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Cultural Intelligence: Its Measurement and Effects on Cultural Judgment and Decision Making, Cultural Adaptation and Task Performance

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ABSTRACT We enhance the theoretical precision of cultural intelligence (CQ: capability to function effectively in culturally diverse settings) by developing and testing a model that posits differential relationships between the four CQ dimensions (metacognitive, cognitive, motivational and behavioural) and three intercultural effectiveness outcomes (cultural judgment and decision making, cultural adaptation and task performance in culturally diverse settings). Before testing the model, we describe development and cross-validation (N = 1,360) of the multidimensional cultural intelligence scale (CQS) across samples, time and country. We then describe three substantive studies (N = 794) in field and educational development settings across two national contexts, the USA and Singapore. The results demonstrate a consistent pattern of relationships where metacognitive CQ and cognitive CQ predicted cultural judgment and decision making; motivational CQ and behavioural CQ predicted cultural adaptation; and metacognitive CQ and behavioural CQ predicted task performance. We discuss theoretical and practical implications of our model and findings.

KEYWORDS cultural adaptation, cultural intelligence, cultural judgment and decision making, individual difference, task performance

INTRODUCTION

Although globalization has made the world seem smaller and 'flat' in many ways (Friedman, 2005), increasing cultural diversity creates challenges for individuals and organizations, making the world 'not so flat' after all. For instance, a sizeable body of research demonstrates the challenges of cultural diversity for multicultural domestic work teams (Tsui and Gutek, 1999); multinational work teams (Earley and Gibson, 2002); global leaders (Van Dyne and Ang, 2006); and those in

overseas work assignments (Bhaskar-Shrinivas et al., 2005). Relatively little research, however, focuses on factors that could improve intercultural encounters (Gelfand et al., 2007). In particular, research on individual capabilities for intercultural effectiveness is sparse and unsystematic, leaving an important gap in our understanding of why some individuals are more effective than others in culturally diverse situations.

Responding to this need, Earley and Ang (2003) developed the construct of cultural intelligence (CQ) based on contemporary theories of intelligence (Sternberg, 1986). Defined as an individual's capability to function and manage effectively in culturally diverse settings, CQ is a multidimensional construct targeted at situations involving cross-cultural interactions arising from differences in race, ethnicity and nationality.

To date, research on CQ has focused primarily on conceptual theorizing (Sternberg and Grigorenko, 2006). Ng and Earley (2006) discussed conceptual distinctions between CQ, a culture-free etic construct, and the traditional view of intelligence that is culture-bound and emic; Triandis (2006) discussed theoretical relationships between CQ capabilities and forming accurate judgments; Brislin et al. (2006) discussed CQ as critical for expecting and addressing the unexpected during intercultural encounters; Earley and Peterson (2004) developed a systematic approach to intercultural training that links trainee CQ strengths and weaknesses to training interventions. Janssens and Brett (2006) advanced a fusion model of team collaboration for making culturally intelligent, creatively realistic team decisions.

In comparison, empirical research on CQ has been scarce – primarily due to the newness of the construct. Ang et al. (2006) demonstrated that the four dimensions of CQ were distinct from, and yet related to, more distal Big Five personality traits in conceptually meaningfully ways. In another study, Templer et al. (2006) examined motivational CQ and demonstrated that it predicted adjustment of global professionals, beyond realistic job and living conditions previews. These two studies are noteworthy because they provide initial evidence of the discriminant validity and practical significance of CQ.

Although promising, this early empirical research is limited in scope. Accordingly, the objective of this article is to integrate the literatures on intelligence and intercultural competencies, describe the development of a 20-item Cultural Intelligence Scale (CQS), and report the results of three studies that tested substantive predictions of CQ dimensions. Given the newness of CQ, we start by reviewing the theoretical conceptualization of the four CQ dimensions. We then develop a model that relates specific dimensions of CQ to cognitive, affective and behavioural aspects of intercultural effectiveness, based on the framework introduced by Shaffer et al. (2006). Empirically, we examine psychometric properties of the CQS, including cross-validation, generalizability across time and generalizability across countries. We then report the results of three substantive studies designed to test

our hypotheses using multiple settings, tasks and measures to triangulate results. Overall, we aim to advance CQ research and offer practical implications for effectiveness in culturally diverse situations.

THEORETICAL BACKGROUND AND HYPOTHESES

Nature and Conceptualization of CQ

Earley and Ang (2003) anchored their discussion of the theoretical bases of CQ in contemporary theories of intelligence. We summarize their key arguments here.

Definition. Cultural intelligence (CQ), defined as an individual's capability to function and manage effectively in culturally diverse settings, is consistent with Schmidt and Hunter's (2000, p. 3) definition of general intelligence as 'the ability to grasp and reason correctly with abstractions (concepts) and solve problems.' Although early research tended to view intelligence narrowly as the ability to solve problems in academic settings, there is now increasing consensus that intelligence may be displayed in places other than the classroom (Sternberg and Detterman, 1986). This growing interest in 'real world' intelligence includes intelligence that focuses on specific content domains such as social intelligence (Thorndike and Stein, 1937), emotional intelligence (Mayer et al., 2000) and practical intelligence (Sternberg et al., 2000). CQ acknowledges the practical realities of globalization (Earley and Ang, 2003) and focuses on a specific domain – intercultural settings. Thus, following Schmidt and Hunter's (2000) definition of general intelligence, CQ is a specific form of intelligence focused on capabilities to grasp, reason and behave effectively in situations characterized by cultural diversity.

CQ as a multidimensional construct. Sternberg's (1986) integrative framework proposed different 'loci' of intelligence within the person. Metacognition, cognition and motivation are *mental* capabilities that reside within the head, while overt actions are *behavioural* capabilities. Metacognitive intelligence refers to control of cognition: the processes individuals use to acquire and understand knowledge. Cognitive intelligence refers to knowledge structures and is consistent with Ackerman's (1996) intelligence-as-knowledge concept, which argues for the importance of knowledge as part of the intellect. Motivational intelligence refers to the mental capacity to direct and sustain energy on a particular task or situation and recognize that motivational capabilities are critical to 'real world' problem solving (Ceci, 1996). Behavioural intelligence refers to outward manifestations or overt actions: what people do rather than what they think (Sternberg, 1986, p. 6).

Applying Sternberg's multiple-loci of intelligence, Earley and Ang (2003) conceptualized CQ as comprising metacognitive, cognitive, motivational and behavioural dimensions with specific relevance to functioning in culturally diverse

settings. Metacognitive CQ reflects mental processes that individuals use to acquire and understand cultural knowledge, including knowledge of and control over individual thought processes (Flavell, 1979) relating to culture. Relevant capabilities include planning, monitoring and revising mental models of cultural norms for countries or groups of people. Those with high metacognitive CQ are consciously aware of others' cultural preferences before and during interactions. They also question cultural assumptions and adjust their mental models during and after interactions (Brislin et al., 2006; Triandis, 2006).

While metacognitive CQ focuses on higher-order cognitive processes, cognitive CQ reflects knowledge of the norms, practices and conventions in different cultures acquired from education and personal experiences. This includes knowledge of the economic, legal and social systems of different cultures and subcultures (Triandis, 1994) and knowledge of basic frameworks of cultural values (e.g., Hofstede, 2001). Those with high cognitive CQ understand similarities and differences across cultures (Brislin et al., 2006).

Motivational CQ reflects the capability to direct attention and energy toward learning about and functioning in situations characterized by cultural differences. Kanfer and Heggestad (1997, p. 39) argued that such motivational capacities 'provide agentic control of affect, cognition and behaviour that facilitate goal accomplishment.' According to the expectancy-value theory of motivation (DeNisi and Pritchard, 2006; Eccles and Wigfield, 2002), the direction and magnitude of energy channelled toward a particular task involves two elements – expectations of success and value of success. Those with high motivational CQ direct attention and energy toward cross-cultural situations based on intrinsic interest (Deci and Ryan, 1985) and confidence in their cross-cultural effectiveness (Bandura, 2002).

Behavioural CQ reflects the capability to exhibit appropriate verbal and nonverbal actions when interacting with people from different cultures. As Hall (1959) emphasized, mental capabilities for cultural understanding and motivation must be complemented with the ability to exhibit appropriate verbal and nonverbal actions, based on cultural values of specific settings. This includes having a wide and flexible repertoire of behaviours. Those with high behavioural CQ exhibit situationally appropriate behaviours based on their broad range of verbal and nonverbal capabilities, such as exhibiting culturally appropriate words, tone, gestures and facial expressions (Gudykunst et al., 1988).

CQ as an aggregate multidimensional construct. The four dimensions of CQ are qualitatively different facets of the overall capability to function and manage effectively in culturally diverse settings (Earley and Ang, 2003). Like facets of job satisfaction, the dimensions of CQ may or may not correlate with each other. Thus, overall CQ represents an aggregate multidimensional construct, which according to Law et al. (1998) includes: (i) dimensions at the same level of conceptualization as the overall construct; and (ii) dimensions make up the overall construct. In sum, metacognitive

CQ, cognitive CQ, motivational CQ and behavioural CQ are different capabilities that together form overall CQ.

Conceptual Distinctiveness of CQ

To further clarify the nature of CQ, we discuss differences and similarities between CQ and personality, and other intelligences, as well as existing intercultural competency models.

Personality. As an individual difference capability, CQ refers to what a person can do to be effective in culturally diverse settings. Thus, it is distinct from stable personality traits which describe what a person typically does across time and across situations (Costa and McCrae, 1992). Since temperament influences choice of behaviours and experiences, some personality traits should relate to CQ. Consistent with this, Ang et al. (2006) showed discriminant validity of the four dimensions of CQ compared with the Big Five personality traits and demonstrated meaningful relationships between specific personality characteristics and specific aspects of CQ. Notably, and as expected, openness to experience – the tendency to be creative, imaginative and adventurous (Costa and McCrae, 1992) related to all four dimensions of CQ.

Other intelligences. Since CQ is grounded in the theory of multiple intelligences (Sternberg and Detterman, 1986), CQ is similar to, yet distinct from, other forms of intelligence. We consider two forms of intelligence commonly investigated in management research to illustrate this point: general mental ability (GMA: Schmidt and Hunter, 2000) and emotional intelligence (EI: Law et al., 2004; Mayer et al., 2000). CQ is similar to these other intelligences because it is a set of capabilities, rather than preferred ways of behaving (Mayer et al., 2000). These constructs differ, however, in the nature of the abilities. General mental ability focuses on cognitive abilities, is not specific to particular types of contexts (Schmidt and Hunter, 2000) such as culturally diverse situations, and does not include behavioural or motivational aspects of intelligence. Emotional intelligence focuses on the ability to deal with personal emotions. Like CQ, it goes beyond academic and mental intelligence. It differs, however, from CQ because it focuses on the general ability to perceive and manage emotions without consideration of cultural context. Given that emotional cues are symbolically constructed and historically transmitted within culture (Fitch, 1998), the ability to encode and decode emotions in the home culture does not automatically transfer to unfamiliar cultures (Earley and Ang, 2003). Thus, a person with high EI in one cultural context may not be emotionally intelligent in another culture. In contrast, CQ is culture free and refers to a general set of capabilities with relevance to situations characterized by cultural diversity.

