eight cultural groups overlapped across the two data sets, namely, Brazil, China, Germany, Israel, Malaysia, Norway, Russia, and the U.S.A. Both Pearson's and rank-order correlation coefficients were computed.

The correlations were moderate to high: social cynicism, $r(6) = .58$, ns, rank-order $r(6) = .74$, $p < .05$; reward for application, $r(6) = .74$, $p < .05$, rank-order $r(6) = .31$, ns; social complexity, $r(6) = .71$, $p < .05$, rank-order $r(6) = .66$, $p < .10$; fate control, $r(6) = .75$, $p < .05$, rank-order $r(6) = .71$, $p < .05$; and religiosity, $r(6) = .99$, $p < .001$; rank-order $r(6) = .91$, $p < .01$. Despite the small sample size, all axiom dimensions showed at least one significant correlation, suggesting that axioms have at least moderate temporal stability. As expected,

religiosity showed the strongest temporal stability.

A Short Version of SAS II

The eight items with the highest loading for each axiom dimension based on the CFA results were selected to form a short version. We computed correlations between the short version (40 items) and the long version (83 items) for each dimension for each sample to evaluate their equivalence. Moreover, the correlation between the short version and the excluded items was computed for each dimension, with Spearman-Brown correction. The average reliabilities of the short forms are good, except for social complexity and fate control, a shortfall that is addressed in Study 2. The correlations between the short and long versions ranged from .80 to .96 across the 12 samples (see Table 7). Furthermore, the short versions and the remaining items showed generally high correlations, with averages at .74 or higher.

Insert Table 7 about here

Discussion

Following a deductive, culturally decentered approach to item generation, we developed and examined an 83-item SAS II in 12 cultural samples. The five-factor structure of social axioms is generally supported. We note that the cross-cultural equivalence of the structure is not as high as expected, perhaps because we tested a relatively complex factor model, and/or because social axioms may be more sensitive to cultural influence than self-oriented individual difference variables. In addition, SAS II is more reliable than SAS, but social complexity and fate control still show marginal reliability in some countries. Given that an alpha of .60 is adequate for newly developed scales (Nunnally, 1967), SAS II can still provide a useful tool for tapping these two axiom dimensions.

Social Axioms and Big-Five Personality Factors

We tested the linkages between social axioms and Big-Five personality factors to provide some initial evidence for the validity of SAS II, and obtained interpretable results. Results also demonstrate that axioms and the five-factor personality dimensions are distinct but related, because only small to moderate overlap is observed. This conclusion based upon a wide range of cultures corroborates a similar conclusion reached by Chen, Fok et al. (2006).

Specifically, social cynics are higher on neuroticism, but lower on agreeableness and extraversion. These findings are consistent with the argument that a cynical, negativistic worldview is related to worry and anxiety, and the orientation towards withdrawal and defensiveness in interpersonal domains. Individuals high on reward for application are higher on agreeableness and conscientiousness. Thus, the belief in the utility of effort is related to the orientation towards getting along with others and being responsible and dutiful. Social complexity is linked to intellect positively, which supports the argument that the belief in the complexity and variability of the world is associated with a preference for diversity and novelty. Consistent with the culture-level analysis conducted by Leung and Bond (2004), religiosity is positively correlated with agreeableness. The belief in a supernatural being and the positive consequences of religions is related to the orientation towards getting along with others. We propose that religiosity is related to the endorsement of a central teaching of probably all religions, namely, the need to care for fellow humans, which explains why religiosity is related to agreeableness. In line with Chen, Fok et al. (2006), we did not find any consistent relationship between fate control and the five personality dimensions. Our account of the relationships is speculative and requires the scrutiny of future research.

Two predictions receive mixed support. Reward for application shows a significant,

positive correlation with extraversion only in 2 samples, but 3 samples show negative, non-significant correlations. Only three samples show significant, positive relationships between social complexity and neuroticism, but two samples show negative, non-significant correlations. One explanation for these mixed findings is that the shortened IPIP scale may be limited by its construct breadth (Donnellan et al., 2006). Another plausible explanation lies in the differential utility of social axioms across diverse cultural systems. In any event, these mixed findings need to be evaluated in future research.

Temporal Stability of Social Axioms

As expected, our results on the temporal change of social axioms suggest that worldviews endorsed in a society are quite stable across the eight year span studied. We propose that unless major societal events disrupt the life of a large number of people, such as wars, natural disasters, and political and economical upheavals, social axioms remain relatively stable on the societal level.

It is interesting that religiosity is the most stable axiom dimension, supporting similar findings at the individual level (Boehnke, 2009; Oceja, 2009). In fact, Inglehart and Baker (2000) also concluded that although cultural values may change due to modernization, religious beliefs and spiritual values persist. Perhaps religions are institutionalized in most societies, and religious beliefs are therefore being actively maintained and promoted. Other axiom dimensions are less stable because they do not benefit from the endorsement of and promotion by social institutions.

Study 2

While SAS II is generally more reliable than SAS, fate control and social complexity still have marginal reliability for some countries. Many new items for fate control and social complexity are problematic. To diagnose the problems, we have scrutinized the items

defining these two constructs carefully to identify their core characteristics, and we have also examined the new items that were dropped or did not yield high item-total correlations.

