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Measuring Cultural Intelligence: A New Test of the CQ Scale

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Abstract

Despite an increasing number of publications on cultural intelligence (CQ), the operationalization and conceptualization of this construct demand further attention. In this replication study among 308 experienced overseas Chinese respondents, a two-dimensional structure seems to better represent the data than the original four-dimensional CQ scale. The results of the analysis identify two new dimensions: internalized cultural knowledge and effective cultural flexibility, both of which exhibit satisfactory levels of reliability and validity. A series of regression analyses also provide assessments of the nomological validity of the new CQ dimensions in relation to their antecedents and consequences.

Keywords

Cultural intelligence, CQS, psychometric properties, discriminant validity

Introduction

The development of the cultural intelligence (CQ) construct has filled an important gap in intelligence literature by focusing on people's capabilities in a domain critical for human resource management, namely, the cross-cultural context (Ng, Ramaya, Teo, & Wong, 2005). Since the emergence of the (rational) intelligence construct early in the last century (i.e., the Stanford-Binet test, developed in 1916), proposals for additional, specific intelligence constructs have emerged, including practical intelligence (Sternberg & Wagner, 1986), social intelligence (Goleman, 2006), emotional intelligence (Salovey & Meyer, 1990), and cultural intelligence (Earley, 2002). Since its inception (Earley & Ang, 2003), research on the CQ construct has evolved in two directions: an international management perspective (e.g., Thomas et al., 2008) and a social psychology perspective (e.g., Ang, Van Dyne, Koh, Ng, Templer, Tay, & Chandrasekar, 2007). Each stream of research proposes measurement scales; in this study, we focus on the CQS instrument developed by Ang et al. (2007), which has been available for a longer time and been used more intensively. Their CQS consists of four dimensions, including motivation, which is missing from other instruments but is important, in that it relates directly to people's intention to continue working in cross-cultural environments despite their frustration or confusion.

Both CQ and the CQS instrument started to attract scholars' attention more substantially after the 2004 Academy of Management Conference and the publication of a special issue of *Group & Organization Management Journal* (2006). Several studies theoretically and empirically relate CQ to other constructs, such as personality traits (Ang, Van Dyne, & Koh, 2006), emotional intelligence (Ang et al., 2007; Brislin, Worthley, & Macnab, 2006; Crowne, 2009, 2013; Ward, Fischer, Lam, & Hall, 2009), cross-cultural competency (Ang et al., 2007), cross-cultural adjustment (Templer, Tay, & Chandrasekar, 2006), multicultural

personality (Ward et al., 2009), cognitive complexity (Fee, Gray, &Lu, 2013), and cross-cultural capital (Jackson, 2013).

The growing popularity of the CQ construct also attracted critics though. Blasco, Feldt, and Jakobsen (2012) question whether CQ is an ability that can be learned easily, and Crowne (2009) criticizes the use of the CQ and EQ constructs in isolation instead of studying these constructs together. Furthermore, Ward et al. (2009) complain that CQ fails to explain additional variance in adaptation outcomes beyond that explained by personality and emotional intelligence, such that CQ might not be sufficiently distinct from emotional intelligence.

These critics have prompted new sets of questions for CQ research, related to (1) the measurement of the CQ construct, (2) the dimensionality of the CQS, and (3) its nomological validity (Ang et al., 2007; Ng & Early, 2006; Ward et al., 2009). Matsumoto and Hwang (2013, p. 867) call for further psychometric testing of "the goodness of fit of identified structures across cross-cultural samples of different demographics-sex, age, language, and so on." Therefore, despite the growing number of studies, the development of a valid and reliable measure of CQ remains a work in progress.

To respond to calls for further tests of the CQS, we replicate Ang et al.'s (2007) original CQS instrument with a sample of 308 Chinese respondents. This replication study seeks to advance the development of the CQS in three important ways. First, we examine the reliability and validity (including discriminant validity, which was lacking in previous studies) of the CQS by testing the scale with a group of Chinese respondents who have significant overseas experience, which is critical to ensure that respondents fully understand the subtleties of the items (Huang, Curran, Keeney, Poposki, & DeShon, 2012). In this way, we depart from previous studies that suffer from external validity issues, because they have tested the CQS scale using samples of respondents with limited overseas experience. Second,

we analyze the relationship between the CQS dimensions and one of their most important outcomes, cross-cultural communication effectiveness, to embed CQ better within its nomological net. Finding evidence of a relation between CQ and one of its logically expected outcomes strengthens the validity of the CQS (Driel & Gabrenya, 2013). Third, we test CQS while controlling for several critical variables, such as interaction frequency, gender, and education. Without such controls, it would be impossible to disentangle the effect of CQ on communication effectiveness from the effects of the contextual variables.

The results of our study also provide potentially critical managerial implications. A better measurement scale for CQ would be valuable for human resource managers in multinational firms, to help them select better candidates for oversea assignments and to assess the effectiveness of cross-cultural training. Cultural intelligence also is an important competency for cross-cultural teams, for which virtual communication across cultures requires effective CQ development. With an improved CQ scale, managers can further distinguish among personality, CQ, and EQ and thereby develop more focused training programs. Finally, it should enhance understanding of the relation between CQ and experience and the way unfamiliar experiences may develop and reshape people's identities.

The remainder of this article is organized as follows: First, we provide an overview of relevant literature on CQ and the CQS. Second, we describe our method and present the results of our empirical tests of the original four-factor CQS. Third, on the basis of these results, we propose a revised two-factor CQ scale and test its psychometric characteristics and antecedents and outcomes. Fourth, we conclude with a discussion of the implications of our results and some directions for further research.

Literature Review

The Cultural Intelligence (CQ) Concept

Cultural intelligence pertains to how people adapt and thrive when they find themselves in an environment other than the one in which they were socialized (Brislin et al., 2006). In a business context, a culturally intelligent manager can make better decisions in cross-cultural contexts and communicates and negotiates more effectively with foreign partners (Imai & Gelfand, 2010), while also appropriately motivating employees from various cultures (Elenkov & Manev, 2009).

As a form of intelligence, comparable to social or emotional intelligence (Brislin et al., 2006; Crowne, 2009; Elenkov & Pimentel, 2008; Kumar, Rose, & Subramaniam, 2008), CQ refers to people's capabilities across cultures (Ng & Early, 2006; Thomas, 2006); other forms of intelligence instead tend to focus on a particular aspect in a single cultural context. Sternberg (1997) suggests a general definition of intelligence as the abilities necessary to select, shape, and adapt to an environment. However, whereas general intelligence focuses on academic skills and emotional intelligence reflects the capability to interact and work with other people (Mayer, Roberts, & Barsade, 2008), CQ entails the ability to interact effectively with people who are culturally different (Thomas, 2006). Thus, CQ is a specific form of intelligence focused on the ability to grasp, reason, and behave effectively in situations characterized by cultural diversity (Ang et al., 2007; Hampden-Turner & Trompenaars, 2006). These skills include the acceptance of a certain degree of cross-cultural confusion, the suspension of judgment of cultural values, and a desire to understand cultural differences (Brislin et al., 2006). Furthermore, CQ represents a system of interacting knowledge and skills, linked by cultural metacognition that enables people to adapt to, select, and shape the cultural aspects of their environment (Thomas et al., 2008).

