Reviewing Half a Century of Measuring Cross-Cultural Competence: Aligning Theoretical Constructs and Empirical Measures

By: Nicole Franziska Richter, Christopher Schlaegel, Vasyl Taras, Ilan Alon, Allan Bird

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Abstract:

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Keywords: cross-cultural competence | cultural intelligence | intercultural competence | global mindset | multicultural personality | measurement | systematic review

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Reviewing half a century of measuring cross-cultural competence: Aligning theoretical constructs and empirical measures

Nicole Franziska Richter [a,*], Christopher Schlaegel [b], Vasyl Taras [c], Ilan Alon [d,e], Allan Bird [f]

[a] University of Southern Denmark, Campusvej 55, 5230 Odense, Denmark
[b] Otto von Guericke University Magdeburg, Universitätsplatz 2, 39106 Magdeburg, Germany
[c] University of North Carolina at Greensboro, 516 Stirling Street, Greensboro, NC 27402, USA
[d] University of Ariel, Ramat Hagolan St. 65, Ariel 40700, Israel
[e] University of Agder, Gimlemoen 19, 9i 241, 4604 Kristiansand, Norway
[f] Goa Institute of Management Poriem, Sattari, Goa 403505, India

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ABSTRACT

We provide a comprehensive review of how cross-cultural competence (CCC) has been measured over the past half-century in order to more closely align theoretical constructs and empirical measures. Based on a content analysis of 68 academic and commercial CCC instruments and a supplemental survey of 160 experts, we review the approaches used in these instruments to conceptualize and quantify CCC, discuss their limitations, and recommend best practices and directions for future researchers and practitioners when selecting and using CCC instruments or developing new alternatives.

1. Introduction

Cross-cultural collaboration has increased dramatically in recent years (e.g., Richter et al., 2020). Surveys indicate that almost 90% of corporate employees in OECD countries have completed work in international teams (CultureWizard, 2018). At the same time, firms face growing nationalism that influences collaboration with their international business partners (Ghauri et al., 2021). In this context, individuals require what is referred to as cross-cultural competence (CCC), cultural intelligence (CQ), a global mindset (GM), or multicultural efficacy (to name a few terms, e.g., Taras, 2020). The relevance of these concepts is without debate in management research (e.g., Holzmüller & Stöttinger, 2001). Indeed, there is a substantial body of empirical research (Rockstuhl & Van Dyne, 2018; Schlaegel et al., 2021; Yari et al., 2020), showing that CCC and related constructs have positive associations with outcomes such as expatriation (Engle et al., 2015; Richter et al., 2020), negotiation performance (Imai & Gelfand, 2010), job and team performance (Ang et al., 2007; Richter et al., 2021), and global leadership (Alon & Higgins, 2005). Accordingly, there are a large variety of measurement instruments that have been developed that we review and evaluate in this study.

Our review includes instruments designed to measure the underlying individual characteristics and competencies that promote effective or superior performance in cross-cultural settings (Boyatzis, 1982; Spencer & Spencer, 1993), regardless of their label. To avoid listing a complete set of possible labels, we use the term "cross-cultural competence" (CCC) as an overarching term throughout the paper and for the entire nomological network (in line with Johnson et al., 2006; Matsumoto & Hwang, 2013).

The existing literature on instruments to measure CCC suffers from ambiguity that relates to their theoretical meaning, empirical meaning, and the alignment between the two. A construct's theoretical meaning is reflected in a concise definition of the construct itself and of possible subdimensions. If a construct is multidimensional, then it is important to also define the nature of the relationship between the subdimensions and the construct. For instance, are the subdimensions manifestations of the construct or defining characteristics? In developing measurement instruments, an implicit empirical meaning is created that should adequately cover a construct's theoretical meaning (Bagozzi, 2011). Failing to adequately define and align these meanings leads to several problems (MacKenzie et al., 2011). First, it sows confusion about what the construct does and does not refer to, as well as confusion about the similarities and differences between it and other constructs in the field. Second, the constructs' subdimensions are contaminated because there

* Corresponding author.
E-mail address: nicole@sam.sdu.dk (N.F. Richter).

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is overlap with other constructs in the field. Third, this lack of alignment leads to inconsistent conclusions about the constructs' associations with outcomes and antecedents.

Regarding the first problem, several efforts have sought to clarify the conceptualization and nomological network of CCC and their theoretical meaning (Andresen & Bergdolt, 2017; Gertsen, 1990; Johnson et al., 2006; Leung et al., 2014; Levy et al., 2007; Ng & Earley, 2006; Spitzberg & Chagnon, 2009). Due to these efforts, some progress has been achieved in differentiating between the three most commonly used constructs in the international business and management literature: CCC, CQ, and GM (Yari et al., 2020). While all three constructs refer to the ability to function effectively in cross-cultural environments, GM is understood as distinct due to its stronger focus on mastering global management and business challenges (Andresen & Bergdolt, 2017). CCC is distinct from CQ because of its stronger focus on communication and its incorporation of personality traits (Gertsen, 1990; Johnson et al., 2006; Leung et al., 2014). Finally, as a construct that developed from the intelligence literature, CQ often focuses on capabilities (Leung et al., 2014). However, reviewing the corresponding measurement instruments that purport to translate the meaning of the theoretical construct into empirical meaning, we find that these distinctions are not actually reflected at the empirical level. For instance, there are instruments for measuring CCC that do not incorporate communication or personality traits (e.g., Byram, 1997; Suarez-Balcazar et al., 2011). Second, some studies introducing measurement instruments do not provide a definition of the theoretical constructs that they aim to measure. In addition, the majority of studies do not define how subdimensions align with their constructs or to each other (e.g., in the form of a higher-order abstraction or an aggregate; see Law et al., 1998). Third, the definitions of the conceptual subdimensions of constructs suffer from a lack of agreement on a common language. Scholars use different terms for constructs or dimensions that they define similarly. For example, Javidan et al. (2010) present a subdimension they label "cosmopolitan outlook,[1]" while Kupka et al. (2011) introduce a dimension they call "cultural affinity." However, both dimensions have essentially the same definition.

With regard to the contamination of constructs, our review demonstrates that there is a lack of precision and an absence of universal agreement on the boundaries of what specific instruments measure. For instance, in some models, efficacy is one of several dimensions comprising CQ (e.g., in the model of Van Dyne et al., 2012, which also involves metacognition). In others, it is the construct itself (e.g., Jeffreys & Dogan, 2012), which then includes subdimensions such as metacognition that are also used to measure CQ.

Finally, with respect to the third problem, there are barriers to the accumulation of knowledge about the outcomes and antecedents of similar subdimensions used to measure different constructs. Researchers studying specific constructs (e.g., CQ or CCC) rarely acknowledge findings derived from studies using other constructs, even though the instruments employed in those studies use the same subdimensions and try to explain the same outcomes, such as expatriation intentions. Consequently, as bibliometric studies and meta-analyses have shown, research remains divided based on measurement instruments (Rockstuhl & Van Dyne, 2018; Schlaegel et al., 2021; Yari et al., 2020). Hence, confusion around constructs and their subdimensions has made it difficult for scholars to locate related publications and compare findings. This obstacle impedes scientific progress (Pfeffer, 1993) as it creates barriers to the integration and synthesis of research and to the understanding of the underlying mechanisms that explain associations.

Ultimately, these problems are a major hindrance to creating a solid understanding of CCC's emergence, consequences, and even meaning. It is in this area that our study makes a contribution. We seek to resolve these three problems by providing an in-depth comparative review of 68 CCC measurement instruments. We review the steps in the development of the instruments, which includes a systematic review of the definition of the constructs and their subdimensions. We utilize a conceptual coding framework to identify dimensions that are defined consistently, even though they use different terminologies. For example, we subsumed the above mentioned (sub)dimensions "cosmopolitan outlook" and "cultural affinity" under the subdomain[2] "cosmopolitanism." We review the nature of the relationship between the construct and its subdimensions and discuss whether it is reflected at the measurement level. Finally, we review the statistical properties of the instruments such as their reliability, internal and external validity. Consequently, we help promote the measurement of CCC and provide a reciprocal feedback loop for the conceptualization of constructs, working back from the empirical to the theoretical (Bagozzi, 2011). Reviewing the existing knowledge about constructs and subdimensions that share a meaning and the research on constructs and subdimensions that are theoretically and empirically distinct can help resolve conflict and confusion in many areas of research on cross-cultural interactions.

Previously, Matsumoto and Hwang (2013) reviewed 10 CCC instruments, Bücker and Poutsma (2010) four, and Chen and Gabrenya (2021), five. However, these studies did not systematically review the instruments' theoretical and empirical meaning. Hence, we believe our review to be the first to demonstrate: how existing CCC instruments overlap and contrast with one another, whether different scales can be meaningfully compared, and whether the content of CCC instruments accurately reflects the conceptualization of the underlying constructs. Hence, our contribution to the CCC literature is in: 1) comparing and contrasting the conceptual and empirical meaning of the CCC constructs and subdimensions in measurement instruments, 2) evaluating the instruments' reliability and validity, 3) providing an overview of the relevance of constructs and subdimensions, 4) highlighting best practices and remaining limitations in measuring CCC; and 5) outlining recommendations for future research.