We conclude that for social complexity, the items concerning the usefulness of flexibility in dealing with issues and events, and the changeability of people tend to show low item-total correlations. One potential problem with these items may be that they tend to be abstract or extreme in the position stated; statements that are more concrete and less extreme may fare better in mapping this construct. With regard to fate control, which involves the belief in fate and the possibility of predicting and altering fate, we notice that the number of items tapping the alterability of fate is small. Again, the newly added items expressing extreme beliefs tend not to fare well, and many such items are dropped.

A second study was thus conducted to generate new items for further improving the reliability of fate control and social complexity. A deductive approach is again adopted, with input from culturally diverse collaborators to develop a culturally balanced set of new items. The items were evaluated with university students in Hong Kong and the U.S.A., which represent two very different cultural contexts. Again, the five-factor model of personality is used to provide initial evidence for the validity of the axioms dimensions.

Method

Participants

University students were recruited in Hong Kong ($N = 129$) and the U.S.A. ($N = 130$). The Hong Kong sample included 54 male and 75 female local Chinese, with a mean age of 21.75 ($SD = 2.84$). The American sample included 73 males and 57 females, with mean age of 20.55 ($SD = 2.87$). For the American sample, 89% were Caucasians, 4% Native Americans, 2% Latino Americans, 2% African Americans, 1% Asian Americans, and 2% others.

Measures

Social axioms. The first three authors developed new items for social complexity and fate control based on an analysis of the core items that define these two constructs, as well as problematic items that were excluded from SAS II. Collaborators from Japan, Brazil, the U.S.A., Russia, Israel, and Malaysia provided comments on the new items with regard to their appropriateness and clarity from their cultural perspectives, and suggested some new items for inclusion. Based on these suggestions, the first three authors developed 11 and 17 new items for social complexity and fate control, respectively. These new items were developed in English and subsequently translated into Chinese with a back translation procedure for administration in Hong Kong.

Pilot data from 28 Hong Kong university students were collected to examine the reliability of these new items together with the 83-item SAS II. Four redundant items from fate control were dropped due to highly similar content with other items based on the judgment of the three major authors. In addition, the items were screened by examining their item-total correlations, and two items from social complexity were dropped because of low item-total correlations. This new version of SAS II included 105 items, with 9 and 13 new items for social complexity and fate control, correspondingly.

Big-Five personality. As in Study 1, Mini-International Personality Item Pool (Mini-IPIP; Donnellan et al., 2006) was utilized to measure the five-factor model of personality. Acceptable internal consistency was obtained across the samples, average alphas = .69.

Procedure

In Hong Kong, participants were recruited through advertisements in a local university, and their participation was paid, while participants in the American sample were recruited

from a subject pool for course credits. Respondents completed the questionnaire anonymously in a group setting.

Results

Confirmatory Factor Analysis, Procrustes Rotation, and Reliability Analysis

Confirmatory factor analysis was conducted with the pooled correlation matrix generated from the Hong Kong and American data based on the meta-analytic procedure described before. Since the sample size was relatively small compared to the parameters needed to be estimated, the number of observed variables in the model was reduced using a data parceling procedure. In Study 1, items defining social cynicism, reward for application and religiosity were found to be very good. For these three axiom factors, items were grouped according to their factor loadings into three parcels for each factor (i.e., nine total parcels). For social complexity and fate control, however, it was necessary to examine individual items to screen out problematic ones.

We first tested the model with five axiom factors, and model fit was not satisfactory, $\chi^2(1,700, N = 259) = 3,219, p < .001, \chi^2/df = 1.84, SRMR = .082, RMSEA = .068, NNFI = .80, IFI = .81, CFI = .81$. Results from an exploratory factor analysis, based on principal components analysis with varimax rotation, suggested it was more appropriate to regard the two facets of fate control as related factors. Recall that fate control involves the belief that events are influenced by fate, but that there are ways to predict and alter fate. Based on this conceptualization, we split fate control items into two sub-factors: Fate determinism and fate alterability. Fate determinism refer to the belief that events that happen in life are determined by fate, whereas fate alterability refer to the belief that fated outcomes can be predicted and altered. In addition, four newly added items were dropped from social complexity, two items from fate determinism, and two items from fate alterability because of low factor loadings (<

.30) and potential double-loadings ($> .20$). The final model involved 97 items and two sub-factors for fate control, which formed a higher-order factor. This model showed a reasonable fit: $\chi^2(1,263, N = 259) = 2,093, p < .001, \chi^2/df = 1.66, SRMR = .075, RMSEA = .049, NNFI = .87, IFI = .87, CFI = .87$ (see Table 8 for factor loadings)². Correlations among the five latent factors were on the low side (mean = .15), except for the correlations between reward for application and social complexity ($r = .34$) and between religiosity and social cynicism ($r = -.34$).

Procrustes rotation was performed to check the similarity between the factor structure of each cultural group and the common factor structure (see Table 9 for results). The factor structure of each cultural group was quite similar to the common factor structure based on the pooled correlation matrix, as all Tucker's ϕ s were larger than .85.