Existing intercultural competency constructs. Although there is a large body of literature on intercultural competencies (see Paige (2004) for a comprehensive review), this research generally suffers from ambiguous construct definitions and poor integration, resulting in a fragmented list of competencies that lack theoretical coherence (Yamazaki and Kayes, 2004). Since CQ is grounded explicitly in the theoretical framework of multiple intelligences (Earley and Ang, 2003; Sternberg and Detterman, 1986), the four dimensions of CQ should provide a systematic rationale for organizing and integrating existing research on intercultural competencies.

Examining the intercultural competency scales in Paige's (2004) review highlights several gaps that CQ addresses. First, most intercultural competencies scales mix ability and personality (e.g., CCAI: Cross-Cultural Adaptability Inventory; CCWM: Cross-Cultural World Mindedness; CSI: Cultural Shock Inventory; ICAPS: Intercultural Adjustment Potential Scale; IDI: Intercultural Development Inventory; MAKSS: Multicultural Awareness-Knowledge-Skills Survey; OAI: Overseas Assignment Inventory; and Prospector). Although personality characteristics are important to cross-cultural adjustment, including stable dispositional traits in competency models muddies the validity and precision of these models. Second, although many scales include items that are similar to CQ, no scale is based explicitly on contemporary theories of intelligence and no scale systematically assesses the four aspects of intelligence. Third, CQ is not specific to a particular culture. Thus, CQ differs from cultural competency models that focus on country specific knowledge or ability such as the Culture-Specific Assimilator.

In sum, we argue that CQ is conceptually distinct from personality traits, other intelligences and other intercultural competencies. Grounding CQ as a form of intelligence allows precision about the nature of CQ as a set of relatively malleable capabilities that can be enhanced over time (Earley and Peterson, 2004).

Hypotheses for CQ and Intercultural Effectiveness Outcomes

The expatriate and cross-cultural literatures tend to emphasize adjustment outcomes (Black and Stephens, 1989). More recently, however, researchers have called for, and examined, more comprehensive conceptualizations of effectiveness in culturally diverse settings (Caligiuri, 1997). For example, Shaffer et al. (2006) examined cognitive, affective and behavioural aspects of intercultural effectiveness. Using their framework, we consider relationships between CQ and cultural judgment and decision making (a cognitive outcome), cultural adjustment and well-being (an affective outcome), and task performance (a behavioural outcome).

Cultural judgment and decision making (CJDM). Judgment and decision making (JDM) refers broadly to human information processes for making decisions. JDM tasks require deliberate reasoning, evaluation of evidence and comparison of alternatives (Einhorn and Hogarth, 1981). In our research, we examine the quality of

decisions regarding intercultural interactions (CJDM). Effective CJDM requires understanding cultural issues and making appropriate interpretations based on cultural values (Mendenhall and Oddou, 1985).

Given that CJDM emphasizes analytical abilities, we propose that cognitive CQ and metacognitive CQ should be most relevant in predicting CJDM effectiveness. Cognitive CQ should relate positively to CJDM effectiveness because those with higher cognitive CQ have elaborate cultural schemas, defined as mental representations of social interactions of particular cultural groups (Triandis, 1994). Since schemas facilitate conceptually driven information processing, having rich cultural schemas should allow individuals to identify and understand key issues in CJDM and develop appropriate explanations.

Metacognitive CQ is the higher-order mental capability to think about personal thought processes, anticipate cultural preferences of others and adjust mental models during and after intercultural experiences. As such, metacognitive CQ should positively relate to CJDM effectiveness. When people are aware of potential differences in thought processes, they tend to make isomorphic attributions, defined as interpreting behaviour from the actor's perspective and giving it the same meaning as that intended by the actor (Triandis, 2006). Acknowledging but moving beyond cultural stereotypes to incorporate unique individual characteristics (such as diversity within culture and variability in behaviour across time and situations) allows those with high metacognitive CQ to understand others and make higher quality cultural decisions.

We do not predict relationships for motivational CQ and behavioural CQ with CJDM effectiveness because the analytical processes involved in reasoning about cultural issues do not emphasize the capability to channel energy or display appropriate behaviours. Accordingly,

Hypothesis 1: Metacognitive CQ (H1a) and cognitive CQ (H1b) will relate positively to cultural judgment and decision making (CJDM) effectiveness.

Cultural adaptation. When individuals relocate to unfamiliar cultures, they often experience stress because norms and behaviours are unfamiliar and confusing. Research on intercultural encounters demonstrates the importance of cultural adaptation (e.g., Bhaskar-Shrinivas et al., 2005). Cultural adaptation includes the sociocultural sense of adjustment and psychological feelings of wellbeing (Searle and Ward, 1990). Following Shaffer et al. (2006), we consider cultural adaptation an affective outcome because it represents subjective assessments with affective implications.

Since intercultural interactions can be stressful (Mendenhall and Oddou, 1985), motivational CQ and behavioural CQ have special relevance to cultural adaptation. This is consistent with meta-analytic findings that self-efficacy and relationship skills predict expatriate adjustment (Bhaskar-Shrinivas et al., 2005).

Motivational CQ should positively relate to cultural adaptation because those with higher motivational CQ have intrinsic interest in other cultures and expect to be successful in culturally diverse situations. According to social cognitive theory (Bandura, 2002), they initiate effort, persist in their efforts and perform better. For example, Epel et al. (1999) demonstrated that higher efficacy beliefs led to engagement and persistence in difficult situations, as well as better adjustment.

Behavioural CQ is the capability to exhibit appropriate verbal and nonverbal actions in culturally diverse situations. Since cultural adaptation is a person's sense of fitting in and wellbeing in a particular situation, those with the capability to vary their behaviour (behavioural CQ) should have higher cultural adaptation. According to Goffman's (1959) theory of self-presentation, individuals use impression management techniques so that others view them positively. Since cultures differ in their norms for appropriate behaviours (Hall, 1959; Triandis, 1994), the ability to display a flexible range of behaviours is critical to creating positive impressions and developing intercultural relationships (Gudykunst et al., 1988). When individuals are flexible, they are less offensive to others, more likely to fit in and better adapted.

We do not predict relationships for metacognitive CQ and cognitive CQ with cultural adaptation because cognitive capabilities do not necessarily translate into actions and behaviours. For example, Hall's (1993) research on foreign service workers concluded that cognitive training did not significantly enhance cultural adjustment. Thus,

Hypothesis 2: Motivational CQ (H2a) and behavioural CQ (H2b) will relate positively to cultural adaptation.

Task performance. Task performance is a function of knowledge, skills, abilities and motivation directed at role-prescribed behaviour, such as formal job responsibilities (Campbell, 1999). Performance evaluation is the degree to which individuals meet role expectations (Katz and Kahn, 1978). Cultural values, however, influence role expectations and perceptions of role expectations. For instance, Stone-Romero et al. (2003) argued that individuals often receive poor performance evaluations when they have a different cultural background, do not understand cultural differences in role expectations and do not conform to role expectations.

Since expectations for performing role prescribed behaviours often differ across cultures, we propose that all four dimensions of CQ will enhance cognitive understanding, motivation and behavioural enactment of role expectations. We start with cognitive CQ. When individuals have elaborate cultural schemas, they should have a more accurate understanding of role expectations. For example, those with rich mental representations of culturally based social interactions are more aware of potential differences in role expectations and more likely to demonstrate appropriate role behaviours.

Next, we consider metacognitive CQ and task performance. Those with high metacognitive CQ know when and how to apply their cultural knowledge. They do not rely on habitual knowledge structures, but select from multiple knowledge structures depending on the context. They also know when to suspend judgment based on stereotypes and when to look for additional cues (Triandis, 2006). Accordingly, they have more accurate understanding of expected role behaviours in situations characterized by cultural diversity.

Those with high motivational CQ should have higher task performance because they direct energy toward learning role expectations, even when role sender cues are confusing due to cultural differences (Stone-Romero et al., 2003). For example, persistence provides more opportunities to obtain feedback. Those with energy and persistence tend to practice new behaviours and, through practice, improve their performance.

Finally, behavioural CQ should positively relate to task performance. Those with high behavioural CQ flex their verbal and nonverbal behaviours to meet the expectations of others. When self-presentation (Goffman, 1959) parallels role expectations, misunderstandings should be lower and task performance should be higher. Consistent with this, Shaffer et al. (2006) demonstrated the positive effects of behavioural flexibility on cross-cultural performance. Combining the above arguments, we propose that each of the four dimensions of CQ should positively relate to task performance.

Hypothesis 3: Metacognitive CQ (H3a), cognitive CQ (H3b), motivational CQ (H3c) and behavioural CQ (H3d) will relate positively to task performance.

METHOD

Development of the Cultural Intelligence Scale (CQS)

To develop the Cultural Intelligence Scale (CQS), we reviewed the intelligence and intercultural competencies literatures and supplemented this with interviews from eight executives with extensive global work experience. We used educational and cognitive psychology operationalizations of metacognition (e.g., O'Neil and Abedi, 1996) for awareness, planning, regulating, monitoring and controlling cognitive processes of thinking and learning. We used knowledge of cultural domains identified by Triandis (1994) and supplemented with Murdock's (1987) Human Relations Areas Files, including economic, legal and social systems in other cultures. We drew on Deci and Ryan (1985) for intrinsic satisfaction and Bandura (2002) for self-efficacy in intercultural settings. Finally, we used intercultural communication for verbal and nonverbal flexibility (Gudykunst et al., 1988; Hall, 1959).

Item pool generation. Hinkin (1998) suggested starting with twice as many items as targeted for the final scale to allow psychometric refinement. We aimed for a

parsimonious scale with four to six items for each CQ dimension to minimize response bias caused by boredom and fatigue (Schmitt and Stults, 1985) while providing adequate internal consistency reliability. The second author wrote 53 items for the initial item pool (about 13 per CQ dimension). Each item contained one idea, was relatively short in length, and used simple, direct language. Since negatively worded items can create artifacts, we used positively worded items. Next, a panel of three faculty and three international executives (each with significant cross-cultural expertise) independently assessed the randomly ordered 53 items for clarity, readability and definitional fidelity (1 = very low quality; 5 = very high quality). We retained the 10 best items for each dimension (40 items).

Initial factor structure validity. We examined the factor structure of the initial 40 items with a sample of undergraduates in Singapore (N = 576; 74 percent female; mean age 20). Given that we designed the measure to reflect the four theoretical dimensions of CQ, we expected to confirm a four-factor structure and assessed dimensionality with CFA (LISREL 8: maximum likelihood estimation and correlated factors). We started with the initial 40 items and conducted a comprehensive series of specification searches. We deleted items with high residuals, low factor loadings, small standard deviations or extreme means and low item-to-total correlations. We retained 20 items with the strongest psychometric properties as the Cultural Intelligence Scale (CQS): four metacognitive CQ, six cognitive CQ, five motivational CQ and five behavioural CQ (see Appendix I for the Cultural Intelligence Scale). CFA demonstrated good fit of the hypothesized four-factor model to the data: χ^2 (164*df*) = 822.26, NNFI = 0.91, CFI = 0.92, SRMR = 0.06, and RMSEA = 0.08 ($p < 0.05$). Standardized factor loadings for items in the four scales (0.52–0.80) were significantly different from zero (*t*-values: 9.30–17.51, $p < 0.05$). The four factors had moderate intercorrelations (0.21–0.45) and acceptable variances (0.75–1.03). The corrected item-to-total correlations for each subscale (0.47–0.71) demonstrated strong relationships between items and their scales, supporting internal consistency. Composite reliabilities exceeded 0.70 (metacognitive CQ = 0.72, cognitive CQ = 0.86, motivational CQ = 0.76 and behavioural CQ = 0.83: Fornell and Larcker, 1981).

