

## Scenario-based scales measuring cultural orientations of business owners

Christine König · Holger Steinmetz · Michael Frese · Andreas Rauch · Zhong-Ming Wang

Published online: 12 January 2007  
© Springer-Verlag 2007

**Abstract** We argue that many approaches to cross-cultural measurement in entrepreneurship research have been flawed, and that there is a need for scales measuring cultural orientations at the individual level. We developed scenario-based scales measuring seven cultural orientations of business owners, namely uncertainty avoidance, power distance, in-group collectivism, assertiveness, future orientation, humane orientation, and performance orientation. The cultural orientations are manifested in the practices business owners apply in their businesses. We validated the scales on 461 Chinese and German business owners. The assessment of the scales' invariance across China and Germany suggests that they hold cross-cultural validity and thus allow for meaningful cross-cultural comparisons. Moreover, the scales show good test-retest reliabilities. The assessment of the relationships between the seven cultural orientations and their validation constructs suggests that the scales hold construct validity and thus allow for accurate descriptions and predictions of behaviors.

**Keywords** Scenario-based scales · Cultural orientations · Business owners

**JEL Classification** M13

---

The study “Psychological Factors of Entrepreneurial Success in China and Germany” (FR 638/23-1) was supported by grant of the German Research Foundation (Deutsche Forschungsgemeinschaft). We gratefully acknowledge this. We thank Eva Schraub and Jens Unger as well as Wei Wei Guo, Xiangyang Zhao, and Jiping Zhu for their substantial contributions to the study.

C. König (✉) · H. Steinmetz · M. Frese · A. Rauch  
Department of Work and Organizational Psychology, University of Giessen,  
Otto-Behaghel-Strasse 10F, 35394 Giessen, Germany  
e-mail: Christine.Koenig@psychol.uni-giessen.de

Z.-M. Wang  
School of Management, University of Zhejiang,  
34 Tian Mu Shan Road, Hangzhou 310028, China

## 1 Introduction

Culture is manifested in practices and values of societies and organizations (Erez and Gati 2004; Hofstede 2001; House and Javidan 2004). Evolutionary economics has been concerned with the application of Darwinian thinking to economics (Aldrich 1999). Businesses need to develop dynamic capabilities to deal with their environments (Busenitz and Arthurs 2006). The development of dynamic capabilities is both enhanced and restricted by societal and organizational cultures. Freytag and Thurik (2007) have argued persuasively that culture constitutes an important construct in entrepreneurship research. Indeed, there has been a recent increase in cross-cultural studies on entrepreneurship (Hayton, George, and Zahra 2002). Several good scales have been developed to measure societal culture, such as the ones by Hanges and Dickson (2004) and Schwartz (1994). However, these scales should only be used if research is oriented towards the societal level of analysis. For example, these scales should be used when relating the cultural dimension of uncertainty avoidance to societal rates of business ownership (e.g., Wennekers, Thurik, van Steel, and Noorderhaven 2007). In contrast, if research is oriented towards the individual level of analysis, scales developed to measure individual cultural orientations should be used. For example, these scales should be used when studying interactions between individual business owners' cultural orientations and societal culture, such as whether business owners with high cultural orientations of fostering collectivism in their businesses have to extend more effort to develop collectivistic organizational cultures if their businesses operate in individualistic rather than in collectivistic cultures. Cultural orientations are manifested in practices and values of individuals (Chirkov et al. 2003; Erez and Gati 2004; Maznevski et al. 2002).

We developed and validated scenario-based scales that measure cultural orientations of business owners.<sup>1</sup> Given their conceptual and methodological features, the scales differ from other scales commonly used in cross-cultural research: Instead of measuring culture at the aggregate level, they measure cultural orientations at the individual level, and instead of being based on Likert items, they are based on scenarios.

### 1.1 The need for individual-level measurement of owners' cultural orientations

Many cross-cultural studies in entrepreneurship research have focused on individual owners (cf. the review by Hayton et al. 2002). However, instead of measuring the individual owners' cultural orientations, these studies imputed national culture scores found in other cross-cultural studies to each individual owner ("culture inferred from nationality" as Hayton et al. 2002, p.38, called it). The study by Steensma et al. (2000), which imputed Hofstede's national culture scores as individual scores, may serve as an example. Hofstede (2001) has repeatedly warned against such imputations because they involve committing ecological fallacies. They

---

<sup>1</sup> For simplification, 'business owners' are referred to as 'owners' in the following.

are based on the wrong assumption that all people within a nation show the same level of cultural constructs. Moreover, imputing national culture scores found in studies based on non-owners (such as the study by Hofstede which was based on managers) to owners is problematic because owners are systematically different from non-owners across cultures (McGrath and MacMillan 1992). Finally, the relationships between cultural constructs and outcome variables often differ depending on the level at which the constructs are measured (Klein et al. 1994; Hofstede 2002).

There are two approaches to dealing with these problems. The first approach is to measure cultural orientations of owners using scales developed to measure societal culture. However, this leads to problems of analysis and interpretation (Chan 1998; Klein et al. 1994). The use of aggregate-level scales at the individual level often involves losses of reliability and validity (Spector et al. 2001; Hofstede 2002). The second approach is to measure cultural orientations of owners using scales developed to measure individual cultural orientations. However, among the cultural orientation scales, we are not aware of any that are suitable for owners. Therefore, we developed cultural orientation scales that measure the practices owners apply in their businesses. We considered practices to be more relevant for studying owners than values because practices are related to behaviors (Frese 2006). Owners are commonly defined as individuals who found, own, and manage businesses (Carland et al. 1984). How owners go about managing their businesses becomes apparent in their practices (Schein 1987). The practices owners apply in their businesses provide starting points for the development of organizational cultures. Starting from owners' practices, organizational cultures develop as a result of the interactions between owners and their employees (Schein 1987). Thus, although owners cannot entirely determine their businesses' organizational cultures, they can substantially influence them through their practices. Owners support organizational cultures they consider conducive to business performance (Ogbonna and Harris 2000; Schein 1987). As starting points for their development, owners apply practices that may or may not be in accordance with their personality traits (Schein 1987). For example, owners who are personally low on humane orientation may nevertheless apply humane-oriented practices if they expect humane-oriented organizational cultures to foster their employees' motivation. Whereas personality traits are genetic and unalterable (Jang et al. 1996), cultural orientations are acquired and can be altered. Thus, cultural orientations can be distinguished from personality traits.

The scales measure seven cultural orientations that refer to cultural dimensions introduced by the Global Leadership and Organizational Behavior Effectiveness (GLOBE) Study (House and Javidan 2004). The cultural dimensions represent a theoretical and empirical advancement over other cultural dimensions introduced earlier in cross-cultural research. We based the scales on definitions given by Javidan et al. (2004, p. 30), but adapted the definitions to the practices owners apply in their businesses: *Uncertainty avoidance* implies that owners support reliance on "social norms, rules, and procedures" to prevent incertitude. *Power distance* means that owners promote acceptance of power being distributed unequally. *Collectivism* signifies that owners foster "collective distribution of resources and collective action" (*institutional collectivism*) as well as family "loyalty and cohesiveness" (*in-group collectivism*). *Assertiveness* implies that owners support confrontation and

aggressiveness. *Future orientation* signifies that owners foster “delaying gratification, planning, and investing in the future.” *Humane orientation* means that owners promote fairness, altruism, generosity, care, and kindness. *Performance orientation* implies that owners support striving for “performance improvement and excellence.”<sup>2</sup>

Cultural orientations have an important function for how businesses are managed. The function of cultural orientations is similar to the importance of organizational cultures for business performance (O’Reilly and Chatman 1966). For example, if owners support uncertainty avoidance, there is little support for risk taking. Provided that risk taking is crucial for business performance, owners’ support for uncertainty avoidance may reduce business performance. We do not assume that there are one-to-one relationships between owners’ cultural orientations and business performance. Rather, we assume with Tung et al. (2006) that there are interactions. For example, owners’ support for uncertainty avoidance may reduce business performance if their businesses operate in high-tech environments with many competitors and therefore need to take risks to achieve their goals.

The development and the validation of the scales were embedded in a study on Chinese and German owners. This enabled us to ascertain whether the scales are suitable for both Chinese and German owners and whether they allow for meaningful comparisons across China and Germany. The two cultures are quite different (Hofstede 2001; Javidan et al. 2004). If we succeeded in demonstrating the scales’ suitability for Chinese and German owners, we could be optimistic that the scales would also be suitable for owners from other cultures and would allow for meaningful comparisons across cultures beyond China and Germany.

## 1.2 Scenario-based measurement

Cross-cultural scholars have recently suggested that culture and cultural orientations should be measured using scales based on scenarios rather than using scales based on Likert items (Heine et al. 2001, 2002; Kitayama 2002; Peng et al. 1997). Likert items and scenarios differ in the measurement of culture and cultural orientations (Peng et al. 1997): Likert items consist of general abstract statements, such as *I care for my family members*, and standardized scale responses, such as *strongly agree* or *strongly disagree*. Hence, Likert items measure culture and cultural orientations via people’s self-evaluations on general abstract statements. In contrast, scenarios consist of concrete social situations, such as *Your poorly qualified nephew asks you to employ him in your business*, and behavioral options, such as *You employ your poorly qualified nephew* or *You don’t employ your poorly qualified nephew*. Hence, scenarios measure culture and cultural orientations via people’s behavioral preferences in concrete social situations.