Cultural Intelligence: A Multidimensional Construct

As conceptualized by Ang et al. (2006, 2007), CQ is a multidimensional construct with four dimensions: metacognitive, cognitive, motivational, and behavioral.

Metacognitive CQ is the person's cultural consciousness and awareness of cultural cues during interactions with people from other cultural backgrounds. Ang et al. (2006) describe it as the processes people use to acquire and understand cultural knowledge. People with metacognitive CQ consciously question their own cultural assumptions, reflect on these assumptions, and then develop cultural knowledge and skills during interactions with people from other cultures (Ang & Van Dyne, 2008).

Cognitive CQ is a competence based on the knowledge of norms, practices, and conventions used in different cultural settings, acquired through education and personal experience (Ang et al., 2007; Ang & Van Dyne, 2008). It includes knowledge of the economic, legal, and social systems of different cultures, as well as the value system of these cultures (Ang et al., 2007).

Motivational CQ represents a capability to direct attention and energy toward learning about and functioning in situations characterized by cultural differences. People with high motivational CQ have an intrinsic interest in cross-cultural situations and are confident of their personal cross-cultural effectiveness (Ang et al., 2007). A high score on the motivational CQ dimension reflects a high level of self-efficacy (Ng & Earley, 2006).

Finally, *behavioral CQ* refers to the capability to exhibit appropriate verbal and nonverbal behavior when interacting with people from different cultures (Ang et al., 2006). People with high behavioral CQ behave appropriately in cross-cultural settings, because of their good verbal and nonverbal communication capabilities. They also know how to use culturally appropriate words, tones, gestures, and facial expressions (Ang et al., 2007).

Empirical Tests of the CQS

The four-dimensional CQS has undergone testing in several validation and development studies (see the Appendix). However, despite Ang and Van Dyne's (2008) claim that the four-dimensional structure is clear, robust, meaningful, and stable across samples, time, and countries, our review of extant empirical studies indicates that most validation studies are limited in either the (1) sample used or (2) test of discriminant validity.

First, the samples used in most CQ studies tend to consist of respondents with little cross-cultural experience (e.g., Amiri, Moghimi, & Kazemi, 2010; Ang & Van Dyne, 2008; Ang et al., 2006; Gregory, Prifling, & Beck, 2009; Templer et al., 2006; Vedadi, Kheiri, & Abbasalizadeh, 2010; Ward et al., 2009), which could threaten the validity of their results. For example, Ang et al. (2006) used a sample of undergraduate business students with relatively little foreign experience (1.8 on a three-point scale, in which 1 means no experience and 2 indicates moderate experience). Ang et al. (2007, study 1) also used samples of young undergraduate students between 19 and 22 years of age with no work experience abroad. Crowne's (2008) study seems to be the exception: 76% of the students in that sample had international experience. However, most of their experiences involved vacations, which contribute less to cross-cultural learning than do work or study abroad experiences (Crowne, 2008). Because CQ refers to a capability to function effectively in culturally diverse settings (Earley & Ang, 2003) and deals with how people adapt and thrive in an environment other than the one in which they were socialized (Brislin et al., 2006), it requires some experience with cross-cultural encounters and foreign cultures to develop (Tarique & Takeuchi, 2008). This argument receives empirical support from Ramalu, Rose, Kumar, and Uli (2010), who find significant correlations between the length of stays abroad and three of the four CQ dimensions (metacognitive, cognitive, and behavioral CQ). Similarly, Imai and Gelfand (2010) reveal a positive correlation between international experience and behavioral CQ.

Tarique and Takeuchi (2008) also find that international non-work experience significantly improves CQ, though Crowne (2008) acknowledges that vacation contributes much less to CQ development than study or work experience abroad. Across their studies, Ward et al. (2009) note that older students studying abroad with more foreign experience have higher average CQ than younger students with less foreign experience. The lack of foreign experience may influence not only the level of CQ but also the psychometric properties of the scale and its dimensionality. Young (student) respondents without extended foreign experience likely lack sufficient cross-cultural knowledge to differentiate fully among the items that measure the CQ dimensions. Thus, their experiences likely reflect a cultural perspective that is too limited to enable them to assess the subtleties of the CQS items effectively.

Second, many validation studies fail to report tests of discriminant validity of the four-dimensional structure of the CQS, despite the moderately high to high intercorrelations across dimensions (Chen, Li, & Sawangpataakanul, 2011; Chen, Portnoy & Liu, 2012; Elenkov & Manev, 2009; Fischer, 2011; Harrison, 2012; Imai & Gelfand, 2010; Lin et al., 2012; MacNab & Worthley, 2012; Ramalu et al., 2010; Rockstuhl, Seiler, Ang, Van Dyne, & Annen, 2011; Rose, Ramula, Uli, & Kumar, 2010; Vedadi et al., 2010; Ward et al., 2009; Ward, Wilson, & Fischer, 2011). For example, Ward et al. (2009) report correlations as high as .74 between metacognitive and motivational CQ and .78 between metacognitive and behavioral CQ. Van Dyne, Ang, and Koh (2009) find correlations between metacognitive and motivational CQ (up to .76) and between metacognitive and behavioral CQ (up to .71). Tarique and Takeuchi (2008) also cite high correlations across all four CQ dimensions (from .63 to .83). The studies report acceptable reliability and convergent validity, but they still need to test for discriminant validity (Fornell & Larcker, 1981), because a lack of discriminant validity creates the risk of multicollinearity (Grewal, Cote, & Baumgartner, 2004; Marsh, Dowson, Pietsch, & Walker,

2004; Perrinjaquet, Furrer, Usunier, Cestre, & Valette-Florence, 2007). For example, Grewal et al. (2004) demonstrate that high multicollinearity (correlations between .60 and .80) due to a lack of discriminant validity can lead to substantial Type II errors (greater than 50% and frequently above 80%).