We computed Cronbach alphas for each axiom dimension (see Table 9), and the reliability coefficients for all axiom dimensions were acceptable. In particular, the alphas for social complexity were .70 and .77 in the Hong Kong and American samples, respectively; and those for fate control were .86 and .87, respectively. The two facets of fate control also showed good reliability: .81 and .81 for fate determinism for Hong Kong and the U.S.A. respectively, and .84 and .80 for fate alterability. We conclude that the current version of social complexity and fate control are more reliable than the previous version.

Insert Tables 8 and 9 about here

Correlations with the Big-Five Personality Dimensions

We examined the expected relationships between axiom dimensions and the Big-Five personality factors based on bivariate correlations (see Table 10). Social cynicism was

significantly and positively correlated with neuroticism in Hong Kong, $r = .25, p < .01$, and the correlation in the U.S.A. was in the same direction, but not significant. Social cynicism was significantly and negatively associated with agreeableness for Hong Kong, $r = -.24, p < .01$, and for the U.S.A., $r = -.39, p < .001$. Social cynicism was significantly and negatively correlated with extraversion in the U.S.A., $r = -.16, p < .05$, and this correlation was negative, but not significant in Hong Kong. The pattern of results for social cynicism was similar to that found in Study 1.

Reward for application was significantly and positively related to conscientiousness and agreeableness in Hong Kong, $r = .44, p < .001$ and $r = .22, p < .01$, respectively. These correlations were positive in the U.S.A., but not significant. Consistent with Study 1, the correlation between reward for application and extraversion was positive, but not significant for both samples. The pattern of results was similar to the pattern found in Study 1.

Social complexity was positively associated with intellect in Hong Kong, $r = .15, p < .05$, and the correlation was also positive in the U.S.A., but not significant. Consistent with the mixed finding in Study 1, social complexity was positively and significantly related to neuroticism in Hong Kong, $r = .22, p < .01$, but the correlation was negative, but not significant in the U.S.A. This pattern of results was similar to the pattern observed in Study 1.

Religiosity was significantly and positively related to agreeableness in Hong Kong, $r = .21, p < .01$, and the correlation was positive but not significant in the U.S.A. This pattern of results was similar to the pattern observed in Study 1.

As in Study 1, Fate control was not significantly related to extraversion in the two samples. An exploratory analysis showed that fate determinism showed a significant positive relationship with neuroticism, $r = .19, p < .05$ and $r = .20, p < .05$ in Hong Kong and in the U.S.A., respectively. However, neuroticism was not correlated with fate alterability, $r = .06$,

ns and $r = .04$, ns. Some speculation about this finding is provided in the discussion.

Insert Table 10 about here

Short Form for the Revised SAS II

We explored the possibility of creating short forms for social complexity and fate control. As in Study 1, we selected the 8 items with the highest loadings from each dimension based on the CFA results to create the short forms. The correlations between the short forms and the long forms for both axiom dimensions were very high (see Table 11). Moreover, the short forms show high correlations with the corresponding items that are not selected, suggesting that the items included in the short forms are generally equivalence with items not selected. The reliability results showed that the short forms are adequate, except for social complexity for Hong Kong. Despite the lower reliability, we note that the correlation between the short forms and the long form for social complexity in Hong Kong was actually high, $r = .84$.

Insert Table 11 about here

Discussion

One goal is to improve the reliability of social complexity and fate control by adding new items generated in a deductive and culturally decentered manner. As expected, the reliability of social complexity and fate control was improved by the new items, especially for fate control. In addition, with these new items, fate control can be split into two sub-factors, fate determinism and fate alterability, which correspond to the two facets in the definition of

fate control (Leung & Bond, 2004). Consistent with the notion of fate control, a model with these two subscales forming a higher-order factor showed reasonably good model fit. The fate control scale, which combines the items from the two sub-scales, show very high internal consistency. In fact, these two subscales show moderate correlations with each other, $r = .35$ and $r = .58$ for Hong Kong and the U.S.A., respectively.

The validity of the revised SAS II is supported by the relationships between the axiom dimensions and the Big-Five personality factors, which are generally consistent with those observed in Study 1. It is noteworthy that as in Study 1, fate control did not show any relationship with the Big-Five personality dimensions in Study 2, but fate determinism showed a significant positive correlation with neuroticism across the two cultural groups. This finding is not surprising, as fate determinism is conceptually close to external locus of control, which tends to correlate with neuroticism positively (e.g., Erez & Judge, 2001). Fate alterability is distinct from the concept of locus of control, and it stands to reason that it should not show any significant correlation with neuroticism. Some interesting speculations can be made with regard to these two facets of fate control. Fate control has shown a positive, but small correlation with external locus of control (Singelis et al., 2003), and we speculate that fate determinism, but not fate alterability, is driving this correlation. Zhou and colleagues (2009) found that fate control is positively related to academic achievement at the societal level, and we speculate that fate alterability, not fate determinism, is responsible for this positive relationship. The identification of the two sub-scales of fate control gives rise to some very interesting research questions for future investigation.

Finally, the short forms for social complexity and fate control are now reasonably reliable, and show very high correlations with their corresponding long forms. Researchers who are constrained by the length of a survey may use the short forms to measure the five

axiom dimensions.