Following Kirkman and Law's (2005) recommendations to conduct research in different cultures, we collected additional data from Singapore and the USA to assess the generalizability of the CQS across samples, time and countries with three cross-validation samples. We then tested our hypotheses in three substantive studies.

Cross-Validation of the Cultural Intelligence Scale (CQS) across samples. CFA on the first cross-validation sample (N = 447 undergraduates in Singapore, 70 percent female, mean age 20) demonstrated good fit for the hypothesized four-factor model: χ^2 (164*df*) = 381.28, NNFI = 0.96, CFI = 0.96, SRMR = 0.04, and RMSEA = 0.05

($p < 0.05$). Standardized loadings (0.50–0.79) were significantly different from zero (*t*-values: 8.32–12.90, $p < 0.05$), with moderate correlations between factors (0.23–0.37) and acceptable variances (0.87–1.05). Corrected item-to-total correlations for each subscale (0.46–0.66) demonstrated strong relationships between items and their scales, supporting internal consistency. Reliabilities exceeded 0.70 (metacognitive CQ = 0.77, cognitive CQ = 0.84, motivational CQ = 0.77, and behavioural CQ = 0.84).

Generalizability of the Cultural Intelligence Scale (CQS) across time. A subset of respondents (N = 204, 76 percent female, mean age 20) from the Singapore cross-validation sample completed the CQS again four months later. We examined T1–T2 longitudinal measurement invariance using CFA and an augmented covariance matrix as input (rather than a multi-sample approach) to account for time-wise correlated errors (Vandenberg and Lance, 2000). We used a 20-item by two-measurement occasion matrix and specified eight latent variables (four T1 CQ factors and four T2 CQ factors), with unique variances of identical items correlated across time.

Following procedure suggested by Vandenberg and Lance (2000), we began with a correlated four-factor model with no constraints (parameters at T1 and T2 freely estimated). Results demonstrated acceptable fit (Model A: χ^2 (692*df*) = 981.18, NNFI = 0.94, CFI = 0.95, SRMR = 0.06, RMSEA = 0.04), suggesting that the four-factor model held across the two time periods. We then tested two alternative models. The χ^2 difference between Models A and B (factor loadings constrained to be invariant) failed to reach significance ($\Delta\chi^2$ (16*df*) = 22.79, *p* = *ns*), providing strong support for invariance in factor loadings across T1 and T2. The χ^2 difference between Models B and C (item intercepts constrained to be invariant) also failed to reach significance ($\Delta\chi^2$ (14*df*) = 17.59, *p* = *ns*), providing support for item intercept invariance.

Generalizability of the Cultural Intelligence Scale (CQS) across countries. We assessed equivalence of the CQS in a US sample (N = 337 undergraduates, 55 percent female, mean age 22) compared with the Singapore cross-validation sample (N = 447) using sequential tests of model invariance (Byrne, 1998). Model A (four factors with loadings freely estimated across samples) demonstrated good fit: χ^2 (328*df*) = 723.23, NNFI = 0.96, CFI = 0.97, SRMR = 0.05, RMSEA = 0.05, indicating equivalence in a number of factors. We tested two alternative models. The χ^2 difference between Models A and B (four factors with loadings forced to be invariant) failed to reach significance ($\Delta\chi^2$ (16*df*) = 13.74, *p* = *ns*), providing strong support for invariance in factor loadings across settings. The χ^2 difference between Models B and C (four factors with factor covariances forced to be invariant) failed to reach significance ($\Delta\chi^2$ (10*df*) = 17.96, *p* = *ns*), supporting invariance in factor covariances. In sum, multiple group tests of invariance demonstrated the same four factor structure holds across the two countries.

STUDY 1

We assessed H1 (metacognitive CQ and cognitive CQ as predictors of CJDM effectiveness) and H2 (motivational CQ and behavioural CQ as predictors of cultural adaptation) in Study 1, controlling for relevant individual differences.

Samples and Procedures

Two samples of undergraduates, (N = 235: Midwestern USA, 45 percent female, average age 22; N = 358: Singapore, 76 percent female, average age 19) participated in the study as partial fulfillment of course requirements. CQ has direct relevance to students because over 77 percent of incoming freshmen in the USA have prior international experience (e.g., traveling or hosting international students) and students increasingly cross cultures for study, internships and personal travel (Cushner and Karim, 2004). The percentage of foreigners in each university was 25 percent in Singapore and 22 percent in the USA.

In the US sample, participants completed on-line questionnaires on CQ, EI and Big Five personality in a computer lab, followed by a test of general mental ability and an on-line negotiation exercise that was part of an unrelated study. Finally, they completed CJDM scenarios, rated their cultural adaptation and provided information on demographics and cross-cultural experience.

Expanding on this design, we collected data in Singapore at three points in time across one semester. In the first two weeks, students completed questionnaires on CQ, EI, cross-cultural adaptability, cross-cultural experience and general mental ability. Students made CJDM decisions in week five and rated their cultural adaptation in week 12.

Measures

Cultural judgment and decision making (CJDM). In the US sample, we assessed CJDM with five cross-cultural decision making scenarios (Cushner and Brislin, 1996). We selected scenarios with theoretically meaningful differences in cultural values – collectivism, power distance, masculinity, specific-diffuse and low-high context communication – involving people from different parts of the world (the USA, France, South Korea, Japan, Philippines, China and the Middle East). Participants read scenarios describing cultural interactions and selected the best response to explain each. We summed correct responses (range 0–5) for CJDM. In the Singapore sample, students analysed a cross-cultural case (Trompenaars and Hampden-Turner, 1997) and described their strategies for resolving the dilemma. Instructors rated the effectiveness of strategies (range 0–10) for CJDM.

Cultural adaptation. We assessed interactional adjustment with three items (USA/Singapore: $\alpha = 0.94/0.95$): How well have you adjusted to your current situation

in terms of socializing with people; interacting with people on a day-to-day basis; getting along with people (1 = extremely unadjusted; 7 = extremely adjusted) from Black and Stephens (1989). We assessed wellbeing with four items ($\alpha = 0.78/0.84$), asking participants to rate the extent of your general wellbeing for each of the following: been able to concentrate on whatever you have been doing; felt that you are playing a useful part/making useful contributions; felt capable of making decisions; been able to face up to your responsibilities (1 = not at all; 7 = a very great extent) from Goldberg and Williams (1988).

Cultural intelligence. Participants (USA/Singapore) completed the 20-item CQS (see Appendix I): metacognitive CQ ($\alpha = 0.76/0.70$); cognitive CQ ($\alpha = 0.80/0.88$); motivational CQ ($\alpha = 0.79/0.75$); and behavioural CQ ($\alpha = 0.82/0.87$).

Cognitive ability. We assessed general mental ability (GMA) in both samples with the WPT (Wonderlic, 1999).

Emotional intelligence. We assessed EI in the US sample with Schutte et al.'s (1998) 33-item, four-dimension scale: optimism/mood regulation (12 items, $\alpha = 0.83$), appraisal of emotions (six items, $\alpha = 0.78$), utilization of emotions (six items, $\alpha = 0.68$) and social skills (nine items, $\alpha = 0.76$). Given the relatively high correlations among the four dimensions (0.42–0.70), we reduced the length of the questionnaire for the Singapore sample by selecting two items with the highest loadings for each factor to form a unidimensional, eight-item EI scale ($\alpha = 0.86$). This is consistent with the original dimensionality of the scale. In the US sample, the full scale correlated with the shortened scale 0.77.

Big 5 personality. In the US sample, we assessed Big 5 personality (FFM: Costa and McCrae, 1992): conscientiousness (12 items, $\alpha = 0.80$), openness (12 items, $\alpha = 0.66$), extraversion (12 items, $\alpha = 0.75$), agreeableness (12 items, $\alpha = 0.74$) and emotional stability (12 items, $\alpha = 0.80$).

Cross cultural adaptability inventory. In the Singapore sample, we included the four-factor Cross-Cultural Adaptability Inventory (CCAI: Kelley and Meyers, 1995), the most widely used scale for assessing cross-cultural competency (Paige, 2004): personal autonomy (7 items, $\alpha = 0.59$), emotional resilience (18 items, $\alpha = 0.82$), flexibility/openness (15 items, $\alpha = 0.66$), and perceptual acuity (10 items, $\alpha = 0.74$).

Controls. We included sex (0 = F, 1 = M), cross-cultural experience (1 = not experienced at all, 2 = moderately experienced, 3 = very experienced), and age (years) as controls.

Dimensionality, Internal Consistency and Validity Evidence

We conducted confirmatory factor analysis at the item level, except for FFM, EI and CCAI scales where we used item-parcels to reduce model complexity and establish more stable parameter estimates (Bagozzi and Edwards, 1998). For the

FFM, we randomly divided the 12 items per factor into three parcels of four items each. For EI, we randomly created three item parcels per factor. For CCAI, we used three item parcels.

CFA demonstrated acceptable fit. In the US sample, CFA for the 17 constructs (four CQ factors, FFM, general mental ability, four EI, CJDM, interactional adjustment and wellbeing) demonstrated acceptable fit: χ^2 (1350*df*) = 2349.73, NNFI = 0.93, CFI = 0.94, SRMR = 0.06, and RMSEA = 0.05 ($p < 0.05$). Reliabilities for the CQ factors were 0.77–0.82 with standardized factor loadings (0.57–0.76) significantly different from zero (*t*-values: 7.07–9.18, $p < 0.05$). In the Singapore sample, CFA for the 13 constructs (four CQ factors, four CCAI, general mental ability, EI, CJDM, interactional adjustment and wellbeing) also demonstrated acceptable fit: χ^2 (869*df*) = 1686.18, NNFI = 0.95, CFI = 0.96, SRMR = 0.05, and RMSEA = 0.05 ($p < 0.05$), with CQ factor reliabilities 0.71–0.88 and standardized factor loadings (0.53–0.85) significantly different from zero (7.46–17.77, $p < 0.05$).

We assessed convergent validity by examining correlations between the CQ factors and related constructs. As expected, the four CQ factors moderately and positively related to EI (USA: r = 0.18–0.41, mean = 0.27; Singapore: r = 0.12–0.28, mean = 0.18). Eleven of the 16 correlations between the four factors of CQ and the four factors of the CCAI were significant (r = 0.07–0.48, mean = 0.22). In sum, analyses support convergent validity.

We assessed discriminant validity following the procedures suggested by Fornell and Larcker (1981). To demonstrate discriminant validity, the variance shared between a construct and any other construct in the model (the squared correlation between the two constructs) should be less than the variance that construct shares with its measures (AVE: average variance extracted). Results demonstrated discriminant validity between the four CQ factors in both samples (USA/Singapore): each AVE (0.41–0.48/0.38–0.58) exceeded the square of the correlations (0.17–0.40/0.07–0.30). Results also support discriminant validity between CQ and other constructs: USA – AVEs for each CQ factor (0.41–0.48) exceeded the square of the correlations of the CQ factors with the four EI factors, general mental ability, FFM, CJDM, interactional adjustment and wellbeing (0.00–0.31); Singapore – AVEs for each CQ factor (0.38–0.58) exceeded the square of the correlations with the four CCAI factors, general mental ability, EI, CJDM, interactional adjustment and wellbeing (0.00–0.37). This provides evidence of discriminant validity of the four CQ factors as well as discriminant validity of CQ compared with other constructs (general mental ability, EI, FFM, CJDM, CCAI, interactional adjustment and wellbeing).

