

## **Developing and Evaluating the Social Axioms Survey in Eleven Countries : Its Relationship With the Five-Factor Model of Personality**

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# Developing and Evaluating the Social Axioms Survey in Eleven Countries: 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, which measures individuals' general beliefs about the world. In Study 1, results from 11 countries support the original five-factor structure

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and achieve higher reliability for the axiom dimensions as measured by the new scale. Moreover, moderate but meaningful associations between axiom and Big-Five personality dimensions were found. Temporal change of social axioms at the culture level was examined and found to be moderate. In Study 2, additional new items were generated for social complexity and fate control, then assessed in Hong Kong and the United States. Reliability was further improved for both dimensions. Additionally, two subfactors of fate control were identified: fate determinism and fate alterability. Fate determinism, but not fate alterability, related positively to neuroticism. Other relationships between axiom and personality dimensions 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. This research thus provides a stronger foundation for applying the construct of social axioms around the world.

### Keywords

values, attitudes, beliefs, personality, social cognition

“Truths on one side of the Pyrennes  
Are falsehoods on the other.”

Pascal, *Pensees*

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.

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 United States, Japan, and Germany. In a subsequent study involving 40 cultural groups (Leung & Bond, 2004), the same five factors emerged in an exploratory factor analysis that did not assume any a priori structure. 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* asserts that human nature and the social world yield negative outcomes; *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* asserts 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 religious practice.

At the culture level, average axiom scores characterizing cultural groups (i.e., their citizens' scores) reveal many meaningful relationships with various societal variables. For instance, Leung and Bond (2004) found that social cynicism is related to lower life satisfaction, that social complexity is related to a 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 United States, social complexity correlated positively with cognitive flexibility. Safdar, Lewis, and Daneshpour (2006) found that religiosity correlated positively with various indicators of well-being among Iranian immigrants in Canada. Fu et al. (2004) found that across several cultural groups, reward for application was related to the rated effectiveness of 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, see Leung & Bond, 2004, 2009).

The distinctiveness of the social axiom construct has been consistently demonstrated. Social axioms show predictable but low correlations with values (Leung, Au, Huang, Kurman, Niit, & Niit, 2007) and with other well-established personality dimensions (e.g., Chen, Bond, & Cheung, 2006; Chen, Fok, Bond, & Matsumoto, 2006). Social axioms can therefore complement these well-known individual difference constructs for a better understanding and prediction of individual behaviors within and 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 including items from diverse sources and submitting the data collected to exploratory factor analysis. The five dimensions of 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, with their average alphas below .60 across the societies studied. Although an alpha of .50 to .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 measuring social axioms more reliably are noteworthy. First, by now there is sufficient research on, and theoretical understanding of, the axiom constructs (Leung & Bond, 2009) to permit the adoption of a deductive approach (Burisch, 1984; Wiggins, 1973). In this approach, items are developed based on construct definitions and are then subjected to

empirical scrutiny so that the best items can be selected. Many well-known scales, such as the Self-Construal Scale (Singelis, 1994), have been developed with a deductive approach.

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 are developed in the West 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 are more comprehensively covered. Furthermore, a multicultural assessment during scale development can eliminate items that are suboptimal for some cultural groups. Good examples of this approach include the value survey developed by Schwartz (1992) and the GLOBE project for measuring cultural dimensions (House et al., 2004).

The development of the new version of Social Axioms Survey (SAS II) follows the culturally decentered approach. Psychologists from 10 countries were involved in generating pan-cultural items to measure the five axiom dimensions, and data from 11 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 personality factors to help elucidate the meanings of the five social axioms. Five broad personality dimensions have been validated across cultures: 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 nonsignificant correlation ( $r = .15$ ) between religiosity and agreeableness was found; and no significant correlations were 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 diligent self-application. 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 and explore their world intellectually. 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, leading to lower assurance 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 a significant positive relationship at the societal level based on 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.

We have no basis for predicting how fate control predicts a person's position on the Big Five, but suspect that the resignation involved in a fatalistic worldview may associate with neuroticism. Furthermore, 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. Our research provides a more definitive evaluation of the relationship between fate control and personality dimensions.

### *The Stability of Social Axioms in Societies*

The data based on SAS (Leung & Bond, 2004) were collected about 8 years before the current data collection, making it possible 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.