General Discussion

A Deductive, Culturally Decentered Approach to Scale Development

Psychological scales are usually developed in the West, and then adapted for application in other cultural contexts. This importation strategy has two major problems: The definition of a construct, while appropriate in the culture of origin, may be problematic in some other cultural contexts, and some items may be inadequate in tapping the construct (Cheung, 2004). The culturally decentered approach is an effective strategy to address these two problems, as the involvement of researchers from diverse cultural backgrounds will increase the likelihood of arriving at culturally equivalent constructs and items (van de Vijver & Leung, 1997).

The deductive, culturally decentered approach to scale development is illustrated by the two studies reported in this paper. In developing the original SAS, the items were identified empirically with exploratory factor analysis. Despite the many meaningful results obtained (Leung & Bond, 2009), social complexity and fate control have shown marginal reliability in some of the cultural groups studied. One primary goal of the present research is to improve the reliability of the five axiom dimensions by generating new items based on the construct definitions of the axiom dimensions from diverse cultural perspectives.

This approach to scale development can be tedious and time-consuming, but the iterative approach employed in the present research can expedite the process. In essence, this process involves integrating the input from collaborators with diverse cultural backgrounds in an iterative manner. For our research, a large number of new items were first generated by the collaborators based on the construct definitions of the axiom dimensions (Burisch, 1984; Wiggins, 1973). The first and third authors then consolidated the items and produced a set of non-redundant, culturally wide-ranging items for the collaborators to choose from and

comment on. Based on the input received, the first and third authors further improved the wording of some items and finalized the scale for administration.

Despite the meticulous procedure followed in Study 1, the effort was not entirely successful, as the reliability for social complexity and fate control, while improved, was still marginal. In retrospect, the problem lies in the relatively broad construct definitions of these two dimensions vis-à-vis the other three dimensions. We conclude that clear, precise construct definitions are crucial for the deductive, culturally decentered approach to work.

Guided by a better understanding of the characteristics of the items that define social complexity and fate control, new items were generated with a simplified iterative procedure. In this procedure, the first and second authors generated the new items, and with input from a subset of the collaborators, finalized the new items for administration. Although we only gathered data in two cultural groups, the results suggest considerable improvement in the reliability of these two axiom dimensions. The simplified iterative procedure proves useful if there is already considerable knowledge about the constructs under investigation. In other words, this simplified procedure should not replace the full-fledged iterative procedure adopted in Study 1 in the initial attempt to construct a culturally decentered scale.

Social Axioms and Personality

Across the two studies, the axiom dimensions show interpretable and differentiated relationships with the Big-Five personality factors. In general, social cynicism is positively related to neuroticism, and negatively related to agreeableness and extraversion. Reward for application is positively related to conscientiousness and agreeableness. Social complexity is positively related to intellect, and religiosity is positive related to agreeableness. Finally, fate determinism is positively related to neuroticism, but this finding has to be replicated in future research because it is not examined in Study 1.

It is important to note that the correlations between axioms and the Big-Five personality factors rarely exceed .30 across the societies studied. In a similar vein, Leung and colleagues (2007) found that axioms and values generally correlate at a low level. Thus, axioms as a type of individual difference variable are distinct from, but related to the Big-Five personality factors and values. Social axioms represent beliefs about the world and may be regarded as worldviews, whereas values and the Big-Five personality factors are concerned with self-views (Chen, Wu, & Bond, 2009), and may provide one way to introduce a measure of the situation into social psychology (Bond & Leung, 2009).

Our findings open up a new line of enquiry linking personality and social axioms. Personality refers to stable affective, cognitive, and behavioral orientations, and considerable research has investigated the origin of personality (e.g., Shiner, Masten, & Tellegen, 2002). A recent development on the origin of personality has examined the relationship of culture and personality profiles (e.g., Allik & McCrae, 2004; McCrae, 2002). A number of mechanisms have been proposed to account for why cultural groups show stable and distinct personality profiles, ranging from ecological variables such as climate, genetic variables, to social variables, such as socialization practices. Our research adds to this development by highlighting a social axiom perspective that calls for the examination of linkages between social axioms and personality dimensions, and whether social axioms may be antecedents of personality orientations.

Temporal Stability of Axioms at Individual and Cultural Levels

Study 1 shows that social axioms are quite stable across the eight year span studied. This finding is at the societal level, and does not preclude the possibility that some individuals in a society may show large temporal shifts in social axioms because of their particular life experiences, such as unexpected unemployment. Nonetheless, the endorsement of social

axioms at the societal level is stable, as the correlations between axiom scores across the eight year span is large, with a mean of .75. In contrast, Leung et al. (2010) measured social cynicism among a group of working adults in Shanghai three times in a year, with two six-month gaps in between. The correlations for social cynicism across two time periods are found to be much smaller ($r < .40$).