2. Review approach

2.1. Literature search

The goal of our literature search was to locate all resources that provide descriptions of CCC measurement instruments, including academic publications, user manuals, or other supporting documentation on the use of CCC instruments. First, we searched databases of academic literature, starting with Google Scholar, followed by ABI/Inform Global, EBSCO, Proquest, Science Direct, Scopus, and Web of Science. We used a set of keywords and combinations of keywords (as suggested in Andresen & Bergdolt, 2017) comprising: 1) cultural, cross-cultural, intercultural, global, and 2) intelligence, competence, competency, competencies, and mindset. Second, we complemented this search by examining earlier reviews of CCC measures (e.g., Matsumoto & Hwang, 2013). Third, we complemented the database search with an issue-by-issue review of journals identified as relevant outlets in previous studies (see Ott & Michailova, 2018; Schlaegel et al., 2021; Yari et al., 2020). The latter included organizational behavior/human resource journals (e.g., *Organizational Behavior and Human Decision Processes*, *Journal of Organizational Behavior*), international management/international business journals (e.g., *Journal of World Business, Journal of International Business Studies*), management journals (e.g., *Group and Organization Management*), education journals (e.g., *Academy*

[1] In their study, they initially called this subdimension cosmopolitan attitude, but renamed it cosmopolitan outlook during the process of developing their scale.

[2] The term (sub)dimension refers to the (sub)dimensions that authors outline as part of their measurement instrument. The term (sub)domain refers to a bundle of (sub)dimensions that we coded as belonging to a specific content domain.

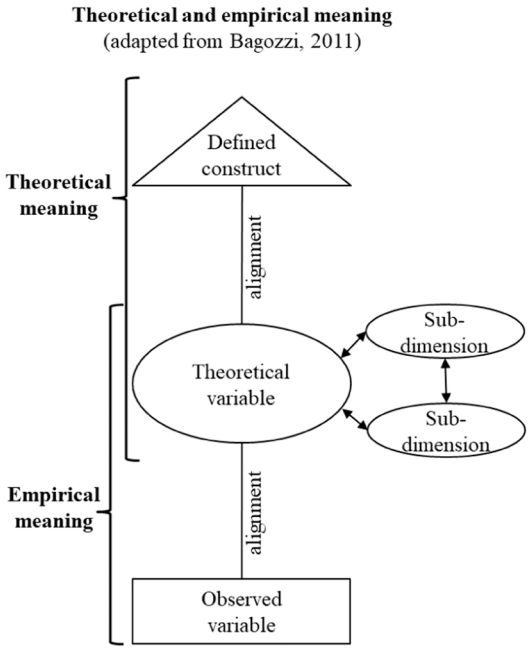
of Management Learning and Education), and psychology journals (e.g., *Journal of Applied Psychology*). Fourth, we checked the references of the articles in our initial pool for links to additional, relevant publications. Books (e.g., Ang & Van Dyne, 2008), literature reviews (e.g., Andresen & Bergdolt, 2017), and meta-analytic studies of research on CCC (e.g., Rockstuhl & Van Dyne, 2018) that referenced other publications were of particular interest. Fifth, we used Google Scholar's "cited by" function to find links to more recent research. Lastly, we reached out to colleagues, via the mailing lists of the Academy of International Business and the International Management Division of the Academy of Management, for information on other instruments that measure CCC. Overall, this procedure ensured that our search covered and included the relevant contributions from psychology and education, recent and older publications, and conference presentations, books and book chapters, publications in lesser-known journals, and unpublished studies.

2.2. Instrument selection

Initially, we discovered 105 CCC instruments. We applied the following inclusion/exclusion criteria to limit our scope to a collection of instruments that target the same criterion and provide a basis for comparison. First, we included instruments that measure competency as a trait, attitude, worldview, or capability. We were guided by the definition of competencies as characteristics that lead to effective or superior performance (Boyatzis, 1982; Spencer & Spencer, 1993) applied in a cross-cultural context. In addition, we followed the framework of Leung et al. (2014), which assigned competencies to three domains: personality traits (as underlying, deep, and enduring individual characteristics), attitudes and worldviews, and capabilities (including motivations as a reason for performance or behaviors). With this framework in mind, we excluded instruments that measure only antecedent factors, such as international experiences (e.g., Douthitt et al., 1999) or identity (e.g., Shokef & Erez, 2008), as well as instruments that directly measure outcomes such as job performance in intercultural settings (e.g., Hawes & Kealey, 1981). Second, we focused on instruments that measure CCC at the individual level. Therefore, we excluded instruments that measure CCC at the organizational level, such as firm-level CQ (Ang & Inkpen, 2008). Third, we excluded instruments that were designed for one-time use, meaning they were designed specifically for use with a single, distinctive population and/or for a single setting or purpose. Such instruments are often combinations or adaptations of existing instruments, such as Williams (2005). Fourth, we excluded instruments that focus on specific contexts, because they cannot be easily compared with other instruments. Examples include instruments specifically related to the nursing/healthcare context with items about medical aspects or about the doctor-patient relationship, such as Campinha-Bacote (1999). Finally, we excluded instruments for which available information was too limited to perform an in-depth evaluation. This was the case, for example, with commercial instruments which, for proprietary reasons, did not disclose information regarding their psychometric properties (e.g., KnowledgeWorkx, no date). After applying these filtering procedures, our sample consisted of 68 instruments for review.

2.3. Coding

Following recommendations from Gaur and Kumar (2018), we developed a coding protocol to structure the results while reducing researcher bias. Two members of our author team with an in-depth knowledge of the CCC literature independently coded the instruments' characteristics and content based on the study that reports about the development of the instrument. Fig. 1 illustrates our coding framework and its conceptual background. We first coded information that relates to the development of the theoretical meaning, including the definitions of the constructs and (sub)dimensions and how they were developed. Second, we coded information that relates to the development of the empirical meaning. This includes the identification of the most relevant (sub)dimensions, and the development of measurement approaches that reflect the conceptual idea of the associations between the (sub)dimensions and the construct. Finally, we coded information that relates to the scale's attributes (e.g., number of items), purification procedures,



Core steps in instrument development (adapted from MacKenzie et al. 2011)	Our coding framework
Step 1	Coding of…
Definition of the construct and subdimensions (based on: review of research/theory); definition how the subdimensions are associated with the construct and each other	- definitions of the construct, and (sub)dimensions into domains - development base: Theory and literature review - defined association between (sub)dimensions and construct
Step 2	Coding of…
Development of empirical meaning and measures (incl. research with experts/ practitioners to identify key attributes); conceptualization of measurement approaches (e.g., abstraction/aggregate)	- procedures to develop empirical meaning: involvement of experts/practitioners - the form of multidimensional construct
Step 3	Coding of…
Scale refinement and instrument validation; reliability and validity assessments	- core attributes: who answers, scaling, number/ form of items (general/criterion-related) - refinement of items, dimensions - assessment sample characteristics - reliability, validity (convergent, discriminant, predictive), measurement invariance

Note: We use the term *criterion* to denote the target construct that an instrument aims to measure (e.g., effectiveness). We use the term *(sub)dimension* to denote a distinct aspect that authors outline as part of their measurement instrument (e.g., on the 20-item CQ scale, motivational CQ or behavioral CQ). We use the term *content domain* to denote a bundle of dimensions that we coded as belonging to a specific content domain, building on two frameworks that we introduce in more detail later.

Fig. 1. Our coding framework and its conceptual background.

and statistical properties including reliability and validity, and how and where they were tested.

In addition to being more comprehensive in scope, a core contribution that our review provides above and beyond existing reviews is that we code the empirical meaning inherent in the measurement instruments. Typically, authors introducing a new instrument outline the various dimensions captured by the instrument (referred to by the authors as facets, subdimensions, factors, or components). For instance, the 20-item Cultural Intelligence Scale (CQS) by Ang et al. (2007) comprises four dimensions: cognitive CQ, metacognitive CQ, motivational CQ, and behavioral CQ. To clarify and understand the content of the dimensions, we referred to the authors' definitions. If no definition was available, we reviewed the measurement items to arrive at an understanding of the dimensions' content. Hence, when coding the CCC dimensions, we primarily referred to the authors' definitions of individual CCC dimensions. We used the measurement items to determine the definitions if none were provided.