On the one hand, the results of the preliminary tests of the CQS are encouraging, such that the reliability and convergent validity of the scale and its dimensions demonstrate acceptable properties. On the other hand, most validation studies rely on samples of respondents with limited overseas experience, and few of them report the discriminant validity of the four-dimensional CQ structure, despite indications of high correlations between these dimensions. To overcome these concerns, we assess the psychometric properties (including discriminant validity) of the CQS with a sample of Chinese respondents who have extensive overseas experience and have intensely confronted cultural differences. We assert that the original four-dimensional structure of the CQS is not as robust as previously believed, due to issues related to the cultural context. We also posit that the CQS is not completely etic, which legitimates a replication study with a homogeneous sample of native Chinese respondents, using a translated version of the CQS. As far as we know, no previous study related to the CQS has tested a Chinese CQS in a homogeneous sample.

Method

Sample

To test the psychometric properties of the CQS, we conducted a survey of Chinese respondents with extensive foreign experience, mainly through studies overseas. Mature expatriate Chinese students are hard to find, so we relied on chain sampling (Faugier & Sargeant, 1997) and approached overseas Chinese communities online. The Chinese students

were distributed across various countries. After deleting questionnaires with more than 10% missing values and those answered randomly, 308 questionnaires remained as appropriate for the analysis, which together formed a balanced sample. The descriptive characteristics in Table 1 show that the sample consists of 51.3% female respondents and 48.7% male respondents, 63.3% of whom are older than 24 years, whereas only 2.6% are younger than 20 years. Furthermore, 67.8% of the respondents have completed a bachelors' degree, and 33.1% are pursuing a Ph.D. degree. In terms of time spent abroad, 80.8% have spent more than a year, 49.3% more than three years, and 33.4% more than five years. Finally, 72% of the respondents often or constantly interact with people from another culture

Students required 12–15 minutes to complete the online questionnaire, which indicated satisfactory levels of attention. Furthermore, not all students who started to fill in the questionnaire completed it, because they could stop responding without any penalty. This self-selection meant that only more motivated students completed the survey; we thus do not expect any inefficient effort responding, as described by Huang et al. (2012).

(see Table 1 next page)

Table 1: Sample Characteristics

External Variables	Mean	SD
Age[1]	27.69 years	6.03 years
Gender (male/female)	150/158	48.7%/51.3%
Education[2]		
high school/ vocational education	12	3.9%
bachelor	87	28.2%
master/MBA	107	34.7%
PhD	102	33.1%
Time Abroad[3]		
Less than 3 months	23	7.5%
3-6 months	12	3.9%
6-12 months	24	7.8%
1-3 years	97	31.5%
3-5 years	49	15.9%
More than 5 years	103	33.4%
Contact frequency[4]		
seldom	8	2.6%
occasionally	78	25.3%
often	160	51.9%
All the time	62	20.1%

Questionnaire Design and Measures

To reduce the risk of common method bias (CMB), in designing the questionnaire, we started with the independent CQ scale, followed by factual demographic questions and then the dependent performance scale. The social desirability scale concluded the questionnaire. Furthermore, as recommended by Podsakoff, MacKenzie, Lee, and Podsakoff (2003), we used different scale endpoints for the dependent and independent variables.

The survey instrument consisted of four parts. The first part was the original, Chinese-language version of the CQS, with 20 items covering the four dimensions of CQ: 4

metacognitive CQ items (e.g., “I am conscious of the cultural knowledge I use when interacting with people with different cultural backgrounds”), 6 cognitive CQ items (e.g., “I know the legal and economic systems of other cultures”), 5 motivational CQ items (e.g., “I enjoy interacting with people from different cultures”), and 5 behavioral CQ items (e.g., “I change my verbal behavior (e.g., accent, tone) when a cross-cultural interaction requires it”). The final CQS, developed by Ang et al. (2007), appears in Table 2. All CQS items were measured on seven-point Likert scales, ranging from 1 (“strongly disagree”) to 7 (“strongly agree”).

The second part of the instrument featured the demographic items: gender (male = 1, female = 2); age (less than 20 years old, between 20 and 24, between 25 and 29, between 30 and 39, and more than 40 years old); education (less than bachelor, bachelor, Master/MBA, and Ph.D.); time spent abroad (How long have you lived/studied/worked outside your home country in total?), which uses six categories (less than 3 months, 3–6 months, 6–12 months, 1–3 years, 3–5 years, more than 5 years); and contact frequency, using the categories “seldom,” “occasionally,” “often,” and “all the time.”

The third part contained four questions to measure the effectiveness of respondents’ communication behavior across national cultures (e.g., “How effective were/are you in expressing your opinion to, in absorbing information from, in starting a conversation with, in understanding people from other cultures during your time abroad?”), on a five-point Likert scale (adapted from Hammer, Gudykunst, & Wiseman, 1978). The Cronbach’s alpha of this adapted scale was .774.

Finally, the ten questions in the fourth part measured respondents’ social desirability, as a means to assess the possible biasing effect of social desirability on CQS scores. Social desirability significantly influences emotional intelligence (Kluemper, 2008), a concept

strongly related to CQ (Ward et al., 2009). To measure it, we used the Marlow-Crowne Social Desirability Scale, version 2 (10) (Strahan & Gerbasi, 1972).

All the items in sections 2–4 employed existing scales, originally developed in English and then translated into Chinese, using standard translation–back translation procedures (Van de Vijver & Leung, 1997). The CQS we used already had been translated into Chinese (Ang et al., 2007). As far as we know, ours is the first sample of homogeneous, mainland Chinese respondents who answered in their native language.

Data Analysis

Our analytical strategy first required us to assess scale reliability using Cronbach's alpha values and factor loadings. Alphas greater than or equal to .70 suggest acceptable reliability, along with factor loadings that exceed .50 (Nunnally & Bernstein, 1994). After applying internal reliability tests to determine which items to retain, we conducted confirmatory factor analyses (CFA), using AMOS 16.0, to test the proposed four-factor CQS model. As recommended by Perrinjaquet et al. (2007), we tested four-factor models rather than the four dimensions separately, which enabled us to assess the discriminant validity of the four CQ dimensions. We employed maximum likelihood estimation procedures, because the data did not strongly violate multivariate normality assumptions (McDonald & Ho, 2002). Following common practice (e.g., Byrne, 2001; Hu & Bentler, 1999), we used multiple indicators to assess model fit: normed chi-square (χ^2/d.f.), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), non-normed fit index (NNFI), and comparative fit index (CFI), such that we required RMSEA $\leq$ .05, SRMR $\leq$ .06, NNFI $\geq$ .90, CFI $\geq$ .95, and χ^2/d.f. less than or equal to 2 as indicators of good model fit. To assess discriminant validity, we started with the procedure recommended by Fornell and Larcker (1981) and compared the square root of the average variance extracted (AVE) with the correlations between the CQS dimensions. Next we used CFA to compare unconstrained

measurement models with alternative measurement models in which we constrained the covariances between CQ dimensions to be equal to 1. A significant fit difference that favors the unconstrained models would indicate discriminant validity. To examine the nomological validity of the CQS, we also conducted several regression analyses to find the relationships of CQ with several antecedents (i.e., gender, education, contact frequency, time spent abroad, and social desirability) and consequences (i.e., cross-cultural communication effectiveness). Finally, we tested for CMB, because our study used self-reported measures from the same respondents for both the independent and the dependent variables.