A few studies provide indirect support for the above conjecture. Leung, Hui, and Bond (2007) found in Hong Kong that the average test-retest reliability of social axioms was .74, a level comparable to that of personality measures (Bazana & Stelmack, 2004). Boehnke (2009) studied intergenerational transmission of axioms among university students in Germany. When mean scores of students were compared with those of their parents, the differences were not large (less than .30 on a 5-point scale), except for fate control (.39 for student and mother, and .50 for student and father). In a similar vein, Ocejja (2009) found that the differences between Spanish students and parents were not large (less than .30 on a 5-point scale), with the exception of social complexity (.44). Both studies suggest that social axioms are 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 deductive, 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 I**

### *Method*

**Participants.** Psychologists from 10 countries were involved in developing the new items: Brazilian, Chinese, German, Ghanaian, Israeli, Japanese, Malaysian, Mexican, Russian, and American. These countries are diverse with regard to traditional culture, religion, socioeconomic development, and political systems, thus facilitating the development of culturally comprehensive and balanced items for the new scale.

In the data collection phase, Norway and South Africa were included because data collection was possible, but Japan was excluded because it was difficult to collect data in that specified time period. All participants were university students. Twenty-four participants were discarded because of large missing values (> 10% of the items) or problematic response sets, resulting in a final sample of 2,217 respondents from 11 cultural groups.

To cross-validate the results from these samples, data were also collected in a private university in Germany that catered mostly to 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.

## Measures

**Social axioms.** Based on the meaning of the five axiom dimensions (Leung & Bond, 2004), new items were developed. The 39 pancultural items defining the five axiom dimensions in SAS were used as a reference. Collaborators from the 10 participating countries generated 15 to 20 new items in both their native languages and English for each axiom dimension, resulting in 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 with the following criteria: (1) They capture the meaning of the axiom dimensions; (2) they differ from the existing items; (3) their content is clear and understandable from their cultural perspectives; and (4) they are easy to translate. They then identified good items based on these criteria, 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 further polished by the first and third authors for greater understandability.

The 143 new items were added to the existing 39 pancultural items for a pilot study with a sample of 39 American university students, with the aim to reduce the length of the survey. We dropped items with low item-total correlations because they were not reliable in a major country. A reasonably large number of items were retained in the final version, which included 125 items, with 86 new items and the 39 original items. The items were rated on 5-point Likert scales, with ends labeled as *strongly disbelieve* and *strongly believe*. Their reliabilities are reported in the Results section.

**Big-Five personality.** 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), which shows acceptable psychometric properties across studies (Donnellan et al., 2006).

Each personality factor was measured by four items. Respondents rated each personality description on a 5-point Likert-type 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, which are acceptable, given that there are only four items in each scale.

**Procedure.** Participants were mainly recruited from subject pools for course credit. The procedure of back translation was followed to translate the instruments into local languages if needed. 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, except the Israelis. Demographic information, such as age, gender, and ethnicity, was collected. Details of the sample characteristics and recruitment procedures are summarized in Table 1.

**Table 1.** Sample Characteristics and Recruitment Procedures—Study I

Country	Sample Size	Male	Female	Questionnaire Language	Sampling	Administration 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
Malaysia	212	106	106	Bahasa 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
United States	199	95	103	English	Subject pool	Group
International	171	91	79	English	Subject pool	Individual and group

## Results

**Item selection.** In each cultural group, reliable items were first selected to enhance the internal consistency of each axiom dimension based on item-total correlations. Items that showed negative or low item-total correlations were dropped. This procedure had the benefit of reducing the number of items for subsequent confirmatory factor analysis to avoid an overly complex factor model.

The 39 pan-cultural items identified in Leung and Bond (2004) were used as anchors, because they had previously been established with 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. Using this optimization procedure, 83 items, 44 of them new, were finally included for further analysis. Each axiom dimension comprised at least eight new items except for fate control, which contained only five.

**Confirmatory factor analysis.** Confirmatory factor analysis (CFA) was conducted to evaluate the fit of the five-factor structure (Leung & Bond, 2009) using LISREL 8.80 (Jöreskog & Sörbom, 2006). 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 the 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 (see Table 2). Given the very complex model fitted, the CFA results, especially SRMR and RMSEA, suggested a reasonably good fit (Bentler & Bonett, 1980; Hu & Bentler, 1998). 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 low (mean  $r = .19$ ), except for the correlation between reward for application and social complexity ( $r = .52$ ).



