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A bi-factor theory of the four-factor model of cultural intelligence: Meta-analysis and theoretical extensions

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ABSTRACT

Today's pervasiveness of intercultural interactions has spawned scholarly interest in cultural intelligence (CQ) – the capability to function effectively across cultures. Applying meta-analytic techniques, we harness the recent explosion of research on the four-factor model of CQ to address three fundamental, yet unresolved theoretical issues. First, we explicate the benefits of conceptualizing and modeling CQ as a bi-factor model where each factor provides both unique and holistic information. Results shed light on Gelfand's puzzle of whether to facet or not and clearly show the value of the four factors. Second, we advance and test a theoretical model delineating differential relationships between the four CQ factors and three forms of intercultural effectiveness. Findings, based on 199 independent samples (N = 44,155), underscore the value of a nuanced, theoretical model of CQ with differential effects of the four factors. Finally, going beyond prior research, we also address mediated and moderated relationships and expand our understanding of the CQ nomological network. We discuss the implications of these findings for theorizing about the CQ factors and suggest directions for future research.

1. Introduction

Cultural Intelligence (CQ), defined as the capability to function effectively in intercultural contexts (Ang & Van Dyne, 2008; Earley & Ang, 2003), is ubiquitous, given that intercultural interactions are a pervasive feature of people's social and professional lives. Ang et al. (2007) drew on Sternberg (1986) to delineate a four-factor model of CQ and provided preliminary evidence that the four CQ factors (motivational CQ, metacognitive CQ, cognitive CQ, and behavioral CQ) differentially predict important intercultural effectiveness outcomes. Since then, research on CQ has evolved rapidly, and many scholars have attested to the theoretical and practical utility of the CQ concept. For example, Gelfand, Imai, and Fehr (2008) concluded that "CQ has begun to demonstrate its theoretical elegance, empirical potential, and practical importance in a remarkably short period of time" (p. 376). The conclusion of Matsumoto and Hwang's (2013) review of cross-cultural competence models emphasized "the promising evidence for assessing CQ" (p. 867).

Despite the excitement surrounding the promise of CQ, important questions about the theoretical bases of CQ remain unanswered. First, although Ang et al. (2007) conceptualized CQ as an aggregate multidimensional construct, there is no clear consensus on the conceptualization of CQ and how it should be modeled. Some studies have used a single-factor model (e.g., Adair, Buchan, Chen, & Liu, 2016; Rockstuhl, Seiler, Ang, Van Dyne, & Annen, 2011). Other research has modeled CQ as comprising four correlated factors (e.g., Presbitero, 2016). Still other studies have combined/split factors (e.g., Bücker, Furrer, & Lin, 2015) or have examined a single CQ factor in isolation (e.g., Chua, Morris, & Mor, 2012). Each of these studies made important contributions to the cumulative knowledge about CQ. Still, inconsistency in modeling CQ is troubling because it suggests that findings across studies may not be comparable and even worse, may be misleading.

Second, research has not replicated Ang et al.'s (2007) initial evidence of differential validity of the four CQ factors. As Gelfand et al. (2008: 379) observed, "theorizing on the facets [four factors] can be imprecise, inconsistent, and/or contradictory." Some scholars have emphasized metacognitive and behavioral CQ as predictors of task performance (e.g., Ang et al., 2007), while others have focused on motivational CQ as a predictor of task performance (e.g., Chen, Liu, & Portnoy, 2012). This inconsistency is problematic because it demonstrates a lack of shared understanding of the theoretical utility of the four CQ factors.

Third, although some studies have considered more complex and more complete models that include mediation and moderation (e.g., Chen, Kirkman, Kim, Farh, & Tangirala, 2010; Xu & Chen, 2017), we

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lack cumulative knowledge about the CQ nomological network. This is problematic because it suggests that our understanding of these more complex models is piecemeal and may not reflect stable patterns of relationships. Addressing these three issues is important because lack of theoretical clarity about the fundamental nature of CQ and the four dimensions and lack of replication of CQ relationships suggests that recommendations scholars have made to managers may be inappropriate.

We address the first problem by advancing and testing a bi-factor CQ model that simultaneously accounts for the effects of a latent CQ factor as well as the effects of specific CQ factors. Bi-factor models have a long history in intelligence research (Gustafsson & Balke, 1993; Holzinger & Swineford, 1937) and have seen a recent resurgence in the context of modeling psychometric multidimensionality (Chen, West, & Sousa, 2006; Morin, Arens, & Marsh, 2016; Reise, 2012).

A specific advantage of bi-factor models, particularly relevant here, is that they simultaneously model coexisting general (i.e., latent CQ) and specific (i.e., CQ factors) constructs. They are called bi-factor models because item responses are modelled as a function of both a general and a specific factor. That is, in a *five*-factor bi-factor CQ model, one general factor (latent CQ) and four specific factors (metacognitive, cognitive, motivational, and behavioral CQ) are used to explain the covariance among a set of CQ items.

Thus, in the debate about whether CQ should be represented as a single-factor or a four-factor model, the bi-factor CQ model highlights a third option: overall CQ comprises both a general factor reflecting shared variance among CQ factors, and specific factors reflecting relevant specificity unexplained by this general factor. Throughout the manuscript, we use the terms *overall* CQ to refer to the theoretical construct of CQ and *latent* CQ to refer to the empirical general factor reflecting shared variance among the four specific CQ factors.

Responding to the second problem, we apply meta-analytic techniques to test Ang et al.'s (2007) theoretical model of CQ. Faced with a 'reproducibility crisis,' numerous scientists have argued that replication is a crucial cornerstone of cumulative science (Bettis, Helfat, & Shaver, 2016). Meta-analyses are often heralded as "*the* tool for accumulating data and synthesizing them into generalizable knowledge" (Eden, 2002, p. 841; emphasis in original) because they overcome difficulties associated with primary studies, such as sampling and measurement error (Schmidt & Hunter, 2014).

Finally, in response to the third problem, we advance theorizing on CQ, extend Ang et al.'s (2007) theoretical arguments for differential CQ effects, and test a mediated CQ model where proximal intercultural effectiveness outcomes differentially mediate the effects of the four CQ factors on more distal intercultural effectiveness outcomes. We also advance and test more nuanced theoretical arguments for interactive effects of metacognitive CQ with the other three CQ factors. Although Earley and Ang (2003) conceptualized the CQ factors as acting in concert to affect outcomes, we are aware of only one study (Chua & Ng, 2017) that has examined interactive effects of CQ factors. Thus, we offer a more nuanced understanding of CQ that goes beyond examination of CQ factors in isolation. Taken together, these extensions make important theoretical contributions to the CQ literature because they lead to more precise and comprehensive understanding of the effects of the four CQ factors (Gelfand et al., 2008).

We structure the remainder of this paper as follows. First, we provide a brief overview of the four-factor CQ model. We then discuss the advantages of modeling CQ as a bi-factor model that accounts for a latent CQ factor as well as each of the four factors. We next discuss unresolved theoretical issues in the CQ literature and advance specific hypotheses about (a) differential relationships between specific CQ factors and intercultural effectiveness outcomes, (b) mediators of CQ effects, and (c) the moderating role of metacognitive CQ. We then describe our methods and results and conclude by discussing the theoretical and practical importance of differentiating among the four CQ factors as the basis for providing a roadmap for future CQ research.

2. The four-factor CQ model

Ang and colleagues (Ang & Van Dyne, 2008; Earley & Ang, 2003) drew on Sternberg's (1986) multiple loci of intelligence framework that differentiated between cognitive, motivational, and behavioral loci of intelligence. Cognitive loci of intelligence comprise metacognition (i.e., understanding one's own and other's cognitions) and cognition (i.e., what one knows). Motivational loci of intelligence encompass the affective intensity and direction of attention. Behavioral loci of intelligence include verbal and nonverbal actions that result from mental processes.

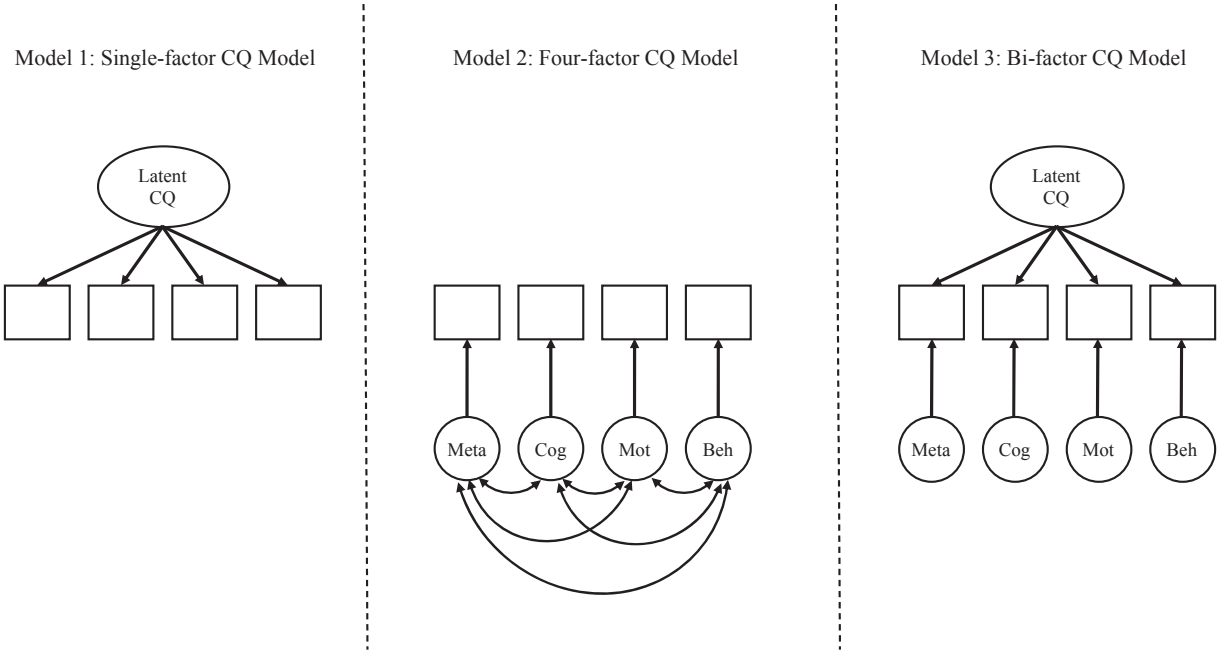

Fig. 1. Three conceptual models of CQ that correspond to a single-factor, four-factor, and bi-factor model of CQ. Not shown in the figure are relationships of latent variables with intercultural effectiveness outcomes.

Applying this multi-loci framework of intelligence to cultural capabilities, Ang et al. (2007) conceptualized CQ as a multidimensional construct with four factors: (1) metacognitive CQ – the mental capability to acquire and understand cultural knowledge; (2) cognitive CQ – knowledge about cultures and cultural differences; (3) motivational CQ – the capability to direct and sustain effort toward functioning in intercultural situations; and (4) behavioral CQ – the capability for behavioral flexibility in intercultural interactions (Ang & Van Dyne, 2008; Ang et al., 2007).

Each CQ factor describes a capability that facilitates intercultural effectiveness. However, this may be where the similarity ends because the four CQ capabilities differ in meaningful ways. Ang et al. (2007) positioned CQ theoretically as an aggregate multidimensional construct. As an aggregate multidimensional construct, the theoretical construct of overall CQ has two defining features: (a) CQ factors exist at the same level of conceptualization as the latent CQ construct and (b) CQ items reflect both common variance shared among all CQ factors and factor-specific variances (Law, Wong, & Mobley, 1998). Accordingly, CQ items provide *holistic* and *unique* information about a person's capability to function effectively in intercultural contexts.

Although Ang et al. (2007) demonstrated that the four factors contain unique information by showing differential predictive validity for different intercultural effectiveness outcomes, researchers have yet to address the implications of the mix of unique and holistic information implied by this theoretical conceptualization of CQ. This is problematic because it leads to conceptual ambiguity in interpreting findings from the two most common approaches to modeling CQ: the single-factor CQ Model and the four-factor CQ Model. Below, we briefly highlight advantages and disadvantages of the single-factor and four-factor CQ models and advance an integrative conceptualization: the bi-factor CQ model (see Fig. 1 for a visual depiction of all three models).

2.1. Unique and holistic information: Advancing a bi-factor CQ model

The single-factor CQ model (see Model 1 in Fig. 1) aggregates the four CQ factors to form a single-factor CQ construct.[1] The single-factor CQ model has three advantages (Chen, Hayes, Carver, Laurenceau, & Zhang, 2012). First, it is simple conceptually and analytically. Second, the CQ score tends to be more reliable than individual factors because it is based on more items. Finally, a single-factor CQ construct is conceptually broader than any factor individually and thus represents the complexity of the capability to function effectively in intercultural contexts. To date, scholars have demonstrated relationships for single-factor CQ with many outcomes, including intercultural adaptation (e.g., Ramalu, Rose, Uli, & Kumar, 2012), intercultural performance (e.g., Groves & Feyerherm, 2011), and negotiation outcomes (Imai & Gelfand, 2010).

Despite these advantages of the single-factor CQ model, it does not provide information on how the individual CQ factors relate to intercultural effectiveness outcomes. Thus, it remains unclear whether all four CQ factors relate equally to outcomes, whether specific factors relate to outcomes in all contexts, or whether the same outcome is related to different CQ factors in different contexts. This conceptual ambiguity is problematic. For example, a single-factor CQ could yield weaker research findings relative to individual CQ factors if non-predictive factors are included in the single-factor CQ score, and the inclusion of irrelevant CQ factors could lead to the development of inappropriate theories, wasted research effort, and ill-targeted interventions aimed at developing non-predictive CQ factors (Chen, Hayes, et al., 2012).

In contrast to the single-factor CQ model, the four-factor CQ model (see Model 2 in Fig. 1) accounts for the role of each CQ factor in predicting intercultural effectiveness outcomes. Although the four-factor CQ model compensates for the disadvantages of the single-factor CQ, it confounds factor-specific contributions with the effect of shared variance among the CQ factors. For some factors, both the unique and the shared variances may be related to intercultural effectiveness, whereas for other factors, only the shared variance may be related to intercultural effectiveness outcomes. Other concerns with the four-factor CQ model include the possibility that (a) findings based on factor-specific effects may not generalize because the four-factor CQ model takes advantage of sample-specific variance (Markon, 2009) and (b) multicollinearity due to shared CQ variance can result in unstable estimates of the relationships between CQ factors and outcomes, leading to interpretive difficulties.