We referred to two existing categorizing schemes to structure the dimensions and analyze their use in different instruments. First, we adopted the organizing scheme of Leung et al. (2014), who presented a widely used classification of traits, attitudes/worldviews, and capabilities. Second, to enable a fine-grained coding of the meaning that is implicit in the variety of dimensions of measurement instruments, we used the framework of Bird and colleagues (Bird, 2013; Bird et al., 2010; Bird et al., 2019). They delineated the content domain of CCC from a conceptual perspective and proposed three broader content domains of CCC (perception management, relationship management, and self-management). Their framework proved to be useful in the field of global leadership and was acknowledged as "promising because of its comprehensiveness" in the field of CCC (Leung et al., 2014). The model comprises traits (e.g., openness), attitudes and worldviews (e.g., multicultural attitude), and capabilities (e.g., social/behavioral flexibility), and assigns them to three broader and 17 specific content domains (or subdomains). This approach complements the Leung et al. (2014) framework by presenting an orthogonal (but not contradictory) point of view (see Fig. 2). The 17 subdomains reflected the identified dimensions quite well. The dimensions that did not fit into the outlined domains were subject to an open coding process. We grouped the dimensions that appeared more often into five additional domains that we added to the initial framework.

The average intercoder agreement across the various coded aspects – measured by Cohen's kappa (Cohen, 1960) – was 0.81, which is above the recommended 0.70 threshold. Disagreements between the coders mainly related to the coding of dimensions and were resolved by discussing them with a third member of the author team.

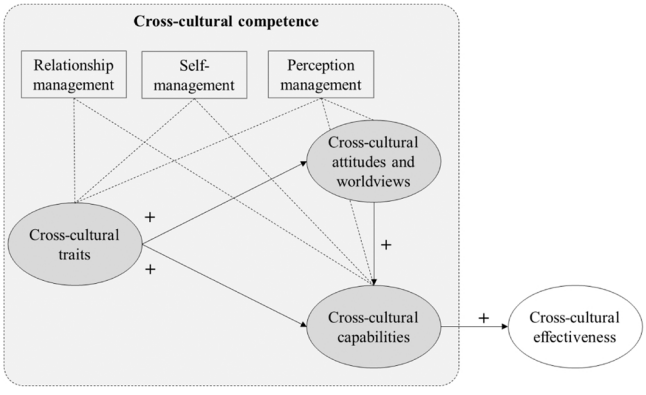


Fig. 2. A general framework of intercultural effectiveness.
Adapted from: Leung et al. (2014, p. 489) and the classification in (Bird et al., 2019).

2.4. Expert survey

As outlined in MacKenzie et al. (2011), researchers who develop a measurement instrument need to "…examine how the focal construct has been defined in prior research, and to conduct interviews with practitioners and/or subject matter experts. […] The goal in conducting interviews […] is to identify the key aspects […] of the construct's domain" (MacKenzie et al., 2011, p. 298). To evaluate the key aspects of the construct's domain along with all of the (sub)domains included in the different measurement instruments, we surveyed CCC experts and practitioners. While researchers may have used expert surveys when developing their individual scales, our survey provided us with a comparative overview of the relevance of all of the subdomains identified above and beyond single instruments. In addition, we asked the respondents about their use and expected future use of specific instruments. In this way, the expert survey provides a robustness check of our review's findings and complements the conceptual assessment of content domains.

Subject matter experts were recruited via personal contacts, professional mailing lists, and expert lists provided in prior studies (Yari et al., 2020). Although we anonymized their responses, we first asked them a series of questions about their publications in peer-reviewed journals, books, and practitioner-oriented periodicals, and teaching in the field of CCC to confirm the level of their expertise. Respondents answered these questions on a five-point Likert scale ranging from 1 = "no/none" to 5 = "more than 5." Of the initial pool of 175 respondents, we excluded 15 who had no publications or ongoing research projects with CCC instruments (as a demonstration of their expertise), leaving a final sample of 160 experts. We split this sample into business practice experts (typically managers or HR specialists in international companies with expertise and experience in CCC-related training and consulting), academic experts (typically university faculty), and key academic experts (i.e., with a knowledge of a large number of constructs and a large number of publications in the subject area). Appendix 1 summarizes the sample's characteristics.

Our questionnaire included questions about the unaided and aided awareness of measurement instruments and questions about their past, present, and future use. While citation statistics mainly document the past use of instruments, which may be driven by the same set of authors, this approach provided us with additional forward-looking insight into the usage intentions of various stakeholder groups. Furthermore, participants were presented with a list of dimensions/content domains, including their definitions (identified by our content analysis of instruments). We asked them to indicate the perceived relevance of each dimension in measuring CCC and the relevance of each dimension in the cross-cultural business context on a seven-point Likert scale ranging from 1 = "not relevant at all" to 7 = "highly relevant." Then, we asked them an open-ended question about the absence of relevant CCC dimensions to help us evaluate the comprehensiveness of our review. Finally, the participants evaluated and commented on the conceptualization of CCC.

3. Conceptualization, dimensionality, and development of instruments

Our final database included 68 CCC instruments, of which 58 were published in peer-reviewed journals or conference proceedings. Although the use of these instruments was unrestricted, some were limited to education and research purposes (Ang et al., 2007; Bartel-Radic & Giannelloni, 2017; Javidan et al., 2017; Mumford, 1998; Van Dyne et al., 2012). The remaining 10 were commercial instruments (developed by consulting companies that were mainly founded by academics). Tables 1a-1m provide a detailed overview of all of the instruments and is organized along the main steps of the instrument development process (as depicted in Fig. 1).

Table 1a
An overview of the CCC measurement instruments (1/1).

				Step I scale development						Step II scale development		
Reference	**Instrument label**	**Instrument label category**	**Purpose**	**Core criteria categorization based on the instrument definition**	**(Sub)domain(s) covered,abbreviated labels** Bird et al. (2010)	**Domain(s) covered** Leung et al. (2014)	**Literature reviewed**	**Theoretical basis**	**Relation of dimensions with construct/ each other**	**Subject experts**	**Focus group**	**Concept-ualization**
(Adair et al., 2009)	Intercultural Communication Edge (ICE)[A]	IC	Recruitment/ Selection/ Research	NIA	Communication ability	Capabilities	NIA	NIA	NIA/NIA	NIA	NIA	Individual dimensions scores
(Alon et al., 2016)	Business Cultural Intelligence Quotient (BCIQ)[A]	CQ	Assessment (Self)	Cross-cultural success	Cultural knowledge, cultural metacognition, cross-cultural motivation, communication ability	Capabilities	Yes	Yes	Yes/No	Yes	No	Aggregate model
(Ang et al., 2007)	Cultural Intelligence Scale (CQS)[A]	CQ (FME)	Assessment (Self)	Function/engage/ interact effectively, manage/lead effectively	Cultural knowledge, cultural metacognition, cross-cultural motivation, social behavioral flexibility	Capabilities	Yes	Yes	Yes/Yes	Yes	Yes	Aggregate model
(Van Dyne et al., 2008)	Cultural Intelligence Scale (CQS) Observer Report[A]	CQ (FME)	Recruitment/ Selection/ Research	Function/engage/ interact effectively, manage/lead effectively	Cultural knowledge, cultural metacognition, cross-cultural motivation, social behavioral flexibility	Capabilities	Yes	Yes	Yes/Yes	Yes	Yes	Aggregate model
(Ang & Van Dyne, 2008)	Mini-Cultural Intelligence Scale (CQS)[A]	CQ (FME)	Assessment (Self)	Function/engage/ interact effectively, manage/lead effectively	Not applicable	Capabilities	NIA	NIA	NIA/ NIA	NIA	NIA	Aggregate model
(Bartel-Radic & Giannelloni, 2017)	Cross-cultural Competence (CCC)[A]	CCC	Assessment (Self)	Assess/understand intercultural situations accurately, adapt/ adjust	Open-mindedness, acceptance of risk, ethnocentrism vs. ethnorelativism, cultural knowledge, diverse other (PM), cross-cultural motivation, emotional sensitivity, communication ability, self-confidence, emotional resilience	Traits/ attitudes/ capabilities	Yes	No	Yes/Yes	Yes	No	Individual dimensions scores
(Bhawuk & Brislin, 1992)	Intercultural Sensitivity Inventory (ICSI)[A]	IS	Assessment (Self)	No definition	Open-mindedness, social behavioral flexibility, diverse other	Traits/ capabilities	Yes	Yes	Yes/No	No	No	Aggregate model
(Braskamp et al., 2014)	Global Perspective Inventory (GPI)[A]	CC-OA/GO	Assessment (Self)	Assess/understand intercultural situations accurately, readiness/ openness to interact/to others	Cultural knowledge, interpersonal engagement, emotional sensitivity, self-identity	Traits/ capabilities	Yes	Yes	Yes/No	Yes	Yes	Individual dimensions scores

Note: CC-A/A = cross-cultural adaptability/adjustment. CC-OA/GO = cross-cultural open attitude/global orientation, CC-SE = cross-cultural self-efficacy, FME = function and manage effectively in cross-cultural situations. GL = global leadership. GM = global mindset. IC = intercultural communication. IE = intercultural effectiveness. IR = intercultural readiness. IS = intercultural sensitivity. MP = multicultural personality. NIA = no information available.