<sup>2</sup> *Gender egalitarianism*, another cultural dimension introduced by the GLOBE Study (House and Javidan 2004), means that owners promote gender equality (Javidan et al. 2004, p. 30). We disregarded this cultural dimension because we were not concerned with gender issues. However, to provide complete scales, we are currently developing and validating a scale measuring gender egalitarianism. The scale can be received upon request.

Scales based on Likert items tend to hold lower cross-cultural validity than scales based on scenarios, which means that they tend to allow for less meaningful cross-cultural comparisons (Peng et al. 1997). The cross-cultural validity of scales based on Likert items has been challenged for two main reasons. First, Likert items are more likely to be interpreted differently by people from different cultures than scenarios because general abstract statements and standardized scale responses offer a wider scope of interpretation than concrete social situations and behavioral options (Kitayama 2002; Peng et al. 1997). For example, Chinese and German owners are more likely to differ in their interpretations of what it means to care for one's family members than in their interpretations of what it signifies to be asked by one's poorly qualified nephew to employ him in one's business. Also, Chinese and German owners are more likely to differ in their interpretations of what it means to 'strongly agree' or to 'strongly disagree' than of what it signifies to employ or not employ one's poorly qualified nephew. Different interpretations threaten the validity of cross-cultural comparisons (Kitayama 2002; Peng et al. 1997).

Second, Likert items are more affected by the reference group effect than scenarios (Heine et al. 2001; Peng et al. 1997). The reference group effect occurs when people have to refer to the standards of their reference groups (Heine et al. 2002). Likert items are affected by the reference group effect because people have to refer to the standards of their reference groups to give their self-evaluations on general abstract statements (Biernat et al. 1991). For example, to tell how much they care for their family members, owners have to consider how much other owners care for their family members. Scenarios are less affected by the reference group effect because people do not have to refer to the standards of their reference groups to give their behavioral preferences in concrete social situations (Peng et al. 1997). For example, to tell whether or not they prefer to employ their poorly qualified nephews, owners do not have to consider whether or not other owners prefer to employ their poorly qualified nephews. The reference group effect occurs because people from different cultures have different reference groups that may differ in their standards (Heine et al. 2002). For example, Chinese owners refer to other Chinese owners, whereas German owners refer to other German owners. If Chinese owners generally care more for their family members than German owners, Chinese owners evaluate themselves with higher standards than German owners. Different standards threaten the validity of cross-cultural comparisons (Heine et al. 2002; Peng et al. 1997).

In addition to these cross-cultural issues, scales based on Likert items tend to hold lower construct validity than scales based on scenarios, which means that they tend to allow for less accurate descriptions and predictions of behaviors (Peng et al. 1997). The construct validity of scales based on Likert items has been challenged because people's self-evaluations on general abstract statements less accurately describe and predict their behaviors than people's behavioral preferences in concrete social situations (Chan and Schmitt 1997; Motowidlo et al. 1990). For example, owners' self-evaluations on how much they care for their family members less accurately describe and predict the active support they provide to them than owners' preferences on whether or not to employ their poorly qualified nephews.

As we wanted the cultural orientation scales to hold cross-cultural validity and construct validity, we based them on scenarios rather than on Likert items. However,

this involved potential loss of reliability in terms of coefficient alpha (Cronbach 1951) and composite reliability, a reliability estimate used in structural equation modeling (Fornell and Larcker 1981). Coefficient alpha and composite reliability estimate internal consistency. Scales based on scenarios tend to show lower internal consistencies than scales based on Likert items (Chan and Schmitt 1997; Motowidlo et al. 1990). Consisting of concrete social situations and behavioral options, scenarios capture more situational and behavioral aspects than Likert items that consist of general abstract statements and standardized scale responses. Therefore, scenarios have higher specific variances that result in lower intercorrelations. We accepted potential loss of reliability in terms of coefficient alpha and composite reliability because we considered it outweighed by the superior cross-cultural validity and construct validity held by scales based on scenarios. Moreover, there is an alternative to coefficient alpha and composite reliability, and that is test-retest reliability. Test-retest reliability is assumed to be a more appropriate reliability estimate for scales based on scenarios because it does not estimate internal consistency (Chan and Schmitt 1997; Motowidlo et al. 1990).

### 1.3 Cross-cultural validity

The cultural orientation scales are useful for scholars in cross-cultural research if they hold cross-cultural validity and thus allow for meaningful comparisons across cultures. In particular, the scales must enable scholars to meaningfully compare the means of the seven cultural orientations as well as the relationships between them. Five forms of invariance should be supported for the scales (Steenkamp and Baumgartner 1998; Vandenberg and Lance 2000):

*Configural invariance* implies that a measure holds an equal configuration of factors and indicators across cultures. The same indicators load on the same factors. Given configural invariance, scholars can compare constructs across cultures because the constructs have the same meaning. Configural invariance provides the basis for all other forms of invariance (Horn and McArdle 1992). *Metric invariance* means that the indicators have equal factor loadings across cultures. *Scalar invariance* signifies that the indicators do not only have equal factor loadings but also equal intercepts across cultures. Given metric and scalar invariance, scholars can conduct meaningful cross-cultural comparisons of observed and latent construct means (Horn and McArdle 1992; Meredith 1993). *Factor variance invariance* implies that the factors have equal variances across cultures. Given metric and factor variance invariance, scholars can conduct meaningful cross-cultural comparisons of relationships between constructs (Schmitt 1982; Steenkamp and Baumgartner 1998). *Error variance invariance* means that the indicators hold equal error variances across cultures. Given metric, factor variance, and error variance invariance, a measure is equally reliable across cultures (Steenkamp and Baumgartner 1998).

Configural, metric, scalar, and error variance invariance are forms of measurement invariance, which concerns the relationships between the factors and the indicators (Byrne et al. 1989). Factor variance invariance is a form of structural invariance, which concerns the factors themselves (Byrne et al. 1989).

In contrast to full invariance, partial invariance signifies that some, but not all, parameters are equal across cultures (Reise et al. 1993). Partial invariance is more likely to be supported in cross-cultural research than full invariance (Steenkamp and Baumgartner 1998). Fortunately, partial invariance hardly affects the meaningfulness of cross-cultural comparisons. Provided that metric and scalar invariance are partially given, construct means can still be meaningfully compared across cultures (Byrne et al. 1989). Provided that metric and factor variance invariance are partially given, relationships between constructs with equal variances can still be meaningfully compared across cultures (Byrne et al. 1989).

#### 1.4 Construct validity

We established a nomological net (Cronbach and Meehl 1955) in which we related the seven cultural orientations to other constructs that are theoretically associated with them. Among the constructs covered in the study, we considered nine constructs to be appropriate validation constructs for the seven cultural orientations:

(1) *Achievement striving* implies that owners work hard to achieve their goals (McClelland 1961). (2) *Deliberation* means that owners carefully consider their decisions (Costa and McCrae 1992). (3) *Error communication* signifies that owners turn to their employees if they have made errors (Rybowiak et al. 1999). (4) *Meta-cognitive activity* implies that owners plan, monitor, and revise their performance (Rybowiak et al. 1999; Schmidt and Ford 2003). (5) *Task-oriented personal initiative* means that owners take proactive and self-starting approaches to seizing opportunities and preparing for challenges (Frese et al. 1996). (6) *Relationship-oriented personal initiative* signifies that owners take proactive and self-starting approaches to improving and expanding their business relationships (Zhao et al. 2005). (7) *Social satisfaction* implies that owners are satisfied with the social relationships they have with their employees. (8) *Number of co-owners who are actively involved in the management of the business*. (9) *Number of family members who work in the business*.

We made the hypotheses that uncertainty avoidance is negatively related to task-oriented and to relationship-oriented personal initiative. Taking proactive and self-starting approaches to seizing opportunities and preparing for challenges or to improving and extending business relationships brings about changes and therefore increases uncertainty. Thus, task-oriented and relationship-oriented personal initiative require willingness to take risks (Fay and Frese 2001; Frese et al. 1997). Owners who consider it beneficial to rely on social norms, rules, and procedures to prevent uncertainty should be unwilling to take risks. This renders them unlikely to show task-oriented and relationship-oriented personal initiative.

We hypothesized a negative relationship between power distance and error communication. To turn to their employees if they have made errors, owners must be ready to acknowledge fallibility (Rybowiak et al. 1999; Hofstede 1984). Owners who deem it advantageous that their employees accept power being distributed unequally should be interested in demonstrating infallibility to assert their superior positions. Therefore, they are unlikely to communicate their errors.



We made the hypotheses that institutional collectivism is positively related to the number of co-owners who are actively involved in the management of the business, and that in-group collectivism is positively related to the number of family members who work in the business. Owners who consider it beneficial to act collectively are likely to join with others in managing their businesses, whereas owners who deem it advantageous to be loyal and cohesive within families are likely to employ their family members (Van Steekelenburg et al. 2000; Hofstede 1984).