Because of the dearth of relevant research, we cannot be certain that axioms are more stable at the societal level than at the individual level. We argue that only significant societal changes that rock and challenge the assumptions and beliefs of people can result in major changes in social axioms (Li & Leung, in press). In the absence of societal changes, social axioms are quite stable at the societal level and serve as collective guides for socio-cultural practices and individual behaviors. Individual temporal fluctuation in the endorsement of social axioms within a society may behave like random errors and cancel each out, making the endorsement of social axioms at the societal level stable. We propose that together with values, social axioms are important building blocks of theoretical frameworks that account for societal stability and change overtime. A productive research avenue is to explore the relationship of societal events and change of social axioms at the societal level.

Future Research Directions and Conclusion

While the results reported in the two studies are generally meaningful and coherent, there are several limitations and issues that need to be addressed in future research. First, university students were studied, which limits the generalizability of the results. Future studies need to extend the research to the general population.

Second, although the items are generated by collaborators with diverse cultural backgrounds, we have obviously not covered all the cultures in the world. Some items may not perform well in cultural settings not evaluated in our research, and this concern may be

more salient for social complexity and fate control, as the revised scales were only examined in Hong Kong and the U.S.A. Further research is needed to cover a larger set of cultures. A related issue is that the present research is concerned with structural equivalence across cultures, but not with scalar equivalence. Comparing cultures on their mean endorsement on axiom dimensions must be conducted with caution.

Third, the Big-Five personality factors were used to provide some initial evidence for the validity of SAS II. Although many studies have provided empirical and theoretical support for the social axiom framework (Leung & Bond, 2009), more research is needed to explore the nomological network of the axiom dimensions as measured by SAS II. A related issue that is a short form of the big five measure was used, and our results need to be replicated with a long version in future research.

Fourth, Study 2 shows that fate control is made up of two related facets, fate determinism and fate alterability, in Hong Kong and the U.S.A. It is unclear what determines the emergence of these two facets. Moreover, we are also cautious about the generalization of the 6-factor solution to other cultural groups. It is also not clear how these two facets operate. We speculate that fate determinism may be more related to negative psychological/social functioning, and fate alterability more related to positive psychological/social functioning. This reasoning may explain why people high on fate control may simultaneously show positive and negative functioning. For instance, fate control is related to stress (Kuo et al., 2006), but also to high academic achievement (Zhou et al., 2009). This possibility stands in stark contrast to the findings based on locus of control, which show that internals generally exhibit more positive psychological functioning than externals (e.g., Chan, 1989; Van Haafden, Yu, & Van de Vijver, 2004). Much remains to be learned about fate control and its two facets in future research.

Finally, many real-life situations do not allow the administration of a long questionnaire. The reliability of the short forms of SAS II, with eight items per scale, is generally acceptable. More importantly, the correlations between the short forms and long forms are very high ($r > .80$). Nonetheless, the validity of the short forms needs to be evaluated systematically in future research.

In conclusion, based on a deductive, culturally decentered approach, new items were generated to improve the reliability of the Social Axioms Survey. In two studies, results from diverse cultural contexts show that SAS II is more reliable than the original SAS. The axiom dimensions as measured by SAS II show meaningful and differentiated relationships with the Big-Five personality factors, which provide some initial evidence for the validity of SAS II.

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Footnote

¹Regression analyses were also conducted to test the associations after controlling for age and gender of participants. However, since the results were similar, for simplicity, only correlations results were presented.

²The 5-factor CFA results for the 97 items were $\chi^2 (1,264, N = 259) = 2,350, p < .001, \chi^2/df = 1.86, SRMR = .078, RMSEA = .064, NNFI = .82, IFI = .83, CFI = .83.$

Table 1

Sample Characteristics and Recruitment Procedures – Study 1

Country	Sample			Questionnaire		Administration
	size	Male	Female	language	Sampling	setting
Brazil	163	86	77	Portuguese	Subject pool	Individual
China	169	79	88	Chinese	Subject pool	Group
Germany	211	60	151	German	Subject pool	Group
Ghana	288	128	160	English	Subject pool	Group
Israel	152	77	74	Hebrew	Subject pool	Group
				Bahasa		
Malaysia	212	106	106	Malay	Subject pool	Group
Mexico	93	20	73	Spanish	Subject pool	Group
Norway	204	45	130	Norwegian	Subject pool	Group
Russia	159	76	83	Russian	Subject pool	Group
South Africa	196	92	99	English	Random sampling	Group
U.S.A.	199	95	103	English	Subject pool	Group
						Individual and
International	171	91	79	English	Subject pool	Group

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Table 2

Different Versions of Social Axioms Survey II

Axiom	125-item version – Study 1			83-item version – Study 1			105-item version – Study 2			97-item version – Study 2		
	Old ^a	New	Total	Old ^a	New	Total	Old ^b	New	Total	Old ^b	New	Total
Social cynicism	11	21	32	11	9	20	20	0	20	20	0	20
Reward for application	9	17	26	9	8	17	17	0	17	17	0	17
Social complexity	6	18	24	6	12	18	18	9	27	18	5	23
Fate control	6	13	19	6	5	11	11	13	24	11	9	20
Religiosity	7	17	24	7	10	17	17	0	17	17	0	17
Total	39	86	125	39	44	83	83	22	105	83	14	97

^aThe number represents the number of items from the 39-item SAS, which is the same for all versions.

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^bThe number represents the number of items from the 83-item version, which is the same for the 105-item and 97-item versions.