Results

We first subjected the original 20 CQS items to a CFA (Model 1) and computed the Cronbach's alpha for each of the four CQS dimensions. We examined the error variances, correlations, standard errors, goodness-of-fit indices, and factor loadings to assess the psychometric properties of the model (Cheung & Rensvold, 2002). The error variances were all positive and did not significantly differ from 0, no correlations were greater than 1, and standard errors were not too large. The Cronbach's alpha coefficients were satisfactory, ranging from .69 for metacognitive CQ (MC), motivational CQ (MOT), and behavioral CQ (BEH) to .81 for cognitive CQ (COG) (see Table 2). However, the factor loadings of four items (MC2, MOT1, MOT4, and BEH1) failed to reach the .50 threshold value. Model 1 possesses relatively poor fit (see Table 3), with values of 2.51 for the normed chi-square, .070 for RMSEA, .059 for SRMR, .88 for the goodness-of-fit index (GFI), .85 for the adjusted goodness-of-fit index (AGFI) and NNFI, and .87 for the CFI.

(see Tables 2 and 3 next pages)

Table 2. CFA Standardized Factor Loadings and Cronbach's Alphas

		Model 1				Model 8	
		MC	**COG**	**MOT**	**BEH**	**ICK intelligence**	**ECF intelligence**
MC1	I am conscious of the cultural knowledge I use when interacting with people with different cultural backgrounds.	.66				.52	
MC2	I adjust my cultural knowledge as I interact with people from a culture that is unfamiliar to me.	.39				n.u.	
MC3	I am conscious of the cultural knowledge I apply to cross-cultural interactions.	.85				.75	
MC4	I check the accuracy of my cultural knowledge as I interact with people from different cultures.	.55				n.u	
COG1	I know the legal and economic systems of other cultures.		.69			.67	
COG2	I know the rules (e.g., vocabulary, grammar) of other languages.		.51			.52	
COG3	I know the cultural values and religious beliefs of other cultures.		.76			.79	
COG4	I know the marriage systems of other cultures.		.70			.67	
COG5	I know the arts and crafts of other cultures.		.66			.62	
COG6	I know the rules for expressing non-verbal behaviors in other cultures.		.62			n.u.	
MOT1	I enjoy interacting with people from different cultures.			.46			n.u.
MOT2	I am confident that I can socialize with locals in a culture that is unfamiliar to me.			.70			.77
MOT3	I am sure I can deal with the stresses of adjusting to a culture that is new to me.			.65			.65
MOT4	I enjoy living in cultures that are unfamiliar to me.			.46			n.u.
MOT5	I am confident that I can get accustomed to the shopping conditions in a different culture.			.50			n.u.
BEH1	I change my verbal behavior (e.g., accent, tone) when a cross-cultural interaction requires it.				.43		n.u.
BEH2	I use pause and silence differently to suit different cross-cultural situations.				.51		.49
BEH3	I vary the rate of my speaking when a cross-cultural situation requires it.				.59		.59
BEH4	I change my non-verbal behavior when a cross-cultural interaction requires it.				.64		.50
BEH5	I alter my facial expressions when a cross-cultural interaction requires it.				.63		n.u.
	Cronbach's alpha	.69	.81	.69	.68	.83	.71

Notes: n.u. = not used.

Table 3. Measurement Models' Fit Indices

Model	Modifications	χ^2	d.f.	χ^2/d.f.	RMSEA	SRMR	GFI	AGFI	NNFI	CFI
Model 1	Full model (four dimensions) (20 items)	411.0	164	2.51	.070 [.062 - .079]	.061	.88	.85	.85	.87
Model 2	Delete items with low loadings (MC2, MOT 1, MOT4, BEH1) (16 items)	253.8	98	2.58	.072 [.061 - .083]	.059	.91	.87	.88	.90
Model 3	Delete items with cross-loadings (COG6) (15 items)	187.1	84	2.23	.063 [.051 - .075]	.056	.93	.90	.91	.93
Model 4	Covariances between error terms (COG4-MOT3, BEH4-BEH5, and MOT2-BEH3)	149.5	81	1.85	.053 [.039 - .066]	.050	.94	.91	.94	.95
Model 5	All covariances between MC, COG, MOT, and BEH constrained to 1	211.3	87	2.43	.068 [.057 - .080	.081	.92	.88	.90	.87
Model 6	Covariances between MC-COG and MOT-BEH constrained to 1	162.6	83	1.96	.056 [.043 - .069]	.056	.94	.91	.93	.94
Model 7	Delete MOT5 for factor loading and MC4 and BEH5 for cross-loading (12 items)	77.8	48	1.62	.047 [.025 - .063]	.046	.96	.94	.96	.97
Model 8	New model (two dimensions), MC-COG and MOT-BEH are created	88.4	51	1.73	.049 [.031 - .066]	.045	.96	.93	.96	.97

To achieve satisfactory model fit and confirm the psychometric properties of the CQS, we first deleted the four items with factor loadings lower than .50 and recomputed the CFA (Model 2). In terms of convergent validity, the factor loadings and Cronbach's alphas reached satisfactory levels. The resulting CFA fit indices—χ^2/d.f. = 2.58, RMSEA = .073, SRMR = .059, GFI = .91, AGFI = .87, NNFI = .88, and CFI = .90—improved slightly but still were not satisfactory. Therefore, we examined modification indices (MIs) to identify potential cross-loadings. One cognitive CQ item (COG6) cross-loaded on the behavioral CQ dimension; we removed it before computing Model 3. The fit indices of Model 3 again depicted some improvements but still fell short of the recommended thresholds: χ^2/d.f. = 2.23, RMSEA = .063, SRMR = .056, GFI = .93, AGFI = .90, NNFI = .91, and CFI = .93. In the next step, again based on an examination of the MIs (Byrne, 2001), we added covariances between the error terms of COG4–MOT3, BEH4–BEH5, and MOT2–BEH3 and ran another CFA. The improved outcomes of Model 4 achieved acceptable fit indices: χ^2/d.f. = 1.85, RMSEA = .053, SRMR = .050, GFI = .94, AGFI = .98, NNFI = .94, and CFI = .95.