**Table 2.** Factor Loadings and Item Descriptions of the 83-Item Version–Study I

Social cynicism	
<b>Opportunities for people to get wealthy promote dishonesty.</b>	.50
Kind-hearted people usually suffer losses.	.50
<b>People who become rich and successful forget the people who helped them along the way.</b>	.49
<b>People create hurdles to prevent others from succeeding.</b>	.47
<b>People dislike others who succeed in life.</b>	.46
Kind-hearted people are easily bullied.	.46
Powerful people tend to exploit others.	.46
<b>The only way to get ahead is to take advantage of others.</b>	.45
<b>People enjoy watching others fight among themselves.</b>	.42
Power and status make people arrogant.	.42
<b>Good connections with people in power are more important than hard work.</b>	.41
<b>People always expect something in return for a favor.</b>	.40
<b>Praise is just a sweet way for people to get what they want from others.</b>	.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 toward the rich.	.32
People deeply in love are usually blind.	.28
People will stop working hard after they secure a comfortable life.	.16
Reward for application	
<b>Endurance and determination are key to achieving goals.</b>	.60
<b>Difficult problems can be overcome by hard work and persistence.</b>	.56
Hard working people will achieve more in the end.	.55
<b>Success requires strong willpower.</b>	.55
<b>Hard-working people are well rewarded.</b>	.51
One will succeed if he/she really tries.	.46
Adversity can be overcome by effort.	.44
<b>Building the way step by step leads to success.</b>	.44
Knowledge is necessary for success.	.41
<b>One gets from life as much as one puts into it.</b>	.41
Every problem has a solution.	.37
Competition brings about progress.	.35
<b>Failures can make people wiser.</b>	.33
Caution helps avoid mistakes.	.32
Failure is the beginning of success.	.31
<b>Opportunities only present themselves to those who are seeking them.</b>	.30
One who does not know how to plan his or her future will eventually fail.	.24
Social complexity	
<b>A person's behavior is influenced by many factors.</b>	.56
People may have opposite behaviors on different occasions.	.55
Human behavior changes with the social context.	.48
<b>Every person is unique.</b>	.44
One has to deal with matters according to the specific circumstances.	.43
<b>A bad situation can suddenly change for the better.</b>	.39
<b>Different versions of the same reality can all be true.</b>	.39
One's behaviors may be contrary to his or her true feelings.	.38
<b>People with different opinions can all be correct.</b>	.36
<b>Many issues appear far more complicated than they really are.</b>	.33
<b>People can suddenly lose everything they have.</b>	.31

(continued)

Table 2. (continued)

There is usually only one way to solve a problem.(R)	.29
<b>Being flexible in life is the key to happiness.</b>	.29
<b>Flexibility has nothing to do with success.(R)</b>	.27
<b>A person is either good or evil, and circumstances have nothing to do with it.(R)</b>	.25
<b>A person can change drastically in a short time.</b>	.24
<b>A person changes little over the course of his or her life.(R)</b>	.23
Current losses are not necessarily bad for one's long-term future.	.20
Fate control	
<b>Fate determines a person's success in life.</b>	.66
Fate determines one's successes and failures.	.65
<b>The people whom a person will love in his or her life are determined by fate.</b>	.53
<b>Fate has nothing to do with the tragedies of life.(R)</b>	.46
<b>Some people are born lucky.</b>	.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
<b>Fortune comes when you least expect it.</b>	.23
Most disasters can be predicted.	.17
Religiosity	
Belief in a religion helps one understand the meaning of life.	.67
<b>Religion helps people make good choices for their lives.</b>	.66
Religious faith contributes to good mental health.	.65
<b>Religion slows down human progress.(R)</b>	.59
There is a supreme being controlling the universe.	.56
<b>Religion makes people healthier.</b>	.56
<b>Religion makes people happier.</b>	.54
Belief in a religion makes people good citizens.	.53
<b>Religious practice makes it harder for people to think independently.(R)</b>	.52
<b>Only weak people need religion.(R)</b>	.52
Religion makes people escape from reality.(R)	.51
<b>Practicing a religion unites people with others.</b>	.48
Religious people are more likely to maintain moral standards.	.47
Religious beliefs lead to unscientific thinking.(R)	.46
<b>Ignorance leads people to believe in a supreme being.(R)</b>	.46
<b>Evidence of a supreme being is everywhere for those who seek its signs.</b>	.44
<b>Religion contradicts science.(R)</b>	.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 direction.