We hypothesized negative relationships between assertiveness and deliberation as well as between assertiveness and meta-cognitive activity. Carefully considering decisions and planning, monitoring, and revising performance imply cautiousness and forethought (Costa and McCrae 1992; Schmidt and Ford 2003). Owners who deem it advantageous to be confrontative and aggressive should be rather impulsive. Therefore, they are unlikely to show deliberation and meta-cognitive activity.

We made the hypothesis that future orientation is positively related to achievement striving. Owners who consider it beneficial to delay gratification and to invest in the future are likely to work hard to achieve their goals (McClelland 1961). Moreover, we made the hypotheses that future orientation is positively related to deliberation and to meta-cognitive activity. Carefully considering decisions and planning, monitoring, and revising performance reflect planful action (Costa and McCrae 1992; Schmidt and Ford 2003). Owners who deem it advantageous to plan should act planfully. This renders them likely to show deliberation and meta-cognitive activity.

We hypothesized positive relationships between humane orientation and error communication as well as between humane orientation and social satisfaction. To turn to their employees if they have made errors and to be satisfied with the social relationships they have with their employees, owners must perceive these relationships as trusting and compassionate (Rybowiak et al. 1999; Hofstede 1984). Given that fairness, altruism, generosity, care, and kindness enhance mutual trust and compassion, owners who promote these qualities should perceive their relationships with their employees as trusting and compassionate. Therefore, they are likely to communicate their errors and to be socially satisfied.

We made the hypothesis that performance orientation is positively related to achievement striving. Owners who consider it beneficial to strive for excellence are likely to work hard to achieve their goals (McClelland 1961). Moreover, we hypothesized a positive relationship between performance orientation and meta-cognitive activity. Owners who deem it advantageous to strive for performance improvement are likely to plan, monitor, and revise their performance (Schmidt and Ford 2003). Finally, we made the hypotheses that performance orientation is positively related to task-oriented and to relationship-oriented personal initiative. Taking proactive and self-starting approaches to seizing opportunities and preparing for challenges or to improving and extending business relationships enhances business performance (Frese et al. 2000; Koop et al. 2000). Owners who support striving for performance improvement and excellence should be interested in enhancing business success. This renders them likely to show task-oriented and relationship-oriented personal initiative.



## 2 Materials and methods

### 2.1 Development

Following a parallel approach (Harkness et al. 2003), we developed the cultural orientation scales in a team of Chinese and German scholars. We combined our expertise to make sure that the scales were suitable for both Chinese and German owners. We developed the scales in English. The translations into Chinese and German were produced and checked by competent bilinguals.

We created scenarios that consist of social situations and behavioral options. The social situations describe problems owners may encounter in their businesses. They all begin with *Imagine that...* and end with *What do you do?*. Each social situation represents one of the seven cultural orientations. For example, the problem whether or not to employ one's poorly qualified nephew represents in-group collectivism. The behavioral options describe behaviors owners may show to solve the problems. They all begin with *You....* Two behavioral options follow each social situation. The first option represents a low score on the cultural orientation, whereas the second option represents a high score. For example, not employing one's poorly qualified nephew represents low in-group collectivism, whereas employing him represents high in-group collectivism. Between the two behavioral options, there are two mirror-inverted three-point scales that are directed towards the first and the second option, respectively. The two scales range from *somewhat true of me* (3/4) over *very true of me* (2/5) to *extremely true of me* (1/6). The scenario from which the examples are taken is presented in the [Appendix](#) (scenario 'C 7').

To complete the scales, owners have to make themselves aware of how they generally behave in their businesses. Going through the scenarios, they have to make mental simulations of their behaviors in the social situations. For each social situation, they have to decide which of the two behavioral options applies more to them. They can indicate their decision by ticking a point on the respective three-point scale.

In a pilot study, we tested the scenarios on 100 Chinese and German business students. Based on the data obtained from the business students, we conducted exploratory factor analyses to judge whether the scenarios appropriately measured the seven cultural orientations. Judging them as appropriate, we included all those scenarios in the scales that had high factor loadings on the seven cultural orientations. At the end of their development, the scales comprised 40 scenarios. Institutional collectivism and in-group collectivism were each assessed by three scenarios. Uncertainty avoidance and power distance were each measured by five scenarios, whereas assertiveness, future orientation, humane orientation, and performance orientation were each assessed by six scenarios.

### 2.2 Participants and procedure

We used a random sample of Chinese and German businesses. To participate in the study, Chinese and German owners had to meet two criteria. First, the

owners had to own (with shares of at least 10%) and manage their businesses. However, they did not necessarily have to have founded them. We established this criterion because we defined owners as individuals who own and manage businesses that they may or may not have founded. Compared to common definitions that equally emphasize founding, ownership, and management (Carland et al. 1984), our definition places less emphasis on founding. Owners shape their businesses not only through founding but also through owning and managing them (Schein 1987). Owners who have not founded but purchased or inherited their businesses may still substantially influence their businesses' organizational cultures. Second, the owners had to have at least one employee. We established this criterion because there is a qualitative difference between owners who work alone and owners who have employees. The step towards having employees implies a change in self-perception, responsibility, and managerial demands (Frese and de Kruif 2000). To be able to control for industry effects, we restricted participation to owners whose businesses belonged to one of four industries, namely information technology, hotel and catering, automobile, and construction.

We searched for participants in Zhejiang, a region in eastern China, and Hesse, a region in western Germany. As a first strategy, we used yellow pages as well as lists provided by the Chinese local government and the German chamber of commerce. As a second strategy, we relied on personal contacts and recommendations. The first strategy was more effective in Germany, whereas the second strategy was more effective in China.

Of the 464 owners who met the two criteria in China, 269 (58%) participated in the study. Of the 709 owners who met the two criteria in Germany, 302 (43%) participated in the study. After having interviewed the owners, we asked them to complete a questionnaire that included the cultural orientation scales. Of the 571 owners who participated in the study, 461 (81%) completed the questionnaire. They served as participants for the validation of the scales. Among them were 260 Chinese (56%) and 201 Germans (44%). Most of the Chinese and the German owners did not only own and manage their businesses but had also founded them (82%,  $n=213$ , and 68%,  $n=137$ , respectively). The Chinese owners had 198 employees on average. Their businesses belonged mostly to the automobile industry (33%,  $n=85$ ), followed by the hotel and catering industry (26%,  $n=68$ ), the information technology industry (21%,  $n=56$ ), and the construction industry (20%,  $n=51$ ). The German owners had 12 employees on average. Their businesses belonged mostly to the construction industry (41%,  $n=82$ ), followed by the information technology industry (23%,  $n=47$ ), the hotel and catering industry (21%,  $n=43$ ), and the automobile industry (15%,  $n=30$ ).

Six months after they had completed the scales for the first time, we asked 25 German owners to complete them a second time. The 22 German owners (88%) who agreed to do so served as participants for the assessment of the scales' test-retest reliabilities. The sub-sample was representative of the German sample.

### 2.3 Measures

Apart from the cultural orientation scales, the questionnaire included scales and single items that measured the validation constructs:<sup>3</sup> Achievement striving and deliberation were each assessed by two items developed by Costa and McCrae (1992). Sample items were *I work hard to accomplish my goals* and *I think things through before coming to a decision*, respectively. The items were rated on five-point scales ranging from *strongly disagree* (1) to *strongly agree* (5). Error communication was measured by four items adapted from Rybowski et al. (1999). A sample item was *If I cannot rectify an error by myself, I turn to my employees*. The items were rated on five-point scales ranging from *does not apply at all* (1) to *applies completely* (5). Meta-cognitive activity was assessed by ten items adapted from Schmidt and Ford (2003). A sample item was *I think about what skills need the most practice*. The items were rated on five-point scales ranging from *strongly disagree* (1) to *strongly agree* (5). Task-oriented personal initiative was measured by seven items developed by Frese et al. (1997), whereas relationship-oriented personal initiative was assessed by seven items developed by Frese et al. (2005). Sample items were *I actively attack problems* and *I actively seek to improve my business relationships*, respectively. The items were rated on five-point scales ranging from *does not apply at all* (1) to *applies completely* (5). Social satisfaction was measured by a single item (*How satisfied are you with your social relationships with your employees?*). The item was rated on a seven-point scale ranging from *very unsatisfied* (1) to *very satisfied* (7). The number of co-owners who are actively involved in the management of the business and the number of family members who work in the business were each assessed by a single item.

### 2.4 Cross-cultural validation

To ascertain whether the cultural orientation scales hold cross-cultural validity, we tested configural, metric, scalar, factor variance, and error variance invariance. We specified a model of configural invariance in which we restricted the configuration of the seven cultural orientations and their scenarios to be equal across the Chinese and the German samples. The model of configural invariance comprised the scenarios that appropriately measured the seven cultural orientations. We included all those scenarios in the model that had high factor loadings and low modification indices. We assigned scales and origins to the seven cultural orientations by setting the factor loading of one scenario per cultural orientation to one and fixing its intercept to zero.

---

<sup>3</sup> The composite reliabilities of the scales measuring the validation constructs could only be assessed through specifying and estimating models. Therefore, they are presented in the result section.