To assess discriminant validity, we compared the square root of the AVE with the correlations across the four CQ dimensions (Fornell & Larcker, 1981). The square root of the AVE values in Table 4 ranged from .56 to .71, whereas pairwise correlations ranged from .64 to .82. The correlations between metacognitive and cognitive CQ (r = .82) and between motivational and behavioral CQ (r = .82) were both higher than their respective AVEs, which indicated a lack of discriminant validity for these two pairs. As a more formal test, we also compared the unconstrained CFA model (Model 4) with two alternative models: Model 5, in which we constrained all the covariances between the four CQ dimensions to be equal to 1, such that we could test if the cultural intelligence construct was best represented by only a single dimension, and Model 6, in which we constrained the two covariances between metacognitive and cognitive CQ and between motivational and behavioral CQ to be equal to

1 to determine if the cultural intelligence construct was best represented by two dimensions. As we noted previously, a significant fit difference that favors the constrained model would indicate a lack of discriminant validity.

Table 4. Correlation Matrix

	Mean	SD	MC	COG	MOT	BEH	SDB
MC	3.69	.87	***.71***				
COG	4.24	1.18	.82***	***.67***			
MOT	5.37	1.05	.65***	.68***	***.64***		
BEH	5.02	1.02	.64***	.54***	.82***	***.56***	
SDB	5.92	1.02	.01	.10	.05	.05	n.a.
CQ	4.89	.87	.83***	.81***	.78***	.73***	.07

Note: Results from Model 4 (15 items). Square root of the average variance extracted is on the diagonal.
*** $p < .001$.

The fit indices of Model 5 decreased significantly compared with those of Model 4: χ^2/d.f. = 2.43, RMSEA = .068, SRMR = .081, GFI = .92, AGFI = .88, NNFI = .90, and CFI = .87. The comparison between the levels of fit of two models yielded a significant chi-square difference in favor of the unconstrained model ($\Delta\chi^2$ = 61.6, $p < .001$); the one-dimension model represented the data poorly. Compared with those of Model 4, the fit indices of Model 6 also decreased, but to a lesser extent: χ^2/d.f. = 1.96, RMSEA = .056, SRMR = .056, GFI = .94, AGFI = .91, NNFI = .93, and CFI = .94. The comparison of the levels of fit models again yielded a significant chi-square difference in favor of the unconstrained model ($\Delta\chi^2$ = 13.1, $p < .01$). However, the MIs revealed three problematic items: MOT5 had a factor loading smaller than .50, and MC4 and BEH5 cross-loaded. After deleting these three items, we computed Model 7, which showed significantly improved fit indices compared with Model 4: χ^2/d.f. = 1.62, RMSEA = .045, SRMR = .046, GFI = .96, AGFI = .94, NNFI = .96, and CFI =

.97. The comparison between the levels of fit of these two models yielded a significant chi-square difference, but it was in favor of the constrained model ($\Delta\chi^2$ = 51.9, p < .001). Therefore, a two-dimensional model with 12 items appears to represent the data better than the four-dimensional original model.

In a final step, we recomputed a two-dimensional model (Model 8) in which we combined the MC and COG items into a single dimension, called *internalized cultural knowledge intelligence (ICK intelligence*), and the MOT and BEH items into a single dimension, called *effective cultural flexibility intelligence (ECF intelligence).* Model 8 exhibits satisfactory fit indices, in support of a two-dimensional reconceptualization of the cultural intelligence construct: χ^2/d.f. = 1.73, RMSEA = .049, SRMR = .045, GFI = .96, AGFI = .93, NNFI = .96, and CFI = .97. The reliabilities of the two dimensions were satisfactory, with Cronbach's alphas of .83 for ICK intelligence and .71 for ECF intelligence. The two dimensions also exhibited satisfactory discriminant validity, in that their correlation (.65) was smaller than the square root of their respective AVEs (both .66), which mitigates potential multicollinearity issues (Grewal et al., 2004). The mean and standard deviation of ICK intelligence were 4.49 and 1.06, and for ECF intelligence, the values were 5.17 and .90, respectively.

To explore the antecedents and outcomes of these two new CQ dimensions and assess their nomological validity, we ran a series of regressions. In the first two models, ICK intelligence and ECF intelligence served as the dependent variables, with gender, education, contact frequency, time abroad, and social desirability as independent variables.

However, before conducting these analyses, we tested for possible CMB (Podsakoff et al., 2003) by conducting CFAs for alternative models that included the dependent (communication effectiveness) and independent (ICK intelligence and ECF intelligence) variables simultaneously. We focused on the CFI statistics, such that a ΔCFI of .01 or less

would indicate a non-significant change (Cheung & Rensvold, 2002). Compared with the three-factor model (ICK, ECF, and communication effectiveness), the Harman one-factor model revealed a significantly poorer fit (ΔCFI = .218). We also tested for the bias with the marker technique recommended by Podsakoff et al. (2003). The Chi-square test demonstrated that the fit of the model with the marker was poorer than the fit of the model without it ($\Delta\chi^2$/d.f. = 1.72 – 1.63 = .09, $p < .05$). In addition, the regression coefficients with the marker were all close to 0. Therefore, CMB did not appear to have a significant effect on our data.

We provide the results of the regression analyses in Table 5. The variances explained by these two models, 18.1% for ICK intelligence and 11.4% for ECF intelligence, respectively, were significant and satisfactory. Gender exhibited a significant relation with both ICK intelligence (β = .123, $p < .05$) and ECF intelligence (β = .144, $p < .05$); that is, women showed higher levels of CQ than men. Education did not relate statistically to either CQ dimension. Contact frequency exerted a strong relation with both ICK intelligence (β = .288, $p < .001$) and ECF intelligence (β = .226, $p < .001$). Time spent abroad only influenced ICK intelligence (β = .161, $p < .01$) and had an insignificant relationship with ECF intelligence (β = .058, $p > .05$). Finally, as we expected, social desirability had a positive relation with both ICK intelligence (β = .156, $p < .01$) and ECF intelligence (β = .142, $p < .01$). The change in R-square was .92, so 9.2% of the variance in cross-cultural communication effectiveness can be explained by cultural intelligence, which is significant.