*Procrustes rotation.* Procrustes rotation was also performed to check the similarity between the factor structure of each cultural group and the common factor structure described above. The 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; van de Vijver and Poortinga (1994) proposed a cutoff value of .90, while Ten Berge (1986) suggested a lower value of .85.

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 did not meet the criterion

**Table 3.** Results for Procrustes Rotation, Reliabilities, and Means—Study I

Country	Social Cynicism			Reward for Application			Social Complexity			Fate Control			Religiosity		
	phi	$\alpha$	M	phi	$\alpha$	M	phi	$\alpha$	M	phi	$\alpha$	M	phi	$\alpha$	M
Brazil	0.96	.80	2.69	0.83	.69	4.01	0.88	.65	3.83	0.81	.67	2.65	0.94	.88	3.29
China	0.86	.71	2.85	0.89	.80	3.60	0.88	.82	3.79	0.75	.61	2.92	0.86	.80	3.20
Germany	0.92	.80	2.83	0.94	.80	3.61	0.87	.73	4.02	0.88	.69	2.67	0.95	.87	3.10
Ghana	0.91	.73	2.95	0.90	.75	4.00	0.80	.62	3.76	0.80	.63	2.94	0.85	.70	3.63
Israel	0.90	.82	2.71	0.91	.75	3.70	0.84	.61	4.01	0.86	.72	2.61	0.93	.90	2.99
Malaysia	0.87	.80	2.96	0.89	.86	4.22	0.80	.61	3.69	0.61	.60	3.11	0.87	.87	4.00
Mexico	0.89	.80	2.66	0.67	.81	3.89	0.78	.75	3.80	0.80	.74	2.68	0.82	.80	3.37
Norway	0.92	.81	2.60	0.80	.68	3.68	0.77	.56	3.89	0.83	.68	2.53	0.95	.87	2.93
Russia	0.83	.78	2.84	0.69	.73	3.72	0.79	.75	3.85	0.45	.61	2.93	0.90	.88	3.30
South Africa	0.95	.82	2.84	0.92	.81	3.89	0.90	.65	3.92	0.86	.68	2.66	0.96	.91	3.35
United States	0.94	.79	2.69	0.93	.76	3.85	0.91	.73	3.87	0.88	.69	2.69	0.96	.90	3.38
Average	0.90	.79	2.78	0.85	.77	3.83	0.84	.68	3.86	0.78	.67	2.76	0.91	.85	3.32

of .85 (average phi = .78), 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 (see Table 3 for details).

**Reliability analysis.** We computed Cronbach alphas for each dimension (see Table 3). For social cynicism (20 items), the reliability coefficients for all 11 cultural groups were higher than .70 (mean  $\alpha$  = .79). For reward for application (17 items), all the alphas were higher than or close to .70 (mean  $\alpha$  = .77). For social complexity (18 items), four alphas were below .65 (mean  $\alpha$  = .68). For fate control (11 items), again four alphas were below .65 (mean  $\alpha$  = .68). Finally, for religiosity (17 items), all alphas exceeded .70 (mean  $\alpha$  = .85). Thus, three axiom dimensions as measured by SAS II are internally consistent across cultures, but the reliabilities of social complexity and fate control, while improved, are still marginal.

**Cross-validation with a sample of German and international students.** The sample of 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 internal reliability 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 factors (see Table 4).<sup>1</sup> We looked for consistent patterns,

**Table 4.** Bivariate Correlations Between Social Axiom and Personality Dimensions—Study I

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		
South Africa	.11†	-.23***	-.15**	.18**	.08	.03	.18**	.13*	.20***	.02		
United States	.33***	.01	-.10†	.19***	.22**	.14*	.18**	.07	.10	.05		
International Average	.22***	-.18**	-.07	.21***	.16**	-.02	.37***	.01	-.01	-.10†		
	.18	-.17	-.13	.18	.18	.06	.25	.06	.18	.02		

†*p* < .10. \**p* < .05. \*\**p* < .01. \*\*\**p* < .001 (all one-tailed tests).

both in size and direction, from the correlation results. Social cynicism was significantly and positively correlated with neuroticism in 7 out of the 11 samples, significantly and negatively associated with agreeableness in 8 samples, and significantly and negatively correlated with extraversion in 4 samples, with only 3 other samples showing positive but nonsignificant correlations. All three predictions concerning social cynicism were thus generally supported and not significantly reversed in any cultural group.