Starting from the model of configural invariance, we specified nested models of metric, scalar, factor variance, and error variance invariance. In the nested models, we successively constrained the factor loadings and intercepts of the scenarios, the variances of the seven cultural orientations, as well as the error variances of the scenarios, to be equal across the Chinese and the German samples. We estimated the models by conducting multi-group confirmatory factor analyses. We used LISREL 8 (Jöreskog and Sörbom 1993) and maximum likelihood estimation method on the basis of variance-covariance matrices and mean vectors. To evaluate model fit, we relied on the chi-square test (Jöreskog 1971) along with the root mean square error of approximation (RMSEA; Browne and Cudeck 1993) and the comparative fit index (CFI; Bentler 1990). We interpreted RMSEA values below 0.060 and CFI values close to 0.95 as good model fit (Hu and Bentler 1999). To compare two nested models, we relied on the chi-square difference test (Bollen 1989). Given a non-significant increase in chi-square between the less and the more constrained model, full invariance was supported. Given a significant increase in chi-square between the less and the more constrained model, we investigated whether partial invariance was supported. We examined modification indices and relaxed the equality constraint for those parameters that were unequal across the Chinese and the German samples.

We assessed the scales' composite reliabilities in the Chinese and the German samples. Moreover, we assessed their test-retest reliabilities in the German sub-sample.

## 2.5 Construct validation

To ascertain whether the cultural orientation scales hold construct validity, we assessed the relationships between the seven cultural orientations and their validation constructs. We specified a model of configural invariance in which we restricted the configuration of the seven cultural orientations and their scenarios as well as the configuration of the nine validation constructs and their items to be equal across the Chinese and the German samples. Apart from the scenarios that appropriately measured the seven cultural orientations, the model of configural invariance comprised the items that appropriately measured the nine validation constructs. We included all those items in the model that had high factor loadings and low modification indices. We assigned scales and origins to the nine validation constructs by setting the factor loading of one item per validation construct to one and fixing its intercept to zero.

The model of configural invariance provided the relationships between the seven cultural orientations and their validation constructs. To ascertain whether the relationships could be meaningfully compared across the Chinese and the German samples, we tested not only configural invariance but also metric and factor variance invariance. Starting from the model of configural invariance, we specified nested models of metric and factor variance invariance. In the nested models, we successively constrained the factor loadings of the scenarios and the items, as well as the variances of the seven cultural orientations and the nine validation constructs, to be equal across the Chinese and the German samples. We estimated the models by

conducting multi-group confirmatory factor analyses. To determine the significance of the difference between two correlation coefficients, we used the Fisher  $r$ -to- $z$  transformation.

We assessed the composite reliabilities of the scales measuring the validation constructs. The assessment was made in the Chinese and the German samples.

### 3 Results

#### 3.1 Cross-cultural validity

The results obtained in the tests of configural, metric, scalar, factor variance, and error variance invariance are presented in Table 1.

The model of configural invariance (Model A) comprised 23 scenarios that appropriately measured the seven cultural orientations. In-group collectivism was assessed by two scenarios.<sup>4</sup> Uncertainty avoidance, assertiveness, future orientation, and performance orientation were each measured by three scenarios. Humane orientation and power distance were assessed by four and five scenarios, respectively. The model of configural invariance provided adequate fit ( $\chi^2(418)=603.45$ ; RMSEA =0.044; CFI=0.94). Hence, configural invariance was supported. Given configural invariance, the seven cultural orientations can be meaningfully compared across the Chinese and the German samples.

In the model of full metric invariance (Model B), the factor loadings of the scenarios were constrained to be equal across the Chinese and the German samples; they are presented in Table 2. The increase in chi-square between the model of configural invariance (Model A) and the model of full metric invariance (Model B) was not significant ( $\Delta\chi^2(16)=24.82$ ,  $p>0.05$ ), and the latter model achieved adequate fit ( $\chi^2(434)=628.26$ ; RMSEA=0.044; CFI=0.93). Hence, full metric invariance was supported for each of the seven cultural orientations.

In the model of full scalar invariance (Model C), the intercepts of the scenarios were restricted to be equal across the Chinese and the German samples; they are presented in Table 2. The increase in chi-square between the model of full metric invariance (Model B) and the model of full scalar invariance (Model C) was highly significant ( $\Delta\chi^2(16)=74.61$ ,  $p<0.01$ ). Full scalar invariance was thus not supported for each of the seven cultural orientations. Examination of the modification indices revealed that the significant increase in chi-square was due to unequal intercepts of two scenarios measuring power distance, one scenario measuring assertiveness, and one scenario measuring humane orientation. The intercepts of the three scenarios measuring power distance and humane orientation were higher in the Chinese sample, which means that, regarding these three scenarios, the Chinese owners

<sup>4</sup> Due to low factor loadings and high modification indices, the scenarios created to assess institutional collectivism turned out to be inappropriate. Therefore, they were not comprised in the model of configural invariance.

**Table 1** Tests of configural, metric, scalar, factor variance, and error variance invariance

Models	Comparisons	$\chi^2$ (df)	$\Delta\chi^2$ ( $\Delta$ df)	RMSEA	CFI
A Configural invariance	–	603.45 (418)**	–	0.044	0.94
B Full metric invariance	A versus B	628.26 (434)**	24.82 (16) <sup>n.s.</sup>	0.044	0.93
C Full scalar invariance	B versus C	702.87 (450)**	74.61 (16)**	0.050	0.91
D Partial scalar invariance	B versus D	641.92 (446)**	13.66 (12) <sup>n.s.</sup>	0.044	0.93
E Full factor variance invariance	D versus E	668.22 (453)**	26.30 (7)**	0.046	0.93
F Partial factor variance invariance	D versus F	646.71 (451)**	4.79 (6) <sup>n.s.</sup>	0.044	0.93
G Full error variance invariance	F versus G	889.87 (474)**	263.16 (23)**	0.062	0.86
H Partial error variance invariance	F versus H	664.85 (463)**	18.14 (12) <sup>n.s.</sup>	0.044	0.93

\* $p < 0.05$ , \*\* $p < 0.01$

ticked higher scale points. The intercept of the scenario measuring assertiveness was higher in the German sample, which means that, regarding this scenario, the German owners ticked higher scale points. In the model of partial scalar invariance (Model D), we relaxed the equality restriction for the unequal intercepts. The increase in chi-square between the model of full metric invariance (Model B) and the model of partial scalar

**Table 2** Variances of the cultural orientations as well as factor loadings, intercepts, and error variances of the scenarios

Cultural orientations (variances)	Scenarios	Factor loadings (unstandardized)	Factor loadings (standardized)	Intercepts	Error variances
Uncertainty avoidance (0.40 / 0.19)	UA1	1.00	0.50	0.00	1.29 / 0.44
	UA2	1.22	0.54	-0.23	1.10
	UA6	1.20	0.60	0.38	0.80
Power distance (0.62)	PD1	0.87	0.50	1.05 / 0.64	1.71 / 1.09
	PD2	0.91	0.58	0.75 / 0.22	1.28 / 0.70
	PD3	1.00	0.77	0.00	0.42
	PD4	0.95	0.65	0.37	0.80
	PD6	0.85	0.52	0.69	1.23
In-group collectivism (0.42)	C5	1.00	0.52	0.00	1.16
	C7	0.87	0.53	-0.22	0.82
Assertiveness (0.38 / 0.21)	A3	1.09	0.75	-0.71 / -0.39	0.28
	A5	1.00	0.54	0.00	0.93 / 0.46
	A6	1.35	0.70	-0.91	0.86 / 0.16
Future orientation (0.28)	FO2	1.00	0.47	0.00	1.02
	FO4	1.15	0.52	-0.81	1.29 / 0.69
	FO6	1.30	0.69	-1.26	0.56
Humane orientation (0.43)	HO1	1.00	0.62	0.00	0.68
	HO3	0.74	0.56	1.40	0.59 / 0.39
	HO4	0.88	0.59	0.66 / 0.34	0.62
	HO6	0.96	0.59	0.24	0.90 / 0.54
Performance orientation (0.37)	PO2	1.00	0.45	0.00	2.09 / 0.72
	PO3	0.82	0.54	1.52	0.75 / 0.45
	PO5	0.77	0.32	0.09	2.54 / 1.33

In cases of unequal variances, factor loadings, intercepts, and error variances across the Chinese and the German samples, two values are given. The first value refers to the Chinese sample, whereas the second value refers to the German sample.

invariance (Model D) was not significant ( $\Delta\chi^2(12)=13.66, p>0.05$ ), and the latter model achieved adequate fit ( $\chi^2(446)=641.92$ ; RMSEA=0.044; CFI=0.93). Hence, full scalar invariance was supported for uncertainty avoidance, in-group collectivism, future orientation, performance orientation, whereas partial scalar invariance was supported for power distance, assertiveness, and humane orientation. Given full metric and partial scalar invariance, the observed and latent means of the seven cultural orientations can be meaningfully compared across the Chinese and the German samples.