(see Table 5 next page)

Table 5. Regression Results

	ICK Intelligence	ECF Intelligence	Cross-Cultural Communication Effectiveness	Cross-Cultural Communication Effectiveness
Gender	.123*	.144*	.141**	.087†
	(2.290)	(2.574)	(2.761)	(1.792)
Education	-.026	-.020	____	____
	(-.464)	(-.335)		
Contact frequency	.288***	.226***	.367***	.268***
	(5.413)	(4.085)	(7.149)	(5.288)
Time abroad	.161**	.058	.189***	.144**
	(2.916)	(1.006)	(3.709)	(2.961)
Social desirability	.156**	.142*	.065	.004
	(2.920)	(2.556)	(1.275)	(.086)
ICK intelligence				.250***
				(4.132)
ECF intelligence				.125*
				(2.139)
F-Value	13.339***	7.737***	23.164***	24.278***
R^2	.181	.114	.234	.313
ΔR^2				.092***

Notes: ICK intelligence = internalized cultural knowledge intelligence, ECF intelligence = effective cultural flexibility intelligence. Standardized coefficients and *t*-values are in parentheses.
$^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

To assess the nomological validity of the two CQ dimensions, we tested the relation of ICK and ECF intelligence with cross-cultural communication effectiveness, controlling for the demographic variables, in a hierarchical regression. As the results in Table 5 show, in the first model, with only the demographic controls, the variance explained was 23.4%. We excluded education from this model to avoid multicollinearity issues. Gender (β = .141, p < .01), contact frequency (β = .367, p < .001), and time spent abroad (β = .189, p < .001) revealed significant relations with cross-cultural communication effectiveness, but social desirability was not significantly related to it. We noted a score of .07 between CQ and social desirability (SDB) and scores of .01 between MCCQ and SDB, .10 between COGCQ and

SDB, .05 (non-significant) between BEHCQ and SDB, and .05 between MOTCQ and SDB (see Table 4). Harman's single-factor test did not reveal a dominant single factor for the Chinese data (first factor explained 29.8% of variance). Testing for social desirability in the Chinese data, we found that the correlations between CQ items and social desirability were less than .2 (Watkins, 1996), except for item MC3.

When we entered ICK and ECF intelligence into the second model, it explained 31.3% of the variance (additional 9.2%, significant at .001). Both ICK intelligence (β = .250, p < .001) and ECF intelligence (β = .125, p < .05) exerted significant positive effects on cross-cultural communication effectiveness, in support of the nomological validity of these two dimensions.

Discussion and Conclusion

Recently scholars have proposed and developed the concept of CQ to better understand and explain differences in cross-cultural effectiveness. To measure CQ, Earley and Ang (2003) developed the CQS, which has been used in an increasing number of studies. However, the validity of previous CQ studies might be questionable, due to the lack of foreign experience of the respondents and the omission of discriminant validity tests. To overcome these limitations, we examine the validity and reliability of the CQ construct by testing the CQS with a homogeneous sample of 308 Chinese respondents who have relatively extensive overseas experience. Although the scale provides satisfactory reliability and convergent validity, its discriminant validity was unsatisfactory. The four dimensions of the CQS are too strongly correlated to be distinguishable, which might cause multicollinearity issues when using the scale to assess cross-cultural effectiveness. In reexamining the dimensionality of the CQ scale, we find instead that the CQ construct is best conceptualized by two dimensions with adequate psychometric properties, which we labeled *ICK intelligence* and *ECF*

intelligence. The former depicts a person's awareness of cultural knowledge, composed of items measuring metacognitive CQ that express consciousness of cultural knowledge, together with items measuring cognitive CQ that express cultural knowledge and cultural knowledge structures. That is, ICK intelligence has a cognitive nature, exhibiting commonalities with cognitive intelligence. Cognitive intelligence also represents the specialization of general intelligence in the domain of cognition, in ways that reflect experience and learning about cognitive processes, such as memory (Côté & Miners, 2006). The latter dimension consists of items from the motivation and behavior CQ dimensions. It regroups the self-efficacy part of the motivation CQ dimension with the ability to adjust verbal and nonverbal abilities from the behavior CQ dimension, into a new dimension that reflects self-conscious adjustment. Thus ECF intelligence has an action-oriented nature and commonalities with emotional intelligence. Emotional intelligence represents the specialization of general intelligence in the area of emotions, reflecting experience and learning about emotions (Côté & Miners, 2006). A two-dimensional CQ model also has been proposed by Ward et al. (2009), but their version exhibited poor fit compared with the original four-dimensional model. We offer two possible explanations for the differences in our results: First, Ward et al. (2009) kept the 20 original CQS items, whereas in our analysis, we deleted 8 items with poor factor loadings or cross-loadings. Second, we used a sample of older students, with extensive foreign experience, whereas the students in Ward et al.'s (2009) study were younger and had just arrived at a foreign university.

The discriminant validity of CQS dimensions has often been overlooked in previous studies, which is highly problematic, in that our findings reveal that the four-dimensional CQS lacks discriminant validity. Many studies have failed to identify this issue, because they simply did not test for discriminant validity. Studies that offer support for discriminant validity mainly have been based on samples of young students with limited foreign

experience (e.g., Tarique & Takeuchi, 2008; Ward et al., 2009). Such samples likely pose a threat to the validity of the results, because CQ can be developed only through experience with foreign cultures (Crowne, 2008; Imai & Gelfand, 2010; Ramalu et al., 2010; Tarique & Takeuchi, 2008). For example, international assignments relate positively to the development of CQ (Caligiuri & Tarique, 2009). Our regression results provide further support for this argument, in that they show that contact frequency and time spent abroad are critical antecedents of CQ. Therefore, students with little foreign experience may lack the cultural awareness necessary to respond to and differentiate among survey items—especially if they answer survey items in a language other than their native language. Crowne (2008) also finds that education and employment abroad influence CQ positively, unlike vacations abroad. Thus, both the breadth (number of visits to foreign countries) and the depth (degree of interaction with locals) of cultural exposure appear to affect the development of CQ (Crowne, 2013).

Time spent abroad has a significant influence on ICK intelligence but not on ECF intelligence. This result could imply that spending time abroad is not sufficient to cause people to adapt their behavior; rather, what is necessary is that they interact with local people instead of remaining within their own cultural group (e.g., in expatriate compounds, "Chinatown"). In the samples in previous studies, respondents may have had such limited international experience (e.g., students at the start of their study) that they could not respond in an appropriate way.

Experience abroad combined with frequent interaction with host nationals is important for the development of CQ. Thus, CQ can be perceived of as a set of learning capabilities that support people's ability to benefit more from international assignments (Ng, Van Dyne, & Ang, 2009; Vogelgesang, Clapp-Smith, & Palmer, 2009). Yet educational level has no significant relation with either dimension of CQ, which means that CQ is a type of tacit

knowledge that must be experienced rather than learned through formal teaching. Perhaps junior managers should be sent abroad on expatriate assignments early in their careers to develop their CQ, as long as those assignments include frequent interaction opportunities with people from various cultural backgrounds. Both ICK and ECF intelligence influence cross-cultural communication effectiveness, which confirms the importance of CQ for individual development, especially for those who receive international or expatriate work assignments (Paik & Sohn, 2004). For example, in the recruitment and selection of new university graduates, applicants with overseas study experience or internships abroad may already have developed their CQ, which likely makes them more suitable for international assignments (Caligiuri, 2009; Crowne, 2008; Crowne, 2013; Takeuchi et al., 2005; Tarique & Takeuchi, 2008).