Table 1b
An overview of the CCC measurement instruments (1/2).

				Step I scale development						Step II scale development		
Reference	**Instrument label (A = academic, C = corporate)**	**Instrument label category**	**Purpose**	**Core criteria categorization based on the instrument definition**	**(Sub)domain(s) covered, abbreviated labels** Bird et al. (2010)	**Domain(s) covered** Leung et al. (2014)	**Literature reviewed**	**Theoretical basis**	**Relation of dimensions with construct/ each other**	**Subject experts**	**Focus group**	**Concept-ualization**
(Brinkmann & Van Weerdenburg, 2019)	Intercultural Readiness Check[C]	Diverse other: IR	Assessment (Self) Recruitment/ Selection/	No definition	Open-mindedness, multicultural attitude, acceptance of risk, cultural metacognition, interpersonal engagement, interaction management, social behavioral flexibility, communication ability, diverse other (RM), creativity	Traits/ attitudes / capabilities	NIA	NIA	NIA/NIA	NIA	NIA	Individual dimensions scores
(Briones et al., 2009)	Cultural Self-efficacy Scale for Adolescents (CSES-A)[A]	CC-SE/FME	Assessment (Self)	Function/engage/ interact effectively	Self-confidence	Traits	Yes	Yes	Yes/No	No	No	Aggregate model
(Byram, 1997)	Intercultural Communicative Competence (ICC) Model[A]	CCC	Recruitment/ Selection/ Research	No definition	Multicultural attitude, cultural knowledge, cultural metacognition	Attitudes /capabilities	NIA	NIA	NIA/NIA	NIA	NIA	Individual dimensions scores
(Byram et al., 2014)	The INCA project (Intercultural Competence Assessment)[A]	CCC	Recruitment/ Selection/ Research	No definition	Acceptance of risk, cultural knowledge, emotional sensitivity, respectfulness, social behavioral flexibility, communication ability	Traits/ capabilities	NIA	NIA	NIA/NIA	NIA	NIA	Individual dimensions scores
(Caligiuri et al., 2000)	Attitudinal and Behavioral Openness Scale (ABOS)[A]	CC-OA/GO	Assessment (Self)	Function/engage/ interact effectively	Cosmopolitanism, cultural metacognition, interpersonal engagement, diverse other	Attitudes /capabilities	Yes	No	No/No	No	Yes	Unclassified
(Chen & Starosta, 2000)	Intercultural Sensitivity Scale[A]	IS	Assessment (Self)	Intercultural sensitivity	Relationship interest, interpersonal engagement, respectfulness, self-confidence	Traits/ capabilities	Yes	No	Yes/No	No	No	Aggregate model
(Clarke, 2000)	Global Leadership Assessment[A]	GL	Recruitment/ Selection/ Research	Global leadership/ work effectively	Interaction management, communication ability, diverse other (RM), self-confidence, diverse other (SM), diverse other	Traits/ capabilities	NIA	NIA	NIA/NIA	NIA	NIA	Individual dimensions scores
(Cornelius et al., 2004)	Consumer-Based Cultural Competency Inventory[A]	CCC	Recruitment/ Selection	Other	Multicultural attitude, ethnocentrism vs. ethnorelativism, cultural knowledge, respectfulness, language ability, diverse other	Attitudes /capabilities	Yes	No	Yes/No	Yes	No	Aggregate model
(Crano & Crano, 1993)	Inventory of Student Adjustment Strain (ISAS)[A]	CC-A/A	Assessment (Self)	Adaptability/ adjustment	Stress ability	Traits	NIA	NIA	NIA/NIA	NIA	NIA	Aggregate model/Score on overall ISAS

Note: CC-A/A = cross-cultural adaptability/adjustment. CC-OA/GO = cross-cultural open attitude/global orientation, CC-SE = cross-cultural self-efficacy, FME = function and manage effectively in cross-cultural situations. GL = global leadership. GM = global mindset. IC = intercultural communication. IE = intercultural effectiveness. IR = intercultural readiness. IS = intercultural sensitivity. MP = multicultural personality. NIA = no information available.

Table 1c
An overview of the CCC measurement instruments (1/3).

				Step I scale development						Step II scale development		
Reference	**Instrument label (A = academic, C = corporate)**	**Instrument label category**	**Purpose**	**Core criteria categorization based on the instrument definition**	**(Sub)domain(s) covered,abbreviated labels** Bird et al. (2010)	**Domain(s) covered** Leung et al. (2014)	**Literature reviewed**	**Theoretical basis**	**Relation of dimensions with construct/ each other**	**Subject experts**	**Focus group**	**Concept-ualization**
(Evelina Ascalon et al., 2008)	Cross-Cultural Social Intelligence (CCSI)[A]	CQ	Assessment (Self)	No definition	Ethnocentrism vs. ethnorelativism, emotional sensitivity	Traits/attitudes	Yes	Yes	Yes/No	Yes	Yes	Unclassified
(Fantini & Tirmizi, 2006)	Intercultural Competence (ICC)[A]	CCC	Assessment (Self)	No definition	Multicultural attitude, cultural knowledge, diverse other	Attitudes /capabilities	Yes	No	Yes/No	No	No	Unclassified
(Fantini, 2000)	Intercultural Competence (ICC): A YOGA Form[A]	CCC	Assessment (Self)	No definition	Multicultural attitude, cultural knowledge, language ability, diverse other	Attitudes-/capabilities	Yes	No	Yes/No	No	No	Unclassified
(Guyton & Wesche, 2005)	Multicultural Efficacy Scale (MES)[A]	CC-SE	Assessment (Self)	Function/engage/ interact effectively	Multicultural attitude, self-confidence, diverse other	Traits/attitudes	Yes	Yes	Yes/No	No	No	Unclassified
(Hammer, Bennett, & Wiseman, 2003)	Intercultural Development Inventory (IDI)[A]	IS	Assessment (Self)	Assess/understand intercultural situations accurately	Ethnocentrism vs. ethnorelativism	Attitudes	Yes	Yes	Yes/No	Yes	Yes	Unclassified
(Hett, 1993)	Global mindedness scale	CC-OA/GO, GM	Assessment (Self)	Other	Cosmopolitanism, category inclusiveness, ethnocentrism vs. ethnorelativism, diverse other (RM), self-confidence	Traits/ attitudes	Yes	Yes	Yes/No	Yes	Yes	Aggregate model
(Hobman et al., 2004)	Group Openness to Diversity Scale[A]	CC-OA/GO	Recruitment/ Selection/ Research	Communicate effectively	Open-mindedness	Traits	Yes	Yes	Yes/No	No	No	Individual dimensions scores
(Holcomb-McCoy & Day-Vines, 2004)	Multicultural Counseling Competence and Training Survey-Revised (MCCTS-R)[A]	Divers other	Assessment (Self)	No definition	Multicultural attitude, cultural knowledge	Attitudes /capabilities	Yes	No	Yes/No	No	No	Unclassified
(Javidan et al., 2017)	Global Orientation Scale[A]	CC-OA/GO	Assessment (Self)	Assess/understand intercultural situations accurately, reduced anxiety/ comfort/positive emotion	Interpersonal engagement, self-confidence	Traits/ capabilities	Yes	Yes	Yes/No	Yes	Yes	Aggregate model
(Javidan et al., 2010)	Global Mindset Inventory[A]	CC-OA/GO, GM	Assessment (Self)	Manage/lead effectively, influence others	Cosmopolitanism, curiosity, cultural knowledge, global business savvy, interpersonal engagement, emotional sensitivity, diplomacy, self-confidence, diverse other	Traits/ attitudescapabilities	Yes	Yes	Yes/No	Yes	Yes	Aggregate model

Note: CC-A/A = cross-cultural adaptability/adjustment. CC-OA/GO = cross-cultural open attitude/global orientation, CC-SE = cross-cultural self-efficacy, FME = function and manage effectively in cross-cultural situations. GL = global leadership. GM = global mindset. IC = intercultural communication. IE = intercultural effectiveness. IR = intercultural readiness. IS = intercultural sensitivity. MP = multicultural personality. NIA = no information available.

Table 1d
An overview of the CCC measurement instruments (1/4).