To address the limitations of the single-factor and four-factor CQ models, we propose that CQ is best modeled as a bi-factor model (see Model 3 in Fig. 1). Bi-factor models, originally introduced by Holzinger and Swineford (1937), hypothesize (a) the existence of a general factor that accounts for variance shared between specific factors and (b) the existence of orthogonal specific factors that each exert unique effects on outcomes, over and above the general factor. Bi-factor models have a long history in intelligence research (Gustafsson & Balke, 1993) and have increasingly been applied in personality research to model the multidimensional structure of personality traits (McAbee, Oswald, & Connelly, 2014).

Conceptualizing CQ as a bi-factor model suggests that the theoretical construct of overall CQ is similar to a higher-order construct that is measured with five factors: the latent CQ factor (i.e., shared variance among CQ items) and four specific CQ factors (i.e., metacognitive CQ, cognitive CQ, motivational CQ, and behavioral CQ that account for factor-specific variance in CQ items). Consistent with Ang et al.'s (2007) conceptualization, we maintain that overall CQ is an aggregate multidimensional construct that can be formed as a linear combination of the five factors in the bi-factor model. At the same time, all factors (latent *and* specific CQ factors) in the bi-factor model are modeled as reflective latent constructs.

Modeling the shared variance among CQ factors as a latent construct is also theoretically meaningful. Theoretically, the shared variance among CQ factors arises from the dynamic interactions and reciprocal relationships between CQ factors over time. For example, those with high motivational CQ may learn more about other cultures due to their interest in cultures, thus increasing their cognitive CQ. As a result of knowing more about other cultures, their interest in other cultures may also increase in return.

Given Ang et al.'s (2007) conceptualization of CQ as an aggregate multidimensional construct in which CQ items reflect both shared (i.e. latent) and factor-specific CQ variance, we argue that a bi-factor CQ model is the most comprehensive and most accurate representation of CQ. This is because a bi-factor model provides richer and conceptually less ambiguous information than the single-factor or four-factor models.

Another key advantage of the bi-factor model is the ability to examine outcome relationships of a latent CQ factor and the four CQ factors simultaneously (McAbee et al., 2014). Importantly, a bi-factor CQ model allows one to test *incremental* validity of factor-specific CQ variance over and above latent CQ variance. Thus, we examine the incremental validity of the four CQ factors over and above latent CQ to address the still unresolved puzzle that Gelfand et al. (2008, p. 379) posed to CQ research: "to facet or not to facet?" Given that CQ factors theoretically provide both holistic *and* unique information (Ang et al., 2007), we predict:

[1] In Fig. 1 and our empirical analyses, we represent the single-factor CQ as a latent (i.e., reflective) construct. Theoretically, the aggregating the four CQ factors into a total CQ score is also consistent with an aggregate (i.e., composite indicator; Bollen & Bauldry, 2011) construct. Empirically, because the composite indicator model fixes the factor weights to be equal whereas the reflective model estimates the factor weights empirically, the reflective model outperforms the composite indicator model as a predictor of outcomes. Thus, in the context of predictive validity of single-factor CQ, a reflective model represents a more conservative test than a composite indicator model.

Hypothesis 1.. Specific CQ factors in a bi-factor CQ model predict intercultural judgment (H1a), intercultural adaptation (H1b), and intercultural performance (H1c), over and above a latent CQ factor.

2.2. Comparing validities of CQ factors for intercultural effectiveness outcomes

A major contribution of Ang et al. (2007) is delineating differential relationships for CQ factors with intercultural judgment and decision making, intercultural adaptation, and intercultural task performance. Judgment and decision making is defined as choosing between alternative courses of action based on the relative value of the consequences (Starcke & Brand, 2016). Intercultural judgment and decision making focuses on the quality of decisions regarding intercultural interactions (Cushner & Brislin, 1996). Intercultural judgment and decision making is challenging due to inherent human ethnocentric tendencies (Triandis, 2006) and assumptions that what is "normal" in one's own culture is normal for all people.

Ang et al. (2007) hypothesized that metacognitive and cognitive CQ would be positively related to intercultural judgment and decision making. Those who are attentive to cues about alternative meanings of a behavior based on culture (high metacognitive CQ) and those with elaborate cultural schema (high cognitive CQ) interpret behavior from the other person's perspective instead of interpreting behaviors ethnocentrically (Triandis, 2006). High quality strategic thinking about other people's perspectives and a deep understanding of culturally diverse others allows those with high metacognitive and cognitive CQ to make high quality intercultural decisions. By contrast, motivational and behavioral CQ should be less relevant to cultural decision making because the analytical processes required for intercultural judgment and decision making do not emphasize the capability to sustain effort (motivational CQ) nor the capability to display flexible behaviors (behavioral CQ).

In support of these arguments, Ang et al. (2007) demonstrated positive relationships for metacognitive and cognitive CQ with intercultural judgment and decision making (but not for motivational or behavioral CQ) in samples of American and Singaporean undergraduate students, as well as a sample of international managers. Hence, we expect metacognitive CQ and cognitive CQ to be stronger predictors of intercultural judgment and decision making than motivational CQ or behavioral CQ.

Hypothesis 2.. Metacognitive CQ (H2a) and cognitive CQ (H2b) will be more positively related to intercultural judgment and decision making than will motivational CQ and behavioral CQ.

Intercultural adaptation is defined as the degree of comfort (e.g., low stress) associated with living in another culture (Bhaskar–Shrinivas, Harrison, Shaffer, & Luk, 2005). Intercultural adaptation includes the sociocultural sense of adjustment and psychological feelings of well-being (Searle & Ward, 1990). Intercultural adaptation is challenging because uncertainty about norms and behaviors in novel cultural settings is inherently stressful (Church, 1982).

Ang et al. (2007) proposed that motivational and behavioral CQ would be positively related to intercultural adaptation. This is consistent with meta-analytic findings that self-efficacy and relationship skills (Bhaskar–Shrinivas et al., 2005) are positively associated with intercultural adaptation. Those with high motivational CQ enjoy intercultural interactions and are confident that they can succeed in intercultural contexts (Ang et al., 2007). They invest in learning new behaviors because they value functioning effectively in intercultural contexts. Furthermore, and consistent with social cognitive theory (Bandura, 2002), those with high motivational CQ persist in challenging intercultural situations. Initiative and persistence allow those with high motivational CQ to adjust to the social and working environments of other cultures.

Intercultural adaptation is a person's sense of fitting into another culture. Thus, behavioral CQ should also predict intercultural adaptation. Molinsky (2007) defined code-switching as the ability to flex one's behavior and argued that flexibility is crucial for developing strong relationships with culturally diverse others. This is because culture influences the norms for appropriate behavior (Hall, 1993). When people are flexible, they are not offensive to others and they adapt and fit in. By contrast, metacognitive CQ and cognitive CQ should be less relevant to intercultural adaptation because cognitive capabilities do not necessarily translate into behavior (Hall, 1993).

Ang et al.'s (2007) empirical findings were consistent with these arguments and demonstrated that motivational and behavioral CQ (rather than metacognitive CQ and cognitive CQ) predicted intercultural adaptation in samples of American and Singaporean undergraduate students, as well as in a sample of international managers. Based on these arguments and empirical findings, we expect motivational CQ and behavioral CQ to be stronger predictors of intercultural adaptation than metacognitive CQ or cognitive CQ.

Hypothesis 3.. Motivational CQ (H3a) and behavioral CQ (H3b) will be more positively related to intercultural adaptation than will metacognitive CQ and cognitive CQ.

Performance is a complex, multidimensional construct that refers to the evaluation of behavior in terms of the extent to which the behavior contributes to organizational effectiveness (e.g., Campbell, 1990). Intercultural performance is performance in a culturally diverse context. Intercultural performance is challenging because cultures differ in their expectations and assessments of appropriate behaviors (Shin, Morgeson, & Campion, 2007).

Here, we examine four common dimensions of intercultural performance. Task performance (i.e., behaviors that directly transform raw materials into goods and services or serve and maintain the technical core through indirect services; Motowildo, Borman, & Schmit, 1997) and citizenship performance (i.e., discretionary behaviors that promote the efficient and effective functioning of the organization but are not explicitly recognized by the formal reward system; Organ, Podsakoff, & MacKenzie, 2006) are the two most commonly differentiated dimensions of performance. Based on Ang and Van Dyne's (2008) nomological network of CQ and their prevalence in CQ studies, we also examined two additional dimensions of performance: adaptive performance (i.e., behaviors related to how individuals adapt to changing conditions or job requirements; Pulakos, Arad, Donovan, & Plamondon, 2000) and leadership performance (i.e., behaviors related to processes of influencing others and facilitating individual and collective efforts to accomplish shared objectives; Yukl, 2010).

Ang et al. (2007) hypothesized that all four CQ factors would be positively related to intercultural performance. Those who regularly check the accuracy of their cultural assumptions (high metacognitive CQ) and have a rich understanding of cultural differences in behavioral norms (high cognitive CQ) develop an accurate understanding of performance expectations in novel cultural settings. Understanding the performance expectations of others allows those with high metacognitive CQ and high cognitive CQ to demonstrate appropriate behaviors and meet the expectations of culturally diverse others. Furthermore, those who enjoy intercultural interactions and believe they can succeed in intercultural interactions (high motivational CQ) enact culturally appropriate behaviors and this facilitates their performance. Finally, those with a large repertoire of verbal and nonverbal behaviors (high behavioral CQ) adjust their self-presentation behaviors so that they meet the expectations of others. When self-presentation behaviors (Goffman, 1959) meet cultural expectations, intercultural performance is high.

Ang et al.'s empirical findings demonstrated that metacognitive CQ and behavioral CQ predicted intercultural performance in two samples of international managers. Although Ang and colleagues did not find motivational CQ or cognitive CQ to be significant predictors of

intercultural performance, subsequent studies have demonstrated that motivational CQ and cognitive CQ also predict intercultural performance. For example, Chen et al. (2010) and Chen, Liu, et al. (2012) demonstrated positive relationships between motivational CQ and intercultural performance for expatriate mangers and real estate agents. In addition, Presbitero (2016) showed that all four CQ factors predicted intercultural performance of Filipino call center employees serving customers from the U.S., Canada, and Australia. Hence, we expect that all four CQ factors will predict intercultural performance.

Hypothesis 4.. Metacognitive CQ (H4a), cognitive CQ (H4b), motivational CQ (H4c), and behavioral CQ (H4d) will relate positively to intercultural performance.

3. Theoretical extensions of Ang et al.'s (2007) CQ model

We also extend Ang et al. (2007) conceptual model by delineating mediators of CQ effects and by considering moderating effects of metacognitive CQ that qualify CQ relationships.

3.1. Mediators of CQ effects

Hypothesis 1 predicted that metacognitive CQ and cognitive CQ relate to intercultural judgment and decision making; Hypothesis 2 predicted that motivational CQ and behavioral CQ relate to intercultural adaptation; and Hypothesis 3 predicted that all four CQ factors relate to intercultural performance. Findings by Ang et al.'s (2007) also show that intercultural judgment and decision making as well as intercultural adaptation are positively related to intercultural performance.

Extending these findings, we posit that intercultural judgment and decision making and intercultural adaptation are more proximal outcomes of CQ than intercultural performance. This is because intercultural judgment and decision making and adaptation reflect behaviors of the focal actor and intercultural performance reflects other people's judgments of the focal actor's behaviors. Thus, we expect that intercultural judgment and decision making mediates the effects of metacognitive CQ and cognitive CQ on intercultural performance and intercultural adaptation mediates the effects of motivational CQ and behavioral CQ on intercultural performance.

Intercultural performance is challenging because culture influences expectations about the value and appropriateness of specific behaviors (Shin et al., 2007). According to Triandis (2006), those who make high quality decisions in intercultural contexts avoid ethnocentric sense-making and adapt their actions to the culture (Stone–Romero, Stone, & Salas, 2003). In contrast, those with low quality intercultural judgment and decision making tend to assume universal behavioral norms and do not adapt their behavior to the culture. Consistent with these arguments, Rockstuhl, Ang, Ng, Lievens, and Van Dyne (2015) showed that intercultural judgment and decision making predicted observer-rated task performance in multicultural teams across three studies. Thus, intercultural judgment and decision making should explain why those with high metacognitive CQ and cognitive CQ perform their jobs effectively.

Research demonstrates that intercultural adaptation is a key antecedent to effective performance (Bhaskar–Shrinivas et al., 2005). Whereas those who do not adapt experience more fatigue and lack the energy to complete work effectively, those who adapt have more personal resources to invest in work (Cohen, 1980). Specifically relating to CQ, Chen et al. (2010) demonstrated that sociocultural adjustment mediated the relationship between expatriate's motivational CQ and supervisor-rated performance. Thus, intercultural adaptation should explain why those with high motivational and behavioral CQ perform effectively in intercultural contexts. Taken together, these conceptual arguments and empirical evidence support the prediction that intercultural adaptation and intercultural judgment and decision making are proximal antecedents of intercultural performance. Accordingly, we predict:

Hypothesis 5.. Intercultural judgment and decision making will mediate the positive relationships of metacognitive CQ (H5a) and cognitive CQ (H5b) with intercultural performance.

Hypothesis 6.. Intercultural adaptation will mediate the positive relationships of motivational CQ (H6a) and behavioral CQ (H6b) with intercultural performance.

3.2. Moderating effects of metacognitive CQ

Earley and Ang (2003) posited that the CQ factors are mutually interdependent and interact to predict cultural effectiveness. According to Gelfand et al. (2008, pp. 379–380), "although CQ facets were originally purported to act in concert in influencing behavior (Chapter 1; Earley & Ang, 2003), very little research has examined how the dimensions *interact* (emphasis in original) in predicting outcomes." Now, almost 10 years later, we are aware of only one study (Chua & Ng, 2017) that considered interactive effects of CQ factors. Specifically, Chua and Ng demonstrated that metacognitive CQ moderated the relationship between cognitive CQ and creativity.

Theories of adaptive expertise originated in the expertise development (Holyoak, 1991) and skill acquisition literatures (Kanfer & Ackerman, 1989) and aim to understand how self-regulation processes influence performance under novel or changing circumstances. A major contribution of the adaptive expertise research is its emphasis on metacognition as a critical factor that distinguishes experts who respond effectively to novel circumstances from those who struggle (Bohle Carbonell, Stalmeijer, Könings, Segers, & van Merriënboer, 2014).

As Smith, Ford, and Kozlowski (1997: 96) pointed out, individuals with high metacognitive capabilities engage in mindful and deliberate learning and "these self-regulatory capabilities enable them to recognize novelty or change, select potential responses, monitor and evaluate progress, and modify or create different responses to the task if necessary." Notably, self-regulatory processes moderate the extent to which declarative knowledge, motivation, and behavioral skills contribute to performance adaptation (Chen, Thomas, & Wallace, 2005). Those with high metacognitive capabilities engage in effective self-regulatory processes and benefit from their knowledge, motivation, and behavioral skills. Hence, Chen et al. (2005: 837) concluded that "to facilitate adaptive performance, team leaders should ensure that members of their team engage in *effective* (emphasis added) regulation processes."