Study 1 Results

Table 1 reports descriptive statistics, correlations, and reliabilities for the US sample (N = 235) and Table 2 reports this information for the Singapore sample (N = 358).

Table 1. Means, standard deviations, scale reliabilities and inter-correlations (Study 1, US sample)†

	MN	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*
1. CJDM	3.03	1.04	–																		
2. Interactional Adjustment	5.90	1.15	0.13	(0.94)																	
3. Wellbeing	5.34	0.86	0.14*	0.49**	(0.78)																
4. Metacognitive CQ	5.00	0.93	0.27**	0.23**	0.36**	(0.76)															
5. Cognitive CQ	3.67	0.97	0.21**	0.13	0.25**	0.37**	(0.80)														
6. Motivational CQ	5.35	0.93	0.18**	0.29**	0.30**	0.45**	0.42**	(0.79)													
7. Behavioural CQ	4.18	1.18	0.13	0.25**	0.30**	0.42**	0.51**	0.33**	(0.82)												
8. General mental ability	24.83	5.86	0.17**	0.07	0.10	0.06	–0.02	–0.10	0.00	–											
9. EI: Mood Regulation	5.64	0.75	0.15*	0.35**	0.52**	0.41**	0.19**	0.34**	0.19**	0.01	(0.83)										
10. EI: Appraisals	5.23	0.95	0.12	0.17*	0.31**	0.30**	0.26**	0.23**	0.20**	0.11	0.51**	(0.78)									
11. EI: Utilization	5.37	0.79	0.19**	0.09	0.34**	0.40**	0.26**	0.24**	0.25**	0.15*	0.55**	0.42**	(0.68)								
12. EI: Social Skills	5.45	0.75	0.11	0.41**	0.45**	0.38**	0.18**	0.30**	0.22**	0.03	0.70**	0.51**	0.59**	(0.76)							
13. FFM: Conscientiousness	3.72	0.52	–0.07	0.34**	0.59**	0.23**	0.16*	0.16*	0.15*	–0.04	0.43**	0.21**	0.22**	0.38**	(0.80)						
14. FFM: Openness	3.28	0.49	0.28**	0.15*	0.16*	0.27**	0.23**	0.23**	0.28**	0.19**	0.24**	0.22**	0.35**	0.27**	0.01	(0.66)					
15. FFM: Extraversion	3.68	0.49	0.01	0.35**	0.47**	0.20**	0.05	0.19**	0.01	0.06	0.48**	0.28**	0.26**	0.59**	0.44**	0.13	(0.75)				
16. FFM: Agreeableness	3.54	0.50	–0.03	0.30**	0.29**	0.11	–0.08	0.04	0.05	0.10	0.34**	0.28**	0.16*	0.40**	0.31**	0.10	0.50**	(0.74)			
17. FFM: Stability	3.28	0.61	0.05	0.29**	0.50**	0.18**	0.10	0.18**	0.05	0.03	0.48**	0.23**	0.12	0.27**	0.48**	0.04	0.49**	0.33**	(0.80)		
18. Age	21.53	1.91	0.09	–0.01	0.10	0.03	0.08	0.11	0.12	–0.04	–0.03	–0.07	0.09	–0.05	0.00	–0.10	–0.06	–0.10	–0.03	–	
19. Sex‡	0.55	0.50	0.06	–0.16*	–0.16*	–0.03	0.02	0.06	0.01	–0.00	–0.05	–0.07	–0.10	–0.24**	–0.09	–0.12	–0.22**	–0.34**	0.12	0.02	–
20. Cross-cultural experience	2.16	0.49	0.12	0.20**	0.12	0.22**	0.26**	0.40**	0.12	–0.10	0.14*	0.12	0.06	0.18**	0.09	0.07	0.14*	–0.02	0.10	0.05	0.05

Notes:

* $p < 0.05$; ** $p < 0.01$.

† n = 235. Reliability coefficients are in parenthesis along the diagonal.

‡ 0 = female, 1 = male.

CJDM, Cultural Judgment and Decision Making; EI, Emotional Intelligence; FFM, Five Factor Model of Personality.

Table 2. Means, standard deviations, scale reliabilities and inter-correlations (Study 1, Singapore sample)†

	MN	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
1. CJDM	7.82	4.13	–														
2. Interactional adjustment	5.46	0.82	0.07	(0.95)													
3. Wellbeing	4.63	0.83	−0.05	0.45**	(0.84)												
4. Metacognitive CQ	4.51	0.68	0.17**	0.18**	0.24**	(0.70)											
5. Cognitive CQ	3.14	0.80	0.12*	0.13*	0.24**	0.32**	(0.88)										
6. Motivational CQ	4.61	0.67	0.08	0.32**	0.36**	0.40**	0.29**	(0.75)									
7. Behavioural CQ	4.12	0.90	0.09	0.16**	0.23**	0.41**	0.44**	0.23**	(0.87)								
8. General mental ability	25.11	5.76	−0.01	0.04	0.11*	−0.06	0.06	0.00	0.07	–							
9. EI	5.02	0.57	0.02	0.40**	0.49**	0.19**	0.14**	0.28**	0.12*	0.04	(0.86)						
10. CCAI: Autonomy	4.31	0.43	0.11	0.34**	0.38**	0.20**	0.07	0.30**	0.07	−0.04	0.35**	(0.59)					
11. CCAI: Resilience	3.98	0.42	−0.02	0.41**	0.50**	0.21**	0.22**	0.48**	0.09	0.00	0.48**	0.54**	(0.82)				
12. CCAI: Flexibility	3.92	0.38	0.01	0.36**	0.29**	0.19**	0.08	0.38**	0.10	−0.00	0.32**	0.42**	0.58**	(0.66)			
13. CCAI: Acuity	4.31	0.42	0.18**	0.31**	0.36**	0.36**	0.17**	0.28**	0.27**	−0.05	0.32**	0.48**	0.39**	0.45**	(0.74)		
14. Age	19.46	1.05	−0.09	−0.05	0.21**	0.02	0.20**	0.09	0.13*	0.26**	0.04	0.05	0.10	−0.04	−0.05	–	
15. Sex‡	0.24	0.43	−0.07	0.06	0.23**	0.03	0.20**	0.09	0.09	0.34**	0.13*	0.02	0.14**	−0.03	−0.03	0.65**	–
16. Cross-cultural experience	1.78	0.44	0.02	0.08	0.07	0.15**	0.25**	0.23**	0.10	0.01	0.08	0.05	0.14**	0.10*	0.14**	−0.05	0.07

Notes:

* $p < 0.05$; ** $p < 0.01$.

† $n = 358$. Reliability coefficients are in parenthesis along the diagonal.

‡ 0 = female, 1 = male.

CJDM, Cultural Judgment and Decision Making; EI, Emotional Intelligence; CCAI, Cross Cultural Adaptability Inventory.

Table 3 (controlling for age, sex, cross-cultural experience, general mental ability, EI and FFM) and Table 4 (controlling for age, sex, cross-cultural experience, general mental ability, EI and CCAI) report regression results in the USA and Singapore samples. Results in step 3 (USA/Singapore), show that adding CQ increased explained variance in CJDM by 5 percent/3 percent ($\Delta F = 2.85/2.56$, $p < 0.05$), with overall adjusted $R^2 = 0.14/0.05$. Individual beta values support Hypothesis 1a. Metacognitive CQ predicted CJDM ($\beta = 0.21$, $p < 0.01/\beta = 0.15$, $p < 0.05$), over and above the controls. Results also support Hypothesis 1b. Cognitive CQ predicted CJDM ($\beta = 0.16$, $p < 0.05/\beta = 0.13$, $p < 0.05$), over and above the controls.

Regression results also support Hypothesis 2 for both forms of cultural adaptation. Adding CQ in step 3 increased explained variance in interactional adjustment by 4 percent/3 percent (adjusted $R^2 = 0.32/0.24$) and wellbeing by 4 percent/3 percent (adjusted $R^2 = 0.48/0.38$), demonstrating incremental validity of the four CQ factors. Motivational CQ (H2a: $\beta = 0.15$, $p < 0.05/\beta = 0.13$, $p < 0.05$) and behavioural CQ (H2b: $\beta = 0.17$, $p < 0.05/\beta = 0.10$, $p < 0.05$) predicted interactional adjustment, over and above other predictors. Motivational CQ (H2a: $\beta = 0.16$, $p < 0.01/\beta = 0.12$, $p < 0.05$) and behavioural CQ (H2b: $\beta = 0.13$, $p < 0.05/\beta = 0.09$, $p < 0.05$) predicted wellbeing.

In sum, results for both samples in Study 1 support H1 and H2. Usefulness analysis (Darlington, 1968) shows relative variance explained by CQ vis-à-vis other predictors (e.g., general mental ability, EI, FFM and CCAI). Results show the unique variance explained by CQ (0.04 – 0.05) compared to general mental ability (0.01–0.02), EI (0.02–0.05) and FFM (0.04–0.17) in the US sample. The unique variance explained by CQ in the Singapore sample was 0.03, compared with general mental ability (0.00–0.01), EI (0.00–0.08) and CCAI (0.04–0.06).

STUDY 2

We designed Study 2 as part of an executive development program to triangulate findings from Study 1. Thus, we examined CQ and CJDM (H1) in a non-student sample of international managers and also examined CQ and performance in an extended case analysis (H3). We did not assess cultural adaptation (H2) in Study 2 because the short nature of the program raised questions about meaningfulness of adaptation. Study 2 also included social desirability and rhetorical sensitivity to rule out alternative explanations for predicted relationships.

Sample and Procedures

We collected data from 98 international managers participating in a three-day executive development program at a public university in Singapore (31 percent

Table 3. Regression of cultural intelligence on cultural judgment and decision making and cultural adaptation (Study 1, US sample)†

Variable	*Cultural judgment and decision making*			*Cultural adaptation*					
				Interactional adjustment			*Wellbeing*		
	Step 1	*Step 2*	*Step 3*	*Step 1*	*Step 2*	*Step 3*	*Step 1*	*Step 2*	*Step 3*
Age	0.07	0.06	0.07	0.01	0.03	–0.02	0.07	0.08	0.04
Sex‡	0.07	0.05	0.08	–0.22**	–0.15	–0.16*	–0.17*	–0.16*	–0.18**
Cross-cultural experience	0.11	0.10	0.06	0.23**	0.19**	0.14*	0.10	0.06	0.01
General mental ability (GMA)		0.14*	0.13		0.05	0.09		0.08	0.10
EI: Optimism/mood regulation		0.23**	0.16*		0.13	0.12		0.21**	0.19**
EI: Appraisals of emotions		0.00	–0.03		0.00	–0.03		0.06	0.04
EI: Utilization of emotions		0.08	0.04		–0.06	–0.10		0.01	–0.01
EI: Social skills		0.16	0.06		0.21*	0.21*		0.23**	0.23**
FFM: Conscientiousness		–0.07	–0.09		0.28***	0.26***		0.45***	0.42***
FFM: Openness		0.18*	0.17*		0.04	–0.01		0.07	0.02
FFM: Extraversion		–0.14	–0.08		0.04	0.02		–0.05	–0.06
FFM: Agreeableness		–0.08	–0.01		0.09	0.08		0.01	0.00
FFM: Stability		0.01	0.00		0.13	0.13*		0.21**	0.20**
Metacognitive CQ			0.21**			–0.01			0.00
Cognitive CQ			0.16*			0.00			0.01
Motivational CQ			0.05			0.15*			0.16**
Behavioural CQ			–0.04			0.17*			0.13*
F	1.61	2.82**	2.92***	6.56***	6.95***	6.13***	2.64	13.07***	11.12***
ΔF		3.13**	2.85*		6.47***	2.59*		15.58***	2.91*
R^2	0.02	0.17	0.22	0.10	0.35	0.39	0.04	0.49	0.53
ΔR^2		0.15	0.05		0.25	0.04		0.45	0.04
Adjusted R^2	0.01	0.11	0.14	0.08	0.30	0.32	0.03	0.46	0.48
Usefulness analysis:									
GMA ΔR^2 (EI+FFM+CQ in step 2)			0.02			0.01			0.01
EI ΔR^2 (GMA+FFM+CQ in step 2)			0.02			0.05			0.05
FFM ΔR^2 (GMA+EI+CQ in step 2)			0.04			0.07			0.17

Notes:
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
† $n = 235$.
‡ 0 = female, 1 = male.
EI, Emotional Intelligence; FFM, Five Factor Model of Personality.