				Step I scale development						Step II scale development		
Reference	**Instrument label (A = academic, C = corporate)**	**Instrument label category**	**Purpose**	**Core criteria categorization based on the instrument definition**	**(Sub)domain(s) covered, abbreviated labels** Bird et al. (2010)	**Domain(s) covered** Leung et al. (2014)	**Literature reviewed**	**Theoretical basis**	**Relation of dimensions with construct/ each other**	**Subject experts**	**Focus group**	**Concept-ualization**
(Jeffreys & Dogan, 2012)	Transcultural Self-Efficacy Tool[A]	CC-SE	Assessment (Self)	No definition	Cultural metacognition, self-awareness, self-confidence	Traits/ capabilities	Yes	Yes	Yes/No	Yes	No	Aggregate model
(Kefalas & Neuland, 1997)	Global Mindset[A]	CC-OA/GO, GM	Unclear	Adapt/adjust, readiness/ openness to interact/to others	Multicultural attitude, social behavioral flexibility	Attitudes /capabilities	Yes	No	Yes/No	No	No	Unclassified
(Kelley & Meyers, 1987)	Cross-Cultural Adaptability Inventory (CCAI)[A]	CC-A/A	Assessment (Self)	Cross-cultural success	Cultural metacognition, social behavioral flexibility, self-identity, emotional resilience	Traits/ capabilities	NIA	NIA	NIA/NIA	NIA	NIA	Individual dimensions scores
(Kets de Vries, 2004)	Global Executive Leadership Inventory (GELI)[A]	GL	Recruitment/ Selection/ Research	No definition	Interaction management, diverse other (RM), self-confidence, stress ability, stress management, diverse other	Traits/ capabilities	Yes	Yes	Yes/No	No	Yes	Individual dimensions scores
(Koester & Olebe, 1988)	The Behavioral Assessment Scale for Intercultural Communication (BASIC) Effectiveness[A]	IC	Assessment (Self)	Communicate effectively	Nonjudgmentalness, acceptance of risk, ethnocentrism vs. ethnorelativism, interpersonal engagement, interaction management, emotional sensitivity, respectfulness, self-confidence	Traits/ attitudes /capabilities	Yes	Yes	Yes/No	No	No	Unclassified
(Kupka et al., 2011)	Intercultural Affinity Scale (IAFFS)[A]	CC-OA/GO	Recruitment/ Selection	No definition	Cosmopolitanism (C)	Attitudes	Yes	No	Yes/No	No	No	Aggregate model
(Lievens et al., 2003)	An assessment center and behavior description interview to predict cross-cultural training performance[A]	Diverse other	Recruitment/ Selection	Adapt/adjust,	Cultural metacognition, interaction management, social behavioral flexibility, communication ability, self-confidence, diverse other	Traits/ capabilities	Yes	Yes	Yes/No	No	No	Aggregate model
(McNab et al., 2012)	Learning CQ Scale[A]	CQ	Assessment (Self)	Function/engage/ interact effectively, manage/lead effectively	Cultural metacognition, cross-cultural motivation, social behavioral flexibility	Capabilities	Yes	Yes	Yes/No	No	No	Aggregate model
(Matsumoto et al., 2001)	Intercultural Adjustment Potential Scale (ICAPS)[A]	CC-A/A	Recruitment/ Selection/ Research	Adapt/adjust, integrate	Open-mindedness, social behavioral flexibility, emotional resilience, creativity	Traits/ capabilities	Yes	Yes	Yes/No	No	Yes	Aggregate model
(Mendenhall et al., 2012)	Intercultural Effectiveness Scale (IES)[C]	IE	Recruitment/ Selection/ Research	Work effectively	Curiosity, cultural metacognition, relationship interest, interpersonal engagement, self-awareness, emotional resilience, diverse other	Traits/ capabilities	Yes	Yes	Yes/No	Yes	No	Individual dimensions scores

Note: CC-A/A = cross-cultural adaptability/adjustment. CC-OA/GO = cross-cultural open attitude/global orientation, CC-SE = cross-cultural self-efficacy, FME = function and manage effectively in cross-cultural situations. GL = global leadership. GM = global mindset. IC = intercultural communication. IE = intercultural effectiveness. IR = intercultural readiness. IS = intercultural sensitivity. MP = multicultural personality. NIA = no information available.

Table 1e
An overview of the CCC measurement instruments (1/5).

				Step I scale development						Step II scale development		
Reference	**Instrument label (A = academic, C = corporate)**	**Instrument label category**	**Purpose**	**Core criteria categorization based on the instrument definition**	**(Sub)domain(s) covered, abbreviated labels** Bird et al. (2010)	**Domain(s) covered** Leung et al. (2014)	**Literature reviewed**	**Theoretical basis**	**Relation of dimensions with construct/ each other**	**Subject experts**	**Focus group**	**Conceptu-alization**
(Mittal, 2012)	Cross-Cultural Orientation Inventory (CCOI)[A]	CC-OA/GO	Recruitment/ Selection	Readiness/ openness to interact/to others	Multicultural attitude	Attitudes	Yes	No	Yes/No	Yes	No	Individual dimensions scores
(Mumford, 1998)	Culture Shock[A]	Diverse other	Assessment (Self)	Reduced anxiety/ comfort/positive emotion	Emotional resilience	Traits	Yes	Yes	NA/NA	No	Yes	Aggregate model
(Munroe & Pearson, 2006)	Munroe Multicultural Attitude Scale Questionnaire (MASQUE)[A]	CC-OA/GO	Assessment (Self)	No definition	Cultural knowledge, emotional sensitivity, self-confidence	Traits/ capabilities	Yes	Yes	Yes/No	Yes	No	Aggregate model
(OPRA, 2006)	Overseas Preparation Indicator (OPI)[C]	Diverse other: IR	Recruitment/ Selection	Readiness/ openness to interact/to others	Open-mindedness, cultural metacognition, cross-cultural motivation, interpersonal engagement, social behavioral flexibility, self-confidence, diverse other	Traits/ capabilities	NIA	NIA	NIA/NIA	NIA	NIA	Profile model
(Phinney, 1992)	Multigroup Ethnic Identity Measure (MEIM)[A]	Diverse other	Assessment (Self)	Other	Cultural metacognition, social behavioral flexibility, self-identity	Traits/ capabilities	Yes	Yes	Yes/No	No	Yes	Aggregate model
(Pike, 2002)	Openness to Diversity[A]	CC-OA/GO	Assessment (Self)	Readiness/ openness to interact/to others	Open-mindedness	Traits	Yes	Yes	NA/NA	No	No	Aggregate model
(Ponterotto et al., 1996)	Multicultural Counseling Awareness Scale (MCAS)[A]	Diverse other	Assessment (Self)	No definition	Multicultural attitude, cultural knowledge	Attitudes / capabilities	Yes	Yes	Yes/No	Yes	No	Individual dimensions scores
(Ponterotto et al., 2002)	MCKAS (Development and initial validation of the Multicultural Counseling Awareness Scale)[A]	Diverse other	Assessment (Self)	No definition	Multicultural attitude, cultural knowledge	Attitudes / capabilities	Yes	Yes	Yes/No	No	No	Individual dimensions scores
(Prudential_Relocation, 2015)	Global Assessment Inventory (GAI)[C]	Diverse other	Assessment (Self)	Cross-cultural success	Open-mindedness, acceptance of risk, sociability, respectfulness, diverse other (RM), proactive initiative, stress ability, diverse other	Traits/ capabilities	NIA	NIA	NIA/NIA	NIA	NIA	Profile model

(*continued on next page*)

Table 1e (*continued*)

				Step I scale development					Step II scale development		
Reference	**Instrument label (A = academic, C = corporate)**	**Instrument label category**	**Purpose**	**Core criteria categorization based on the instrument definition**	**(Sub)domain(s) covered, abbreviated labels** Bird et al. (2010)	**Domain(s) covered** Leung et al. (2014)	**Literature reviewed**	**Theoretical basis**	**Relation of dimensions with construct/ each other**	**Subject experts**	**Focus group**	**Conceptu-alization**
(Ruegger & Rogers, 1993)	Cross-Cultural Sensitivity Scale (CCSS)[A]	Diverse other	Assessment (Self)	Readiness/ openness to interact/to others	Diverse other (PM)	Capabilities	Yes	No	Yes/No	No	Yes	Aggregate model
(Punzo, Unpublished)	Richardson Global Cultural Style Inventory (RGCSI)[C]	Diverse other	Recruitment/ Selection/ Research	No definition	Category inclusiveness, cultural metacognition, interaction management, diverse other	Capabilities	Yes	No	Yes/No	Yes	Yes	Individual dimensions scores

Note: CC-A/A = cross-cultural adaptability/adjustment. CC-OA/GO = cross-cultural open attitude/global orientation, CC-SE = cross-cultural self-efficacy, FME = function and manage effectively in cross-cultural situations. GL = global leadership. GM = global mindset. IC = intercultural communication. IE = intercultural effectiveness. IR = intercultural readiness. IS = intercultural sensitivity. MP = multicultural personality. NIA = no information available.