We draw on the theory of adaptive expertise and focus on metacognitive CQ as a moderator because the strategic thinking capabilities represented by metacognitive CQ should strengthen the positive effects of motivational CQ, cognitive CQ, and behavioral CQ on intercultural effectiveness outcomes. Based on the availability of primary studies, we examine sociocultural adjustment and intercultural task performance as outcomes of the interaction of metacognitive CQ with the other three CQ factors.

First, we expect that the effects of cognitive CQ will be stronger for individuals with high metacognitive CQ (rather than low). Nelson and Narens' (1995) metacognitive framework describes cognition and metacognition as two interrelated capabilities that operate at different levels of abstraction. Knowledge (e.g., cognitive CQ) is specific and concrete, while thinking about thinking (e.g., metacognitive CQ) is abstract and represents a meta-level capability. In terms of information flow, metacognition triggers additional thinking about situations and causes people to pause, slow down, and consider alternative ways of making sense of what is going on. While cognitive CQ represents knowledge of different cultural schemas, metacognitive CQ helps people avoid quick inferences that may be superficial and wrong.

When cognitive CQ is high, people have elaborate cultural schemas

that enable them to make sense of intercultural interactions (Ang et al., 2007). When cognitive CQ is combined with metacognitive CQ, the adaptive expertise represented by metacognitive CQ should allow people to use their cultural knowledge more effectively.

Metacognitive CQ involves a reflective understanding of what one does and does not know about other cultures (Triandis, 2006). Those with high metacognitive CQ should be aware of gaps in their cultural knowledge, should monitor and check the appropriateness of their cultural knowledge during novel interactions when they encounter paradoxes, and should be willing to update their knowledge when experiences disconfirm their expectations (Brislin, Worthley, & MacNab, 2006).

Finally, although cognitive CQ facilitates culturally informed judgments, the combination of cognitive and metacognitive CQ should make people more sensitive to when they need to suspend judgment (Morris, Savani, Mor, & Cho, 2014) and when they need to entertain alternative perspectives. Thus, we argue that metacognitive CQ strengthens the positive relationship between cognitive CQ and intercultural effectiveness outcomes.

Hypothesis 7.. Metacognitive CQ will moderate the positive relationships of cognitive CQ with intercultural effectiveness outcomes, such that these relationships are stronger when metacognitive CQ is high (rather than low).

Second, we expect that the effects of motivational CQ will be stronger for individuals with high metacognitive CQ (rather than low). Those high in motivational CQ initiate effort in intercultural settings even when cultural differences create stress and ambiguity.

Based on adaptive expertise, however, we argue that the benefits of motivational CQ will be strengthened when people also have high metacognitive CQ. According to Ang and Van Dyne (2008, p. 5), metacognitive CQ "reflects mental process that individuals use to acquire and understand cultural knowledge." Thus, metacognitive CQ should help them focus their motivation, curiosity, and persistence in culturally appropriate ways.

Whereas those high in motivational CQ enjoy intercultural contact, metacognitive CQ should help them connect with culturally diverse others. This is because metacognitive CQ facilitates perspective taking, trust, and relationship building across cultures by engendering affective trust with diverse others (Chua et al., 2012; Mor, Morris, & Joh, 2013). Thus, metacognitive CQ should strengthen the positive effects of motivational CQ on intercultural effectiveness.

Hypothesis 8.. Metacognitive CQ will moderate the positive relationships of motivational CQ with intercultural effectiveness outcomes, such that these relationships are stronger when metacognitive CQ is high (rather than low).

Finally, those with high behavioral CQ have a broad repertoire of verbal and nonverbal behaviors plus speech acts (Ang et al., 2007). We posit, however, that the adaptive expertise of metacognitive CQ combined with behavioral CQ should help them apply this flexibility more effectively. This is because metacognition allows them to be aware, vigilant, and mindful about appropriate behaviors in a given situation and this helps them create positive impressions in novel cultural settings.

For example, metacognition facilitates identification of appropriate behaviors for a specific situation and monitoring the perceptions and reactions of others. Metacognitive CQ allows people to observe interactions and the communication style of cultural counterparts and determine the most suitable level of direct/indirect communication. Likewise, they monitor the expressiveness and the extent to which people use hand gestures. Overall, they demonstrate other-awareness during intercultural interactions (Triandis, 2006; Van Dyne et al., 2012). As a consequence, those with high metacognitive CQ should be more effective in applying their behavioral flexibility and creating positive impressions in culturally diverse situations. Hence, we hypothesize:

Hypothesis 9.. Metacognitive CQ will moderate the positive relationships of behavioral CQ with intercultural effectiveness outcomes, such that these relationships are stronger when metacognitive CQ is high (rather than low).

4. Methods

4.1. Literature search

We employed six strategies to identify published and unpublished articles that that could supply effect sizes. First, we conducted a keyword search in the ABI/Inform, PsycINFO, Proquest Dissertation, and Google Scholar databases using *Cultural Intelligence* as a keyword. Second, we did a backward citation search of articles identified in CQ reviews by Ang, Van Dyne, and Rockstuhl (2015), Leung, Ang, and Tan (2014), Matsumoto and Hwang (2013), Ng, Van Dyne, and Ang (2012), Ang, Van Dyne, and Tan (2011), Ang, Rockstuhl, and Tan (2015), Van Dyne, Ang, and Tan (2017), and Ang, Ng, & Rockstuhl (2018). Third, we used a forward citation search of studies that cited the CQS measure (Ang et al., 2007). Fourth, we searched the references of all articles identified in the first three searches to locate additional CQ papers. Fifth, we searched the conference programs of the Society for Industrial and Organizational Psychology and Academy of Management. Finally, we searched for in-press articles in leading management and cross-cultural journals, including the *Academy of Management Journal*, *Journal of Applied Psychology*, *Journal of Management*, *Journal of Organizational Behavior*, *Organizational Behavior and Human Decision Processes*, *Personnel Psychology*, *Applied Psychology: An International Review*, *Cross Cultural Management: An International Journal*, *International Journal of Intercultural Relations*, and *Journal of Cross-Cultural Psychology*. This search produced in an initial pool of 1149 CQ articles from 2003 through October 2017.

4.2. Inclusion and exclusion criteria

We followed the advice of Aguinis, Pierce, Bosco, Dalton, and Dalton (2011) when determining a number of judgment calls in the meta-analytic process and included primary studies if they met the following criteria. First, studies had to be empirical and so we excluded conceptual papers and papers that cited CQ research without including empirical data on CQ. Second, studies had to examine CQ at the individual level of analysis. Hence, we excluded studies that had only team (e.g., Nouri et al., 2013) or organizational level (e.g., Ang & Inkpen, 2008) data. Finally, we included studies that reported correlation coefficients or provided sufficient information to compute a coefficient involving overall CQ or at least one CQ factor.

Following Viechtbauer and Cheung (2010), we also screened correlations using multiple outlier and influential case diagnostics, including (a) externally standardized residuals, (b) DFFITS values, (c) Cook's distances, (d) covariance ratios, (e) leave-one-out estimates of heterogeneity, (f) hat values, and (g) weights. Based on these analyses we identified six extreme outliers. Closer inspection of these outliers showed that five involved implausible correlations (i.e., after correcting for measurement error, correlations exceeded 1.0), and one involved correlations between CQ factors and sociocultural adjustment that were consistently outside the 80% credibility interval and were, on average, 0.16 higher than the next-highest correlation. We therefore excluded these outliers from our analyses.

The final database included 167 studies with 199 distinct samples. Together, these studies reported 1993 correlations (among the CQ factors and for the CQ factors with antecedents, correlates, and outcomes). The combined sample size across these 199 samples was 44,155 respondents (see supplementary online files #1 and #2).

Supplementary data associated with this article can be found, in the

Table 1
Number of effect sizes and example measures coded for each intercultural effectiveness outcome.

Intercultural effectiveness outcome	Example measures	Number of effect sizes (k) coded			
		Metacognitive CQ	Cognitive CQ	Motivational CQ	Behavioral CQ
Intercultural Judgment and Decision Making	Cushner and Brislin (1996) and Deresky (2006)	10	10	10	10
Sociocultural Adjustment	Black and Stephens (1989) and Ward and Kennedy (1999)	29	29	35	28
Psychological Well-being	Berry, Phinney, Sam, and Vedder (2006) and Goldberg and Williams (1988)	22	25	25	23
Task Performance	Williams and Anderson (1991) and Kraimer and Wayne (2004)	26	27	28	26
Citizenship Performance	Williams and Anderson (1991) and Kraimer and Wayne (2004)	10	9	8	9
Adaptive Performance	Griffin and Hesketh (2003) and Pulakos et al. (2000)	6	6	6	6
Leadership Performance	Avolio and Bass (2004) and Cronshaw and Lord (1987)	12	12	13	12

online version, at https://doi.org/10.1016/j.obhdp.2018.07.005.

4.3. Coding of variables

The first author and two research assistants independently coded each study for sample size; effect size; correlates of CQ; reliability of the CQ factors, outcomes, antecedents, and correlates; as well study and sample characteristics such as rating source (i.e., same-source versus different-source). Agreement among the coders was high (Cohen's κ = 0.89). We resolved discrepancies based on discussion and consensus, following the approach used by Podsakoff, Bommer, Podsakoff, and MacKenzie (2006).

Table 1 summarizes the number of effect sizes for each coded category and provides example measures for each cultural effectiveness outcome (for additional details on coding of outcome variables, see Appendix A). The supplementary online files provide information on the measures coded in each primary study.

4.4. Meta-analytic procedures

We used Hunter and Schmidt's (2004) random-effects meta-analysis method to synthesize correlation coefficients across the primary studies. When studies reported multiple measures of a variable and intercorrelations across measures, we created a linear composite based on Hunter and Schmidt (2004, pp. 433–435).

We corrected each primary correlation for sampling error and attenuation due to unreliability in CQ measures and correlates, using the average reliability across available studies if a study did not provide reliability information. We used the meta-analytic reliability estimate (0.86) reported in Gonzales-Mulé, Mount, and Oh (2014) to correct for unreliability of cognitive ability measures. We did not correct for unreliability in measures of international experience because individual studies rarely report reliability and many measures of international experience (e.g., number of countries lived in, number of international work assignments, or years lived abroad) are typically reported with greater objectivity than perceptual constructs (Stone et al., 2000).

We computed credibility and confidence intervals around ρ (the sample size-weighted mean-observed correlation corrected for unreliability in CQ and its correlates). The credibility interval (CV) provides an estimate of the variability of the population parameter after correcting individual studies for sampling error and unreliability. Wide CVs or those that include zero suggest the presence of moderators. Relationships are viewed as generalizable across situations when the 80% CV excludes zero.

The confidence interval (CI) provides an estimate of the accuracy of estimating ρ by describing the variability around ρ due to sampling error. Relationships are interpreted as meaningfully different from zero when the 95% CI excludes zero. We also report the *Q* statistic, which tests for homogeneity of effect sizes and follows a chi-square distribution with $k - 1$ degrees of freedom (Hedges & Olkin, 1985). A significant *Q* statistic indicates significant differences in effect sizes unaccounted for by sampling error and suggest the presence of moderators.

We report all original CQ meta-analyses in Appendix B. Table B1 reports relationships between the four CQ factors and intercultural effectiveness outcomes. Table B2 shows relationships between the four CQ factors and observer-rated intercultural effectiveness outcomes. Table B3 reports correlations of CQ antecedents and correlates with the four CQ factors, while Table B4 reports correlations among the four CQ factors.

We also created a meta-analytic correlation matrix (see Table B5) that included the four CQ factors, Big 5 personality traits, cognitive ability, emotional intelligence, international experience, and the three most commonly studied intercultural effectiveness outcomes: intercultural judgment and decision making, self-rated sociocultural adjustment, and observer-rated task performance. We constructed this meta-analytic correlation matrix by combining our original CQ meta-analyses, previously published meta-analyses, and additional original meta-analyses when no prior meta-analyses existed for a particular relationship (details for these additional meta-analyses are available from the first author). Finally, Table B6 reports relationships between overall CQ and intercultural effectiveness outcomes.

4.5. Hypotheses tests

We followed the theory-testing method developed by Viswesvaran and Ones (1995) to examine our hypotheses. We used meta-analytically derived correlation matrices for structural equation models (e.g., Harrison, Newman, & Roth, 2006). We derived these correlation matrices separately for each outcome. For example, to test relationships between CQ factors and sociocultural adjustment, we derived a correlation matrix that included relationships among sociocultural adjustment and all CQ factors based on studies reporting sociocultural adjustment as an outcome. We describe our approach for testing specific hypotheses below.

4.5.1. Unique and holistic information: A bi-factor CQ model

We tested the incremental validity of specific CQ factors over and above a latent CQ factor (Hypothesis 1) by comparing the fit of two structural models for the relationship between CQ and each intercultural effectiveness outcome, following the approach outlined by Harrison et al. (2006).

Model 1 corresponds to the single-factor CQ model. In this model, a latent CQ variable explains the co-variation among the four CQ factors. To mirror the common practice of creating single-factor CQ scores as an equally weighted average of the four CQ factors, we constrained the factor loadings of the four CQ factors on latent CQ to be equal. In addition, we also assessed latent CQ as a predictor of intercultural effectiveness outcomes.

Model 2 corresponds to the hypothesized bi-factor CQ model. As in Model 1, this model includes a latent CQ factor that explains the co-variation among the four CQ factors and predicts intercultural effectiveness outcomes. In addition, this model includes an orthogonal set of

four CQ factors that predict different intercultural effectiveness outcomes.

Because Model 1 and Model 2 are nested, we compared the two models using a χ^2-difference test. A significant change in χ^2 between Models 1 and 2 would indicate that the four CQ factors incrementally predict intercultural effectiveness over and above the latent CQ factor. Results of this analysis would shed light on Hypothesis 1 and the value of the four factors (Gelfand et al., 2008).

4.5.2. Comparing validities of CQ factors for intercultural effectiveness outcomes

To test the differential validity of the four CQ factors predicted in Hypotheses 2 and 3, we compared the differences in path coefficients between the hypothesized more influential CQ factors with those of the hypothesized less influential CQ factors using a *Z*-test (Rosseel, 2012).

4.5.3. Mediators of CQ effects

We tested Hypotheses 5 and 6 by comparing two structural equation models. Model 1 represents a full mediation model and Model 2 represents a partial mediation model. Both models use the bi-factor model of CQ. The partial mediation model that allowed free estimation of all indirect and direct effects of both the latent CQ factor and all four specific CQ factors was under-identified.