Reward for application was significantly and positively related to conscientiousness and agreeableness in nine samples. In contrast to our expectation, reward for application showed a significant, positive correlation with extraversion in two samples only, with three other samples showing negative correlations. Thus, two of the three predictions concerning reward for application were generally supported.

Social complexity was significantly and positively associated with intellect in all samples, except Norway. Unexpectedly, only three samples demonstrated significant positive relationships between social complexity and neuroticism. Religiosity was significantly and positively related to agreeableness in seven samples. Finally, fate control was significantly related to extraversion in the Malaysian sample only. To sum up, among our nine predictions, seven were generally supported. The relationships ranged from small to moderate, with no correlation higher than .40.

*Change of axiom means over time.* To evaluate whether the endorsement of social axioms showed any noticeable change in the 8-year period, we calculated the correlations between the means computed from the present data and those reported in Leung and Bond (2004) using the 39 pancultural items. Eight cultural groups overlapped across the two data sets, namely, Brazil, China, Germany, Israel, Malaysia, Norway, Russia, and the United States. Both Pearson 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 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. Additionally, we computed the correlation between the short version and the excluded items for each dimension, using a Spearman-Brown correction. The average reliabilities of the short forms were good, except for social complexity and fate control. The correlations between the short and long versions ranged from .80 to .96 across the 12 samples. Furthermore, the short versions and the remaining items showed generally high correlations, with averages at .74 or higher. Table 5 presents the correlations between the short and long forms of the SAS II for social cynicism, reward for application, and religiosity. The corresponding correlations for the revised social complexity and fate control scales are reported in Study 2.

## 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 was generally supported. We note that the cross-cultural equivalence of the structure was 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

**Table 5.** Bivariate Correlations Between the Short and Long Versions—Study I

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)
United States	.89/.80 (.86)	.87/.73 (.74)	.95/.88 (.86)
International	.89/.79 (.87)	.93/.84 (.80)	.96/.91 (.87)
Average	.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 followed by correlations between the short version and the remaining items, and alpha coefficients of the short forms are given in parentheses.

variables. In addition, the 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 is based on a wide range of cultures and corroborates a similar conclusion reached by Chen, Fok et al. (2006) based on culture-specific data.

Specifically, social cynics are higher on neuroticism but lower on agreeableness and extraversion. These findings support the argument that a cynical, negativistic worldview is related to worry and anxiety and to 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 promoted by the orientation toward getting along with others and being responsible and dutiful. Social complexity is linked to intellect positively, supporting 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 of Leung and Bond (2004), religiosity is positively correlated with agreeableness. The belief in a supernatural being and the positive consequences of religious practices is linked to the orientation toward 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. Note that our account of the relationships is speculative and requires the scrutiny of future research.

Two predictions receive mixed support. Reward for application showed a significant, positive correlation with extraversion only in two samples. Only three samples show significant, positive relationships between social complexity and neuroticism. One explanation for these culturally

narrow 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 8-year span studied. While we recognize that a period of 8 years may not be long enough to detect significant cultural change, these results are at least consistent with the idea 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; Ocejja, 2009). In fact, Inglehart and Baker (2000) also concluded that although cultural values may change due to modernization, religious beliefs and spiritual values persist. Religions receive institutional protection in many societies (Pew Forum on Religion and Public Life, 2009), 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 proved to be problematic. To diagnose the problems, we scrutinized the items defining these two constructs carefully to identify their core characteristics, and we 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 latter aspect is small. Again, the newly added items expressing extreme beliefs tend not to fare well, and many such items were dropped.

A second study was thus conducted to generate new items for further improving the reliability of social complexity and fate control. A deductive approach was again adopted, using 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 United States, which represent two very different cultural contexts. Again, the five-factor model of personality was used to provide initial evidence for the validity of the axiom dimensions.