In the model of full factor variance invariance (Model E), the variances of the seven cultural orientations were constrained to be equal across the Chinese and the German samples; they are presented in Table 2. The increase in chi-square between the model of partial scalar invariance (Model D) and the model of full factor variance invariance (Model E) was highly significant ( $\Delta\chi^2(7)=26.30, p<0.01$ ). Full factor variance invariance was thus not supported. Examination of the modification indices revealed that the significant increase in chi-square was due to unequal variances of uncertainty avoidance and assertiveness. They were higher in the Chinese than in the German sample, which means that, regarding these two cultural orientations, the Chinese owners were more heterogeneous than the German owners. In the model of partial factor variance invariance (Model F), we relaxed the equality constraint for the unequal variances. The increase in chi-square between the model of partial scalar invariance (Model D) and the model of partial factor variance invariance (Model F) was not significant ( $\Delta\chi^2(6)=4.79, p>0.05$ ), and the latter model provided adequate fit ( $\chi^2(451)=646.71$ ; RMSEA=0.044; CFI=0.93). Because most, but not all, variances were equal across the Chinese and the German samples, partial factor variance invariance was supported. Given full metric and partial factor variance invariance, the relationships between power distance, in-group collectivism, future orientation, humane orientation, and performance orientation can be meaningfully compared across the Chinese and the German samples. The relationships involving uncertainty avoidance and assertiveness should be compared with caution.

In the model of full error variance invariance (Model G), the error variances of the scenarios were restricted to be equal across the Chinese and the German samples; they are presented in Table 2. The increase in chi-square between the model of partial factor variance invariance (Model F) and the model of full error variance invariance (Model G) was highly significant ( $\Delta\chi^2(23)=263.16, p<0.01$ ). Full error variance invariance was thus not supported for each of the seven cultural orientations. Examination of the modification indices revealed that the significant increase in chi-square was due to unequal error variances of eleven scenarios measuring uncertainty avoidance, power distance, assertiveness, future orientation, humane orientation, and performance orientation. They were higher in the Chinese than in the German sample, which means that, regarding these eleven scenarios, the Chinese owners produced larger variances due to measurement error than the German owners. In the model of partial error variance invariance (Model H), we relaxed the equality restriction for the unequal error variances. The increase in chi-square between the model of partial factor variance invariance (Model F) and the model of partial error variance invariance (Model H) was not significant ( $\Delta\chi^2(12)=18.14, p>0.05$ ), and the latter model achieved adequate fit ( $\chi^2(463)=664.85$ ; RMSEA=0.044; CFI=0.93). Hence, full error variance invariance



was supported for in-group collectivism, whereas partial error variance was supported for uncertainty avoidance, power distance, assertiveness, future orientation, humane orientation, and performance orientation.

The cultural orientation scales are presented in the [Appendix](#). The scales' composite reliabilities in the Chinese and the German samples are presented in [Table 3](#). The scale measuring uncertainty avoidance showed higher composite reliability in the Chinese sample, whereas the scales measuring power distance, assertiveness, future orientation, humane orientation, and performance orientation displayed higher composite reliabilities in the German sample. Only the scale measuring in-group collectivism showed equal composite reliability across the Chinese and the German samples. This is due to the fact that in-group collectivism is the only cultural orientation for which both full metric and full error variance invariance are given and that, at the same time, has equal factor variances across the Chinese and the German samples. The scales' test-retest reliabilities in the German sub-sample are also presented in [Table 3](#). Each of the scales displayed higher test-retest reliability than composite reliability. This supports the assumption that test-retest reliability is a more appropriate reliability estimate for scales based on scenarios than composite reliability (Chan and Schmitt 1997; Motowidlo et al. 1990).

### 3.2 Construct validity

The relationships between the seven cultural orientations and their validation constructs are presented in [Table 4](#). The relationships were provided by the model of configural invariance.

Apart from the 23 scenarios that appropriately measured the seven cultural orientations, the model of configural invariance comprised 19 items that appropriately measured the nine validation constructs. Social satisfaction, the number of co-

**Table 3** Reliabilities of the scales measuring the cultural orientations and the validation constructs

Cultural orientations/validation constructs	Composite reliabilities		Test-retest reliabilities
	China	Germany	Germany
Uncertainty avoidance	0.60	0.46	0.74
Power distance	0.73	0.77	0.78
In-group collectivism	0.43	0.43	0.78
Assertiveness	0.70	0.74	0.76
Future orientation	0.56	0.61	0.74
Humane orientation	0.66	0.71	0.73
Performance orientation	0.35	0.53	0.75
Achievement striving	0.70	0.66	–
Deliberation	0.55	0.56	–
Error communication	0.69	0.75	–
Meta-cognitive activity	0.75	0.75	–
Task-oriented personal initiative	0.75	0.69	–
Relationship-oriented personal initiative	0.81	0.77	–

Composite reliability is defined as the quotient between the added squared standardized factor loadings and the sum of the added squared standardized factor loadings and the added error variances (Fornell and Larcker 1981).

**Table 4** Relationships between the latent cultural orientations and the latent validation constructs

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
01 Uncertainty avoidance		0.34**	-0.04	0.32*	-0.20	-0.33**	-0.01	-0.28*	-0.02	0.06	-0.09	-0.22*	-0.45**	-0.09	0.11	-0.13
02 Power distance	0.54**		0.64**	0.62**	-0.50**	-0.53**	-0.39**	-0.23**	-0.36**	-0.19**	-0.10	-0.07	-0.11	-0.16*	0.01	0.02
03 In-group collectivism	0.24*	0.13		0.70**	-0.50**	-0.63**	-0.60**	-0.32**	-0.30*	-0.29**	-0.31**	-0.17	-0.07	-0.14	-0.02	0.19*
04 Assertiveness	0.18*	0.11	0.21*		-0.28*	-0.27**	-0.31*	-0.24*	-0.30**	-0.01	-2.6**	-0.17	-0.14	0.02	0.02	0.02
05 Future orientation	-0.48**	-0.41**	-0.40**	-0.23**		0.72**	0.58**	0.31**	0.40**	0.14	0.25**	0.15	0.24*	0.18*	0.02	0.11
06 Humane orientation	-0.38**	-0.53**	0.06	-0.40**	0.39**		0.62**	0.36**	0.40**	0.22**	0.39**	0.28**	0.15	0.19**	-0.10	-0.02
07 Performance orientation	-0.26*	0.09	-0.57**	-0.21*	0.33**	0.07		0.42**	0.42**	0.14	0.35**	0.39**	0.28*	0.26*	0.23	0.08
08 Achievement striving	-0.17	-0.06	-0.21	-0.07	0.13	0.13	0.52**		0.74**	0.27**	0.72**	0.66**	0.51**	0.23**	0.21*	0.00
09 Deliberation	-0.08	-0.09	-0.01	-0.18*	0.12	0.16	0.04	0.36**		0.14	0.60**	0.67**	0.45**	0.26**	0.14	-0.02
10 Error communication	-0.17*	-0.50**	-0.05	-0.11	0.08	0.25**	-0.25**	0.07	0.06		0.24**	0.18*	0.31**	0.23**	0.01	0.02
11 Meta-cognitive activity	-0.05	0.04	-0.20	-0.16*	0.16*	0.11	0.19*	0.33**	0.31**	-0.02		0.77**	0.51**	0.15*	0.14	-0.08
12 Task-oriented PI	-0.22**	-0.13	-0.10	-0.10	0.10	0.09	0.21*	0.59**	0.20	0.13	0.32**	0.66**	0.66**	0.17*	0.21*	0.03
13 Relationship-oriented PI	-0.14	-0.06	-0.31*	-0.10	0.14	0.07	0.35**	0.49**	0.16	0.08	0.33**	0.50**	0.66**	0.20**	0.21*	0.06
14 Social satisfaction	-0.10	-0.12	-0.03	-0.05	-0.07	0.14	-0.11	0.07	0.04	0.18**	0.07	0.04	-0.02	0.20**	0.05	0.05
15 Number of co-owners	0.01	0.01	0.00	0.09	-0.12	-0.10	-0.02	-0.02	-0.00	-0.01	-0.02	0.05	0.04	0.05	0.05	-0.10
16 Number of family members	-0.01	-0.00	0.00	-0.00	0.01	0.00	-0.00	0.01	-0.00	0.00	0.01*	0.01	0.01	0.00	-0.00	-0.00

\* $p < 0.05$ , \*\* $p < 0.01$ . The values above the diagonal refer to the Chinese sample, whereas the values below the diagonal refer to the German sample.

owners who are actively involved in the management of the business, and the number of family members who work in the business were each assessed by one item. Achievement striving, deliberation, and error communication were each measured by two items. Meta-cognitive activity and task-oriented personal initiative were each assessed by three items. Relationship-oriented personal initiative was measured by four items.

The models of configural, full metric, and partial factor variance invariance achieved adequate fits.<sup>5</sup> Hence, configural, full metric, and partial factor variance invariance were supported. Given configural invariance, the seven cultural orientations and the nine validation constructs can be meaningfully compared across the Chinese and the German samples. Given full metric and partial factor variance invariance, the relationships between five of the seven cultural orientations and seven of the nine validation constructs can be meaningfully compared across the Chinese and the German samples. The relationships involving uncertainty avoidance and assertiveness as well as the number of co-owners who are actively involved in the management of the business and the number of family members who work in the business should be compared with caution. The composite reliabilities of the scales measuring the validation constructs are presented in Table 3.