Based on Hypotheses 2 and 3, we therefore estimated partial and full mediation models that included paths from metacognitive CQ and cognitive CQ to intercultural judgment and decision making only, as well as paths from motivational CQ and behavioral CQ to sociocultural adjustment only. In both models, we included paths from the latent CQ factor to both intercultural judgment and decision making and sociocultural adaptation.

4.5.4. Moderating effects of CQ factors

We tested Hypotheses 7–9, which focused on the interactive effects of metacognitive CQ, by conducting multigroup structural equation modeling (SEM) analyses that compared the relationships of CQ with intercultural effectiveness outcomes in samples with low versus high mean levels of metacognitive CQ. Based on availability of data and low statistical power for subgroup moderator analyses associated with less commonly studied outcomes (Aguinis et al., 2011), we focused on the two most commonly studied intercultural effectiveness outcomes: sociocultural adjustment and task performance.

We used the meta-analytic correlation matrices for low and high metacognitive CQ[2] as input for multigroup SEM analyses and compared two structural models using the bi-factor CQ model as a baseline. In Model 1, we constrained relationships of latent CQ and the four CQ factors with intercultural effectiveness to be equal in both groups. In Model 2, we estimated relationships of latent CQ and the four CQ factors with intercultural effectiveness freely in both groups.

If results indicate a significant change in χ^2 between Models 1 and 2, this would indicate that sample means of metacognitive CQ moderates relationships of CQ factors with intercultural effectiveness. When the change in χ^2 was significant, we compared the differences in individual parameters using a *Z*-test (Rosseel, 2012).

[2] We coded mean levels of metacognitive CQ as reported in primary studies, and we then converted reported means into percent of maximum possible score to establish a common metric (POMP; Cohen, Cohen, Aiken, & West, 1999). In particular, POMP scores are equal to: (sample mean – 1) / (number of scale points – 1). POMP scores range between 0 and 1 and allow comparisons of mean levels across alternative scorings, test versions, and populations. We then conducted subgroup moderator analyses based on median split of mean levels of metacognitive CQ to estimate *meta*-analytic correlations matrices for CQ factors with sociocultural adjustment and task performance (for low vs high metacognitive CQ).

5. Results

5.1. Unique and holistic information: A bi-factor CQ model

Table 2 presents the structural equation modeling results for the bi-factor CQ models. In addition, Table 2 shows results of the comparisons of the single-factor CQ model and the bi-factor CQ model. These comparisons address Hypothesis 1 and the issue of whether the specific CQ factors incrementally predict intercultural effectiveness outcomes, over and above a latent CQ factor.

Comparison of Model 1 (single-factor CQ Model) and Model 2 (bi-factor CQ model) shows that the hypothesized bi-factor CQ model fit the data significantly better than the single-factor CQ model for intercultural judgment and decision making ($\Delta\chi^2$ (4df) = 38.86, $p < .01$), sociocultural adjustment ($\Delta\chi^2$ (4df) = 230.83, $p < .01$), psychological well-being ($\Delta\chi^2$ (4df) = 198.00, $p < .01$), observer-rated task performance ($\Delta\chi^2$ (4df) = 115.53, $p < .01$), observer-rated citizenship performance ($\Delta\chi^2$ (4df) = 71.70, $p < .01$), and observer-rated leadership performance ($\Delta\chi^2$ (4df) = 13.77, $p < .01$). These results demonstrate that specific CQ factors relate to these intercultural effectiveness outcomes, over and above the latent CQ factor.

In particular, specific CQ factors explain an additional 2.5% of the variance in intercultural judgment and decision making; an additional 7.5% and 7.9% of the variance in sociocultural adjustment and psychological well-being; and an additional 5.8%, 13.5%, and 5.4% of the variance in observer-rated task performance, citizenship performance, and leadership performance respectively. These results support Hypothesis 1 and confirm that modeling CQ as a bi-factor model accounts for both unique and shared effects of the four factors.

By contrast, the bi-factor CQ model did not fit the data significantly better than the single-factor CQ model for adaptive performance ($\Delta\chi^2$ (4df) = 8.18, *ns*), suggesting that specific CQ factors do not relate to these intercultural effectiveness outcomes over and above latent CQ. Together, these analyses support Ang et al.'s (2007) conceptualization of CQ as an aggregate multidimensional construct and highlight the benefits of considering factor-specific CQ effects beyond the effects of a latent CQ factor.

5.2. Comparing validities of CQ factors for intercultural effectiveness outcomes

5.2.1. Intercultural judgment and decision making

Hypothesis 2 predicted that metacognitive CQ and cognitive CQ would be more positively related to intercultural judgment and decision making than motivational CQ or behavioral CQ. Table 2 shows the parameter estimates of the bi-factor CQ model.

As hypothesized, results indicate that metacognitive CQ ($\beta = 0.18$) and cognitive CQ ($\beta = 0.12$) predicted intercultural judgment and decision making. In addition, relationships of motivational CQ ($\beta = -0.01$) and behavioral CQ ($\beta = -0.05$) with intercultural judgment and decision making were significantly weaker than the relationships of metacognitive CQ (motivational CQ: $Z = 3.69$, $p < .01$; behavioral CQ: $Z = 6.44$, $p < .01$) or cognitive CQ (motivational CQ: $Z = 2.27$, $p < .05$; behavioral CQ: $Z = 4.16$, $p < .01$).

Moreover, relationships of motivational CQ and behavioral CQ with intercultural judgment and decision making did not differ significantly from zero, as indicated by a comparison of a model that estimated these parameters freely versus a model that constrained them to be zero ($\Delta\chi^2$ (2df) = 1.30, *ns*). These results support Hypothesis 2. Although not hypothesized, latent CQ ($\beta = 0.23$) also predicted intercultural judgment and decision making.

5.2.2. Intercultural adaptation

Hypothesis 3 proposed that motivational CQ and behavioral CQ would be more positively related to intercultural adaptation than metacognitive CQ or cognitive CQ. Results in Table 2 support Hypothesis 3

Table 2
Structural equation modeling results for bi-factor CQ models predicting intercultural effectiveness outcomes (Hypotheses 1–4).

				Observer-rated			
CQ Factor	IJDM	Sociocultural adjustment	Psychological well-being	Task performance	Citizenship performance	Adaptive performance	Leadership performance
Metacognitive CQ	0.18	−0.08	−0.08	0.11	0.02	0.15	0.05
Cognitive CQ	0.12	−0.05	−0.11	−0.10	−0.29	0.02	−0.19
Motivational CQ	−0.01	0.28	0.26	0.01	0.12	0.05	0.16
Behavioral CQ	−0.05	−0.04	−0.04	0.28	0.22	0.13	0.02
Latent CQ	0.23	0.51	0.38	0.30	0.28	0.46	0.25
R^2	0.10	0.35	0.23	0.19	0.23	0.25	0.13
$\Delta R^2_{\text{Specific CQ Factors}}$	0.03	0.08	0.08	0.06	0.14	0.00	0.05
$\Delta\chi^2_{\text{Specific CQ Factors}}$ (4df)	38.86**	230.83**	198.00**	115.53**	71.70**	8.18	13.77**
N (Harmonic Mean)	2456	5445	5029	2050	765	633	584

Note. Table reports standardized beta coefficients. IJDM = Intercultural Judgment & Decision Making. $\Delta R^2_{\text{Specific CQ Factors}}$ = Incremental variance explained by four specific CQ factors over and above latent CQ factor. $\Delta\chi^2_{\text{Specific CQ Factors}}$ (4df) = Result of Chi-Square difference test comparing (a) a bi-factor CQ model in which only the latent CQ factor predicts outcomes with (b) a bi-factor CQ model in which latent CQ and the four specific CQ factors predicts outcomes.

for motivational CQ but not for behavioral CQ.

As hypothesized, motivational CQ was positively associated with both sociocultural adjustment ($\beta = 0.28$) and psychological well-being ($\beta = 0.26$). In addition, motivational CQ was more strongly related to sociocultural adjustment than either metacognitive CQ ($\beta = -0.08$; $Z = 17.12$, $p < .01$) or cognitive CQ ($\beta = -0.05$; $Z = 13.96$, $p < .01$). Motivational CQ was also more strongly related to psychological well-being than either metacognitive CQ ($\beta = -0.08$; $Z = 14.88$, $p < .01$) or cognitive CQ ($\beta = -0.11$; $Z = 14.53$, $p < .01$).

Contrary to our expectation, behavioral CQ was not significantly associated with sociocultural adjustment ($\beta = -0.04$) or psychological well-being ($\beta = -0.04$). Relationships of metacognitive CQ, cognitive CQ and behavioral CQ with intercultural adaptation also did not differ significantly from zero, as indicated by a comparison of a model that estimated these parameters freely versus a model that constrained them to be zero (sociocultural adjustment: $\Delta\chi^2$ (3df) = 2.05, *ns;* psychological well-being: $\Delta\chi^2$ (3df) = 6.05, *ns*). Finally, the latent CQ factor predicted both sociocultural adjustment ($\beta = 0.51$) and psychological well-being ($\beta = 0.38$).

5.2.3. Intercultural performance

Hypothesis 4 proposed that all four CQ factors would be positively related to intercultural performance. To provide a more stringent test of Hypothesis 4 and rule out common-method bias as an alternative explanation for the relationships, we tested Hypotheses 4 using observer-rated intercultural performance outcomes. Results in Table 2 provide mixed support for Hypothesis 4 and suggest a more nuanced view of the relationships between the four CQ factors and intercultural performance. In particular, results show that relationships depend on the specific intercultural performance outcomes.

For task performance, relationships of latent CQ ($\beta = 0.30$), metacognitive CQ ($\beta = 0.11$), and behavioral CQ ($\beta = 0.28$) are positive whereas the relationship for cognitive CQ was negative ($\beta = -0.10$). In addition, the relationship of motivational CQ ($\beta = 0.01$) with task performance did not differ significantly from zero, as indicated by a comparison of a model that estimated these parameters freely versus a model that constrained them to be zero ($\Delta\chi^2$ (1df) = 0.00, *ns*).

For citizenship performance, relationships of latent CQ ($\beta = 0.28$), motivational CQ ($\beta = 0.12$), and behavioral CQ ($\beta = 0.22$) are positive whereas the relationship for cognitive CQ was negative ($\beta = -0.29$). In addition, the relationship of metacognitive CQ ($\beta = 0.02$) with citizenship performance did not differ significantly from zero, as indicated by a comparison of a model that estimated these parameters freely versus a model that constrained them to be zero ($\Delta\chi^2$ (1df) = 0.00, *ns*).

For adaptive performance, the relationship of latent CQ ($\beta = 0.46$) is positive. As noted above, the comparison of the bi-factor CQ model and single-factor CQ model ($\Delta\chi^2$ (4df) = 8.18, *ns*) indicates that the relationships of metacognitive CQ ($\beta = 0.15$), cognitive CQ ($\beta = 0.02$), motivational CQ ($\beta = 0.05$), and behavioral CQ ($\beta = 0.13$) with adaptive performance are not significantly different from zero.

Finally, for leadership performance, the relationships of latent CQ ($\beta = 0.25$) and motivational CQ ($\beta = 0.16$) are positive whereas the relationship for cognitive CQ was negative ($\beta = -0.19$). In addition, the relationship of metacognitive CQ ($\beta = 0.05$) and behavioral CQ ($\beta = 0.02$) with leadership performance did not differ significantly from zero, as indicated by a comparison of a model that estimated these parameters freely versus a model that constrained them to be zero ($\Delta\chi^2$ (2df) = 0.03, *ns*).

5.3. Mediators of CQ effects

Hypothesis 5 predicted that intercultural judgment and decision making would mediate the relationships of metacognitive CQ and cognitive CQ with intercultural performance. Likewise, Hypothesis 6 predicted that intercultural adaptation would mediate the relationships of motivational CQ and behavioral CQ with intercultural performance.

As shown in Table 3, the full mediation model provided reasonable fit to the data: χ^2 (8, $N = 2516$) = 423.01, $p < .01$, comparative fit index (CFI) = 0.93, standardized root-mean-square residual (SRMR) = 0.07. Fig. 2 shows the path coefficients for the full mediation model. Table 3 also shows that the partial mediation model fit the data significantly better ($\Delta\chi^2$ (5df) = 336.88, $p < .01$). Moreover, the partial mediation model also had acceptable fit to the data in an absolute sense: χ^2 (3, $N = 2516$) = 86.14, $p < .01$, comparative fit index (CFI) = 0.99, standardized root-mean-square residual (SRMR) = 0.04. Thus, we interpret path coefficients from the partial mediation model (as shown in Fig. 3).

Metacognitive CQ ($\beta = 0.26$, $p < .01$) and cognitive CQ ($\beta = 0.14$, $p < .01$) had significant unique effects on intercultural judgment and decision making beyond the effect of latent CQ ($\beta = 0.20$, $p < .01$). Motivational CQ ($\beta = 0.33$, $p < .01$) but not behavioral CQ ($\beta = 0.01$, *ns*) had significant unique effects on sociocultural adjustment beyond

Table 3
Comparison of fit of alternative structural models of mediators of CQ effects.

Model	χ^2	*df*	CFI	SRMR	$\Delta\chi^2$ (*df*)
Model 1: Full Mediation	423.01**	8	0.93	0.07	
Model 2: Partial Mediation	86.14**	3	0.99	0.04	336.88** (5)[a]

Note. Harmonic $N = 2516$. CFI = comparative fit index. SRMR = standardized root mean square residual.

[a] Compared to Model 1.