3.1. Step I: theoretical meaning underlying the measurement instruments

We first provide insights into the conceptual meaning that underlies the instrument development process. To develop a definition of the construct that is intended to be measured (the core criterion), the developers of instruments in 56 cases reported that they reviewed previous literature, and 38 articles described the theoretical basis underlying their instrument. In 20 articles, the authors did not provide a definition of the construct they aimed to measure. In nine articles, there was no definition at all. The remaining articles were coded as having no definition as they just listed the dimensions to be included or provided a definition that was quite vague such as "confidence to perform skills." When the authors provided a definition, we coded it as such. For instance, if the researchers defined the construct that they intended to measure as "an individual's capability to function and manage effectively in culturally diverse settings" (Ang et al., 2007, p. 337), we coded it as "Function/engage/interact effectively" and as "Manage/lead effectively." In 32 instances, the instruments related to effectiveness in a cross-cultural situation (specifically, "function/engage/interact effectively": 21; "communicate effectively": 2; "manage/lead effectively": 6; "work effectively": 3). In 10 instances, they measured adaptation or integration. In eight cases, they assessed the understanding of intercultural situations. In eight other cases, they measured the readiness or openness to interact or openness to others in general. Finally, in six instances, they dealt simply with cross-cultural success (see Table 1a-1g).

When we compared the instrument's label (the third column from the left in Table 1a-1g) with the categorization of the core criteria (the fifth column), we found that the definitions offered rather few explicit aspects that helped identify the factors that conceptually distinguish different constructs from each other. For instance, for the instruments that were designed to measure a form of CQ, the authors stated that "… CQ is a specific form of intelligence focused on capabilities to grasp, reason, and behave effectively in situations characterized by cultural diversity" (Ang et al., 2007, p. 337). Researchers who referred to a form of cross-cultural or open attitude or a global orientation noted that it would result in "...an individual's ability to function effectively in cross-national […] settings" (Caligiuri et al., 2000, p. 29) or that it "… facilitates open communication and a higher level of integration within groups" (Hobman et al., 2004, p. 567). Concerning instruments that refer to CCC, the researchers likewise stated that it is "...the understanding of [the] specificity of cross-cultural interaction and the capacity to adapt one's behavior to this specificity" (Bartel-Radic & Giannelloni, 2017, p. 633). Hence, given the overlap in criteria, broadening the scope of previous reviews seems warranted.

Next, we coded the dimensions covered by the instruments into content domains. The CCC instruments contained dimensions ranging from one (e.g., "culture shock", Mumford, 1998; "openness to diversity", Pike, 2002) to 12 (e.g., the Global Executive Leadership Inventory, de Vries, 2004). The average number of dimensions was 4.4 per instrument. Some instruments were further split along subdimensions. Fourteen instruments included subdimensions ranging from three to 16, with an average of 6.6 per study. For instance, Van Dyne et al. (2012) outlined four dimensions of CQ, subdivided into a total of 11 subdimensions. In the 68 CCC instruments we identified 252 unique dimension labels, although with some overlap. For instance, researchers who referred to self-efficacy used labels such as efficacy, self-efficacy, self-confidence, and transcultural self-efficacy. In addition, when comparing the definitions of the dimensions, we found that some of the competencies with the same label were defined differently, while others with completely different labels were actually measuring the same phenomenon. For instance, Ruben (1976) referred to a dimension called "interaction posture," which he defined as the "ability to respond to others in a descriptive, non-valuating and nonjudgmental way…" (Ruben, 1976, p. 340) – a definition that exactly fits that of non-judgmentalness (i.e., the ability to respond to others in a non-judgmental, non-evaluating, and descriptive way; Bird et al., 2010).

Table 1f
An overview of the CCC measurement instruments (1/6).

				Step I scale development						Step II scale development		
Reference	**Instrument label (A = academic, C = corporate)**	**Instrument label category**	**Purpose**	**Core criteria categorization based on the instrument definition**	**(Sub)domain(s) covered, abbreviated labels** Bird et al. (2010)	**Domain(s) covered** Leung et al. (2014)	**Literature reviewed**	**Theoretical basis**	**Relation of dimensions with construct/ each other**	**Subject experts**	**Focus group**	**Conceptu-alization**
(Ruben, 1976)	Communication Competency for Intercultural Adaptation / Intercultural Behavioral Assessment Indices[A]	IC	Recruitment/ Selection	Function/engage/ interact effectively	Nonjudgmentalness, acceptance of risk, ethnocentrism vs. ethnorelativism, interaction management, emotional sensitivity, respectfulness, social behavioral flexibility	Traits/ attitudes /capabilities	Yes	No	Yes/No	No	Yes	Unclassified
(Schnabel et al., 2015)	The Test to Measure Intercultural Competence (TMIC-S)[A]	CCC	Training/ Coaching/ Counseling	Readiness/openness to interact/to others	Cultural metacognition, interaction management, sociability, self-awareness, communication ability, self-confidence	Traits/ capabilities	Yes	Yes	Yes/No	Yes	Yes	Latent model
(Stening & Hammer, 1992)	Expatriate Adaptation Scale[A]	CC-A/A	Recruitment/ Selection/ Research	No definition	Interpersonal engagement, communication ability, stress ability	Traits/ capabilities	Yes	Yes	Yes/No	No	Yes	Individual dimensions scores
(Stevens et al., 2014)	Global Competence Inventory (GCI)[C]	CCC	Recruitment/ Selection/ Research	Work effectively	Perception management, nonjudgmentalness, inquisitiveness, acceptance of risk, cosmopolitanism, relationship management, relationship interest, interpersonal engagement, social behavioral flexibility, self-management, optimism, self-confidence, self-identity, emotional resilience, stress ability, stress management, interest flexibility	Traits/ attitudes /capabilities	Yes	Yes	Yes/No	Yes	Yes	Individual dimensions scores
(Stone, 2009)	Intercultural Effectiveness (ICEQ)[A]	IE	Recruitment/ Selection	Function/engage/ interact effectively, cross-cultural success	Open-mindedness, multicultural attitude, cultural knowledge, cross-cultural motivation, emotional sensitivity, self-awareness, emotional resilience, diverse other	Traits/ attitudes /capabilities	Yes	Yes	Yes/No	No	Yes	Individual dimensions scores
(Strohmeier et al., 2017)	Intercultural Competence Development[A]	CCC	Assessment (Self)/ Learning processes	Function/engage/ interact effectively	Multicultural attitude, cultural knowledge, cultural metacognition, cross-cultural motivation, social behavioral flexibility, communication ability, self-confidence, diverse other (SM), diverse other	Traits/ attitudes /capabilities	Yes	Yes	Yes/No	No	Yes	Individual dimensions scores
(Suarez-Balcazar et al., 2011)	Cultural Competence Assessment Instrument (CCAI)[A]	CCC	Assessment (Self)	Function/engage/ interact effectively, assess/understand intercultural situations accurately	Multicultural attitude, diverse other	Attitudes	Yes	No	Yes/No	No	No	Individual dimensions scores

Note: CC-A/A = cross-cultural adaptability/adjustment. CC-OA/GO = cross-cultural open attitude/global orientation, CC-SE = cross-cultural self-efficacy, FME = function and manage effectively in cross-cultural situations. GL = global leadership. GM = global mindset. IC = intercultural communication. IE = intercultural effectiveness. IR = intercultural readiness. IS = intercultural sensitivity. MP = multicultural personality. NIA = no information available.

Table 1 g
An overview of the CCC measurement instruments (1/7).

				Step I scale development						Step II scale development		
Reference	**Instrument label** (A = academic, C = corporate)	**Instrument label category**	**Purpose**	**Core criteria categorization based on the instrument definition**	**(Sub)domain(s) covered,abbreviated labels** Bird et al. (2010)	**Domain(s) covered** Leung et al. (2014)	**Literature reviewed**	**Theoretical basis**	**Relation of dimensions with construct/ each other**	**Subject experts**	**Focus group**	**Conceptu-alization**
(Switzer et al., 1998)	Client Cultural Competence Inventory[A]	CCC	Unclear	Function/engage/ interact effectively	Respectfulness, diverse other	Capabilities	Yes	No	Yes/No	Yes	No	Aggregate model
(Thomas et al., 2012)	Cultural Intelligence Assessment[A]	CQ	Assessment (Self)	Influence others, assess/ understand intercultural situations accurately	Acceptance of risk, ethnocentrism vs. ethnorelativism, cultural knowledge, cultural metacognition, interpersonal engagement, emotional sensitivity	Traits/ attitudes/ capabilities	Yes	Yes	Yes/Yes	Yes	No	Latent model
(Thomas et al., 2015)	Short-form Measure of Cultural Intelligence (SFCQ)[A]	CQ	Recruitment/ Selection	Function/engage/ interact effectively, influence others, assess/understand intercultural situations accurately	Cultural knowledge, cultural metacognition, diverse other	Capabilities	Yes	Yes	Yes/Yes	Yes	No	Latent model
(Tucker, 1999)	Overseas Assignment Inventory (OAI)[C]	Diverse other	Recruitment/ Selection/ Research	No definition	Ethnocentrism vs. ethnorelativism, cultural knowledge, interaction management, emotional sensitivity, communication ability, diverse other	Traits/ attitudes/ capabilities	NIA	NIA	NIA/NIA	NIA	NIA	Individual dimensions scores
(Tucker et al., 2014)	Global Leader Tucker Assessment Profile (GLTAP)[C]	GL	Recruitment/ Selection	Manage/lead effectively, influence others	Acceptance of risk, ethnocentrism vs. ethnorelativism, respectfulness, social behavioral flexibility, stress ability, creativity	Traits/ attitudes/ capabilities	Yes	Yes	Yes/No	No	No	Aggregate model
(Tucker et al., 2014)	Survey of Global Business Experience (GBE)[C]	Diverse other	Recruitment/ Selection	Manage/lead effectively, influence others, work effectively	Interpersonal engagement, interaction management, diverse other	Capabilities	Yes	Yes	Yes/No	No	No	Aggregate model
(Van der Zee & Van Oudenhoven, 2000)	Multicultural Personality Questionnaire (MPQ)[A]	MP	Recruitment/ Selection	Function/engage/ interact effectively, cross-cultural success	Open-mindedness, emotional sensitivity, social behavioral flexibility, emotional resilience	Traits/ capabilities	Yes	No	Yes/No	No	No	Individual dimensions scores
(Van der Zee & Van Oudenhoven, 2001)	Multicultural Personality Questionnaire (MPQ)[A]	MP	Recruitment/ Selection	Function/engage/ interact effectively, cross-cultural success	Open-mindedness, emotional sensitivity, social behavioral flexibility, emotional resilience	Traits/ capabilities	Yes	Yes	Yes/No	No	No	Individual dimensions scores