## Method

*Participants.* University students were recruited in Hong Kong ( $N = 129$ ) and the United States ( $N = 130$ ). 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 a 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 the SAS II. Collaborators from Japan, Brazil, the United States, 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 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. Again, a reasonably large number of items were retained, which included 105 items, with 9 and 13 new items for social complexity and fate control, correspondingly.

**Big-Five personality.** As in Study 1, the Mini-International Personality Item Pool (Mini-IPIP; Donnellan et al., 2006) was used. Acceptable internal consistency was obtained across the samples, average  $\alpha = .69$ .

**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 and given course credit. 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 needing 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 parcels in total). For social complexity and fate control, however, it was necessary to examine individual items to screen out problematic ones.

We tested the model with five axiom factors, and the model fit was moderate,  $\chi^2(1,700, N = 259) = 3,219, p < .001, \chi^2/df = 1.84, SRMR = .082, RMSEA = .068, NNFI = .80, IFI = .81, CFI = .81$ . An exploratory factor analysis, based on principal components analysis with varimax rotation, suggested that the two facets of fate control should be recognized. Recall that fate control involves the belief that events are influenced by fate, but that there are ways to predict and alter fate. We therefore categorized fate control items into two groups and labeled them as fate determinism and fate alterability. Note that many items in fate alterability are about predicting fate, and we argue that these predictions are typically for improving and hence altering fate. 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 ( $> .20$ ), resulting in 97 items for the final model.

We compared two alternative models: a five-factor model with two subfactors for fate control that formed a higher-order factor, and a six-factor model treating the two fate control facets as independent factors. The five-factor model yielded 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, but was similar to the model fit of the six-factor model,  $\chi^2(1,259, N = 259) = 2,078$ ,  $p < .001$ ,  $\chi^2/df = 1.65$ , SRMR = .073, RMSEA = .049, NNFI = .87, IFI = .88, CFI = .87. Nonetheless, we prefer the five-factor model because of our theorizing (see Table 6 for factor loadings).

Correlations among the five latent factors tended to be low (mean  $r = .15$ ), except for the correlations between reward for application and social complexity ( $r = .34$ ) and between religiosity and social cynicism ( $r = -.34$ ). Significant correlations were found between the two facets of fate control:  $r = .35$  and  $r = .58$  for Hong Kong and the United States, respectively.

Procrustes rotation was performed to check the similarity between the factor structure of each cultural group and the common factor structure. We evaluated a five-factor model, with fate control as a single factor measured by items from both facets, because we were not able to evaluate subfactors that form a higher-order factor in this procedure. 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 phis were larger than .85 (see Table 7 for results). We also evaluated a six-factor model, with the two facets of fate control as independent factors. The congruence coefficients of these two facets are reasonably high (phis  $\geq .85$ ).

The Cronbach alphas for the axiom dimensions were acceptable (see Table 7). 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. Thus, although fate control contains two facets, it is quite reliable as a global construct. The two facets of fate control also showed good reliability: .81 and .81 for fate determinism for Hong Kong and the United States, respectively, and .84 and .80 for fate alterability, respectively. We conclude that the current operationalizations of social complexity and now bi-faceted fate control attain a good level of reliability.

*Correlations with the Big-Five personality dimensions.* We examined the predicted relationships between axiom dimensions and the Big-Five personality factors based on bivariate correlations. Social cynicism was significantly and positively correlated with neuroticism in Hong Kong,  $r(127) = .25$ ,  $p < .01$ , and the correlation in the United States was in the same direction, but not significant,  $r(128) = .11$ , *ns*. Social cynicism was significantly and negatively associated with agreeableness for Hong Kong,  $r = -.24$ ,  $p < .01$ , and for the United States,  $r = -.39$ ,  $p < .001$ . Social cynicism was significantly and negatively correlated with extraversion in the United States,  $r(128) = -.16$ ,  $p < .05$ , and this correlation was negative, but not significant in Hong Kong,  $r(127) = -.02$ , *ns*. 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,  $r(127) = .44$ ,  $p < .001$ , and  $r(127) = .22$ ,  $p < .01$ , respectively. These correlations were positive in the United States, but not significant,  $r(128) = .08$ , *ns*, and  $r(128) = .04$ , *ns*, respectively. Consistent with Study 1, the correlation between reward for application and extraversion was positive, but not significant for both samples,  $r(127) = .06$  and  $r(128) = .05$ , *ns*.