** $p < .01$.

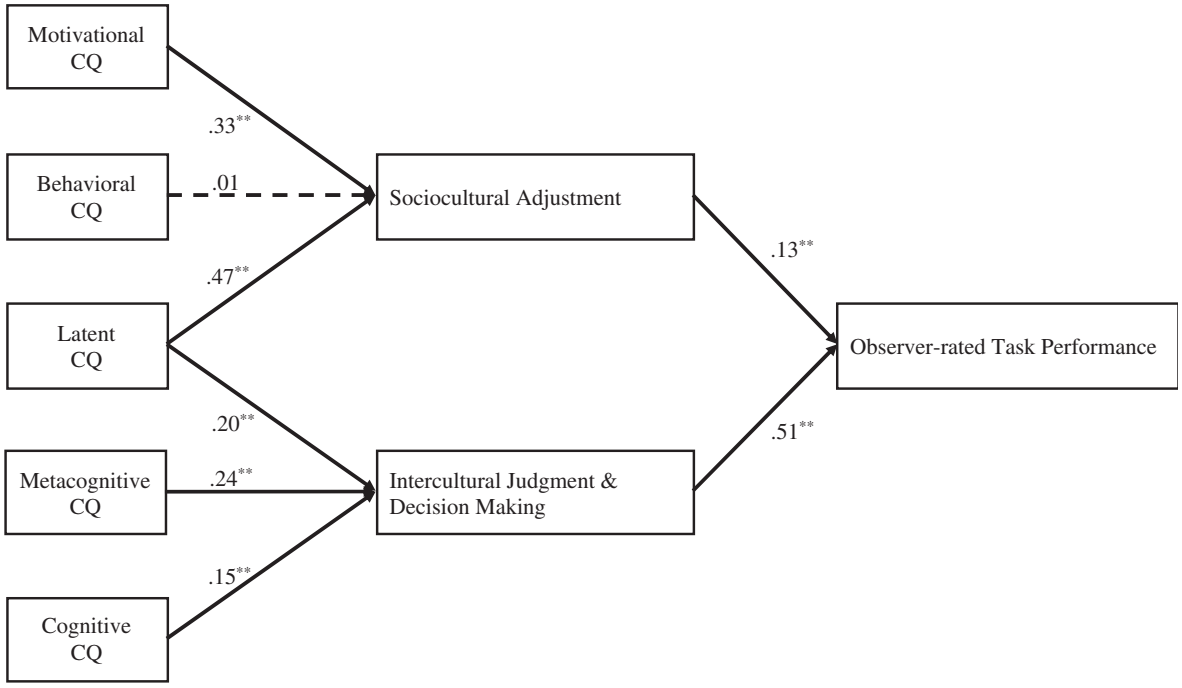

Fig. 2. Meta-analytic structural equation modeling results for full mediation model. $^{*}p < .05$. $^{**}p < .01$.

the effect of latent CQ ($\beta = 0.47$, $p < .01$). In turn, both intercultural judgment and decision making ($\beta = 0.49$, $p < .01$) and sociocultural adjustment ($\beta = 0.07$, $p < .01$) had significant positive relationships with observer-rated task performance.

We tested the mediation predictions based on the significance of the indirect effects of the four CQ factors on task performance when also controlling for their direct effects (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). We summarize these analyses in Table 4, which

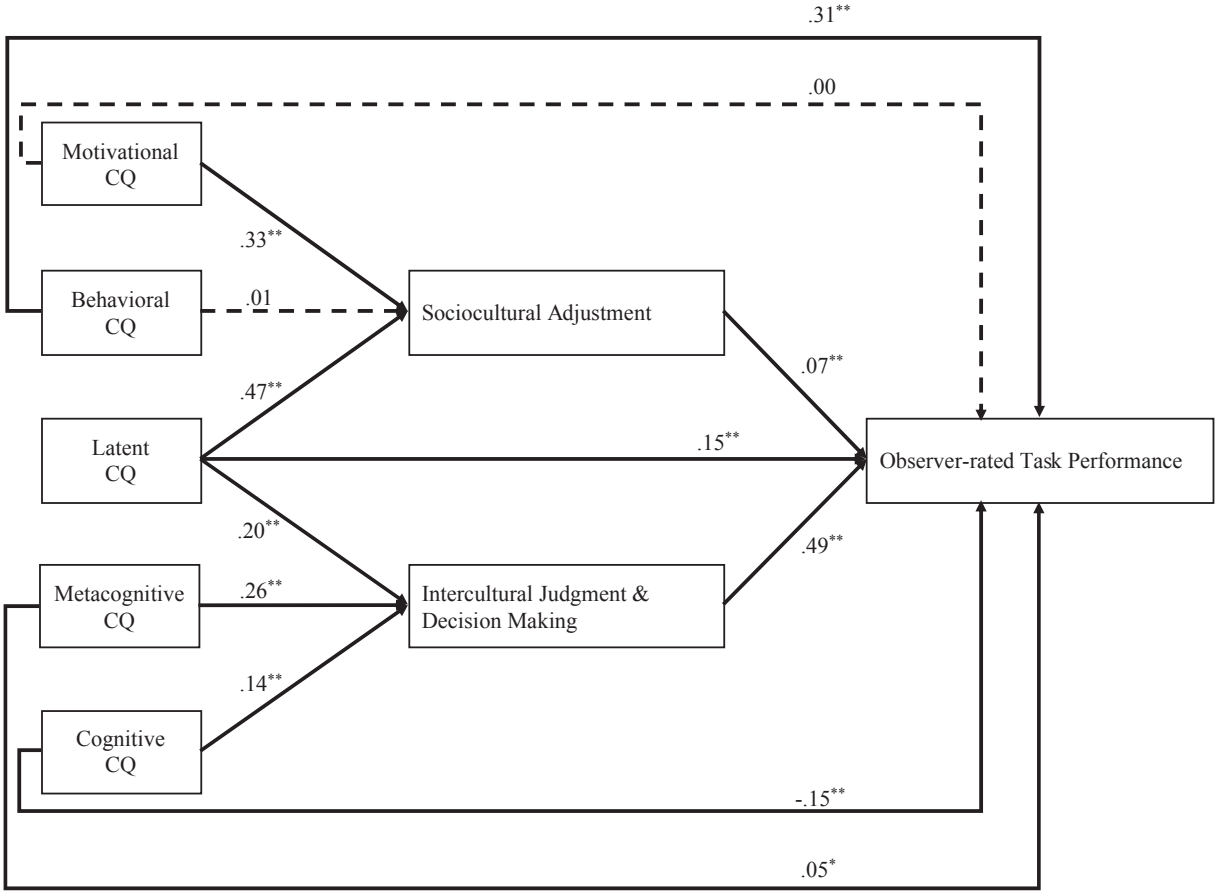

Fig. 3. Meta-analytic structural equation modeling results for partial mediation model. $^{*}p < .05$. $^{**}p < .01$.

Table 4
Test of mediation for intercultural judgment and decision making and sociocultural adjustment in predicting observer-rated task performance (Hypotheses 5 and 6).

	Indirect effect via intercultural judgment and decision making		Indirect effect via sociocultural adjustment		Direct effect	Total effect
CQ Factor	Estimate	*z*	Estimate	*z*		
Metacognitive CQ	0.13	8.49**	–		0.05*	0.18*
Cognitive CQ	0.07	4.01**	–		−0.15**	−0.08**
Motivational CQ	–		0.02	3.14**	0.00	0.02**
Behavioral CQ	–		0.00	0.35	0.31**	0.31**
Latent CQ	0.10	8.21**	0.03	3.08**	0.15**	0.28**

Note. Harmonic $N = 2516$. All computations were based on the standardized coefficients in the partial mediation model. z = Sobel's z-test.
* $p < .05$.
** $p < .01$.

Table 5
Results of subgroup moderator analyses (Hypotheses 7–9).

	DV = Sociocultural Adjustment Sample Mean			DV = Task Performance Sample Mean		
CQ Factor	Low	High	*Z*	Low	High	*Z*
Metacognitive CQ	−0.03	0.42**	12.26**	0.14**	0.09*	0.97
Cognitive CQ	0.07*	0.18**	2.88**	−0.28**	0.04	7.15**
Motivational CQ	0.32**	0.36**	1.03	0.05	0.18**	2.27**
Behavioral CQ	0.01	0.30**	7.48**	0.16**	0.35**	3.62**
Latent CQ	0.61**	0.20**	15.09**	0.38**	0.36**	0.25
N (Harmonic Mean)	2734	1939		1198	1884	
$\Delta\chi^2$ (5df)	214.83**			56.57**		

Note. Table reports standardized beta coefficients for bi-factor CQ models in samples with low versus high mean levels of metacognitive CQ. $\Delta\chi^2$ = Omnibus test that relationships between CQ factors and outcomes differ when sample means are low versus high. Z = Z-test for difference in individual beta-coefficients when sample means are low versus high.
* $p < .05$.
** $p < .01$.

shows the decomposition of effects for the partial mediation model.

Consistent with Hypothesis 5, metacognitive CQ (0.13, $p < .01$) and cognitive CQ (0.07, $p < .01$) had significant indirect effects on observer-rated task performance, via intercultural judgment and decision making. In addition, both metacognitive CQ ($\beta = 0.05$, $p < .05$) and cognitive CQ ($\beta = -0.15$, $p < .01$) had significant direct effects on task performance, suggesting partial mediation. Thus, results support Hypothesis 5.

Consistent with Hypothesis 6, motivational CQ (0.02, $p < .01$) had a significant indirect effect on observer-rated task performance, via sociocultural adjustment. Moreover, motivational CQ did not have a significant direct effect ($\beta = 0.00$, *ns*) on task performance, suggesting full mediation. In contrast, the indirect effect of behavioral CQ (0.00, *ns*), via sociocultural adjustment, was non-significant but behavioral CQ ($\beta = 0.31$, $p < .01$) did exert a significant direct effect on observer-rated task performance. Thus, results partially support Hypothesis 6.[3]

5.4. Moderating effects of CQ factors

Table 5 reports results of subgroup moderator analyses testing the moderating effect of sample means in metacognitive CQ on relationships of the bi-factor CQ model with the intercultural effectiveness outcomes of sociocultural adjustment and task performance. The average level of metacognitive CQ in studies classified as low metacognitive CQ was 63% of the maximum possible score for sociocultural adjustment as an outcome and 65% for task performance. The average level of metacognitive CQ in studies classified as high metacognitive CQ was 77% for sociocultural adjustment as an outcome and 76% for task performance.

Multigroup comparisons of bi-factor CQ models when metacognitive CQ sample means are low versus high indicate that sample means of metacognitive CQ significantly affect relationships between CQ and intercultural effectiveness. When the relationships of CQ factors with outcomes were estimated freely within groups, the model fit the data significantly better than when the relationships were constrained to be equal across groups (sociocultural adjustment: $\Delta\chi^2$ (5df) = 214.83, $p < .01$; task performance: $\Delta\chi^2$ (5df) = 56.57, $p < .01$).

Hypothesis 7 proposed that metacognitive CQ would moderate the relationship between cognitive CQ and intercultural effectiveness, such that the relationship would be stronger for high metacognitive CQ. Results in Table 5 indicate that sample means of metacognitive CQ moderated the effects of cognitive CQ on intercultural effectiveness, but the form of this interaction is more nuanced than hypothesized.

Consistent with Hypothesis 7, the relationship between cognitive CQ and sociocultural adjustment is significantly stronger ($Z = 2.88$, $p < .01$) when mean levels of metacognitive CQ are high ($\beta = 0.18$, $p < .01$) rather than low ($\beta = 0.07$, $p < .05$). This form of the interaction corresponds to an accentuating effect (Gardner, Harris, Li, Kirkman, & Mathieu, 2017). Unexpectedly, however, the overall relationship between cognitive CQ and task performance was negative instead of positive. In turn, this negative relationship was significantly more pronounced ($Z = 7.15$, $p < .01$) when mean levels of metacognitive CQ are low ($\beta = -0.28$, $p < .01$) rather than high ($\beta = 0.04$, *ns*). Thus, high sample means of metacognitive CQ mitigate the negative effect of cognitive CQ on task performance. Overall, results provide

[3] We obtained similar, albeit weaker indirect effects when using residualized measures of intercultural judgment and decision making, sociocultural adjustment, and observer-rated task performance that controlled for the effects of international experience, Big Five personality, cognitive ability, and emotional intelligence. Furthermore, latent CQ and the four CQ factors jointly explained an additional 24% of variance in intercultural judgment and decision making, 23% of variance in sociocultural adjustment, and 39% of variance in observer-rated task performance over and above these control variables.

partial support for Hypothesis 7.

Hypothesis 8 predicted that metacognitive CQ would moderate the relationship between motivational CQ and intercultural effectiveness, such that the relationship is stronger for high metacognitive CQ. Results in Table 5 provide mixed support for Hypothesis 8.

Consistent with the prediction, the positive relationship between motivational CQ and task performance is significantly stronger ($Z = 2.27$, $p < .05$) when sample means of metacognitive CQ are high ($\beta = 0.18$, $p < .01$) rather than low ($\beta = 0.05$, *ns*). However, the positive relationship between motivational CQ and sociocultural adjustment is not significantly stronger ($Z = 1.03$, *ns*) when sample means of metacognitive CQ are high ($\beta = 0.36$, $p < .01$) rather than low ($\beta = 0.32$, $p < .01$).

Hypothesis 9 proposed that metacognitive CQ would moderate the positive relationship between behavioral CQ and intercultural effectiveness, such that the relationship is stronger for high metacognitive CQ. Results in Table 5 support Hypothesis 9.

As hypothesized, the positive relationship between behavioral CQ and sociocultural adjustment is significantly stronger ($Z = 7.48$, $p < .01$) when sample means of metacognitive CQ are high ($\beta = 0.30$, $p < .01$) rather than low ($\beta = 0.01$, *ns*). Likewise, the positive relationship between behavioral CQ and task performance is significantly stronger ($Z = 3.62$, $p < .01$) when sample means of metacognitive CQ are high ($\beta = 0.35$, $p < .01$) rather than low ($\beta = 0.16$, $p < .01$). Thus, higher sample means of metacognitive CQ accentuate the positive effects of behavioral CQ on both intercultural effectiveness outcomes.

Finally, although not hypothesized, sample means of metacognitive CQ also moderated the positive relationship between latent CQ and sociocultural adjustment. In particular, the positive relationship between latent CQ and sociocultural adjustment is significantly weaker ($Z = 15.09$, $p < .01$) when sample means of metacognitive CQ are high ($\beta = 0.20$, $p < .01$) rather than low ($\beta = 0.61$, $p < .01$). This suggests that higher sample means of metacognitive CQ dampen the positive effect of latent CQ on sociocultural adjustment. By contrast, the positive relationship between latent CQ and task performance is not significantly stronger ($Z = 0.25$, *ns*) when sample means of metacognitive CQ are high ($\beta = 0.36$, $p < .01$) rather than low ($\beta = 0.38$, $p < .01$).

6. Discussion

CQ research has deepened our understanding of the predictors of effectiveness in culturally diverse settings. For example, Gelfand et al. (2008, p. 497) identified CQ as an "important individual characteristic that facilitates cultural adaptation and performance." Similarly, Leung et al. (2014, p. 495) stressed the value of CQ as having "thus far provided the most promising evidence" to predict "a range of psychological, behavioral, and performance outcomes."

We meta-analyzed existing CQ research (199 samples; N = 44,155) to address three fundamental, yet unresolved questions about the nature of the CQ construct. First, although prior research has modeled CQ either as a single-factor construct or as four correlated factors, the theoretical conceptualization of CQ as an aggregate multidimensional construct (Ang & Van Dyne, 2008; Ang et al., 2007) implies that CQ factors provide both holistic *and* unique information. Thus, neither the single-factor nor the four-factor CQ model provides a complete understanding of CQ effects.