Table 3

Factor Loadings and Item Descriptions of the 83-item version – Study 1

Item	Factor			
	Social cynicism	Reward for application	Social complexity	Fate contro l Religiosity
Opportunities for people to get wealthy promote dishonesty.	.50			
Kind-hearted people usually suffer losses.	.50			
People who become rich and successful forget the people who helped them along the way.	.49			
People create hurdles to prevent others from succeeding.	.47			
People dislike others who succeed in life.	.46			
Kind-hearted people are easily bullied.	.46			
Powerful people tend to exploit others.	.46			
The only way to get ahead is to take advantage of others.	.45			
People enjoy watching others fight among themselves.	.42			
Power and status make people arrogant.	.42			
Good connections with people in power are more important than hard work.	.41			
People always expect something in return for a favor.	.40			
Praise is just a sweet way for people to get what they want from others.	.40			
Young people are impulsive and unreliable.	.36			

To care about societal affairs only brings trouble for yourself.	.36
Old people are usually stubborn and biased.	.36
It is rare to see a happy ending in real life.	.36
The various social institutions in society are biased towards the rich.	.32
People deeply in love are usually blind.	.28
People will stop working hard after they secure a comfortable life.	.16
Endurance and determination are key to achieving goals.	.60
Difficult problems can be overcome by hard work and persistence.	.56
Hard working people will achieve more in the end.	.55
Success requires strong willpower.	.55
Hard-working people are well rewarded.	.51
One will succeed if he/she really tries.	.46
Adversity can be overcome by effort.	.44
Building the way step by step leads to success.	.44
Knowledge is necessary for success.	.41
One gets from life as much as one puts into it.	.41
Every problem has a solution.	.37
Competition brings about progress.	.35
Failures can make people wiser.	.33
Caution helps avoid mistakes.	.32

Failure is the beginning of success.	.31
Opportunities only present themselves to those who are seeking them.	.30
One who does not know how to plan his or her future will eventually fail.	.24
A person's behavior is influenced by many factors.	.56
People may have opposite behaviors on different occasions.	.55
Human behavior changes with the social context.	.48
Every person is unique.	.44
One has to deal with matters according to the specific circumstances.	.43
A bad situation can suddenly change for the better.	.39
Different versions of the same reality can all be true.	.39
One's behaviors may be contrary to his or her true feelings.	.38
People with different opinions can all be correct.	.36
Many issues appear far more complicated than they really are.	.33
People can suddenly lose everything they have.	.31
There is usually only one way to solve a problem.(R)	.29
Being flexible in life is the key to happiness.	.29

**Flexibility has nothing to do with
success.(R)**

.27

**A person is either good or evil, and
circumstances have nothing to do with
it.(R)**

.25

**A person can change drastically in a short
time.**

.24

**A person changes little over the course of
his or her life.(R)**

.23

Current losses are not necessarily bad for
one's long-term future.

.20

Fate determines a person's success in life.

.66

Fate determines one's successes and failures.

.65

**The people whom a person will love in his
or her life is determined by fate.**

.53

**Fate has nothing to do with the tragedies of
life.(R)**

.46

Some people are born lucky.

.40

Good luck follows if one survives a disaster.

.38

Individual characteristics, such as appearance
and birthday, affect one's fate.

.31

There are many ways for people to predict
what will happen in the future.

.28

There are certain ways to help us improve our
luck and avoid unlucky things.

.24

Fortune comes when you least expect it.

.23

Most disasters can be predicted.

.17

Belief in a religion helps one understand the
meaning of life.

.67

Religion helps people make good choices for their lives.	.66
Religious faith contributes to good mental health.	.65
Religion slows down human progress.(R)	.59
There is a supreme being controlling the universe.	.56
Religion makes people healthier.	.56
Religion makes people happier.	.54
Belief in a religion makes people good citizens.	.53
Religious practice makes it harder for people to think independently.(R)	.52
Only weak people need religion.(R)	.52
Religion makes people escape from reality.(R)	.51
Practicing a religion unites people with others.	.48
Religious people are more likely to maintain moral standards.	.47
Religious beliefs lead to unscientific thinking.(R)	.46
Ignorance leads people to believe in a supreme being.(R)	.46
Evidence of a supreme being is everywhere for those who seek its signs.	.44
Religion contradicts science.(R)	.42

Note. Factor loadings are based on standardized estimates from a confirmatory factor analysis. The newly added items are bold-faced. Reversed items are indicated by (R), and they are recoded so that all loadings

are positive in sign.