Social complexity was positively associated with intellect in Hong Kong,  $r(127) = .15$ ,  $p < .05$ , and the correlation was also positive in the United States, but not significant,  $r(128) = .11$ , *ns*. Consistent with the mixed findings in Study 1, social complexity was positively and significantly related to neuroticism in Hong Kong,  $r(127) = .22$ ,  $p < .01$ , but the correlation was negative, albeit not significant in the United States,  $r(128) = -.08$ , *ns*.

Religiosity was significantly and positively related to agreeableness in Hong Kong,  $r(127) = .21$ ,  $p < .01$ , and the correlation was positive but not significant in the United States,  $r(128) = .06$ , *ns*.

As in Study 1, fate control was not significantly related to extraversion in the two samples,  $r(127) = .10$ , *ns*, and  $r(128) = .03$ , *ns*, in Hong Kong and in the United States, respectively. An

**Table 6.** Factor Loadings and Item Descriptions of the 97-Item Version–Study 2

Item	Factor		
	Social Complexity	Fate Control	
		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		
<b>There is usually more than one good way to handle a situation.</b>	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		
<b>People may behave unpredictably.</b>	0.37		
A person can change drastically in a short time.	0.36		
<b>There are many equally good ways to deal with a problem.</b>	0.36		
Human behavior changes with the social context.	0.36		
<b>A situation can change drastically in an unexpected direction.</b>	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		
<b>People act more or less the same way regardless of the people they interact with. (R)</b>	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 <sup>a</sup>		
Fate determines one's successes and failures.		0.71	
Fate determines a person's success in life.		0.69	
<b>Matters of life and death are determined by fate.</b>		0.69	
The people whom a person will love in his or her life are determined by fate.		0.61	
<b>Major events in life have nothing to do with fate. (R)</b>		0.56	
<b>People's wealth is determined by fate.</b>		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	
<b>Luck can be enhanced by certain tactics.</b>			0.73
<b>Individual characteristics, such as appearance and birthday, can reveal one's fate.</b>			0.67
<b>There are ways for people to find out about their fate.</b>			0.65
<b>There are certain ways for people to improve their destiny.</b>			0.63
Individual characteristics, such as appearance and birthday, affect one's fate.			0.62

(continued)

**Table 6. (continued)**

Item	Factor		
	Social Complexity	Fate Control	
		Fate Determinism	Fate Alterability
There are certain ways to help us improve our luck and avoid unlucky things.			0.59
<b>Major events in people's life can be predicted.</b>			0.51
There are many ways for people to predict what will happen in the future.			0.50
<b>It is impossible to read one's destiny. (R)</b>			0.48
Most disasters can be predicted.			0.40
Good luck follows if one survives a disaster.			0.27

Note. A five-factor model was fit, with fate determinism and fate alterability forming a higher order factor. 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 direction.

<sup>a</sup>not significant at the .05 level.

**Table 7. Results for Procrustes Rotation, Reliabilities, and Means—Study 2**

Culture	Social Cynicism			Reward for Application			Social Complexity			Fate Control			Fate Determinism			Fate Alterability			Religiosity		
	phi	α	M	phi	α	M	phi	α	M	phi	α	M	phi	α	M	phi	α	M	phi	α	M
Hong Kong	.90	.83	3.13	.96	.80	3.84	.88	.70	4.05	.94	.86	3.12	—	.81	3.19	—	.84	3.06	.92	.89	3.39
United States	.93	.82	2.70	.86	.75	3.86	.87	.77	3.97	.95	.87	2.39	—	.81	2.49	—	.80	2.33	.96	.92	3.29
Average	.92	.83	2.92	.91	.78	3.85	.88	.74	4.01	.95	.86	2.76	—	.81	2.84	—	.82	2.70	.94	.91	3.34

Note. For Procrustes rotation, the five-factor model combining items from fate determinism and fate alterability into a single factor of fate control was evaluated.

exploratory analysis showed that fate determinism showed a significant positive relationship with neuroticism,  $r(127) = .19, p < .05$ , and  $r(128) = .20, p < .05$ , in Hong Kong and in the United States, respectively, consistent with earlier speculations. However, neuroticism was not correlated with fate alterability,  $r(127) = .06, ns$ , and  $r(128) = .04, ns$ . In general, the overall pattern of results was similar to the pattern observed in Study 1.