Table 4. Regression of cultural intelligence on cultural judgment and decision making and cultural adaptation (Study 1, Singapore sample)[†]

Variable	*Cultural judgement and decision making*			*Cultural adaptation*					
				Interactional adjustment			*Wellbeing*		
	Step 1	*Step 2*	*Step 3*	*Step 1*	*Step 2*	*Step 3*	*Step 1*	*Step 2*	*Step 3*
Age	−0.08	−0.06	−0.07	−0.13	−0.13*	−0.16*	0.13	0.14*	0.11
Sex[‡]	−0.02	−0.03	−0.04	0.14*	0.09	0.09	0.15*	0.08	0.08
Cross-cultural experience	0.03	−0.01	−0.04	0.05	0.01	−0.02	0.05	−0.04	−0.07
General mental ability (GMA)		0.03	0.04		0.04	0.04		0.06	0.05
EI		−0.06	−0.07		0.23***	0.21***		0.34***	0.33***
CCAI: Personal autonomy		0.01	0.00		0.19***	0.18***		0.10*	0.10*
CCAI: Emotional resilience		0.01	−0.02		0.17**	0.12*		0.24***	0.19***
CCAI: Flexibility		0.18**	0.18**		0.20***	0.17**		0.09	0.05
CCAI: Perceptual acuity		0.18**	0.14*		0.03	−0.01		0.19***	0.15**
Metacognitive CQ			0.15*			0.06			0.05
Cognitive CQ			0.13*			0.06			0.09
Motivational CQ			0.00			0.13*			0.12*
Behavioural CQ			0.00			0.10*			0.09*
F	1.04	2.16*	2.31**	2.03	12.24***	9.52***	8.13***	23.20***	17.47***
ΔF		2.70*	2.56*		17.06***	2.82*		28.76***	3.20*
R^2	0.01	0.06	0.09	0.02	0.24	0.27	0.07	0.38	0.41
ΔR^2		0.05	0.03		0.22	0.03		0.31	0.03
Adjusted R^2	0.00	0.03	0.05	0.01	0.22	0.24	0.06	0.37	0.38
Usefulness analysis:									
GMA ΔR^2 (EI+CCAI+CQ in step2)			0.00			0.00			0.01
EI ΔR^2 (GMA+CCAI+CQ in step2)			0.00			0.03			0.08
CCAI ΔR^2 (GMA+EI+CQ in step2)			0.04			0.06			0.05

Notes:
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
[†] $n = 358$.
[‡] 0 = female, 1 = male.
EI, Emotional Intelligence; CCAI, Cross Cultural Adaptability Inventory.

local, 64 percent male, average age 28, all with bachelor's degrees). Participants represented 17 nations (USA, France, Switzerland, Germany, Netherlands, Bangladesh, India, Indonesia, Vietnam, Philippines, Malaysia, Singapore, China, Taiwan, Australia, Hong Kong and Japan) and held jobs with international scope. The program emphasized cross-cultural management, including lectures, case analyses and developing and presenting business case proposals.

Measures

Cultural judgment and decision making (CJDM). Participants worked individually to complete cultural judgment and decision making of a case involving a cross-cultural challenge faced by a US executive managing a South Korean subsidiary. The instructor rated quality of judgments and decision performance on a scale of 0 to 100 (*CJDM*: mean = 65.63, SD = 7.47).

Task performance. Participants also worked in randomly assigned dyads where they completed an extended problem solving simulation on developing a vacant piece of land in a culturally diverse part of Singapore. As a team of property developers, each dyad produced a written business proposal and gave a verbal presentation on the marketing and financial viability of their development plan. Peers rated task performance with three in-role behaviour items ($\alpha = 0.91$): overall, my partner effectively fulfilled his/her roles and responsibilities concerning the business proposal assignment; overall, my partner's performance met my expectations; for the business proposal assignment, my partner performed his/her tasks the way I would like them to be performed (1 = strongly disagree; 7 = strongly agree) adapted from Tsui (1984, 1990) and Williams and Anderson (1991).

Cultural intelligence. We assessed cultural intelligence with the CQS: metacognitive CQ ($\alpha = 0.71$), cognitive CQ ($\alpha = 0.85$), motivational CQ ($\alpha = 0.71$) and behavioural CQ ($\alpha = 0.83$).

Cognitive ability. We assessed general mental ability with the WPT (Wonderlic, 1999).

Controls. Task performance required significant verbal interaction and presentation of business proposals. Thus, we controlled for communication competence by assessing *rhetorical sensitivity* (five items, $\alpha = 0.79$) to rule out possible contamination based on differences in communication skills (Hart et al., 1980). We also controlled for *social desirability* (Marlowe-Crowne short form: Strahan and Gerbasi, 1972), sex (0 = F, 1 = M), *cross-cultural experience* (total number of countries worked in), and dyadic similarity (0 = different country, 1 = same).

Dimensionality, Internal Consistency and Validity Evidence

CFA of the four CQ factors, general mental ability, CJDM, task performance, rhetorical sensitivity and social desirability demonstrated marginally acceptable fit (χ^2 (401*df*) = 580.53, NNFI = 0.86, CFI = 0.88, SRMR = 0.08, and RMSEA = 0.06 ($p < 0.05$). Reliabilities for the four CQ factors were 0.81–0.88 and standardized factor loadings (0.42–0.96) were significantly different from zero (*t*-values: 4.02–14.41, $p < 0.05$).

Since rhetorical sensitivity involves awareness in adjusting communication to fit the listener (Hart et al., 1980), we expected rhetorical sensitivity would positively relate to metacognitive CQ and behavioural CQ. Results were significant: metacognitive CQ ($r = 0.22$, $p < 0.05$) and behavioural CQ ($r = 0.34$, $p < 0.01$), providing evidence of convergent validity.

Since social desirability can be a source of nuisance variance, a low correlation between the CQS factors and social desirability would provide additional evidence of discriminant validity. Analyses showed that all CQ items had higher mean item-to-total correlations with their respective CQ factor than with social desirability and correlations between CQ factors and social desirability were not significant ($r = -0.07$–0.13), supporting discriminant validity.

Analysis of AVEs (Fornell and Larcker, 1981) provided further evidence of discriminant validity of the four CQ factors, as well as discriminant validity of the CQ factors compared to other constructs. AVEs for each CQ factor (0.47–0.62) exceeded the square of the correlations with other CQ factors (0.00–0.23), as well as with general mental ability, CJDM, task performance, rhetorical sensitivity and social desirability (0.00–0.10).

Study 2 Results

Table 5 reports descriptive statistics, correlations and reliabilities for Study 2. Table 6 summarizes regression results for CJDM (H1a–H1b) and task performance (H3a–H3d).

Results support H1, demonstrating that metacognitive CQ (H1a: $\beta = 0.30$, $p < 0.05$) and cognitive CQ (H1b: $\beta = 0.37$, $p < 0.05$) predicted CJDM. Results support H3a and H3d, demonstrating that metacognitive CQ ($\beta = 0.30$, $p < 0.05$) and behavioural CQ ($\beta = 0.47$, $p < 0.001$) predicted task performance. Cognitive CQ ($\beta = 0.19$, *ns*) and motivational CQ ($\beta = -0.01$, *ns*) did not significantly relate to task performance, and therefore H3b and H3c were not supported.

CQ increased explained variance in CJDM by 22 percent (adjusted $R^2 = 0.21$) and in task performance by 24 percent (adjusted $R^2 = 0.28$), over and above sex, citizenship, cross-cultural experience, dyadic similarity, general mental ability, rhetorical sensitivity and social desirability. Usefulness analysis shows variance

Table 5. Means, standard deviations, scale reliabilities and inter-correlations (Study 2)[†]

	MN	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1. CJDM	65.63	7.47	–											
2. Task Performance	6.03	0.96	0.36*	(0.91)										
3. Metacognitive CQ	5.41	0.78	0.33*	0.46**	(0.71)									
4. Cognitive CQ	3.80	1.03	0.39**	0.14	0.30**	(0.85)								
5. Motivational CQ	5.82	0.75	0.21	0.08	0.49**	0.23*	(0.71)							
6. Behavioural CQ	4.98	0.99	0.11	0.37**	0.32**	0.22*	0.20*	(0.83)						
7. General mental ability	29.06	3.02	0.01	0.25*	0.07	0.07	−0.01	−0.02	–					
8. Rhetorical sensitivity	5.22	0.88	0.07	0.03	0.22*	0.11	0.22*	0.34**	−0.13	(0.79)				
9. Social desirability	0.57	0.14	−0.31*	−0.17	−0.07	0.02	−0.07	0.13	0.13	−0.08	–			
10. Sex[‡]	0.64	0.48	−0.11	0.10	0.04	−0.05	0.13	0.02	−0.25*	0.06	−0.02	–		
11. Citizenship[§]	0.69	0.47	0.10	−0.03	0.07	0.06	0.24*	0.21*	−0.25*	0.24*	−0.03	0.30**	–	
12. Cross-cultural experience	1.58	2.03	0.07	0.14	0.34**	0.26*	0.32**	0.23*	0.09	0.21*	0.08	−0.01	−0.05	–
13. Dyadic similarity[¶]	0.25	0.44	−0.23	−0.16	0.05	−0.14	0.18	−0.09	0.09	−0.03	−0.04	0.05	−0.16	0.01

Notes:

* $p < 0.05$ ** $p < 0.01$.

[†] n = 98. Reliability coefficients are in parenthesis along the diagonal.

[‡] 0 = female, 1 = male.

[§] 0 = local, 1 = foreign.

[¶] 0 = different country, 1 = same country.

CJDM, Cultural Judgment and Decision Making.