To overcome the limitations of both approaches, we advanced and tested a bi-factor CQ model that simultaneously accounts for the effects of a latent CQ factor and the effects of specific CQ factors. Results of our meta-analysis support the bi-factor CQ model and show that latent CQ and specific CQ factors simultaneously predict intercultural effectiveness outcomes. The incremental validity of the four specific CQ factors over and above the latent CQ factor underscores the importance of factor-specific information in predicting intercultural effectiveness outcomes. These results highlight our point that the bi-factor CQ model offers a more nuanced and more accurate understanding of CQ effects and holds great potential to advance theoretical clarity in future CQ research.

Second, prior research had not replicated Ang et al.'s (2007) initial evidence of differential relationships between the four CQ factors and intercultural effectiveness outcomes. Moreover, as Gelfand et al. (2008, p. 379) noted, theorizing on the four factors has been inconsistent, raising the question of whether "to facet or not to facet?" To address this question, we replicated and extended Ang et al.'s (2007) theoretical model of CQ using meta-analytic techniques. Our meta-analytic findings showed that *the four CQ factors were differentially related to specific intercultural effectiveness outcomes*. These findings support the theoretical conceptualization of CQ as an aggregate multidimensional construct and provide cumulative evidence for differential validities of the four CQ factors.

Finally, although studies have begun to examine mediators and moderators of CQ effects, we have lacked cumulative knowledge about the CQ nomological network. To extend our understanding of mediators, we advanced and tested a mediated CQ model where proximal intercultural effectiveness outcomes differentially mediate the effects of the four CQ factors on distal intercultural effectiveness outcomes. Meta-analytic results demonstrate that intercultural judgment and decision making and sociocultural adjustment differentially mediated the effects of metacognitive CQ and cognitive CQ versus motivational CQ on observer-rated task performance.

To extend our understanding of moderators, we advanced and tested more nuanced theoretical arguments for interactive effects of metacognitive CQ with the other three CQ factors. Our meta-analytic findings support the premise that metacognitive CQ moderates the effects of the other three CQ factors on intercultural effectiveness outcomes. This is an important finding because it highlights that the four CQ factors act in concert rather than independently.

Taken together, our meta-analysis offers the most comprehensive evidence to date that the four CQ factors matter to the prediction of intercultural effectiveness outcomes. The novel bi-factor CQ model and theoretical extensions that include mediators and moderators of CQ effects make important contributions because they advance a more comprehensive understanding of the effects of the four CQ factors (Gelfand et al., 2008). Of course, an interesting meta-analysis should not only answer important theoretical questions but also raise new ones. Several of our findings do just that, offering insights into the theoretical foundations of CQ effects and highlighting promising areas for future research. We discuss these theoretical implications below.

6.1. Theoretical implications of the bi-factor CQ model: Unique and latent CQ effects

The strong support demonstrated for the bi-factor CQ model is a major theoretical contribution of the current study. The bi-factor CQ model provides a more complete understanding of CQ effects than either the single-factor or four-factor CQ models because it simultaneously accounts for the effects of a latent CQ factor and specific CQ factors. Our approach provides a theoretical rationale and meta-analytic empirical evidence for differential validities and incremental validity of specific CQ factors over and above latent CQ in predicting different intercultural effectiveness outcomes.

This empirical support for the bi-factor CQ model is theoretically important because it shifts the scholarly conversation about the nature of CQ. Instead of debating whether CQ is better modeled as a latent single-factor construct or as four correlated factors, the bi-factor model suggests the value of both perspectives. The bi-factor model also provides a rationale for how the four CQ factors as a dynamic system with reciprocal relationships between CQ factors can give rise to a latent CQ factor over time.

Integrating the single-factor and four-factor views, our bi-factor CQ model and empirical findings suggest that the relative importance of a

latent CQ factor and the four specific CQ factors may depend on the outcome one wants to predict. Thus, we see future research that deepens our understanding of the relative contributions of latent versus specific CQ factors as more fruitful than research attempting to settle a debate between latent versus aggregate CQ models.

Accordingly, we recommend that future research should model CQ using the bi-factor CQ model. A full technical description of the use of bi-factor models in primary studies is beyond the scope of this meta-analysis (interested readers may refer to Chen et al., 2006; Reise, 2012; and Rodriguez, Reise, & Haviland, 2016 for more technical descriptions). It is important to note, though, that an application of the bi-factor CQ model requires minimum sample sizes comparable to other structural equation modeling techniques. The precise sample requirements will differ depending on factors such as number of latent variables and indicators; strength of factor loadings and relationships between latent variables; or degree of missing data (see MacCallum, Browne, & Sugawara, 1996; Wolf, Harrington, Clark, & Miller, 2013).

Future research is needed to examine whether the essence of the bi-factor CQ model (i.e., that both latent CQ and specific CQ factors predict intercultural effectiveness) can be tested within a linear regression framework. Such research would provide an important alternative to scholars when collecting data from sufficiently large samples is not possible. In the meantime, we recommend that scholars report correlations for both an overall CQ score and for the four specific CQ factors. This would enable future meta-analyses to replicate the procedures advanced here.

6.2. Theoretical implications of differential relationships of CQ factors with outcomes

6.2.1. Differential relationships of CQ factors with intercultural judgment and decision making

We theorized that the mental capabilities represented by metacognitive CQ and cognitive CQ facilitate interpreting behavior from the other person's perspective and have implications for cultural decision making. Consistent with our theorizing, results demonstrated that metacognitive CQ and cognitive CQ (but not motivational CQ and behavioral CQ) were positively associated with intercultural judgment and decision making.

6.2.2. Differential relationships of CQ factors with intercultural adaptation

Based on Ang et al.'s (2007) model, we theorized that motivational CQ and behavioral CQ would have positive relationships with intercultural adjustment. Our findings provide mixed support for these arguments and offer a more nuanced understanding of predictors of intercultural adaption. Although motivational CQ was positively and strongly related to intercultural adaptation, behavioral CQ was not significantly related to intercultural adaptation.

Empirically, this nonsignificant finding could be due to how intercultural adaptation is assessed. We note that several authors have argued for an affective reconceptualization of intercultural adaptation (e.g., Lazarova, Westman, & Shaffer, 2010) because self-assessments of intercultural adaptation reflect a feeling of how one fits in, as opposed to observer-rated assessments of intercultural adaptation that may reflect observed behavioral adaptation. This explanation suggests that future research may deepen our understanding of the relationship between CQ and intercultural adaptation by considering adaptation from a multi-source instead of a single-source perspective.

A theoretical and more interesting explanation for the unexpected finding is that a broad behavioral repertoire is not sufficient for adaptation because adaptation also requires learning when certain behaviors are appropriate. In particular, findings from our moderator analyses – that behavioral CQ was positively associated with adaptation only when metacognitive CQ was high – suggest the value of applying a learning lens to understanding the effects of behavioral CQ (Morris et al., 2014). Although behavioral flexibility provides the *potential* to adjust to other cultures, realizing this potential requires the learning of situation-specific appropriate behaviors. Learning the nuances of such situation-specific behaviors is a function of the capability to learn from experiences and specific situations in the host country (metacognitive CQ). This explanation highlights the adaptive potential of behavioral CQ in the presence of high metacognitive capabilities.

6.2.3. Differential relationships of CQ factors with intercultural performance

Results for the third type of intercultural effectiveness (intercultural performance) are more complex than we expected and suggest the need for more fine-grained theorizing that accounts for the nature of different performance outcomes.

One unexpected finding was that cognitive CQ was negatively related to observer-rated task performance, citizenship performance, and leadership performance when controlling for the effects of latent CQ and the other three CQ factors, even though the zero-order correlations of cognitive CQ with these outcomes were positive. According to MacKinnon, Krull, and Lockwood (2000), such an effect reversal could indicate either mediation or a confounding effect of the other three CQ factors on the relationships of cognitive CQ with performance outcomes. Although both mediation and confounding are identical statistically, they differ in their conceptual interpretation.

In the case of mediation, cognitive CQ could exert its effect *through* the other CQ factors. For example, cultural knowledge may facilitate awareness of one's cultural assumptions (metacognitive CQ) by virtue of providing salient cultural frameworks through which to make sense of everyday interactions, which in turn facilitates understanding and meeting the performance expectations of diverse others.

In the case of confounding, the other CQ factors could affect both cultural knowledge and performance outcomes. For example, those with high metacognitive CQ may develop more cultural knowledge because they actively reflect on cultural interactions, which facilitates understanding and meeting the performance expectations of people who have different cultural backgrounds. Given the statistical equivalence of these explanations, the field needs future research on the causal ordering (and potentially even reciprocal effects) *between* the four CQ factors.

We also unexpectedly found that metacognitive CQ was unrelated to citizenship behaviors. We note that relatively few studies to date have examined CQ and citizenship performance. Thus, the population estimate of this relationship may not be stable and future research should continue to examine this relationship.

An alternative and theoretically promising explanation of this unexpected finding is that individuals with high cultural metacognition might be aware of when others need help but engage in helping only when they are also motivated to engage in helping (Organ, 1990). Thus, metacognitive CQ may be a necessary but not sufficient condition for citizenship performance. Interestingly, this explanation highlights the possibility that motivational CQ might moderate the effects of metacognitive CQ on citizenship performance. Perhaps metacognitive CQ triggers awareness of the needs of culturally diverse others, but only those who enjoy working with people from other cultures (high motivational CQ) respond by providing help. Future research should examine this possibility when there are more studies of these relationships.[4]

[4] We explored this possibility with the limited data available on relationships between CQ and citizenship performance. Results show no significant moderating effect of motivational CQ. That is, the zero-order correlation between metacognitive CQ and citizenship performance is positive and significant, both when sample means of motivational CQ are low (k = 4: ρ = 0.32, 95%CI [0.28,0.37]) and high (k = 4: ρ = 0.31, 95%CI [0.12,0.51], t = 0.14, *ns*). Given the small number of studies in both conditions, we recommend that future research examine the moderating effect of motivational CQ on the relationship between metacognitive CQ and citizenship performance in primary studies.

Finally, results indicate that the four CQ factors did not incrementally predict adaptive performance over and above the latent CQ factor. As with citizenship performance, this may be due to the limited number of studies that have examined these CQ outcomes.

Alternatively, the broad and complex nature of adaptive performance may explain the predictive power of the latent CQ factor. The literatures on the bandwidth-fidelity dilemma (Cronbach & Gleser, 1965) and construct correspondence (Fishbein & Ajzen, 1974) advocate compatibility, such that broad outcomes are better predicted by broad antecedents. Research on attitude-behavior (Harrison et al., 2006) and ability-performance (Schneider & Newman, 2015) relationships supports the notion of compatibility. Thus, it is possible that latent CQ is a more important antecedent of broad intercultural effectiveness outcomes, such as adaptive performance, expatriate career success, global identity, etc. (than the four CQ factors).

6.3. Theoretical implications of mediators of CQ effects

Our meta-analysis advances knowledge of how the four CQ factors impact intercultural performance. Sociocultural adjustment fully mediated the effects of motivational CQ on intercultural task performance, and this corroborates results of Chen et al. (2010) that work adjustment fully mediates the effects of motivational CQ on expatriate job performance. This result also reinforces the value of the stress-coping perspective of international adjustment (Bhaskar–Shrinivas et al., 2005) as a powerful theoretical lens for understanding the effects of motivational CQ on intercultural performance.

Results also showed significant indirect effects of metacognitive CQ and cognitive CQ on intercultural task performance, via intercultural judgment and decision making. We had emphasized the importance of assessing the behavioral expectations of diverse others (Stone–Romero et al., 2003), and our findings support the judgment and decision making perspective for understanding the effects of metacognitive CQ and cognitive CQ on task performance. In addition to the negative direct effect of cognitive CQ we discussed above, our mediation results also revealed a positive direct effect of metacognitive CQ on intercultural performance. This partial mediation effect suggests that judgment and decision making is not the only mechanism through which metacognitive CQ affects intercultural performance and that future research should explore additional mechanisms.

Indeed, a relational perspective provides a complementary lens for explaining metacognitive CQ effects and could suggest alternative mechanisms. For example, empirical evidence shows that those with high metacognitive CQ develop strong affective trust in culturally diverse others which improves their intercultural collaboration (Chua et al., 2012; Rockstuhl & Ng, 2008). Mor et al. (2013) also showed that those with high metacognitive CQ are viewed as empathic and develop effective intercultural collaborations. Thus, metacognitive CQ not only improves intercultural judgment and decision making but also facilitates strong bonds with culturally diverse others. Future research should integrate the judgment and decision making and relational perspectives and examine intercultural judgments and relationship quality as joint mediators of metacognitive CQ effects.

Finally, the lack of indirect effects for behavioral CQ on intercultural task performance highlights the need for future research on how behavioral CQ affects intercultural performance. Here, a relational perspective may also advance theorizing and empirical research on the effects of behavioral CQ.

For example, intercultural communication research (e.g., Spencer–Oatey, 2008), which underlies Ang et al. (2007) conceptualization of behavioral CQ, emphasizes the importance of behavioral flexibility for reducing misperceptions and misattributions. By reducing misperceptions and misattributions, those with higher behavioral CQ may build stronger relationships with diverse others which in turn improves perceptions of their performance.

Similarly, Sue, Bucceri, Lin, Nadal, and Torino (2007) have emphasized that violations of cultural communication norms can be interpreted as a form of microaggression. For example, Westerners who violate Asian communication norms by giving very direct negative feedback may risk being perceived as rude, whereas Asians who fail to conform to Westerns communication norms of speaking up in meetings risk being perceived as disengaged. Perceived microaggressions damage the quality of intercultural relationships (Sue et al., 2007) and could harm observer performance evaluations.

6.4. Theoretical implications of the moderating effects of CQ factors

A major finding of the current meta-analysis is the moderating effects of sample means of metacognitive CQ on relationships between the remaining three CQ factors and intercultural effectiveness. Consistent with the theory of adaptive expertise (Holyoak, 1991), results highlight the crucial role of metacognitive CQ as an adaptive capability that facilitates the application of other CQ capabilities.

One interesting and unexpected interaction pattern was that cognitive CQ had no effect on task performance for individuals with high metacognitive CQ but was negatively related to task performance for individuals with low metacognitive CQ. We had hypothesized an accentuating effect of metacognitive CQ, but results indicate a mitigating effect of mean levels of metacognitive CQ on the cognitive CQ – task performance relationship.

The form of this interaction resembles findings from Chua and Ng's (2017) results for creativity[5] and suggests that metacognitive CQ weakens the negative relationship between cognitive CQ and performance outcomes. Chua and Ng (2017) suggested that when metacognitive CQ is low, high levels of cultural knowledge increase the risk of cognitive overload and cognitive entrenchment.