The correlations between uncertainty avoidance and its two validation constructs were consistent with our hypotheses. Uncertainty avoidance was negatively correlated to task-oriented personal initiative ( $r=-0.22, p<0.05$  /  $r=-0.22, p<0.01$ )<sup>6</sup> and to relationship-oriented personal initiative ( $r=-0.45, p<0.01$  /  $r=-0.14, p>0.05$ ). The more Chinese and German owners support uncertainty avoidance, the less they show task-oriented and relationship-oriented personal initiative. The negative correlation between uncertainty avoidance and relationship-oriented personal initiative was significantly higher in the Chinese sample ( $z=-3.64, p<0.01$ ). In China, business relationships may be more delicate to handle and therefore may require more willingness to take risks than in Germany. This could explain why Chinese owners who support uncertainty avoidance show even less relationship-oriented personal initiative than their German counterparts. There was one non-hypothesized correlation that was as high as the hypothesized correlations. Uncertainty avoidance was negatively correlated to achievement striving ( $r=-0.28, p<0.05$  /  $r=-0.17, p>0.05$ ). The more Chinese and German owners support reliance on social norms, rules, and procedures to prevent uncertainty, the less they work hard to achieve their goals. Post hoc, the negative correlation could be explained as follows: Achievement striving may require willingness to take risks. Owners who support uncertainty avoidance should be unwilling to take risks. This renders them unlikely to show achievement striving.

In accordance with our hypothesis, power distance was negatively correlated to error communication ( $r=-0.19, p<0.01$ ;  $r=-0.50, p<0.01$ ). The more Chinese and German owners promote power distance, the less they communicate their errors. The

---

<sup>5</sup> A table presenting the results obtained in the tests of configural, metric, and factor variance invariance can be received upon request.

<sup>6</sup> Whenever two correlation coefficients are given, the first correlation coefficient refers to the Chinese sample, whereas the second correlation coefficient refers to the German sample.

negative correlation was significantly higher in the German sample ( $z=3.78, p<0.01$ ). In Germany, acknowledgement of fallibility may be regarded as less compatible with leadership than in China. This could explain why German owners who promote power distance communicate their errors even less than their Chinese counterparts.

The correlation between in-group collectivism and its validation construct was only partially in line with our hypothesis.<sup>7</sup> In the Chinese sample, in-group collectivism was positively correlated to the number of family members who work in the business ( $r=0.19, p<0.05$ ). The more Chinese owners foster in-group collectivism, the more they employ their family members. In the German sample, however, in-group collectivism was not correlated to the number of family members who work in the business ( $r=0.00, p>0.05$ ). Employing one's family members may be regarded as collectivism in China but disregarded as nepotism in Germany. This could explain why the hypothesized correlation existed in the Chinese but not in the German sample ( $z=2.03, p<0.05$ ). There were several non-hypothesized correlations that were higher than the hypothesized correlation. No post hoc explanations could be provided for them.

Consistent with our hypotheses, assertiveness was negatively correlated to deliberation ( $r=-0.30, p<0.01 / r=-0.18, p<0.05$ ) and to meta-cognitive activity ( $r=-0.26, p<0.01 / r=-0.16, p<0.05$ ). The more Chinese and German owners support assertiveness, the less they show deliberation and meta-cognitive activity.

The correlations between future orientation and its three validation constructs were in line with our hypotheses. Future orientation was positively correlated to achievement striving ( $r=0.31, p<0.01 / r=0.13, p>0.05$ ), to deliberation ( $r=0.40, p<0.01 / r=0.12, p>0.05$ ), and to meta-cognitive activity ( $r=0.25, p<0.01 / r=0.16, p<0.05$ ). The more Chinese and German owners foster future orientation, the more they show achievement striving, deliberation, and meta-cognitive activity. The correlation between future orientation and achievement striving ( $z=2.01, p<0.05$ ) and the correlation between future orientation and deliberation ( $z=3.21, p<0.01$ ) were significantly higher in the Chinese sample. In China, hard work and careful consideration may be regarded as more essential to implementing long-term projects than in Germany. This could explain why Chinese owners who foster future orientation show even more achievement striving and deliberation than their German counterparts.

In accordance with our hypotheses, humane orientation was positively correlated to error communication ( $r=0.22, p<0.01 / r=0.25, p<0.01$ ) and to social satisfaction ( $r=0.19, p<0.01 / r=0.14, p>0.05$ ). The more Chinese and German owners promote humane orientation, the more they communicate their errors and the more they are socially satisfied. There were two non-hypothesized correlations that were as high as the hypothesized correlations. First, humane orientation was positively correlated to achievement striving ( $r=0.36, p<0.01 / r=0.14, p>0.05$ ). The more Chinese and German owners promote fairness, altruism, generosity, care, and kindness, the more they work hard to achieve their goals. Post hoc, the correlation could be explained as follows: Achievement striving may require motivating others to help achieve one's

<sup>7</sup> As the model of configural invariance comprised no scenarios that appropriately assessed institutional collectivism, we could not test our hypothesis on the positive correlation between institutional collectivism and the number of co-owners who are actively involved in the management of the business.

goals. Owners may promote humane orientation because their employees may be more motivated to help achieve their goals if they are treated in a humane-oriented way. The correlation was significantly higher in the Chinese sample ( $z=2.50, p<0.05$ ). In China, employees' motivation to help achieve owners' goals may be lower than in Germany. This could explain why Chinese owners who show achievement striving promote even more humane orientation than their German counterparts. Second, humane orientation was positively correlated to deliberation ( $r=0.40, p<0.01 / r=0.16, p>0.05$ ). The more Chinese and German owners promote fairness, altruism, generosity, care, and kindness, the more they carefully consider their decisions. Post hoc, the correlation could be explained as follows: Deliberation may reflect responsibility towards others who are affected by one's decisions. Owners who promote humane orientation should act responsibly towards their employees. This renders them likely to show deliberation. The correlation was significantly higher in the Chinese sample ( $z=2.77, p<0.01$ ). In China, responsibility towards employees may be more pronounced than in Germany. This could explain why Chinese owners who promote humane orientation show even more deliberation than their German counterparts.

The correlations between performance orientation and its four validation constructs were consistent with our hypotheses. Performance orientation was positively correlated to achievement striving ( $r=0.42, p<0.01 / r=0.52, p<0.01$ ), to meta-cognitive activity ( $r=0.35, p<0.01 / r=0.19, p<0.05$ ), to task-oriented personal initiative ( $r=0.39, p<0.01 / r=0.21, p<0.05$ ), and to relationship-oriented personal initiative ( $r=0.28, p<0.01 / r=0.34, p<0.01$ ). The more Chinese and German owners support performance orientation, the more they show achievement striving, meta-cognitive activity, and task-oriented and relationship-oriented personal initiative. The correlation between performance orientation and task-oriented personal initiative was significantly higher in the Chinese sample ( $z=2.10, p<0.05$ ). In China, seizing opportunities and preparing for challenges may be regarded as more essential to reaching excellence than in Germany. This could explain why Chinese owners who support performance orientation show even more task-oriented personal initiative than their German counterparts.

#### 4 Discussion

We developed and validated scenario-based scales measuring seven cultural orientations of owners, namely uncertainty avoidance, power distance, in-group collectivism, assertiveness, future orientation, humane orientation, and performance orientation. The cultural orientations are manifested in the practices owners apply in their businesses. These practices provide starting points for the development of organizational cultures.

The assessment of the scales' invariance across China and Germany suggests that they hold cross-cultural validity. Full configural, full metric, and partial scalar invariance were supported, as were partial factor variance and partial error variance invariance. Hence, the scales enable scholars to meaningfully compare the means of the seven cultural orientations across cultures. Moreover, they enable scholars to

conduct meaningful cross-cultural comparisons of the relationships involving power distance, in-group collectivism, future orientation, humane orientation, and performance orientation. The relationships involving uncertainty avoidance and assertiveness should be compared with caution.

Cultural response bias occurs if people from different cultures differ in their response sets (Triandis 1994). The scales measuring uncertainty avoidance, in-group collectivism, future orientation, and performance orientation were not affected by cultural response bias because the Chinese and the German owners did not differ in their response sets on the scenarios assessing these cultural orientations. The scales measuring power distance, assertiveness, and humane orientation were marginally affected by cultural response bias because the Chinese and the German owners differed in their response sets on one or two scenarios assessing these cultural orientations.

The assessment of the relationships between the seven cultural orientations and their validation constructs suggests that most scales hold construct validity. According to tests of invariance, the relationships between five of the seven cultural orientations and seven of the nine validation constructs can be meaningfully compared across China and Germany. The relationships involving uncertainty avoidance and assertiveness as well the number of co-owners who are actively involved in the management of the business and the number of family members who work in the business should be compared with caution. Both in China and in Germany, uncertainty avoidance, power distance, assertiveness, future orientation, humane orientation, and performance orientation demonstrated the hypothesized relationships with their validation constructs. Hence, it can be assumed that the scales measuring these cultural orientations hold construct validity. As for uncertainty avoidance and humane orientation, there were three non-hypothesized relationships that were as high as the hypothesized relationships. However, as post hoc explanations could be provided for these relationships, they do not challenge the construct validity of the scales measuring uncertainty avoidance and humane orientation.