Another interesting finding from our study is that gender has a significant relation with both ICK and ECF intelligence. Female respondents scored higher on both dimensions than male respondents; it appears women are better equipped to develop CQ and succeed in foreign assignments. However, gender also relates to cross-cultural communication effectiveness, a direct effect that disappears as soon as we include CQ in the model. This result might mean that women are more effective than men in cross-cultural communication because of their higher CQ. However, at the same level of CQ, both genders are equally effective communicators.

To address our contrasting result, namely, finding a two-dimensional construct rather than the four-dimensional CQ construct in prior studies, we note that no extant research has featured a sample of homogeneous Chinese respondents. Furthermore, most studies relied on the English version of the CQS. We employed the Chinese translation of the CQS, provided by the Cultural Intelligence Center in Singapore. Our use of both a homogeneous Chinese sample and a Chinese translated version of the CQS may be responsible for our alternative

outcome, which also highlighted a lack of discriminant validity. That is, we have found no previous study that used the Chinese translation of the CQS, and the translation could be the cause of the lower discriminant validity in this study. We conclude from this finding that the CQS is less etic. Another way to support the validity of the CQ construct would be to use it in combination with emotional intelligence and social intelligence constructs, as suggested by Crowne (2009).

As does any research, this study contains some limitations. First, we used self-reported CQ scales, which might have influenced our results (Ang et al., 2007; Ward et al., 2009). To reduce this concern, we controlled for social desirability; it related significantly with both ICK and ECF intelligence. That is, respondents who are sensitive to social desirability report higher CQ scores. We acknowledged and corrected for this biasing relation in our analysis; however, further research could use peer- or superior-reviewed measures to obtain more objective data. Alternatively, other measurement methods could be applied. To prevent measures of attitudes rather than adaptation behavior, the use of role-playing and critical incident techniques might be beneficial.

Second, we used the translated Chinese CQS developed by Ang et al. (2007). Most studies have used the original English-language version, so our comparisons might be limited. To compare our results formally with those of studies using the English-language version of the CQS, we would need to conduct a test of the cross-cultural equivalence of the scale. Additional research might conduct such a test using a non-English version of the scale.

Third, we collected data from cross-culturally experienced respondents from only one country, China. Before the two new CQ dimensions can be applied across cultures, it is necessary to assess their psychometric properties with samples from more countries and different parts of the world, such as Europe, the Americas, and Africa. These new dimensions should be tested not only with students but also among managers who have been exposed to a

wide range of international experiences. Accordingly, the generalizability of these findings is limited. We included students in the sample, because we had access to business students from China who possessed substantial international experience, which fit well with our plan to test the CQS across important, less well tested cultures. Additional studies should explicitly compare results obtained from student and non-student samples. Furthermore, China is an important emerging economy, encompassing large numbers of cross-cultural relationships between businesses, so including China in tests of any measurement scale likely is pertinent to managers who must select and develop employees with cross-cultural competencies. However, further studies should compare the results across multiple cultures.

Additional research also could focus on the relationship between personality and the two new CQ dimensions. Some studies suggest an important role of personality in predicting cross-culturally effective behavior (Caligiuri, 2006; Caligiuri & Tarique, 2009; Ward et al., 2009); therefore, it would be interesting to consider the potential relationships between, say, the Big Five personality traits and ICK and ECF intelligence. In addition, the imprinting relation of early life experiences (e.g., international travel in early childhood, exposure to foreign cultures at a young age) with CQ may be critical for understanding its emergence in people's development (Caligiuri, 2006).

In conclusion, in this research among Chinese students with extended overseas experience, we have critically assessed the dimensionality of the CQS. Our findings show that a two-dimensional model fits the data better than the original four-dimensional model. Our first proposed dimension, ICK intelligence, regroups metacognition and cognition items, and our second, ECF intelligence, combines motivation and behavior items.

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Appendix: Empirical CQS Studies

Authors	Country	Sample	Outcome	Critiques
Ang et al., 2006	Singapore	465 + 338 undergraduate students from multiple countries	Cronbach's alphas = .76-.84. CFA: χ^2 = 369.91, *d.f.* = 164; GFI = .92; NNFI = .96; CFI = .97; SRMR = .046; RMSEA = .053.	Sample consists of students with limited overseas experience.
Templer et al., 2006	Multiple countries	157 global professionals	For one dimension, MOT: Cronbach's alpha = .79	Sample is very diverse. Test only MOT.
Ang et al., 2007, initial factor structure	Singapore	576 undergraduate students in Singapore	Cronbach's alphas for CQ factors = .76-.86. χ^2 = 822.26, *d.f.* = 164, NNFI = .91, CFI = .92, SRMR = .06, RMSEA = .08.	Students with limited overseas experience.
Ang et al., 2007, across samples	Singapore	447 undergraduate students from Singapore	Cronbach's alphas for CQ factors = .77-.84. χ^2 = 381.28, *d.f.* =164, NNFI = .96, CFI = .96, SRMR = .04, RMSEA = .05.	Students with limited overseas experience.
Ang et al., 2007, across time	Singapore	204 students from Singapore	χ^2 = 981.18, d.f. =692, NNFI = .94, CFI = .95, SRMR = .06, RMSEA = .04.	Students with limited overseas experience.
Ang et al., 2007, across countries	Singapore and U.S.	Undergraduate students: U.S. = 337, Singapore = 447.	χ^2 = 723.23, *d.f.* =328, NNFI = .96, CFI = .97, SRMR = .05, RMSEA = .05.	Students with limited overseas experience.
Ang et al., 2007, study 1	U.S.	235 undergraduate students in U.S.	χ^2 = 2349.73, *d.f.* = 1350; NNFI = .93; CFI = .94; SRMR = .05; RMSEA = .05.	Students with limited foreign experience; There is not tested for discriminant validity.
Ang et al., 2007, study 1	Singapore	358 undergraduate students	χ^2 = 1686.18, *d.f.* = 869; NNFI = .95; CFI = .96; SRMR = .05; RMSEA = .05.	Sample consists of students with limited foreign experience; discriminant validity.
Ang et al., 2007, study 2	17 countries worldwide.	98 international managers	Cronbach's alphas = .71-.85 CFA: χ^2 = 580.53, *d.f.* = 401; NNFI = .86; CFI = .88; SRMR = .08; RMSEA = .06.	No test for measurement equivalence among the separate countries.
Ang et al., 2007, study 3	12 Asian and European countries	103 foreign professionals	Cronbach's alphas = .81-.87. χ^2 = 877.24, *d.f.* = 805, NNFI = .96, CFI = .97, SRMR = .07, RMSEA = .03. AVEs for each CQ factor (.46-.56) exceeded the square of the correlations with other CQ factors (.10-.32).	No test for measurement equivalence.
Ang & Van Dyne, 2008	U.S.	142 executive MBA students	Cronbach's alphas = .79-.95. χ^2 = 770.18, *d.f.* = 364, NNFI = .94, CFI = .95, SRMR = .07, RMSEA = .08, χ^2 = 770.18, *df* = 364.	Composition of sample is not exactly clear.
Ang & Van Dyne, 2008	Singapore and U.S.	249 U.S. and 252 Singaporean students.	Discriminant validity, incremental validity, and predictive validity are assessed and confirmed.	Undergraduate students with limited overseas experience.
Tarique & Takeuchi, 2008	U.S.	221 undergraduate and graduate students from 58 countries.	Cronbach's alphas = .82-.90.	Students with limited foreign experience. No test for discriminant validity.