Extending Chua and Ng's (2017) argument, cultural knowledge coupled with low metacognitive CQ may lead to sophisticated stereotyping (Osland & Bird, 2000), which could paradoxically result in rigid responses and negative implications for effectiveness. Those with high metacognitive CQ, however, can mitigate the negative effects of high cultural knowledge because they monitor and check the appropriateness of their understanding during intercultural interactions and are aware of when they need to suspend judgment (Morris et al., 2014).

An alternative explanation, as discussed earlier, may be that the negative main effect of cognitive CQ could be spurious due to mediating or confounding effects of the other three CQ factors. Consistent with this alternative explanation (and our hypothesis), the zero-order correlation between cognitive CQ and task performance is positive and significant, even when metacognitive CQ is low ($\rho = 0.11$, 95%CI [0.03, 0.19]) but is significantly accentuated when metacognitive CQ is high ($\rho = 0.26$, 95%CI [0.15, 0.36], $t = 2.79$, $p < .01$).

6.5. Practical implications

Our findings also have practical implications for the selection and development of global talent. First, the significant relationships

(*footnote continued*)
Such primary studies would also be important because moderation effects at the sample level could differ from those at the individual level of analysis.

[5] Chua and Ng showed a U-shaped relationship between cognitive CQ and creativity at low levels of metacognitive CQ, with a negative relationship occurring when cognitive CQ exceeded 42% of the maximum possible value. All studies relating cognitive CQ to task performance, except Groves and Feyerhern (2011), reported mean levels of cognitive CQ greater or equal to 47% of the maximum possible value. Thus, studies within our database fall within the range of cognitive CQ for which Chua and Ng observed a negative relationship between cognitive CQ and creativity, when metacognitive CQ was low.

between CQ and observer-rated performance outcomes reinforce the value of CQ for international selection. Our meta-analytic findings suggest that validated measures of CQ, such as the Cultural Intelligence Scale (CQS; Ang et al., 2007) could complement informal assessments of global talent that are commonly used. Specifically, CQ accounted for an additional 39% of the variance in observer-rated task performance, an additional 23% of the variance in self-rated sociocultural adjustment, and an additional 24% of the variance in intercultural judgment and decision making, over and above established predictors such as international experience, Big Five personality, cognitive ability, and emotional intelligence. Thus, our findings echo the conclusions of Leung et al. (2014) and Matsumoto and Hwang (2013) that the CQ construct holds promising potential for furthering our understanding of why some people function more effectively across cultures than others.

In addition, our meta-analysis has important implications for intercultural training which has, to date, focused primarily on knowledge or cognitive training (Earley & Peterson, 2004). The importance of motivational and behavioral CQ and our findings regarding the moderating effects of metacognitive CQ suggest that these CQ factors are critical levers of intercultural effectiveness in addition to cultural knowledge. Hence, our meta-analysis highlights the critical need to complement more traditional didactic training with experiential learning approaches to training that aim to enhance motivational, metacognitive, and behavioral CQ.

6.6. Limitations and future research

According to Humphrey (2011), a high quality meta-analysis should provide a roadmap for future research by identifying problematic gaps in our understanding of a phenomenon. Our prior discussion of the theoretical implications of our findings highlighted several promising areas for future research. Here, we discuss additional suggestions for how future research might build on our findings.

6.6.1. Explore factor-specific outcomes

First, we recommend caution in interpreting some of our results because some correlations were estimated based on a small number of primary studies. Although an analysis of the stability of CQ effects (results available from the first author upon request) indicates that the current effect size estimates for CQ relationships are relatively stable, future CQ research should include outcomes such as intercultural judgment and decision making, citizenship performance, and adaptive performance.

Moreover, the differential validities of the four CQ factors highlight the need for future research on factor-specific outcomes. To the extent that the four CQ factors represent qualitatively different aspects of the capability to function effectively in intercultural contexts, research focused on specific CQ factors may deepen our understanding of how different CQ factors translate into intercultural effectiveness.

Such research would extend existing research on metacognitive CQ and affective trust development (Chua et al., 2012), intercultural cooperation (Chua et al., 2012; Mor et al., 2013), and creativity (Chua & Ng, 2017); research on motivational CQ and cultural adaptation (Chen et al., 2010); or research on metacognitive and motivational CQ on cultural learning and job creativity (Xu & Chen, 2017). Research extending our understanding of metacognitive CQ would be particularly timely because metacognitive CQ was an important predictor of intercultural effectiveness outcomes and mean levels of metacognitive CQ moderated the effects of cognitive, motivational, and behavioral CQ.

6.6.2. Replicate and extend interactive CQ effects

Our findings for the interactive effects of mean levels of metacognitive CQ are promising and highlight the co-dependent nature of the four CQ factors. Because we used sample means from primary studies, our analysis was limited. In particular, interaction effects based on sample means could differ from interaction effects at the individual level analysis. Thus, there is a pressing need for future research on the moderating effects of metacognitive CQ on relationships between the other three CQ factors and intercultural effectiveness outcomes using primary data. Research could extend our findings by theorizing and examining (a) curvilinear CQ effects (e.g., Chua & Ng, 2017), (b) recursive CQ effects (e.g., Ng, Van Dyne, & Ang, 2009), and (c) more complex interactive effects using a configurational approach to CQ (e.g., Van Dyne et al., 2012).

6.6.3. Theorize boundary conditions of CQ effects

Finally, we note that the relationships between the CQ factors and other constructs in the CQ nomological network show significant between-study variance. This heterogeneity in effect sizes across studies highlights the need for further theorizing on boundary conditions that qualify CQ relationships.

For example, future research could extend our application of adaptive expertise theory and consider the novelty of cultural situations as an important boundary condition to CQ effects. More novel cultural situations are likely to pose greater adaptation challenges. Baard, Rench, and Kozlowski's (2014) review of performance adaptation highlighted task novelty as amplifying adaptation challenges and moderating relationships of knowledge, motivation, and behavioral skills with performance adaptation. Similarly, we would expect cultural novelty to moderate relationships between CQ and intercultural effectiveness. Cultural distance (Searle & Ward, 1990) and time in the host country (Torbiorn, 1982) are two factors relevant to cultural novelty that future research could explore as boundary conditions of CQ effects.

In addition, research on boundary conditions that show when CQ leads to negative outcomes is also needed. Ten years after Gelfand et al. (2008) drew attention to the potential "dark side" of CQ, little is known about factors that cause CQ to have detrimental effects. Our finding that cognitive CQ had a negative effect on performance that was dampened by high metacognitive CQ may suggest one potential "dark side" of cognitive CQ in the form of sophisticated stereotyping (Osland & Bird, 2000; similar to the notion of cognitive entrenchment in Chua & Ng, 2017). Future research should continue to explore contexts in which CQ might have negative effects on outcomes, for example in competitive intergroup contexts (see for example Epley, Caruso, & Bazerman, 2006).

6.7. Conclusion

Never before has the need to function effectively in intercultural contexts been more apparent than today. Thus, an important goal of this study was to examine the relationships between the four factors of cultural intelligence and intercultural effectiveness outcomes.

Findings from our meta-analysis based on 199 samples (N = 44,155) highlight the predictive power of CQ. Moreover, these findings shed light on three fundamental, yet previously unresolved theoretical issues.

First, we advanced a bi-factor CQ model that simultaneously accounted for the effects of a latent CQ factor and specific CQ factors. Results shed light on Gelfand et al.'s (2008) puzzle of whether to facet or not and demonstrated the incremental validity and the value of the four factors, above and beyond latent CQ.

Second, we demonstrated differential relationships between the four CQ factors and three forms of intercultural effectiveness. These findings underscore the value of a nuanced, theoretical model of CQ with differential effects of the four CQ factors.

Finally, we extended prior research and advanced and tested mediated and moderated CQ relationships that expand our understanding of the CQ nomological network. We hope our theoretical clarification of the nature of the CQ construct and our results will guide future research on cultural intelligence and additional intercultural effectiveness outcomes.

Appendix A. Details of variable coding procedure

We coded the CQ factors for each study based on Ang et al.'s (2007) conceptualization and measurement of CQ. Based on the theoretical conceptualization of CQ as an aggregate multidimensional construct with four CQ factors that reflect qualitatively different capabilities to function effectively in intercultural contexts, we kept studies that dropped items from the original scale but excluded studies that combined items from different CQ factors into novel dimensions (e.g., Bücker et al., 2015). We also kept two dissertation studies that used the extended CQS scale (Van Dyne et al., 2012) to measure the four CQ factors. Results are the same excluding these two dissertations, and given the substantive overlap in the two scales, we included both studies.

We coded effectiveness as intercultural judgment and decision making when participants made decisions about intercultural scenarios or cases. For example, Ang et al. (2007) measured intercultural judgment and decision making with five cross-cultural decision making scenarios from Cushner and Brislin (1996).

We coded effectiveness into five types of intercultural adaptation: general adjustment, interaction adjustment, work adjustment, holistic sociocultural adjustment, and psychological well-being. We subsequently collapsed these into two categories that differentiated sociocultural adjustment from psychological well-being. We validated this decision by demonstrating no substantive differences among the four adjustment categories through separate meta-analyses (available upon request).

We coded effectiveness into four types of intercultural performance: task performance, citizenship performance, adaptive performance, and leadership performance. We used task performance when the measure referred to typical in-role behaviors. For example, Ang et al. (2007) assessed task performance with three in-role behavior items adapted from Tsui (1984, 1990) and Williams and Anderson (1991). We used citizenship performance when the measure referred to extra-role behaviors. For example, Wu and Ang (2011) assessed citizenship with four contextual performance items from Kraimer and Wayne (2004). We used adaptive performance when the measure referred to adaptation to new conditions or job requirements. For example, Şahin and Gürbüz (2014) assessed adaptive performance with eight items adapted from Griffin and Hesketh (2003) and Pulakos, et al. (2000). Finally, we used leadership performance when the measure referred to leadership behaviors or leadership outcomes. For example, Wells (2017) assessed transformational leadership with Avolio and Bass' (2004) scale and Rockstuhl, Ang, Lee, and Paunova (2013) assessed leadership emergence with five items adapted from Cronshaw and Lord (1987).

Appendix B. Original CQ meta-analyses

See Tables B1–B6.

Table B1
Meta-analytic population correlations between CQ factors and intercultural effectiveness outcomes.

						80% CV		95% CI		
Outcome	*k*	*N*	*r*	ρ	*SD*ρ	Lower	Upper	Lower	Upper	*Q*
Intercultural Judgment & Decision Making										
Metacognitive CQ	10	2456	0.22	0.26	0.06	0.18	0.33	0.19	0.32	15.93
Cognitive CQ	10	2456	0.19	0.20	0.06	0.13	0.27	0.13	0.26	15.58
Motivational CQ	10	2456	0.14	0.16	0.11	0.02	0.30	0.07	0.25	31.63**
Behavioral CQ	10	2456	0.13	0.16	0.09	0.04	0.28	0.08	0.25	25.72**
Sociocultural Adjustment										
Metacognitive CQ	29	5272	0.28	0.37	0.17	0.15	0.59	0.29	0.45	148.00**
Cognitive CQ	29	5713	0.28	0.33	0.18	0.10	0.57	0.26	0.41	176.78**
Motivational CQ	35	7113	0.42	0.49	0.18	0.26	0.72	0.42	0.56	252.56**
Behavioral CQ	28	5418	0.29	0.34	0.16	0.14	0.55	0.28	0.41	137.97**
Psychological Well-Being										
Metacognitive CQ	22	4706	0.25	0.28	0.15	0.10	0.47	0.21	0.36	98.77**
Cognitive CQ	25	5933	0.19	0.23	0.13	0.07	0.39	0.16	0.30	97.26**
Motivational CQ	25	5569	0.32	0.40	0.16	0.20	0.61	0.32	0.48	147.11**
Behavioral CQ	23	5176	0.24	0.27	0.16	0.07	0.48	0.19	0.35	126.26**
Task Performance										
Metacognitive CQ	26	4398	0.30	0.38	0.16	0.17	0.59	0.30	0.46	120.72**
Cognitive CQ	27	4860	0.18	0.22	0.14	0.03	0.40	0.15	0.28	101.52**
Motivational CQ	28	5259	0.26	0.32	0.18	0.09	0.55	0.24	0.40	158.67**
Behavioral CQ	26	4679	0.31	0.39	0.14	0.22	0.57	0.33	0.45	101.38**
Citizenship Performance										
Metacognitive CQ	10	1662	0.25	0.34	0.10	0.21	0.47	0.24	0.44	21.61*
Cognitive CQ	9	1393	0.19	0.21	0.21	−0.06	0.48	0.06	0.36	52.78**
Motivational CQ	8	1237	0.28	0.37	0.17	0.15	0.60	0.22	0.52	35.63**
Behavioral CQ	9	1674	0.27	0.37	0.14	0.20	0.55	0.26	0.49	34.67**
Adaptive Performance										
Metacognitive CQ	6	944	0.30	0.37	0.04	0.32	0.42	0.29	0.46	7.06
Cognitive CQ	6	944	0.28	0.35	0.00	0.35	0.35	0.30	0.40	1.86
Motivational CQ	6	944	0.29	0.34	0.07	0.25	0.44	0.24	0.45	9.77
Behavioral CQ	6	944	0.30	0.36	0.13	0.20	0.52	0.23	0.49	16.34**
Leadership Performance										
Metacognitive CQ	12	2753	0.33	0.51	0.20	0.25	0.77	0.40	0.61	102.21**

(*continued on next page*)

Table B1 (*continued*)

						80% CV		95% CI		
Outcome	*k*	*N*	*r*	ρ	*SD*ρ	Lower	Upper	Lower	Upper	*Q*
Cognitive CQ	12	2753	0.28	0.43	0.22	0.14	0.72	0.32	0.54	118.27**
Motivational CQ	13	2851	0.32	0.49	0.21	0.22	0.76	0.39	0.59	109.02**
Behavioral CQ	12	2753	0.31	0.44	0.15	0.25	0.64	0.34	0.54	61.54**

Note. *k* = number of correlations; *N* = combined sample size; *r* = mean uncorrected correlation; ρ = estimated true score correlation corrected for measurement error; CV = credibility interval; CI = confidence interval. *Q* = *Q*-statistic for homogeneity in the true score correlations across studies.

** $p < .01$.

* $p < .05$.

Table B2

Meta-analytic population correlations between CQ factors and intercultural performance (different source only).