We intended to develop two scales measuring the two forms of collectivism, namely institutional collectivism and in-group collectivism. However, we could only partially implement our intention. We did not succeed in developing a scale measuring institutional collectivism because the three scenarios created to assess this form of collectivism turned out to be inappropriate. Therefore, we are currently developing and validating a new scale measuring institutional collectivism. The scale can be received upon request. We succeeded in developing a scale measuring in-group collectivism because two of the three scenarios created to assess this form of collectivism turned out to be appropriate. In-group collectivism demonstrated the hypothesized relationship with its validation construct in China but not in Germany. Hence, it can be assumed that the scale measuring in-group collectivism holds construct validity in China. The validation construct may not have been appropriate for in-group collectivism in Germany. There were several non-hypothesized relationships that were higher than the hypothesized relationship. As no post hoc explanations could be provided for these relationships, they challenge the construct validity of the scale measuring in-group collectivism. Therefore, we are currently revising the scale. It can be received upon request.

## 4.1 Limitations

Some scales do not cover all facets of the cultural orientations specified in the definitions. The 40 scenarios created to assess the cultural dimensions captured all of their facets. However, in the cross-cultural validation of the scales, only 23 scenarios turned out to be appropriate and were included in the scales.

Readers may be concerned about the low internal consistencies of some scales. The scales measuring in-group collectivism and performance orientation show low composite reliabilities both in China and in Germany, whereas the scale measuring future orientation and the scale measuring uncertainty avoidance display low composite reliabilities in China and Germany, respectively. These scales have few scenarios, and short scales usually suffer from low internal consistencies. However, we assume with Chan and Schmitt (1997) and Motowidlo et al. (1990) that test-retest reliability is a more appropriate reliability estimate for scales based on scenarios than composite reliability. All scales show high test-retest reliabilities.

Given that owners are commonly defined as individuals who found, own, and manage businesses (Carland et al. 1984), readers may also be concerned about the fact that the Chinese and the German samples comprised both owners who had and owners who had not founded their businesses. To invalidate this concern, we compared the correlation matrices obtained in the Chinese and the German samples to the correlation matrices obtained in samples that included only founders. Both in China and in Germany, the compared correlation matrices turned out to be quite similar. The correlations between them were  $r=0.99$  ( $p<0.01$ ) in both cultures. Thus, we could rule out that our results were distorted by the fact that the Chinese and the German samples comprised both founders and non-founders.

Given that we developed and validated the scales for Chinese and German owners, their use may be limited in two respects. First, the scales are suitable for owners but may not be suitable for managers. As long as it has not been ascertained whether the scales allow for meaningful comparisons of managers, they should only be used to compare owners. Owners and managers have quite a lot in common. Therefore, we are optimistic that future studies will demonstrate the scales' suitability for managers. Second, the scales are suitable for Chinese and German owners but may not be suitable for owners from other cultures. As long as it has not been ascertained whether the scales can be used to meaningfully compare owners from other cultures, comparisons should be conducted with caution. China and Germany are two quite different cultures. Therefore, we are optimistic that future studies will demonstrate the scales' suitability for owners from other cultures.

## 5 Conclusion

The scales are useful for cross-cultural and organizational scholars. Cross-cultural scholars can use the scales to investigate how owners from different cultures differ in their cultural orientations. Moreover, they can use the scales to investigate cross-



cultural differences in the effects of cultural orientations. Organizational scholars can use the scales to assess the practices owners apply in their businesses. Thereby, they can assess how owners go about managing their businesses and how they support the development of organizational cultures. The scales may also be useful for owners and managers. The scales may be used in training to make owners and managers aware of the practices they apply in their businesses. The awareness of how they go about managing their businesses and how they support the development of organizational cultures may lead owners and managers to challenge and improve their practices.

### Appendix

#### Scales measuring cultural orientations of business owners

##### Uncertainty avoidance (UA 1, UA 2, UA 6)

Imagine that one of your employees comes up with a new idea. His idea sounds promising but its implementation would necessitate considerable changes in your business routines. What do you do?

You encourage your employee to try out his idea.		You refuse to implement your employee's idea. Changing your business routines is too risky to you.
--	--	--

Imagine that one of your clients asks you to work on a project. Since neither you nor your employees have any experience in this field, working on the project would be a big challenge for your business. What do you do?

You accept the project. Exploring new fields will help to improve your business.		You reject the project. Sticking to fields in which you are experienced is much more sensible to you.
--	--	---

Imagine that one of your employees suggests extending your business to new areas in which you are not experienced yet. What do you do?

You implement your employee's suggestion. Extending your business to new areas will help to increase your competitiveness.		You reject your employee's suggestion. Extending your business to new areas is too risky to you.
--	--	--

##### Power distance (PD 1, PD 2, PD 3, PD 4, PD 6)

Imagine that one of your employees challenges a rule you established in your business. What do you do?

You ask your employee to make suggestions about how to change the rule.		You tell your employee to accept the rule.
---	--	--

Imagine that you are faced with a difficult problem in your business. You are not sure how to solve it. What do you do?

You tell your employees about the problem and ask them for their help.	<p style="text-align: center;">←-----→</p> <p style="text-align: center;">(1) (2) (3) (4) (5) (6)</p> <p style="text-align: center;">extremely very somewhat somewhat very extremely true of me true of me</p>	You don't tell your employees about the problem and try to solve it by yourself.
--	--	--

Imagine that one of your employees criticizes the way you run your business. What do you do?

You ask your employee to make suggestions for improvement.	<p style="text-align: center;">←-----→</p> <p style="text-align: center;">(1) (2) (3) (4) (5) (6)</p> <p style="text-align: center;">extremely very somewhat somewhat very extremely true of me true of me</p>	You tell your employee to stop his criticism.
--	--	---

Imagine that you have to make a decision that has important consequences for your business. What do you do?

You make the decision after having consulted your employees.	<p style="text-align: center;">←-----→</p> <p style="text-align: center;">(1) (2) (3) (4) (5) (6)</p> <p style="text-align: center;">extremely very somewhat somewhat very extremely true of me true of me</p>	You make the decision without consulting your employees before.
--	--	---

Imagine that one of your employees refuses to follow an instruction you gave him. What do you do?

You ask your employee for the reasons for his refusal.	<p style="text-align: center;">←-----→</p> <p style="text-align: center;">(1) (2) (3) (4) (5) (6)</p> <p style="text-align: center;">extremely very somewhat somewhat very extremely true of me true of me</p>	You reprimand your employee for his refusal.
--	--	--

**In-group collectivism (C 5, C 7)**

Imagine that you want to employ a new secretary who has at least three years of work experience. Now your best friend's wife applies for the job. She is well qualified but has only been working for one year. What do you do?

You stick to your requirements and don't employ your best friend's wife.	<p style="text-align: center;">←-----→</p> <p style="text-align: center;">(1) (2) (3) (4) (5) (6)</p> <p style="text-align: center;">extremely very somewhat somewhat very extremely true of me true of me</p>	You make an exception to your requirements and employ your best friend's wife.
--	--	--

Imagine that your nephew asks you to employ him in your business. You don't consider him to be sufficiently qualified. What do you do?

You don't employ your nephew due to his poor qualification.	<p style="text-align: center;">←-----→</p> <p style="text-align: center;">(1) (2) (3) (4) (5) (6)</p> <p style="text-align: center;">extremely very somewhat somewhat very extremely true of me true of me</p>	You employ your nephew regardless of his poor qualification.
---	--	--

Assertiveness (A 3, A 5, A 6)

Imagine that one of your employees is very aggressive. He verbally attacks his co-workers whenever they don't agree with him. What do you do?

You tell your employee to change his behavior.		You tolerate your employee's behavior.
--	--	--

Imagine that one of your employees is very dominant. He gives orders to his co-workers although he is not authorized to do so. What do you do?

You tell your employee to change his behavior.		You tolerate your employee's behavior.
--	--	--

Imagine that one of your employees is very aggressive. Whenever he wants to achieve something, he bullies his co-workers. What do you do?

You tell your employee to change his behavior.		You tolerate your employee's behavior.
--	--	--

Future orientation (FO 2, FO 4, FO 6)

Imagine that one of your employees asks you to give him general advice about how to work on a challenging project. What do you do?

You advise your employee to think about things as he goes along.		You advise your employee to plan ahead.
--	--	---

Imagine that one of your employees suggests having regular meetings to plan for the future of your business. What do you do?

You tell your employee that too much planning for the future just distracts from current business.		You are pleased with your employee's suggestion and implement it.
--	--	---

Imagine that one of your employees asks you what to consider prior to starting a project. What do you do?

You advise your employee to start the project right away without considering its long term implications.		You advise your employee to consider the long term implications of the project.
--	--	---

Humane orientation (HO 1, HO 3, HO 4, HO 6)

Imagine that one of your employees who always used to do his work properly suddenly makes a lot of mistakes. You find out that things are not going well for him in his private life. What do you do?

You are not willing to show any consideration for your employee's personal problems. You just tell him to get on top of them.		You feel sorry for your employee and offer him your help.
---	--	---

Imagine that one of your employees asks you for special leave due to unexpected strains in his private life. What do you do?