Table 6. Regression of cultural intelligence on cultural judgment and decision making and task performance (Study 2)[†]

Variable	*Cultural judgement and decision making*			*Task performance*		
	Step 1	*Step 2*	*Step 3*	*Step 1*	*Step 2*	*Step 3*
Sex[‡]	–0.11	–0.14	–0.20	0.13	0.17	0.22
Citizenship[§]	0.15	0.16	0.14	–0.10	–0.06	–0.13
Cross-cultural experience	0.08	0.12	–0.03	0.18	0.17	0.23
Dyadic similarity[¶]	–0.15	–0.16	–0.03	–0.16	–0.19	–0.19
General mental ability (GMA)		0.15	0.15		0.24	0.17
Rhetorical sensitivity		0.04	–0.10		–0.04	–0.31*
Social desirability		–0.33*	–0.32*		–0.27*	–0.28*
Metacognitive CQ			0.30*			0.30*
Cognitive CQ			0.37*			0.19
Motivational CQ			0.14			–0.01
Behavioural CQ			0.28			0.47***
F	0.75	1.21	2.13*	1.11	1.63	3.11**
ΔF		1.78	3.26*		2.21	4.90**
R^2	0.06	0.17	0.39	0.07	0.17	0.41
ΔR^2		0.11	0.22		0.10	0.24
Adjusted R^2	–0.02	0.03	0.21	0.01	0.07	0.28
Usefulness analysis:						
GMA ΔR^2 (Rhetorical Sensitivity + Social desirability + CQ in step2)			0.02			0.03
Rhetorical sensitivity ΔR^2 (GMA + Social desirability + CQ in step2)			0.01			0.05
Social desirability ΔR^2 (GMA + Rhetorical sensitivity + CQ in step2)			0.09			0.07

Notes:
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
[†] n = 98.
[‡] 0 = female, 1 = male.
[§] 0 = local, 1 = foreign.
[¶] 0 = different country, 1 = same country.

explained by CQ (0.22–24) compared favorably with GMA (0.02–0.03), rhetorical sensitivity (0.01–0.05) and social desirability (0.07–0.09).

STUDY 3

We designed Study 3 to triangulate and extend findings from instructional settings (Studies 1–2) to field settings. If field results produce the same pattern of results as Studies 1 and 2, this will reinforce results and strengthen the generalizability of findings.

Sample and Procedures

We collected data from 103 foreign professionals and their supervisors. Foreign professionals (83 percent male, average age 34 years, average job tenure 2.6 years), recruited from other countries (USA, United Kingdom, Denmark, Germany, Belgium, Austria, Greece, Australia, Indonesia, Philippines, China and India), worked for an information technology consulting firm in Singapore. Participants completed web questionnaires on cultural adjustment and wellbeing. Supervisors completed web questionnaires on task performance and employee adjustment (interactional adjustment and work adjustment). Since general adjustment and wellbeing do not focus on work related adjustment, we did not collect supervisor ratings for them.

Measures

Task performance. Supervisors rated task performance with two in-role behaviour items: fulfils the work responsibilities of the job; meets performance expectations (1 = strongly disagree; 7 = strong agree) adapted from Williams and Anderson (1991, $\alpha = 0.95$).

Cultural adaptation. Supervisors rated employee interactional (three items, $\alpha = 0.83$) and work adjustment (three items, $\alpha = 0.77$). Employees rated interactional (three items, $\alpha = 0.89$), work (three items, $\alpha = 0.87$), and general adjustment (five items, $\alpha = 0.76$) and wellbeing (four items, $\alpha = 0.76$). We used the same items as in Study 1 for interactional adjustment and wellbeing. We adapted work adjustment items: how well have you adjusted to your current situation in terms of specific job responsibilities; supervisory responsibilities; performance standards and expectations and general adjustment items and how well have you adjusted to your current situation in terms of living conditions in general; food; shopping; cost of living; healthcare facilities (1 = extremely unadjusted; 7 = extremely adjusted) from Black and Stephens (1989).

Cultural intelligence. We assessed cultural intelligence with the CQS: metacognitive CQ ($\alpha = 0.88$), cognitive CQ ($\alpha = 0.89$), motivational CQ ($\alpha = 0.81$), and behavioural CQ ($\alpha = 0.86$).

Controls. We included sex (0 = F, 1 = M) and *cross-cultural experience* (years of foreign assignment work) as controls.

Dimensionality, Internal Consistency and Validity Evidence

CFA of the four CQ factors; self-report of interactional adjustment, work adjustment, general adjustment, and wellbeing; and supervisor-report of task performance, interactional adjustment, and work adjustment demonstrated good fit:

χ^2 (805*df*) = 877.24, NNFI = 0.96, CFI = 0.97, SRMR = 0.07, and RMSEA = 0.03 ($p < 0.05$). Reliabilities for the four CQ factors were 0.81–0.87, and standardized factor loadings (0.45–0.85) were significantly different from zero (*t*-values: 4.29–8.17, $p < 0.05$).

Analysis of AVEs shows discriminant validity. AVEs for each CQ factor (0.46–0.56) exceeded the square of the correlations with other CQ factors (0.10–0.32) and with self-report of interactional adjustment, work adjustment, general adjustment and wellbeing (0.00–0.29).

Study 3 Results

Table 7 reports descriptive statistics, correlations and reliabilities for the foreign professionals and their supervisors. Table 8 summarizes regression results.

Results support H2. Motivational CQ and behavioural CQ predicted supervisor rated interactional adjustment ($\beta = 0.42$, $p < 0.01$/$\beta = 0.28$, $p < 0.05$) and work adjustment ($\beta = 0.41$, $p < 0.01$/$\beta = 0.35$, $p < 0.05$), thus, supporting H2a and H2b. Motivational CQ and behavioural CQ also predicted self-reported cultural adaptation: motivational CQ (H2a) and interactional ($\beta = 0.41$, $p < 0.001$), work ($\beta = 0.39$, $p < 0.001$), and general adjustment ($\beta = 0.33$, $p < 0.001$) as well as wellbeing ($\beta = 0.47$, $p < 0.001$); behavioural CQ (H2b) and interactional adjustment ($\beta = 0.27$, $p < 0.01$), work adjustment ($\beta = 0.19$, $p < 0.05$), general adjustment ($\beta = 0.26$, $p < 0.01$), and wellbeing ($\beta = 0.19$, $p < 0.05$).

Results support H3a and H3d. Metacognitive CQ ($\beta = 0.47$, $p < 0.01$) and behavioural CQ ($\beta = 0.31$, $p < 0.05$) predicted supervisor rated task performance. Results did not support H3b or H3c for cognitive CQ ($\beta = 0.00$, *ns*) or motivational CQ ($\beta = 0.26$, *ns*) in predicting task performance.

CQ increased explained variance in supervisor rated task performance 36 percent (adjusted $R^2 = 0.29$), interactional adjustment 28 percent (adjusted $R^2 = 0.18$), and work adjustment 29 percent (adjusted $R^2 = 0.19$). CQ also increased explained variance in self-rated interactional adjustment 26 percent (adjusted $R^2 = 0.26$), work adjustment 19 percent (adjusted $R^2 = 0.16$), general adjustment 20 percent (adjusted $R^2 = 0.30$), and wellbeing 29 percent (adjusted $R^2 = 0.26$). Usefulness analysis shows variance explained by CQ (0.19–36) compares favorably with variance explained by demographic characteristics of sex and cross-cultural experience (0.01–0.11).

DISCUSSION

The primary goal of this research was to describe development and cross-validation of the 20-item cultural intelligence scale (CQS) and test substantive predictions based on integration of the intelligence and intercultural competencies literatures. Cross-validation analyses provide strong support for the validity and

Table 7. Means, standard deviations, scale reliabilities and inter-correlations (Study 3)[†]

	MN	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1. Task performance (supervisor)	5.68	0.69	(0.95)											
2. Interactional adjustment (supervisor)	5.71	0.68	0.47**	(0.83)										
3. Work adjustment (supervisor)	5.36	0.79	0.77**	0.46**	(0.77)									
4. Interactional adjustment (self)	5.75	0.85	0.39*	0.21	0.36*	(0.89)								
5. Work adjustment (self)	6.02	0.63	0.34*	0.32*	0.35*	0.45**	(0.87)							
6. General adjustment (self)	5.77	0.64	0.38*	0.21	0.44**	0.58**	0.45**	(0.76)						
7. Wellbeing (self)	5.80	0.66	0.16	0.22	0.27	0.35**	0.60**	0.30**	(0.76)					
8. Metacognitive CQ	4.25	1.25	0.55**	0.33*	0.36*	0.17	0.14	0.20*	0.18	(0.88)				
9. Cognitive CQ	4.72	0.92	0.13	0.17	0.18	0.35**	0.18	0.33**	0.31**	0.28**	(0.89)			
10. Motivational CQ	5.70	0.68	0.33*	0.49**	0.41**	0.48**	0.44**	0.40**	0.50**	0.23*	0.40**	(0.81)		
11. Behavioural CQ	5.01	0.99	0.37*	0.36*	0.41**	0.36**	0.27**	0.36**	0.33**	0.53**	0.29**	0.40**	(0.86)	
12. Sex[‡]	0.83	0.37	−0.08	0.03	−0.06	−0.19	−0.09	−0.37**	−0.00	−0.17	−0.04	−0.11	−0.17	–
13. Cross-cultural experience	3.28	5.83	0.16	0.01	0.12	−0.00	0.09	0.04	0.14	−0.02	0.16	−0.08	−0.15	0.12

Notes:

* $p < 0.05$ ** $p < 0.01$.

[†] n = 103. Reliability coefficients are in parenthesis along the diagonal.

[‡] 0 = female, 1 = male.

Table 8. Regression of cultural intelligence on task performance and cultural adaptation (Study 3)[†]

Variable	*Cultural adaptation*													
	Interactional adjustment (self)		*Work adjustment (self)*		*General adjustment (self)*		*Wellbeing (self)*		*Interactional adjustment (supervisor)*		*Work adjustment (supervisor)*		*Task performance (supervisor)*	
	Step 1	*Step 2*	*Step 1*	*Step 2*	*Step 1*	*Step 2*	*Step 1*	*Step 2*	*Step 1*	*Step 2*	*Step 1*	*Step 2*	*Step 1*	*Step 2*
Sex[‡]	–0.19	–0.12	–0.10	–0.04	–0.38***	–0.32***	–0.02	0.06	0.03	0.04	–0.08	–0.05	–0.10	–0.11
Cross-cultural experience	0.02	0.06	0.10	0.15	0.09	0.13	0.14	0.18	0.00	0.05	0.13	0.23	0.17	0.24
Metacognitive CQ		0.03		0.06		0.02		0.07		0.21		0.21		0.47**
Cognitive CQ		0.17		0.06		0.17		0.13		0.04		–0.02		0.00
Motivational CQ		0.41***		0.39***		0.33***		0.47***		0.42**		0.41**		0.26
Behavioural CQ		0.27**		0.19*		0.26**		0.19*		0.28*		0.35*		0.31*
F	1.81	6.69***	0.88	4.09**	8.13**	8.07***	0.92	6.69***	0.02	2.69*	0.38	2.65*	0.70	3.78**
ΔF		8.83***		5.62***		7.01***		9.41***		4.03**		3.73*		5.17**
R^2	0.04	0.30	0.02	0.21	0.15	0.35	0.02	0.31	0.00	0.28	0.02	0.31	0.03	0.39
ΔR^2		0.26		0.19		0.20		0.29		0.28		0.29		0.36
Adjusted R^2	0.02	0.26	–0.00	0.16	0.13	0.30	0.00	0.26	–0.04	0.18	–0.03	0.19	–0.01	0.29
Usefulness analysis:														
Controls ΔR^2 (CQ in step1)		0.01		0.02		0.11		0.03		0.01		0.04		0.06

Notes:
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
[†] n = 103.
[‡] 0 = female, 1 = male.

reliability of the CQS across samples, time and countries (Singapore and the USA). In addition, results in three substantive studies across different cultural, educational and work settings (N = 794) demonstrate a systematic pattern of relationships between dimensions of CQ and specific intercultural effectiveness outcomes. These findings are noteworthy because they show the value of using contemporary conceptualizations of intelligence as a framework for conceptualizing a set of intercultural competencies: metacognitive CQ, cognitive CQ, motivational CQ and behavioural CQ.