Table 4

Results for Procrustes Rotation – Study 1

Country	Social cynicism	Reward for application	Social complexity	Fate control	Religiosity
Brazil	0.96	0.83	0.88	0.81	0.94
China	0.86	0.89	0.88	0.75	0.86
Germany	0.92	0.94	0.87	0.88	0.95
Ghana	0.91	0.90	0.80	0.80	0.85
Israel	0.90	0.91	0.84	0.86	0.93
Malaysia	0.87	0.89	0.80	0.61	0.87
Mexico	0.89	0.67	0.78	0.80	0.82
Norway	0.92	0.80	0.77	0.83	0.95
Russia	0.83	0.69	0.79	0.45	0.90
South Africa	0.95	0.92	0.90	0.86	0.96
U.S.A.	0.94	0.93	0.91	0.88	0.96
<i>Average</i>	0.90	0.85	0.84	0.78	0.91

Table 5

Reliability Coefficients and Means – Study 1

Country	Social cynicism		Reward for application		Social complexity		Fate control		Religiosity	
	α	M	α	M	α	M	α	M	α	M
Brazil	.80	2.69	.69	4.01	.65	3.83	.67	2.65	.88	3.29
China	.71	2.85	.80	3.60	.82	3.79	.61	2.92	.80	3.20
Germany	.80	2.83	.80	3.61	.73	4.02	.69	2.67	.87	3.10
Ghana	.73	2.95	.75	4.00	.62	3.76	.63	2.94	.70	3.63
Israel	.82	2.71	.75	3.70	.61	4.01	.72	2.61	.90	2.99
Malaysia	.80	2.96	.86	4.22	.61	3.69	.60	3.11	.87	4.00
Mexico	.80	2.66	.81	3.89	.75	3.80	.74	2.68	.80	3.37
Norway	.81	2.60	.68	3.68	.56	3.89	.68	2.53	.87	2.93
Russia	.78	2.84	.73	3.72	.75	3.85	.61	2.93	.88	3.30
South Africa	.82	2.84	.81	3.89	.65	3.92	.68	2.66	.91	3.35
U.S.A.	.79	2.69	.76	3.85	.73	3.87	.69	2.69	.90	3.38
<i>Average</i>	.79	2.78	.77	3.83	.68	3.86	.67	2.76	.85	3.32

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Table 6

Bivariate Correlations between Social Axioms and Personality Dimensions – Study 1

Country	Social cynicism			Reward for application			Social complexity		Religiosity	Fate control
	Neuroticism	Agreeableness	Extraversion	Conscientiousness	Agreeableness	Extraversion	Intellect	Neuroticism	Agreeableness	Extraversion
Brazil	.21***	-.21***	.06	.16**	.14*	.11†	.20***	.06	.23***	.07
China	.21***	-.23***	.11†	.18**	.15*	-.02	.33***	.11†	.12†	.05
Germany	.23***	-.18***	-.07	.26***	.02	.16**	.35***	.13*	.18**	-.08
Ghana	.08†	-.04	.02	.23***	.15**	.05	.19***	-.09†	.22***	-.02
Malaysia	-.05	-.15**	-.04	.21***	.26***	-.01	.29***	.21***	.25***	.14*
Mexico	.19*	-.26**	-.21**	.08	.29***	.06	.25**	.11	.30***	.09
Norway	.28***	-.35***	-.16**	.17**	.13*	.06	.09†	.01	.12†	.03
Russia	.12†	-.01	-.17**	.12†	.39***	.13†	.26***	-.04	.23***	.02

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South Africa	.11†	-.23***	-.15**	.18**	.08	.03	.18**	.13*	.20***	.02
U.S.A.	.33***	.01	-.10†	.19***	.22**	.14*	.18**	.07	.10	.05
International	.22***	-.18**	-.07	.21***	.16**	-.02	.37***	.01	-.01	-.10†
<i>Average</i>	.18	-.17	-.13	.18	.18	.06	.25	.06	.18	.02

Note. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$; all one-tailed tests.

Table 7

Bivariate Correlations between the Short and Long Versions – Study 1

Country	Social cynicism	Reward for application	Religiosity
Brazil	.90/.81 (.85)	.87/.68 (.61)	.93/.83 (.85)
China	.87/.73 (.75)	.87/.72 (.72)	.88/.69 (.75)
Germany	.91/.82 (.80)	.91/.76 (.79)	.91/.82 (.80)
Ghana	.87/.74 (.62)	.90/.78 (.69)	.83/.61 (.62)
Israel	.93/.86 (.85)	.89/.71 (.75)	.93/.85 (.85)
Malaysia	.93/.86 (.83)	.93/.85 (.81)	.92/.83 (.83)
Mexico	.89/.78 (.78)	.90/.78 (.75)	.91/.75 (.78)
Norway	.91/.82 (.82)	.84/.57 (.72)	.92/.81 (.82)
Russia	.90/.81 (.82)	.89/.71 (.73)	.92/.82 (.82)
South Africa	.88/.79 (.88)	.90/.76 (.79)	.94/.85 (.88)
U.S.A.	.89/.80 (.86)	.87/.73 (.74)	.95/.88 (.86)
International	.89/.79 (.87)	.93/.84 (.80)	.96/.91 (.87)
<i>Average</i>	.90/.80 (.81)	.89/.74 (.74)	.92/.80 (.81)

Note. All correlations are significant at the .05 level. Correlations between the short and long versions are reported first, followed by correlations between the short version and the remaining items, and by Alpha coefficients of the short forms given in parentheses. The short forms for social complexity and fate control are reported in Table 11.