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Table 1 g (*continued*)

				Step I scale development						Step II scale development		
Reference	**Instrument label** (A = academic, C = corporate)	**Instrument label category**	**Purpose**	**Core criteria categorization based on the instrument definition**	**(Sub)domain(s) covered,abbreviated labels** Bird et al. (2010)	**Domain(s) covered** Leung et al. (2014)	**Literature reviewed**	**Theoretical basis**	**Relation of dimensions with construct/ each other**	**Subject experts**	**Focus group**	**Conceptu-alization**
(Van der Zee et al., 2013)	Multicultural Personality Questionnaire Short Form (MPQ-SF)[A]	MP	Recruitment/ Selection	Function/engage/ interact effectively, cross-cultural success	Open-mindedness, emotional sensitivity, social behavioral flexibility, emotional resilience	Traits/ capabilities	Yes	NA	Yes/No	Yes	Yes	Individual dimensions scores
(Van Dyne et al., 2012)	Expanded CQ scale (E-CQS)[A]	CQ	Assessment (Self)	Function/engage/ interact effectively, assess/understand intercultural situations accurately	Multicultural attitude, cultural knowledge, cultural metacognition, cross-cultural motivation, social behavioral flexibility, self-confidence	Traits/ attitudes/ capabilities	Yes	Yes	Yes/No	No	No	Aggregate model
(WorldWork_Global, 2018)	The International Profiler (TIP)[C]	Diverse other	Assessment (Self)	NIA	Open-mindedness, cultural knowledge, self-awareness, social behavioral flexibility, social influencing, communication ability, self-identity, emotional resilience	Traits/ capabilities	NIA	NIA	NIA/NIA	NIA	NIA	Profile model
(Zhou et al., 2018)	Cross-organizational cultural intelligence (COCI)[A]	CQ	Recruitment/ Selection	Function/engage/ interact effectively	Cultural knowledge, cross-cultural motivation, social behavioral flexibility, communication ability	Capabilities	Yes	Yes	Yes/No	Yes	Yes	Latent model

Note: CC-A/A = cross-cultural adaptability/adjustment. CC-OA/GO = cross-cultural open attitude/global orientation, CC-SE = cross-cultural self-efficacy, FME = function and manage effectively in cross-cultural situations. GL = global leadership. GM = global mindset. IC = intercultural communication. IE = intercultural effectiveness. IR = intercultural readiness. IS = intercultural sensitivity. MP = multicultural personality. NIA = no information available.

Table 1 h
An overview of the CCC measurement instruments (2/1).

	Step III scale development												Summary Venn diagram			
Reference	Self/ observer	Scaletype	Testpopulation	Country	Factor analysis/ dimensions/ items	# of items (criterion/ general)	Reliability summary	Convergent validity	Discriminant validity	Predictive validity	Validity summary	Measurement invariance countries	Most cited (Google scholar)	Most popular*	HighR/ V/MI**	High coverage***
(Adair et al., 2009)	S	Likert	NIA	NIA	NIA	21 (G)	NIA	NIA	NIA	NIA	NIA	NIA	NIA			
(Alon et al., 2016)	S	Likert, true/false	Students	Mixed	Yes/No/Yes	60/38 (C)	●	CQS	NO	P	◐	○	45	Yes	Yes	
(Ang et al., 2007)	S	Likert	Students/ professionals	USA/ Singapore/ Mixed	Yes/No/Yes	20 (C)	●	CCAI	IE, GMA, EQ, PT, LA,	CCE, CCA, P	●	●	2055	Yes	Yes	Yes
(Van Dyne et al., 2008)	O	Likert	MBAs	USA	No/No/No	20 (C)	●	No	IE	CCA	◐	○	568	Yes		Yes
(Ang & Van Dyne, 2008)	S	Likert	NIA	NIA	NIA	9 (C)	NIA	NIA	NIA	NIA	NIA	NIA	905 (text-book)	Yes		
(Bartel-Radic & Giannelloni, 2017)	S	Likert, MC	Professionals	Mixed	Yes/Yes/Yes	39 (G)	●	No	No	CCK	◔	○	35		Yes	Yes
(Bhawuk & Brislin, 1992)	S	Likert	Students/ MBAs	Mixed	Yes/No/Yes	46 (G)	◐	No	IE	CCE	◐	○	1061			Yes
(Braskamp et al., 2014)	S	Likert	Students	Mixed	Yes/No/Yes	32 (C)	◐	No	IE, LE	No	◔	○	177			
(Brinkmann & Van Weerdenburg, 2019)	S	Likert	NIA	NIA	Yes/No/No	57 (C)	NIA	NIA	NIA	NIA	NIA	NIA	N/A			Yes
(Briones et al., 2009)	S	Likert	Students	Mixed	Yes/Yes/Yes	25 (C)	●	No	IE, GSE	No	◔	○	48			
(Byram, 1997)	S	Likert	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	7710 (Text-book)			
(Byram et al., 2014)	S	Likert	NIA	NIA	NIA	21/4 (C)	NIA	NIA	NIA	NIA	NIA	NIA	N/A			Yes
(Caligiuri et al., 2000)	S	Likert	Student	USA	Yes/Yes/Yes	24 (C)	●	I	No	No	◔	○	116			

Note: BMS = boundaryless mindset. CCA = cross-cultural adjustment. CCE = cross-cultural effectiveness. CCK = cross-cultural knowledge. CCTP = cross-cultural training performance. CT = contact theory. EC = ethnocentrism. EF = effective functioning. EQ = emotional intelligence. EI = expatriation intention. GLE = global leader effectiveness. GMA = general mental ability. GSE = general self-efficacy. I = internationalism. IAS = intercultural anxiety scale. IE = international experience. IO = international orientation. JP = job performance. LA = language ability. LE = level of education. LS = leadership success. MC = multiple choice. MCA = multicultural activity. NA = not applicable. NIA = no information available. P = performance. PT = personality traits. RP = role performance. S = Satisfaction. TTP = Top talent prediction in WHO. WB = well-being. WGI = work group involvement. WMS = world mindedness scale. WV = worldviews. S = self-administered, O = observer-based. Reliability legend: ○ = not reported, ◐ = reliability below threshold or not reported for all individual dimensions, ● = reliability above recommended threshold. Validity legend: ○ = not reported, ◔ = equal to or less than two validity tests, ◐ = three validity tests, ◕ = at least four validity tests, ● = six validity tests. R = reliability. V = validity. MI = measurement invariance. Measurement invariance (country) legend: ○ = not reported, ◐ = measurement invariance across countries tested but not confirmed or only indirectly tested, ● = measurement invariance across countries tested and confirmed. *Most popular instruments based on survey results, identified via the procedure described in Section 4.1; all versions of an instrument were coded in the same way. **High reliability, validity and measurement invariance was assigned if a measurement instrument achieved at least ◐ in reliability, at least ◔ in validity, and at least ◐ in measurement invariance. ***High coverage was identified along two percentages: ≥ 50% of the following four top subdomains (as identified in our expert survey) covered: Open-mindedness / openness, respectfulness, (cross-cultural) motivation, and social / behavioral flexibility or ≥ 37.5% of the following eight subdomains covered: multicultural attitude, communication ability, emotional sensitivity / empathy, nonjudgmentalness, cultural meta-cognition, curiosity, self-awareness, and emotional resilience.