Results demonstrate that CQ has a unique explanatory power in predicting three aspects of intercultural effectiveness (CJDM, cultural adaptation and task performance), after controlling for other individual characteristics previously shown to influence intercultural effectiveness. These individual characteristics include general mental ability, emotional intelligence, cross-cultural adaptability, Big Five personality, rhetorical sensitivity, social desirability, age, sex, dyadic similarity and cross-cultural experience. This evidence of incremental validity combined with CFA and AVE evidence of discriminant validity among the four dimensions of CQ as well as between dimensions of CQ and other individual characteristics further support the conceptual distinctiveness and value of CQ as a meaningful individual difference construct. We discuss key substantive findings below.

Our results for the cognitive outcome of cultural judgment and decision making effectiveness (H1) and the affective outcomes of cultural adaptation (H2) are straightforward. Consistent with hypotheses, metacognitive CQ and cognitive CQ positively related to CJDM effectiveness, while motivational CQ and behavioural CQ positively related to two forms of cultural adaptation: cultural adjustment and wellbeing. This pattern of results supports our contention that cognitive capabilities such as questioning assumptions, adjusting mental models and rich cultural knowledge schemas are especially important for making accurate judgments and decisions when situations involve cultural diversity. It also supports our arguments that the motivational capability to channel energy productively, even when intercultural situations are stressful, and the behavioural capability to exhibit flexible actions that are culturally appropriate are especially important for coping with actual experiences in culturally diverse situations. These findings highlight the value of carefully aligning specific CQ capabilities with specific aspects of intercultural effectiveness.

Our third hypothesis involving CQ and task performance received less empirical support. We had argued a priori that all four dimensions of CQ would predict task performance because Campbell (1999) identified knowledge, skills, abilities and motivation as predictors of job performance, and because CQ should enable individuals to understand and enact role expectations in a manner that is culturally sensitive and appropriate. Results, however, revealed that only metacognitive and behavioural CQ predicted task performance.

Interestingly, bivariate correlations between motivational CQ and task performance failed to reach significance in Study 2 ($r = 0.08$, *ns*) but were significant in Study 3 ($r = 0.33$, $p < 0.05$). This suggests the possibility that differences in the participants (international managers vs. foreign professionals), rater perspectives (peers vs. supervisors), or characteristics of the task (a short-term project vs. ongoing work responsibilities) may have influenced fundamental relationships between motivational CQ and performance. Even in Study 3, however, where the underlying correlation between motivational CQ and task performance was significant, the beta value failed to reach significance when the effects of all four aspects of CQ were considered simultaneously in regression analyses. In addition, we note that the bivariate correlation between cognitive CQ and task performance failed to reach significance in Study 2 ($r = 0.14$, *ns*) and Study 3 ($r = 0.13$, *ns*). Combined, these findings suggest that metacognitive CQ and behavioural CQ are more directly relevant to task performance than the other dimensions of CQ.

Our finding that metacognitive CQ and behavioural CQ predict task performance in intercultural settings is consistent with existing conceptual and empirical research on organizational diversity. For instance, Caldwell and O'Reilly (1982) demonstrated that those who monitored the situation (metacognition) and adapted to the environment (behavioural flexibility) were more effective in boundary spanning jobs that required interactions across groups with different norms. Likewise, Roberts' (2005) conceptual article on professionals argued for the importance of accurate sense making and behavioural flexibility for effective and appropriate self-presentation in organizations characterized by diversity. Our study of culturally diverse settings extends these findings to show that metacognitive and behavioural capabilities are important for effective task performance.

Predictions for cognitive CQ and motivational CQ relative to task performance were not supported; this suggests the need for additional research. Since role expectations for task performance are core responsibilities that are typically well structured and well specified, they may require relatively little knowledge of the larger culture (i.e., cognitive CQ) and relatively little intrinsic interest and self-efficacy to function effectively in culturally diverse situations (i.e., motivational CQ).

Implications for Research and Practice

Our study offers three important implications for intercultural effectiveness research. First, evidence that CQ is conceptually and empirically distinct from other individual differences, such as EI and Big Five, in predicting a range of intercultural effectiveness outcomes suggests the benefits of including CQ when studying culturally diverse situations. Thus, future research on multinational teams, expatriates, overseas work assignments, global leadership and

cross-cultural negotiation may find that inclusion of CQ improves predictions of effectiveness.

Second, the multidimensional conceptualization of CQ and the differential relationships of the dimensions of CQ with specific intercultural effectiveness outcomes suggest the importance of continuing to theorize about and examine CQ as a multidimensional construct, where specific dimensions of CQ have special relevance to different outcomes. For instance, even though our current findings show that only metacognitive CQ and behavioural CQ were related to task performance, future research can examine whether cognitive CQ and behavioural CQ are important for other forms of job performance, such as contextual and adaptive performance where role expectations are less structured and well specified. It also would be important to consider these relationships for different roles, jobs and contexts.

Third, our study has important implications for intercultural training, which has, to date, focused primarily on knowledge or cognitive training (Earley and Peterson, 2004). Since our results highlighted metacognitive CQ and behavioural CQ as fundamental capabilities with relevance to multiple intercultural effectiveness outcomes, training programs could include modules on both. For example, Earley and Peterson (2004) outlined training interventions for CQ dimensions. This included cognitive structure analysis for examining knowledge structures and enhancing awareness and reflection (metacognitive CQ). It also included dramaturgical exercises such as role plays and simulations involving physical, emotional and sensory processes to enhance behavioural flexibility (behavioural CQ).

Limitations

As with all research, this study has limitations. First, we limited the number of constructs assessed in each survey to avoid participant fatigue. To maximize our understanding of the relationships between CQ and other relevant constructs, we included different individual difference constructs in different studies. Thus, we sacrificed consistency of design for breadth of findings. Nevertheless, we suggest that using different CJDM tasks, different aspects of cultural adaptation, different tasks and different raters across settings and samples should enhance the generalizability of findings based on the overall consistency of demonstrated relationships. Thus, our results suggest the robustness of metacognitive CQ and cognitive CQ as predictors of CJDM as well as motivational CQ and behavioural CQ as predictors of cultural adaptation.

We recommend that future research extending our findings by examining additional predictors and outcomes of CQ. This could include individual difference characteristics such as self-monitoring, need for cognition, need for closure, self-efficacy, ethnocentrism, self-construal, and social identity as factors that may

influence the formation and enhancement of CQ. It also could include additional aspects of intercultural effectiveness such as performance in cross-cultural negotiations, conflict management in culturally diverse groups, adjustment to working on global virtual teams, selection for jobs with international responsibilities, and expatriate performance.

A second limitation is the geographic scope of our contexts. Although we followed recommendations of Kirkman and Law (2005) and cross-validated the CQS scale in two different cultural contexts, future research should consider CQ in additional settings. This could include research in Europe, Africa, Latin America and the Middle East.

CONCLUSION

In sum, results of three cross-validation samples and three substantive studies provide strong empirical support for the reliability, stability and validity of the CQS and demonstrate that specific dimensions of CQ have differential relationships with cognitive, affective and behavioural intercultural effectiveness outcomes. This pattern of relationships is a first step toward enhancing the theoretical precision of CQ. Results also suggest that CQ has important implications for practice – especially for selecting, training and developing a culturally intelligent workforce. We hope that this work on cultural intelligence allows insight into why some people are more effective than others in today's global and 'not-so-flat' world.

NOTES

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APPENDIX I

The Cultural Intelligence Scale (CQS)

Read each statement and select the response that best describes your capabilities. Select the answer that BEST describes you AS YOU REALLY ARE (1 = strongly disagree; 7 = strongly agree)

CQ factor	*Questionnaire items*
Metacognitive CQ	
MC1	I am conscious of the cultural knowledge I use when interacting with people with different cultural backgrounds.
MC2	I adjust my cultural knowledge as I interact with people from a culture that is unfamiliar to me.
MC3	I am conscious of the cultural knowledge I apply to cross-cultural interactions.
MC4	I check the accuracy of my cultural knowledge as I interact with people from different cultures.
Cognitive CQ	
COG1	I know the legal and economic systems of other cultures.
COG2	I know the rules (e.g., vocabulary, grammar) of other languages.
COG3	I know the cultural values and religious beliefs of other cultures.
COG4	I know the marriage systems of other cultures.
COG5	I know the arts and crafts of other cultures.
COG6	I know the rules for expressing nonverbal behaviors in other cultures.
Motivational CQ	
MOT1	I enjoy interacting with people from different cultures.
MOT2	I am confident that I can socialize with locals in a culture that is unfamiliar to me.
MOT3	I am sure I can deal with the stresses of adjusting to a culture that is new to me.
MOT4	I enjoy living in cultures that are unfamiliar to me.
MOT5	I am confident that I can get accustomed to the shopping conditions in a different culture.
Behavioral CQ	
BEH1	I change my verbal behavior (e.g., accent, tone) when a cross-cultural interaction requires it.
BEH2	I use pause and silence differently to suit different cross-cultural situations.
BEH3	I vary the rate of my speaking when a cross-cultural situation requires it.
BEH4	I change my nonverbal behavior when a cross-cultural situation requires it.
BEH5	I alter my facial expressions when a cross-cultural interaction requires it.

Note: Use of this scale granted to academic researchers for research purposes only. For information on using the scale for purposes other than academic research (e.g., consultants and non-academic organizations), please send an email to cquery@culturalq.com. The Chinese version of the scales is available on the *MOR* website.

REFERENCES

Ackerman, P. L. 1996. A theory of adult intellectual development: Process, personality, interests, and knowledge. ***Intelligence,*** 22: 227–257.

Ang, S., Van Dyne, L., & Koh, S. K. 2006. Personality correlates of the four-factor model of cultural intelligence. ***Group and Organization Management,*** 31: 100–123.

Bagozzi, R. P., & Edwards, J. R. 1998. A general approach for representing constructs in organizational research. ***Organizational Research Methods,*** 1: 45–87.

Bandura, A. 2002. Social cognitive theory in cultural context. ***Applied Psychology: An International Review,*** 51: 269–290.

Bhaskar-Shrinivas, P., Harrison, D. A., Shaffer, M. A., & Luk, D. M. 2005. Input-based and time-based models of international adjustment: Meta-analytic evidence and theoretical extensions. ***Academy of Management Journal,*** 48: 257–281.

Black, J. S., & Stephens, G. K. 1989. The influence of the spouse on American expatriate adjustment and intent to stay in Pacific Rim overseas assignments. ***Journal of Management,*** 15: 529–544.

Brislin, R., Worthley, R., & MacNab, B. 2006. Cultural intelligence: Understanding behaviors that serve people's goals. ***Group and Organization Management,*** 31: 40–55.

Byrne, B. M. 1998. ***Structural equation modeling with LISREL, PRELIS, and SIMPLIS: Basic concepts, applications, and programming.*** Mahwah, NJ: Erlbaum.