You refuse to grant your employee special leave.		You grant your employee special leave.
--	--	--

Imagine that one of your employees seems to be in a bad mood. What do you do?

You don't care about your employee's bad mood.		You try to find out the reasons for your employee's bad mood.
--	--	---

Imagine that one of your employees is a single father. He has problems balancing the education of his children and his work. Therefore, he asks you to exempt him from working overtime. What do you do?

You refuse to exempt your employee from working overtime.		You exempt your employee from working overtime.
---	--	---

Performance orientation (PO 2, PO 3, PO 5)

Imagine that you plan to do a new project. Now you have to decide who among your employees will be part of the project team. What do you do?

You base your decision mainly on your employees' social skills.		You base your decision mainly on your employees' performance.
---	--	---

Imagine that you want to fill several high positions in your business. Now you have to decide who among your employees will be promoted. What do you do?

You promote your employees based on their seniority.		You promote your employees based on their performance.
--	--	--



- Frese M (ed) *Success and failure of microbusiness owners in Africa: a psychological approach*. Quorum Books, Westport, CT, pp 103–130
- Frese M, König C, Rauch A (2005) Scale manual of the study ‘psychological factors of entrepreneurial success in China and Germany.’ Department of Psychology, Giessen, Germany
- Freytag A, Thurik R (2007) Entrepreneurship and its determinants in a cross country setting. *J Evol Econ* 17
- Hanges PJ, Dickson MW (2004) The development and validation of the GLOBE culture and leadership scales. In: House RJ, Hanges PJ, Javidan M, Dorfman PW, Gupta V (eds) *Culture, leadership, and organizations: the GLOBE study of 62 societies*. Sage, Thousand Oaks, CA, pp 122–151
- Harkness J, Van de Vijver FJR, Johnson TP (2003) Questionnaire design in comparative research. In: Harkness J, Van de Vijver FJR, Mohler PP (eds) *Cross-cultural survey methods*. Wiley, Hoboken, NJ, pp 19–34
- Hayton JC, George G, Zahra SA (2002) National culture and entrepreneurship: a review of behavioral research. *Entrep Theory Pract* 26(4):33–52
- Heine SJ, Kitayama S, Lehman DR, Takata T, Ide E, Leung C et al (2001) Divergent consequences of success and failure in Japan and North America: an investigation of self-improving motivations and malleable selves. *J Pers Soc Psychol* 81(4):599–615
- Heine SJ, Lehman DR, Peng K, Greenholtz J (2002) What’s wrong with cross-cultural comparisons of subjective Likert scales? The reference-group effect. *J Pers Soc Psychol* 82(6):903–918
- Hofstede G (1984) *Cultural dimensions in management and planning*. Asia Pac J Manage 1(2):81–99
- Hofstede G (2001) *Culture’s consequences*, 2nd edn. Sage, Thousand Oaks, CA
- Hofstede G (2002) The pitfalls of cross-national survey research: a reply to the article by Spector et al. on the psychometric properties of the Hofstede Values Survey Module 1994. *Rev Int Psychol Appl* 51(1):170–178
- Horn JL, McArdle JJ (1992) A practical and theoretical guide to measurement invariance in aging research. *Exp Aging Res* 18:117–144
- House RJ, Javidan M (2004) Overview of GLOBE. In: House RJ, Hanges PJ, Javidan M, Dorfman PW, Gupta V (eds) *Culture, leadership, and organizations: the GLOBE study of 62 societies*. Sage, Thousand Oaks, CA, pp 9–28
- Hu L-T, Bentler PM (1999) Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equ Modeling* 6:1–55
- Jang KL, Livesley WJ, Vernon PA (1996) Heritability of the big five personality dimensions and their facets: a twin study. *J Person* 64(3):577–591
- Javidan M, House RJ, Dorfman PW (2004) A nontechnical summary of GLOBE findings. In: House RJ, Hanges PJ, Javidan M, Dorfman PW, Gupta V (eds) *Culture, leadership, and organizations: the GLOBE study of 62 societies*. Sage, Thousand Oaks, CA, pp 29–48
- Jöreskog KG (1971) Simultaneous factor analysis in several populations. *Psychometrika* 36:409–426
- Jöreskog KG, Sörbom D (1993) *Lisrel 8. User’s reference guide*. Chicago, Scientific Software International
- Kitayama S (2002) Cultural and basic psychological processes—toward a system view of culture: comment on Oyserman et al. *Psychol Bull* 128(1):89–96
- Klein KJ, Dansereau F, Hall RJ (1994) Levels issues in theory development, data collection, and analysis. *Acad Manage Rev* 19(2):195–229
- Koop S, De Reu T, Frese M (2000) Sociodemographic factors, entrepreneurial orientation, personal initiative, and environmental problems in Uganda. In: Frese M (ed) *Success and failure of microbusiness owners in Africa: a psychological approach*. Quorum Books, Westport, CT, pp 55–76
- Maznevski ML, DiStefano JJ, Gomez CB, Noorderhaven NG, Wu P-C (2002) Cultural dimensions at the individual level of analysis: the cultural orientations framework. *International Journal of Cross Cultural Management* 2(3):275–295
- McClelland DC (1961) *The achieving society*. Van Nostrand, Princeton, NJ
- McGrath RG, MacMillan IC (1992) More like each other than anyone else? a cross-cultural study of entrepreneurial perceptions. *J Bus Venturing* 7:419–429
- Meredith W (1993) Measurement invariance, factor analysis, and factorial invariance. *Psychometrika* 58(4):525–543
- Motowidlo SJ, Dunnette MD, Carter GW (1990) An alternative selection procedure: the low-fidelity simulation. *J Appl Psychol* 75(6):640–647
- Ogbonna E, Harris LC (2000) Leadership style, organizational culture and performance: empirical evidence from UK companies. *Int J Hum Resour Manag* 11(4):766–788

- O'Reilly CA, Chatman JA (1966) Culture as social control: corporations, cults, and commitment. *Res Organ Behav* 18:157–200
- Peng K, Nisbett RE, Wong NYC (1997) Validity problems comparing values across cultures and possible solutions. *Psychol Methods* 2(4):329–344
- Reise SP, Widaman KF, Pugh RH (1993) Confirmatory factor analysis and item response theory: two approaches for exploring measurement invariance. *Psychol Bull* 114(3):552–566
- Rybowiak V, Garst H, Frese M, Batinic B (1999) Error orientation questionnaire (EOQ): reliability, validity, and different language equivalence. *J Organ Behav* 20:527–547
- Schein EH (1987) *Organizational culture and leadership. A dynamic view*. Jossey-Bass, San Francisco, CA
- Schmidt AM, Ford JK (2003) Learning within a learner control training environment: the interactive effects of goal orientation and metacognitive instruction on learning outcomes. *Pers Psychol* 56(2):405–429
- Schmitt N (1982) The use of analysis of covariance structures to assess beta and gamma change. *Multivariate Behav Res* 17:343–358
- Schwartz S (1994) Beyond individualism-collectivism: new cultural dimensions of values. In: Kim U, Triandis HC, Kagitçibasi C, Choi SC, Yoon G (eds) *Individualism and collectivism: theory, method, and applications*. Sage, London, UK, pp 85–119
- Spector PE, Cooper CL, Sparks K (2001) An international study of the psychometric properties of the Hofstede Values Survey Module 1994: a comparison of individual and country / province level results. *Rev Int Psychol Appl* 50(2):269–281
- Steenkamp J-BEM, Baumgartner H (1998) Assessing measurement invariance in cross-national consumer research. *J Consum Res* 25:78–90
- Steenma HK, Marino L, Weaver KM, Dickson PH (2000) The influence of national culture on the formation of technology alliances by entrepreneurial firms. *Acad Manage J* 43(5):951–973
- Triandis HC (1994) Cross-cultural industrial and organizational psychology. In: Triandis HC, Dunning MD, Hough LM (eds) *Handbook of industrial and organizational psychology*. Consulting Psychologists Press, Palo Alto, CA, pp 103–172
- Tung RL, Walls J, Frese M (2006) Cross-cultural entrepreneurship: the case of China. In: Baum JR, Frese M, Baron RA (eds) *The psychology of entrepreneurship*. Erlbaum, Mahwah, NJ, pp 265–286
- Van Steekelenburg G, Lauw AM, Frese M, Visser K (2000) Problems and coping, strategies and initiative in microbusiness owners in South Africa. In: Frese M (ed) *Success and failure of microbusiness owners in Africa. A psychological approach*. Quorum Books, Westport, CT, pp 77–101
- Vandenberg RJ, Lance CE (2000) A review and synthesis of the measurement invariance literature: suggestions, practices, and recommendations for organizational research. *Organ Res Methods* 3(1):4–69
- Wennekers S, Thurik R, van Steel A, Noorderhaven N (2007) Uncertainty avoidance and the rate of business ownership across 21 OECD countries, 1976–2004. *J Evol Econ* 17
- Zhao X, Giardini A, Frese M (2005) Dynamic network building and business success in China: the function of social skills, proactive and elaborate social strategies and relationship-oriented personal initiative. Manuscript submitted for publication