Table 8
Factor Loadings and Item Descriptions of the 97-item version – Study 2

Item	Social complexity	Factor	
		Fate determinism	Fate alterability
People may have opposite behaviors on different occasions.	0.55		
A person's behavior is influenced by many factors.	0.47		
One has to deal with matters according to the specific circumstances.	0.47		
People with different opinions can all be correct.	0.45		
A bad situation can suddenly change for the better.	0.43		
There is usually more than one good way to handle a situation.	0.42		
Many issues appear far more complicated than they really are.	0.40		
People can suddenly lose everything they have.	0.40		
One's behaviors may be contrary to his or her true feelings.	0.39		
There is usually only one way to solve a problem.(R)	0.38		
People may behave unpredictably.	0.37		
A person can change drastically in a short time.	0.36		
There are many equally good ways to deal with a problem.	0.36		
Human behavior changes with the social context.	0.36		

A situation can change drastically in an unexpected direction.	0.34
A person is either good or evil, and circumstances have nothing to do with it.(R)	0.31
Different versions of the same reality can all be true.	0.28
Flexibility has nothing to do with success.(R)	0.28
People act more or less the same way regardless of the people they interact with. (R)	0.28
A person changes little over the course of his or her life.(R)	0.27
Every person is unique.	0.18
Current losses are not necessarily bad for one's long-term future.	0.14
Being flexible in life is the key to happiness.	0.08 ^a
Fate determines one's successes and failures.	0.71
Fate determines a person's success in life.	0.69
Matters of life and death are determined by fate.	0.69
The people whom a person will love in his or her life is determined by fate.	0.61
Major events in life have nothing to do with fate. (R)	0.56
People's wealth is determined by fate.	0.54
Fate has nothing to do with the tragedies of life.(R)	0.53
Some people are born lucky.	0.46

Fortune comes when you least expect it.	0.30
Luck can be enhanced by certain tactics.	0.73
Individual characteristics, such as appearance and birthday, can reveal one's fate.	0.67
There are ways for people to find out about their fate.	0.65
There are certain ways for people to improve their destiny.	0.63
Individual characteristics, such as appearance and birthday, affect one's fate.	0.62
There are certain ways to help us improve our luck and avoid unlucky things.	0.59
Major events in people's life can be predicted.	0.51
There are many ways for people to predict what will happen in the future.	0.50
It is impossible to read one's destiny. (R)	0.48
Most disasters can be predicted.	0.40
Good luck follows if one survives a disaster.	0.27

Note. Factor loadings are based on standardized estimates from the confirmatory factor analysis. Only results for social complexity, fate determinism, and fate alterability are presented. The newly added items are bold-faced. Reversed items are indicated by (R), and are recoded so that all loadings are positive in sign.

^anot significant at the .05 level.

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Table 9

Results for Procrustes Rotation, Reliability Coefficients and Means – Study 2

Culture	Social cynicism			Reward for application			Social complexity			Fate control			Fate determinism			Fate alterability			Religiosity		
	phi	α	<i>M</i>	phi	α	<i>M</i>	phi	α	<i>M</i>	phi	α	<i>M</i>	phi	α	<i>M</i>	phi	α	<i>M</i>	phi	α	<i>M</i>
Hong Kong	.92	.83	3.13	.95	.80	3.84	.90	.70	4.05	-	.86	3.12	.85	.81	3.19	.95	.84	3.06	.95	.89	3.39
U.S.A.	.93	.82	2.70	.87	.75	3.86	.89	.77	3.97	-	.87	2.39	.86	.81	2.49	.92	.80	2.33	.95	.92	3.29
<i>Average</i>	.93	.83	2.92	.91	.78	3.85	.90	.74	4.01	-	.86	2.76	.86	.81	2.84	.94	.82	2.70	.95	.91	3.34

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Table 10

Bivariate Correlations between Social Axioms and Personality Dimensions – Study 2

	Social cynicism			Reward for application			Social complexity	Religiosity	Fate control	Fate determinism	Fate alterability	
Culture	Neuroticism	Agreeableness	Extraversion	Conscientiousness	Agreeableness	Extraversion	Neuroticism	Intellect	Agreeableness	Extraversion	Extraversion	Extraversion
Hong Kong	.25**	-.24**	-.02	.44***	.22**	.06	.22**	.15*	.21**	.10	.07	.09
U.S.A.	.11	-.39***	-.16*	.08	.04	.05	-.08	.11	.06	.03	-.00	.06
<i>Average</i>	.18	-.32	-.09	.26	.13	.06	.07	.13	.14	.07	.04	.08

Note. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$; all one-tailed tests.

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Table 11

Bivariate Correlations between the Short and Long Versions of Social Complexity ad Fate Control – Study 2

Culture	Social complexity	Fate control	Fate determinism	Fate alterability
Hong Kong	.84/.75 (.58)	.94/.88 (.77)	.90/.76 (.76)	.93/.88 (.80)
U.S.A.	.86/.77 (.71)	.92/.86 (.80)	.91/.79 (.80)	.91/.84 (.69)
<i>Average</i>	.85/.76 (.64)	.93/.87 (.79)	.91/.77 (.78)	.92/.86 (.75)

Note. All correlations are significant at the .05 level. Correlations between the short and long versions are reported first, followed by correlations between the short version and the remaining items, and by alpha coefficients of the short forms given in parentheses.