Caldwell, D. F., & O'Reilly, C. A. 1982. Boundary spanning and individual performance: The impact of self-monitoring. ***Journal of Applied Psychology,*** 67: 124–127.

Caligiuri, P. M. 1997. Assessing expatriate success: Beyond just 'being there'. In Z. Ayan (Ed.), ***Expatriate management: Theory and research:*** 117–140. Greenwich, Conn: JAI Press.

Campbell, J. P. 1999. The definition and measurement of performance in the new age. In D. R. Ilgen & E. D. Pulakos (Eds.), ***The changing nature of performance: Implications for staffing, motivation, and development:*** 399–429. San Francisco, Calif: Jossey-Bass.

Ceci, S. J. 1996. ***On intelligence: A bioecological treatise on intellectual development.*** Cambridge, Mass: Harvard University Press.

Costa, P. T. Jr., & McCrae, R. R. 1992. ***Revised NEO personality inventory (NEO PI-R) and new five-factor inventory (NEO FFI) professional manual.*** Odessa, Fla: Psychological Assessment Resources.

Cushner, K., & Brislin, R. W. 1996. ***Intercultural relations: A practical guide*** (2nd ed.). Thousand Oaks, Calif: Sage.

Cushner, K., & Karim, A. U. 2004. Study abroad at the university level. In D. Landis, J. M. Bennett, & M. J. Bennett (Eds.), ***Handbook of intercultural training*** (3rd ed.): 289–308. Thousand Oaks, Calif: Sage.

Darlington, R. B. 1968. Multiple regression in psychological research. ***Psychological Bulletin,*** 79: 161–82.

Deci, E. L., & Ryan, R. M. 1985. ***Intrinsic motivation and self-determination in human behavior.*** New York: Plenum.

DeNisi, A. S., & Pritchard, R. D. 2006. Performance appraisal, performance management and improving individual performance: A motivational framework. ***Management and Organization Review,*** 2: 253–277.

Earley, P. C., & Ang, S. 2003. ***Cultural intelligence: Individual interactions across cultures.*** Palo Alto, Calif: Stanford University Press.

Earley, P. C., & Gibson, C. B. 2002. ***Multinational work teams: A new perspective.*** Hillsdale, NJ: Lawrence Erlbaum.

Earley, P. C., & Peterson, R. S. 2004. The elusive cultural chameleon: Cultural intelligence as a new approach to intercultural training for the global manager. ***Academy of Management Learning and Education,*** 3: 100–115.

Eccles, J. S., & Wigfield, A. 2002. Motivational beliefs, values, and goals. ***Annual Review of Psychology,*** 53: 109–132.

Einhorn, H. J., & Hogarth, R. M. 1981. Behavioral decision theory: Processes of judgment and choice. ***Annual Review of Psychology,*** 32: 53–88.

Epel, E. S., Bandura, A., & Zimbardo, P. G. 1999. Escaping homelessness: The influences of self-efficacy and time perspective on coping with homelessness. ***Journal of Applied Social Psychology,*** 29: 575–596.

Fitch, K. 1998. ***Speaking relationally: Culture, communication and interpersonal connection.*** New York: Guildford Press.

Flavell, J. H. 1979. Metacognition and cognitive monitoring: A new area of cognitive inquiry. ***American Psychologist,*** 34: 906–911.

Fornell, C., & Larcker, D. R. 1981. Evaluating structural equation models with unobservable variables and measurement error. ***Journal of Marketing Research,*** 18: 39–50.

Friedman, T. L. 2005. ***The world is flat: A brief history of the twenty-first century.*** New York: Farrar, Straus and Giroux.

Gelfand, M. J., Erez, M. E., & Aycan, Z. 2007. Cross-cultural organizational behavior. ***Annual Review of Psychology,*** 58: 479–514.

Goffman, E. 1959. ***The presentation of self in everyday life.*** Harmondsworth: Penguin.

Goldberg, D. P., & Williams, P. 1988. ***A user's guide to the General Health Questionnaire.*** Basingstoke: NFER-Nelson.

Gudykunst, W. B., Ting-Toomey, S., & Chua, E. 1988. ***Culture and interpersonal communication.*** Newbury Park, Calif: Sage.

Hall, E. T. 1959. ***The silent language.*** New York: Doubleday.

Hall, E. T. 1993. ***The anthropology of everyday life.*** New York: Anchor Books.

Hart, R. P., Carlson, R. E., & Eadie, W. F. 1980. Attitudes toward communication and the assessment of rhetorical sensitivity. ***Communication Monographs,*** 47: 1–22.

Hinkin, T. R. 1998. A brief tutorial on the development of measures for use in survey questionnaires. ***Organizational Research Methods,*** 1: 104–121.

Hofstede, G. 2001. ***Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations.*** Thousand Oaks, Calif: Sage.

Janssens, M., &Brett, J. M. 2006. Cultural intelligence in global teams: A fusion model of collaboration. ***Group and Organization Management,*** 31: 124–153.

Kanfer, R., & Heggestad, E. D. 1997. Motivational traits and skills: A person-centered approach to work motivation. ***Research in Organizational Behavior,*** 19: 1–56.

Katz, D., & Kahn, R. L. 1978. ***The social psychology of organizations*** (2nd ed.). New York: Wiley.

Kelley, C., & Meyers, J. 1995. ***The cross-cultural adaptability inventory (manual).*** Minneapolis, Minn: National Computer Systems.

Kirkman, B. L., & Law, K. S. 2005. International management research in AMJ: Our past, present, and future. ***Academy of Management Journal,*** 48: 377–386.

Law, K. S., Wong, C. S., & Mobley, W. H. 1998. Toward a taxonomy of multidimensional constructs. ***Academy of Management Review,*** 23: 741–755.

Law, K. S., Wong, C. S., & Song, L. J. 2004. The construct and criterion validity of emotional intelligence and its potential utility for management studies. ***Journal of Applied Psychology,*** 89: 483–496.

Mayer, J. D., Caruso, R. R., & Salovey, P. 2000. Emotional intelligence meets traditional standards for an intelligence. ***Intelligence,*** 27: 267–298.

Mendenhall, M., & Oddou, G. 1985. The dimensions of expatriate acculturation: A review. ***Academy of Management Review,*** 10: 39–47.

Murdock, G. P. 1987. ***Outline of cultural materials*** (5th revised ed.). New Haven, Conn: HRAF.

Ng, K. Y., & Earley, C. P. 2006. Culture and intelligence: Old constructs, new frontiers. ***Group and Organization Management,*** 31: 4–19.

O'Neil, H. E., & Abedi, J. 1996. Reliability and validity of a state metacognitive inventory: Potential for alternative assessment. ***Journal of Educational Research,*** 89(4): 234–245.

Paige, R. M. 2004. Instrumentation in intercultural training. In D. Landis, J. M. Bennett, & M. J. Bennett (Eds.), ***Handbook of intercultural training*** (3rd ed.): 85–128. Thousand Oaks, Calif: Sage.

Roberts, L. M. 2005. Changing faces: Professional image construction in diverse organizational settings. ***Academy of Management Review,*** 30: 685–711.

Schmidt, F. L., & Hunter, J. E. 2000. Select on intelligence. In E. A. Locke (Ed.), ***The Blackwell handbook of organizational principles:*** 3–14. Oxford: Blackwell.

Schmitt, N. W., & Stults, D. M. 1985. Factors defined by negatively keyed items: The results of careless respondents? ***Applied Psychological Measurement,*** 9(4): 367–373.

Schutte, N. S., Malouff, J. M., Hall, L. E., Haggerty, D. J., Cooper, J. T., Golden, C. J., & Dornheim, L. 1998. Development and validation of a measure of emotional intelligence. ***Personality and Individual Differences,*** 25(2): 167–177.

Searle, W., & Ward, C. 1990. The prediction of psychological and sociocultural adjustment during cross-cultural transitions. ***International Journal of Intercultural Relations,*** 14: 449–464.

Shaffer, M. A., Harrison, D. A., Gregersen, H., Black, J. S., & Ferzandi, L. A. 2006. You can take it with you: Individual differences and expatriate effectiveness. ***Journal of Applied Psychology,*** 91: 109–125.

Sternberg, R. J. 1986. A framework for understanding conceptions of intelligence. In R. J. Sternberg & D. K. Detterman (Eds.), ***What is intelligence? Contemporary viewpoints on its nature and definition:*** 3–15. Norwood, NJ: Ablex.

Sternberg, R. J., & Detterman, D. K. 1986. ***What is intelligence?: Contemporary viewpoints on its nature and definition.*** Norwood, NJ: Ablex.

Sternberg, R. J., Forsythe, G. B., Hedlund, J., Horvath, J. A., Wagner, R. K., Williams, W. M., Snook, S., & Grigorenko, E. L. 2000. ***Practical intelligence in everyday life.*** New York: Cambridge University Press.

Sternberg, R. J., & Grigorenko, E. L. 2006. Cultural intelligence and successful intelligence. ***Group and Organization Management,*** 31: 27–39.

Stone-Romero, E., Stone, D. L., & Salas, E. 2003. The influence of culture on role conceptions and role behavior in organizations. ***Applied Psychology: An International Review,*** 52: 328–362.

Strahan, R., & Gerbasi, K. C. 1972. Short, homogeneous versions of the Marlowe-Crowne Social Desirability Scale. ***Journal of Clinical Psychology,*** 28: 191–193.

Templer, K. J., Tay, C., & Chandrasekar, N. A. 2006. Motivational cultural intelligence, realistic job previews, and realistic living conditions preview, and cross-cultural adjustment. ***Group and Organization Management,*** 31: 154–173.

Thorndike, R., & Stein, S. 1937. An evaluation of the attempts to measure social intelligence. ***Psychological Bulletin,*** 34: 275–285.

Triandis, H. C. 1994. ***Culture and social behavior.*** New York: McGraw Hill.

Triandis, H. C. 2006. Cultural intelligence in organizations. ***Group and Organization Management,*** 31: 20–26.

Trompenaars, F., & Hampden-Turner, C. 1997. ***Riding the waves of culture: Understanding cultural diversity in business.*** London: Nicholas Brealey Publishing.

Tsui, A. S. 1984. A role set analysis of managerial reputation. ***Organizational Behavior and Human Performance,*** 34: 64–96.

Tsui, A. S. 1990. A multiple-constituency model of effectiveness: An empirical examination at the human resource subunit level. ***Administrative Science Quarterly,*** 35: 458–483.

Tsui, A. S., & Gutek, B. 1999. ***Demographic differences in organizations: Current research and future directions.*** New York: Lexington Books/Macmillan.

Van Dyne, L., & Ang, S. 2006. Getting more than you expect: Global leader initiative to span structural holes and reputation effectiveness. In W. H. Mobley & E. Weldon (Eds.), ***Advances in Global Leadership,*** Vol. 4: 101–122. New York: Elsevier/JAI Press.

Vandenberg, R. J., & Lance, C. E. 2000. A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. ***Organization Research Methods,*** 3: 4–69.

Williams, L. J., & Anderson, S. E. 1991. Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behavior. ***Journal of Management,*** 17: 601–618.

Wonderlic, E. F. 1999. ***Wonderlic Personnel Test user's manual.*** Libertyville, Ill: Wonderlic.

Yamazaki, Y., & Kayes, D. C. 2004. An experiential approach to cross-cultural learning: A review and integration of competencies for success expatriate adaptation. ***Academy of Management Learning and Education,*** 3: 362–379.

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