Elenkov & Manev, 2009	EU	153 expatriate managers and 695 subordinates from 27 countries	Cronbach's alpha for CQ = .78.	No test for discriminant validity
Ward et al., 2009, study 1	New Zealand	346 international students in mid-size New Zealand university	Cronbach's alphas between .76 and .79. Four-dimensional model showed acceptable fit, contrary to three-, two-, and one-dimensional models: χ^2 = 453.95, *d.f.* = 164, TLI = .93, CFI = .94, SRMR = .070, RMSEA = .076.	Students with limited overseas experience (1 week). Probable lack of discriminant validity.
Ward et al., 2009, study 2.	New Zealand	118 international students	Cronbach's alphas for CQ and its dimensions = .70 to .93. High correlations of CQ dimensions between .50 and .76	Students with limited foreign experience (1-54 months). Probable lack of discriminant validity, not assessed.
Ward et al., 2009, study 3	New Zealand	102 international students.	Cronbach's alphas = .70 and .95. High correlations of CQ dimensions between .44 and .67.	Students with limited foreign experience (1 semester). Confirmation of discriminant validity.
Gregory et al., 2009	Germany and India	31 managers	Motivational CQ and cognitive CQ influence behavioral CQ, which stimulates a negotiated culture in IT offshore outsourcing project teams.	Sample is small. No test for discriminant validity.
Amiri et al., 2010	Iran	74 teachers	Cronbach's alphas = .70 and .82. Correlation between CQ dimensions and performance ranges from .26 to .35. Correlation among CQ dimensions between .29 and .42.	Sample is small. No test for discriminant validity.
Imai & Gelfand, 2010, study 1	U.S.	236 American employees	Cronbach's alphas for CQ and its dimensions between .89 and .91. χ^2 = 421.82, *d.f.* = 166, CFI = .91, SRMR = .06, RMSEA = .08. Correlations among CQ dimensions between .30 and .54.	No test for discriminant validity.
Imai & Gelfand, 2010, study 2	U.S. and Asia	75 U.S and East-Asian (China, Japan, and Korea) undergraduate and graduate students living in the U.S.	Cronbach's alphas CQ and its dimensions for American students = .80 and .90. Cronbach's alphas of CQ and its dimensions for Asian students = .70 and .86. Correlations among CQ dimensions between .33 and .57.	Samples are small. No test for discriminant validity.
Moon, 2010 (JMP)	Korea	390 Korean students of large public university	Cronbach's alphas between .82 and .88.	Discriminant validity of CQ construct compared to EQ construct.
Ramula et al., 2010	Malaysia	332 international expatriates working in Malaysia for at least 1 year.	Cronbach's alphas between .78 and .90. Correlations among CQ dimensions between .33 and .53.	No test for discriminant validity of CQ dimensions.
Rose et al., 2010	Malaysia	332 expatriates working in Malaysia	Cronbach's alphas between .78 and .91.	No test for discriminant validity.
Vedadi et al., 2010	Iran	78 middle and top managers in Iranian oil industry.	Correlations among CQ dimensions between .30 and .51.	Small sample. No test for discriminant validity.
Chen, Li & Sawangpattanakul, 2011	Taiwan	382 Philippine laborers in Taiwan	Cronbach's alphas between .83 to .92.	No test for discriminant validity.
Fischer, 2011	New Zealand	88 New Zealand and international students	Cronbach's alphas between .67 and .80.	No test for discriminant validity.

Rockstuhl et al., 2011	Switzerland	126 Swiss military officers	Cronbach's alpha is .89. CFA with second order model	No test for discriminant validity of CQ dimensions.
Ward et al., 2011	New Zealand	104 international students from 25 countries in New Zealand university	Cronbach's alphas of MC, COG, MOT, and BEH are .80, .82, .76, and 78 respectively. Correlations between .50 and .65.	No test for discriminant validity.
Groves & Feyerherm, 2011	US	121 MBA students of different ethnicities within the US	Cronbach's alphas between .85 and .92.	No test for discriminant validity.
Chen, Portnoy & Liu, 2012	US	308 real estate managers	Cronbach's alpha larger than .80.	No test for discriminant validity.
Harrison, 2012	UK	718 young, second-year, undergraduate, white students from three UK universities	Cronbach's alphas not presented	No test for discriminant validity
Lin et al., 2012		Students from predominantly Asian countries, such as Malaysia, Thailand, Taiwan, and some from Europe, U.S.	Cronbach's alphas .79-.87	No test for discriminant validity
Moon, Choi, & Jung, 2012	Korea	190 expatriates from various countries in Korea	Cronbach's alphas .81-.90	Positive test for discriminant validity
MacNab & Worthley, 2012		370 managers and management students from various countries	Cronbach's alphas for MC, MOT, and BEH are .85, .83, and .83.	No test for discriminant validity.
Moon, Choi & Jung, 2013	Korea	165 Korean expatriates abroad	Cronbach's alphas .80-.91	Just accepted level of discriminant validity
Crowne, 2013				
Lee, Veasna & Wu, 2013	Taiwan	156 Taiwanese expatriates in China		Test for discriminant validity
Li, Mobley & Kelly, 2013	China, Ireland, US, European, and other countries	294 managers and students with working experience	Cronbach's alphas .76 to .85	

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Abstract

Despite an increasing number of publications on cultural intelligence (CQ), the operationalization and conceptualization of this construct demand further attention. In this replication study among 308 experienced overseas Chinese respondents, a two-dimensional structure seems to better represent the data than the original four-dimensional CQ scale. The results of the analysis identify two new dimensions: internalized cultural knowledge and effective cultural flexibility, both of which exhibit satisfactory levels of reliability and validity. A series of regression analyses also provide assessments of the nomological validity of the new CQ dimensions in relation to their antecedents and consequences.

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