*Short form for the revised SAS II.* To create short form for social complexity and fate control, we selected the eight items with the highest loadings from each dimension based on the CFA results as in Study 1. For fate control, we selected the four highest loading items from each facet.<sup>2</sup> The correlations between the short and the long forms for both axiom dimensions were very high (see Table 8). Moreover, the short forms showed high correlations with the corresponding items that were not selected, suggesting that the items in the short form and the nonselected items were generally equivalent. The short forms were reliable, except for social complexity in Hong Kong. Despite the lower reliability (.58), the correlation between the short form and the long form was high,  $r = .84$ .

**Discussion**

One goal was 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

**Table 8.** Bivariate Correlations Between the Short and Long Versions of Social Complexity and 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)
United States	.86/.77 (.71)	.92/.86 (.80)	.91/.79 (.80)	.91/.84 (.69)
Average	.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.

both dimensions was improved, especially for fate control. Furthermore, fate control can be split into two meaningful subfactors, fate determinism and fate alterability, which correspond to the two facets in the definition (Leung & Bond, 2004). Consistent with previous theorizing, a model with these two subscales forming a higher order factor showed reasonably good model fit. We argue that fate control is useful as a global construct and is measured reliably by a combination of the items from the two subscales. However, we cannot rule out the possibility that the two fate control facets are correlated but independent factors, and future research needs to ascertain the usefulness of conceptualizing these two facets as definers of a higher order factor.

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, but in Study 2 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. This finding highlights the possibility that to answer theoretical questions spurred by the distinction of these two facets, the two subscales of fate control will prove useful.

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 et al. (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. These two subscales of fate control give rise to some 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 developing the original SAS, the items were identified empirically with exploratory factor analysis. Despite the many meaningful results subsequently 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 a sequential 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 nonredundant, culturally wide-ranging items for the collaborators to choose from and comment upon. 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 reliability for social complexity and fate control, while improved, was still marginal. In retrospect, the problem appears to reside 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 items that define social complexity and fate control, new items were generated with a simplified iterative procedure. The first and second authors generated the new items and, with input from a subset of the collaborators, revised and 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 should prove useful if there is already considerable knowledge about the constructs under investigation, but 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 positively related to agreeableness. Finally, fate determinism, but not fate alterability, 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 exceeded .40 across the societies studied. In a similar vein, Leung et al. (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 moderately 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 beliefs about oneself, namely, self-views (Chen, Wu, & Bond, 2009). The influence of the social context on individual

behavior is well-recognized, and social axioms provide one way to introduce a perceiver-based measure of the situation into social psychology (Bond & Leung, 2009).

Our findings open up a new line of enquiry linking personality and social axioms. Considerable research has investigated the origin of personality (e.g., Shiner, Masten, & Tellegen, 2002), and a recent development is to examine 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 asks 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 8-year span studied, with a mean correlation of .75. 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. So Leung et al. (2010) measured social cynicism among a group of working adults in Shanghai three times in a year, with two 6-month gaps in between. The correlations for social cynicism across any 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, 2012). In the absence of societal changes, social axioms are quite stable at the societal level and serve as collective guides for sociocultural 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 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 to the general population.

Second, although the items are generated from diverse cultural perspectives, it is still possible that some items may not perform well in cultural settings not evaluated in our research. This concern may be more salient for social complexity and fate control, as the revised scales were only examined in Hong Kong and the United States. Further research needs 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), research is needed to explore the nomological

network based on SAS II. A related issue that is a short form of the Big Five measure was used, resulting in marginal reliabilities. Our results need to be replicated with a long version in future research.

Fourth, Study 2 showed that fate control is composed of two related facets, fate determinism and fate alterability. It is unclear what determines the emergence of these two facets or how they 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 conjecture explains why people high on fate control may simultaneously show positive and negative functioning. For instance, fate control is related to reported experience of 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 Haaften, Yu, & Van de Vijver, 2004). Much remains to be learned about fate control and its two facets in future research.

Finally, the reliability of the short forms of SAS II, with eight items per scale, is generally acceptable. Even though the correlations between the short and long forms are very high ( $r > .80$ ), the validity of the short form needs to be evaluated 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.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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### Notes

1. Regression 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 correlation results were presented.
2. The set of items for the short version are similar even if the selection is based on all fate control items without considering to which facet they belong.

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