						80% CV		95% CI		
Outcome	*k*	*N*	*r*	ρ	*SD*ρ	Lower	Upper	Lower	Upper	*Q*
Task Performance										
Metacognitive CQ	13	1953	0.24	0.31	0.15	0.13	0.50	0.20	0.43	43.46**
Cognitive CQ	13	1953	0.12	0.15	0.14	−0.03	0.33	0.06	0.24	40.93**
Motivational CQ	15	2814	0.17	0.21	0.10	0.08	0.34	0.13	0.29	35.76**
Behavioral CQ	14	2342	0.28	0.38	0.14	0.20	0.55	0.29	0.46	50.34**
Citizenship Performance										
Metacognitive CQ	5	739	0.20	0.27	0.02	0.24	0.30	0.16	0.38	5.27
Cognitive CQ	5	739	0.08	0.06	0.16	−0.15	0.26	−0.12	0.24	18.11**
Motivational CQ	5	739	0.17	0.23	0.00	0.23	0.23	0.15	0.31	2.27
Behavioral CQ	6	1128	0.24	0.35	0.11	0.21	0.50	0.23	0.47	17.51**
Adaptive Performance										
Metacognitive CQ	5	633	0.33	0.41	0.00	0.41	0.41	0.35	0.48	2.76
Cognitive CQ	5	633	0.29	0.35	0.00	0.35	0.35	0.29	0.41	1.88
Motivational CQ	5	633	0.31	0.36	0.09	0.24	0.47	0.23	0.48	9.67*
Behavioral CQ	5	633	0.34	0.41	0.09	0.29	0.53	0.29	0.54	9.87*
Leadership Performance										
Metacognitive CQ	3	576	0.24	0.26	0.04	0.21	0.31	0.12	0.40	3.65
Cognitive CQ	3	576	0.12	0.12	0.18	−0.11	0.34	−0.13	0.36	17.25**
Motivational CQ	4	674	0.21	0.25	0.00	0.25	0.25	0.17	0.33	2.90
Behavioral CQ	3	576	0.19	0.22	0.00	0.22	0.22	0.20	0.24	0.08

Note. *k* = number of correlations; *N* = combined sample size; *r* = mean uncorrected correlation; ρ = estimated true score correlation corrected for measurement error; CV = credibility interval; CI = confidence interval. *Q* = *Q*-statistic for homogeneity in the true score correlations across studies.

** $p < .01$.

* $p < .05$.

Table B3

Meta-analytic population correlations between CQ factors and other antecedents of intercultural effectiveness.

						80% CV		95% CI		
Construct	*k*	*N*	*r*	ρ	*SD*ρ	Lower	Upper	Lower	Upper	*Q*
International Experience										
Metacognitive CQ	55	11,934	0.14	0.14	0.12	−0.01	0.30	0.10	0.19	204.58**
Cognitive CQ	49	11,060	0.15	0.17	0.14	0.00	0.35	0.13	0.22	223.18**
Motivational CQ	57	13,330	0.17	0.19	0.15	−0.01	0.38	0.14	0.23	324.94**
Behavioral CQ	51	11,534	0.12	0.12	0.12	−0.03	0.27	0.08	0.16	191.16**
Extraversion										
Metacognitive CQ	24	4513	0.22	0.26	0.08	0.16	0.35	0.21	0.31	42.51**
Cognitive CQ	24	4513	0.14	0.17	0.12	0.02	0.31	0.11	0.22	66.22**
Motivational CQ	25	5153	0.29	0.35	0.10	0.23	0.48	0.30	0.40	63.13**
Behavioral CQ	23	4424	0.17	0.21	0.10	0.08	0.35	0.15	0.28	56.46**
Agreeableness										
Metacognitive CQ	17	3486	0.18	0.20	0.09	0.09	0.32	0.14	0.27	35.85**
Cognitive CQ	17	3486	0.07	0.06	0.11	−0.09	0.20	−0.02	0.13	45.24**
Motivational CQ	16	3397	0.22	0.23	0.14	0.05	0.42	0.15	0.32	64.22**
Behavioral CQ	16	3397	0.16	0.18	0.05	0.11	0.24	0.12	0.23	22.11
Conscientiousness										
Metacognitive CQ	19	3634	0.16	0.22	0.07	0.12	0.31	0.15	0.28	31.70*

(*continued on next page*)

Table B3 (*continued*)

						80% CV		95% CI		
Construct	*k*	*N*	*r*	ρ	*SD*ρ	Lower	Upper	Lower	Upper	*Q*
Cognitive CQ	19	3634	0.05	0.05	0.02	0.02	0.08	0.00	0.10	20.34
Motivational CQ	18	3545	0.15	0.19	0.08	0.09	0.30	0.13	0.26	34.43**
Behavioral CQ	18	3545	0.14	0.16	0.01	0.15	0.18	0.12	0.21	18.36
Emotional Stability										
Metacognitive CQ	18	3818	0.09	0.10	0.07	0.01	0.18	0.05	0.15	29.21*
Cognitive CQ	18	3818	0.02	0.04	0.05	−0.03	0.11	−0.01	0.09	24.80
Motivational CQ	18	4285	0.17	0.21	0.07	0.12	0.29	0.16	0.25	30.48*
Behavioral CQ	17	3729	0.05	0.04	0.06	−0.04	0.11	−0.01	0.08	25.04
Openness to Experience										
Metacognitive CQ	28	5115	0.33	0.40	0.11	0.26	0.53	0.33	0.46	74.77**
Cognitive CQ	28	5115	0.26	0.32	0.09	0.21	0.43	0.26	0.38	56.14**
Motivational CQ	28	5986	0.33	0.41	0.11	0.26	0.56	0.35	0.47	89.91**
Behavioral CQ	27	5026	0.26	0.33	0.09	0.21	0.45	0.27	0.39	59.60**
Cognitive Ability										
Metacognitive CQ	9	1660	0.09	0.08	0.11	−0.06	0.22	−0.03	0.19	21.62**
Cognitive CQ	8	1610	0.09	0.07	0.13	−0.09	0.23	−0.06	0.20	26.65**
Motivational CQ	9	1716	0.01	0.02	0.18	−0.21	0.24	−0.11	0.14	45.54**
Behavioral CQ	8	1610	0.02	0.04	0.00	0.04	0.04	−0.02	0.11	5.77
Emotional Intelligence										
Metacognitive CQ	15	3395	0.45	0.49	0.13	0.33	0.66	0.41	0.58	74.49**
Cognitive CQ	15	3395	0.30	0.32	0.10	0.20	0.45	0.25	0.39	41.79**
Motivational CQ	15	3395	0.46	0.51	0.14	0.33	0.68	0.41	0.60	83.06**
Behavioral CQ	15	3395	0.37	0.41	0.14	0.23	0.59	0.33	0.50	76.64**

Note. *k* = number of correlations; *N* = combined sample size; *r* = mean uncorrected correlation; ρ = estimated true score correlation corrected for measurement error; CV = credibility interval; CI = confidence interval. *Q* = *Q*-statistic for homogeneity in the true score correlations across studies.

** $p < .01$.

* $p < .05$.

Table B4
Meta-analytic population correlations among CQ factors.

						80% CV		95% CI		
CQ Factor	*k*	*N*	*r*	ρ	*SD*ρ	Lower	Upper	Lower	Upper	*Q*
Metacognitive CQ										
Cognitive CQ	115	24,769	0.48	0.56	0.14	0.38	0.74	0.53	0.59	718.53**
Motivational CQ	116	25,413	0.51	0.63	0.15	0.44	0.82	0.60	0.66	844.57**
Behavioral CQ	115	25,201	0.52	0.61	0.16	0.40	0.82	0.58	0.65	997.17**
Cognitive CQ										
Motivational CQ	117	25,640	0.45	0.54	0.15	0.35	0.73	0.51	0.57	760.15**
Behavioral CQ	117	25,459	0.43	0.51	0.12	0.35	0.67	0.48	0.54	542.15**
Motivational CQ										
Behavioral CQ	118	26,091	0.47	0.57	0.15	0.37	0.77	0.54	0.60	843.91**

Note. *k* = number of correlations; *N* = combined sample size; *r* = mean uncorrected correlation; ρ = estimated true score correlation corrected for measurement error; CV = credibility interval; CI = confidence interval. *Q* = *Q*-statistic for homogeneity in the true score correlations across studies.

** $p < .01$.

Table B5
Correlation table from meta-analytic results.

	Variable	1	2	3	4	5
1.	Metacognitive CQ	–				
2.	Cognitive CQ	0.56 (115/24,769)	–			
3.	Motivational CQ	0.63 (116/25,413)	0.54 (117/25,640)	–		
4.	Behavioral CQ	0.61 (115/25,201)	0.51 (117/25,459)	0.57 (118/26,091)	–	
5.	International Experience	0.14 (55/11,934)	0.17 (49/11,060)	0.19 (57/13,330)	0.12 (51/11,534)	–
6.	Extraversion	0.26 (24/4513)	0.17 (24/4513)	0.35 (25/5153)	0.21 (23/4424)	0.11 (12/2947)
7.	Agreeableness	0.20 (17/3486)	0.06 (17/3486)	0.23 (16/3397)	0.18 (16/3397)	0.08 (10/2305)
8.	Conscientiousness	0.22 (19/3634)	0.05 (19/3634)	0.19 (18/3545)	0.16 (18/3545)	0.00 (10/2305)
9.	Emotional Stability	0.10 (18/3818)	0.04 (18/3818)	0.21 (18/4285)	0.04 (17/3729)	0.09 (11/2861)
10.	Openness to Experience	0.40 (28/5115)	0.32 (28/5115)	0.41 (28/5986)	0.33 (27/5026)	0.15 (13/3503)

(*continued on next page*)

Table B5 (*continued*)

	Variable	1	2	3	4	5
11.	Cognitive Ability	0.08 (9/1660)	0.07 (8/1610)	0.02 (9/1716)	0.04 (8/1610)	-0.04 (9/1400)
12.	Emotional Intelligence	0.49 (15/3395)	0.32 (15/3395)	0.51 (15/3395)	0.41 (15/3395)	0.09 (6/1379)
13.	Intercultural Judgment & Decision Making	0.26 (10/2456)	0.20 (10/2456)	0.16 (10/2456)	0.16 (10/2456)	0.08 (6/1100)
14.	Sociocultural Adjustment (self-rated)	0.37 (29/5272)	0.33 (29/5713)	0.49 (35/7113)	0.34 (287/5418)	0.08[f] (19/4073)
15.	Task Performance (observer-rated)	0.31 (13/1953)	0.15 (13/1953)	0.21 (15/2814)	0.38 (14/2342)	0.02[e] (6/938)

	Variable	6	7	8	9
1.	Metacognitive CQ				
2.	Cognitive CQ				
3.	Motivational CQ				
4.	Behavioral CQ				
5.	International Experience				
6.	Extraversion	–			
7.	Agreeableness	0.17[a] (234/135,529)	–		
8.	Conscientiousness	0.00[a] (632/683,001)	0.27[a] (344/162,975)	–	
9.	Emotional Stability	0.19[a] (710/440,440)	0.25[a] (561/415,679)	0.26[a] (587/490,296)	–
10.	Openness to Experience	0.17[a] (418/252,004)	0.11[a] (236/144,205)	−0.06[a] (338/356,680)	0.16[a] (423/254,937)
11.	Cognitive Ability	0.02[b] (61/21602)	0.00[b] (38/11,190)	−0.04[b] (56/15,429)	0.09[b] (61/21,404)
12.	Emotional Intelligence	0.32[h] (26/8479)	0.31[h] (26/8479)	0.38[h] (27/8566)	0.40[h] (26/8479)
13.	Intercultural Judgment & Decision Making	0.04 (4/644)	0.02 (4/644)	0.05 (4/644)	0.05 (4/644)
14.	Sociocultural Adjustment (self-rated)	0.29[c] (12/1865)	0.16[c] (4/533)	0.22[c] (6/862)	0.32[c] (6/923)
15.	Task Performance (observer-rated)	0.09[g] (56/9664)	0.07[h] (56/9702)	0.21[g] (64/12,434)	0.11[g] (53/9184)

	Variable	10	11	12	13	14
1.	Metacognitive CQ					
2.	Cognitive CQ					
3.	Motivational CQ					
4.	Behavioral CQ					
5.	International Experience					
6.	Extraversion					
7.	Agreeableness					
8.	Conscientiousness					
9.	Emotional Stability					
10.	Openness to Experience	–				
11.	Cognitive Ability	0.22[b] (46/13,182)	–			
12.	Emotional Intelligence	0.29[h] (26/8479)	0.00[h] (16/2158)	–		
13.	Intercultural Judgment & Decision Making	0.33 (4/644)	0.20 (7/1600)	0.04 (3/1093)	–	
14.	Sociocultural Adjustment (self-rated)	0.29[c] (9/1267)	0.02 (4/1,143)	0.53 (5/1506)	0.07 (3/1093)	–
15.	Task Performance (observer-rated)	0.06[h] (48/7797)	0.44[g] (425/32,124)	0.23[h] (7/835)	0.52 (4/507)	0.17[f] (9/1708)

Note. Table contents: r_c *(k/N)*. r_c = corrected population correlation. k = number of correlations; N = combined sample size. Correlations of observer-rated task performance with emotional intelligence, Big Five traits, and cognitive ability were also corrected for range restriction.

[a] Ones (1993).
[b] Judge, Jackson, Shaw, Scott, and Rich (2007).
[c] Wilson, Ward, and Fischer (2013).
[e] Mol, Born, Willemsen, and Van der Molen (2005).
[f] Bhaskar–Shrinivas et al. (2005).
[g] Joseph, Jin, Newman, and O'Boyle (2015).
[h] Joseph and Neuman (2010).

Table B6
Meta-analytic population correlations between overall CQ and intercultural effectiveness outcomes.

						80% CV		95% CI		
Outcome	k	N	r	ρ	SDρ	Lower	Upper	Lower	Upper	Q
Intercultural Judgment & Decision Making	–	–	–	–	–	–	–	–	–	–
Sociocultural Adjustment	21	4357	0.46	0.57	0.21	0.31	0.84	0.47	0.68	231.14**
Psychological Well-Being	21	5061	0.29	0.32	0.30	−0.06	0.70	0.21	0.44	355.41**
Task Performance	28	5479	0.32	0.40	0.16	0.19	0.61	0.32	0.47	158.69**
Citizenship Performance	8	1428	0.35	0.40	0.20	0.15	0.65	0.22	0.58	62.19**
Adaptive Performance	3	552	0.30	0.41	0.00	0.41	0.41	0.31	0.50	1.44
Leadership Performance	13	3322	0.33	0.46	0.24	0.16	0.77	0.36	0.57	184.17**

Note. k = number of correlations; N = combined sample size; r = mean uncorrected correlation; ρ = estimated true score correlation corrected for measurement error; CV = credibility interval; CI = confidence interval. Q = Q-statistic for homogeneity in the true score correlations across studies.

** $p < .01$.

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