Table 1i
An overview of the CCC measurement instruments (2/2).

	Step III scale development												Summary Venn diagram			
Reference	Self/ observer	Scaletype	Testpopulation	Country	Factor analysis/ dimensions/ items	# of items (criterion/ general)	Reliability summary	Convergent validity	Discriminant validity	Predictive validity	Validity summary	Measurement invariance countries	Most cited (Google scholar)	Most popular*	HighR/ V/MI**	High coverage***
(Byram et al., 2014)	S	Likert	NIA	NIA	NIA	21/4 (C)	NIA	NIA	NIA	NIA	NIA	NIA	NIA			Yes
(Caligiuri et al., 2000)	S	Likert	Student	USA	Yes/Yes/Yes	24 (C)	●	I	No	No	◔	○	116			
(Chen & Starosta, 2000)	S	Likert	Student	USA	Yes/Yes/Yes	24 (C)	◐	ICAS, IES, EC	No	No	◔	○	1130	Yes		
(Clarke, 2000)	S	Likert	NIA	NIA	NIA	58 (G)	ni	NIA	NIA	NIA	NIA	NIA	NIA			
(Cornelius et al., 2004)	S	Likert	Consumers	Mixed	Yes/No/Yes	52 (C)	◐	No	No	No	○	○	41			
(Crano & Crano, 1993)	S	Likert	Students	Mixed	NIA	60 (C)	●	No	No	No	○	○	125			
(Evelina Ascalon et al., 2008)	S	Likert, MC	Students	Mixed	Yes/Yes/Yes	14 (C)	●	EC	GMA, PT	No	◐	○	105		Yes	
(Fantini & Tirmizi, 2006)	S	Likert	NIA	NIA	Yes/Yes/Yes	54 (C)	●	No	No	No	○	○	616			
(Fantini, 2000)	S	Likert	Professionals	Mixed	No/No/No	22–32 (C)	○	NIA	NIA	NIA	NIA	NIA	600			
(Guyton & Wesche, 2005)	S	Likert/ MC	Students	USA	Yes/Yes/Yes	35 (C)	◐	No	No	No	○	○	222			
(Hammer et al., 2003)	S	Likert	Students/ Professionals	Mixed	Yes/No/Yes	50 (C)	●	WMS, IAS	No	No	◔	○	2341	Yes		
(Hett, 1993)	S	Likert	Students	USA	Yes/Yes/No	30 (C)	●	No	IE	No	◔	○	285			
(Hobman et al., 2004)	S	Likert	Professionals	Australia	Yes/No/Yes	6 (G)	●	No	No	WGI	◔	○	282			

Note: BMS = boundaryless mindset. CCA = cross-cultural adjustment. CCE = cross-cultural effectiveness. CCK = cross-cultural knowledge. CCTP = cross-cultural training performance. CT = contact theory. EC = ethnocentrism. EF = effective functioning. EQ = emotional intelligence. EI = expatriation intention. GLE = global leader effectiveness. GMA = general mental ability. GSE = general self-efficacy. I = internationalism. IAS = intercultural anxiety scale. IE = international experience. IO = international orientation. JP = job performance. LA = language ability. LE = level of education. LS = leadership success. MC = multiple choice. MCA = multicultural activity. NA = not applicable. NIA = no information available. P = performance. PT = personality traits. RP = role performance. S = Satisfaction. TTP = Top talent prediction in WHO. WB = well-being. WGI = work group involvement. WMS = world mindedness scale. WV = worldviews. S = self-administered, O = observer-based. Reliability legend: ○ = not reported, ◐ = reliability below threshold or not reported for all individual dimensions, ● = reliability above recommended threshold. Validity legend: ○ = not reported, ◔ = equal to or less than two validity tests, ◐ = three validity tests, ◕ = at least four validity tests, ● = six validity tests. R = reliability. V = validity. MI = measurement invariance. Measurement invariance (country) legend: ○ = not reported, ◐ = measurement invariance across countries tested but not confirmed or only indirectly tested, ● = measurement invariance across countries tested and confirmed. *Most popular instruments based on survey results, identified via the procedure described in Section 4.1; all versions of an instrument were coded in the same way. * *High reliability, validity and measurement invariance was assigned if a measurement instrument achieved at least ◐ in reliability, at least ◔ in validity, and at least ◐ in measurement invariance. ***High coverage was identified along two percentages: ≥ 50% of the following four top subdomains (as identified in our expert survey) covered: Open-mindedness / openness, respectfulness, (cross-cultural) motivation, and social / behavioral flexibility or ≥ 37.5% of the following eight subdomains covered: multicultural attitude, communication ability, emotional sensitivity / empathy, nonjudgmentalness, cultural meta-cognition, curiosity, self-awareness, and emotional resilience.

Table 1j
An overview of the CCC measurement instruments (2/3).

	Step III scale development												Summary Venn diagram			
Reference	Self/ observer	Scaletype	Testpopulation	Country	Factor analysis/ dimensions/ items	# of items (criterion/ general)	Reliability summary	Convergent validity	Discriminant validity	Predictive validity	Validity summary	Measurement invariance countries	Most cited (Google scholar)	Most popular*	HighR/ V/MI**	High coverage***
(Holcomb-McCoy & Day-Vines, 2004)	S	Likert	Professionals	USA	Yes/Yes/Yes	32 (C)	●	No	No	No	○	○	83			
(Javidan et al., 2017)	S	Likert	Professionals	Mixed	Yes/Yes/Yes	20 (C)	●	No	IE, LE	GLE	◐	○	0		Yes	
(Javidan et al., 2010)	S	Likert	Students	USA	Yes/Yes/Yes	76 (C)	●	No	IE, PT, LA, GSE	TTP	◐	○	53	Yes	Yes	
(Jeffreys & Dogan, 2012)	S	Likert	Students	USA	Yes/No/Yes	83 (C)	●	No	No	No	○	○	119			
(Kefalas & Neuland, 1997)	S	Likert	Professionals	NIA	Yes/Yes/Yes	40 (G)	◐	No	IE	No	◔	○	0			
(Kelley & Meyers, 1987)	S	Likert	NIA	NIA	Yes/Yes/Yes	58 (G)	◐	NIA	NIA	NIA	NIA	NIA	NIA	Yes		
(Kets de Vries, 2004)	S	Likert	NIA	NIA	Yes/Yes/Yes	109 (G)	NIA	NIA	NIA	NIA	NIA	NIA	NIA			
(Koester & Olebe, 1988)	O	Likert	Students	USA	Yes/No/No	9 (G)	●	No	No	No	○	○	270			
(Kupka et al., 2011)	S/O	Likert	Students	Mixed	Yes/No/Yes	7 (C)	○	No	IE	No	◔	○	5			
(Lievens et al., 2003)	O	Likert	Professionals	Mixed	Yes/No/No	NIA (C)	◐	No	GMA, PT	CCTP, LA	◐	○	330			
(McNab et al., 2012)	S	Likert	Students	Mixed	Yes/No/No	12 (C)	●	No	IE, GSE	CT	◐	○	111			Yes

Note: BMS = boundaryless mindset. CCA = cross-cultural adjustment. CCE = cross-cultural effectiveness. CCK = cross-cultural knowledge. CCTP = cross-cultural training performance. CT = contact theory. EC = ethnocentrism. EF = effective functioning. EQ = emotional intelligence. EI = expatriation intention. GLE = global leader effectiveness. GMA = general mental ability. GSE = general self-efficacy. I = internationalism. IAS = intercultural anxiety scale. IE = international experience. IO = international orientation. JP = job performance. LA = language ability. LE = level of education. LS = leadership success. MC = multiple choice. MCA = multicultural activity. NA = not applicable. NIA = no information available. P = performance. PT = personality traits. RP = role performance. S = Satisfaction. TTP = Top talent prediction in WHO. WB = well-being. WGI = work group involvement. WMS = world mindedness scale. WV = worldviews. S = self-administered, O = observer-based. Reliability legend: ○ = not reported, ◐ = reliability below threshold or not reported for all individual dimensions, ● = reliability above recommended threshold. Validity legend: ○ = not reported, ◔ = equal to or less than two validity tests, ◐ = three validity tests, ◕ = at least four validity tests, ● = six validity tests. R = reliability. V = validity. MI = measurement invariance. Measurement invariance (country) legend: ○ = not reported, ◐ = measurement invariance across countries tested but not confirmed or only indirectly tested, ● = measurement invariance across countries tested and confirmed. *Most popular instruments based on survey results, identified via the procedure described in Section 4.1; all versions of an instrument were coded in the same way. **High reliability, validity and measurement invariance was assigned if a measurement instrument achieved at least ◐ in reliability, at least ◔ in validity, and at least ◐ in measurement invariance. ***High coverage was identified along two percentages: ≥ 50% of the following four top subdomains (as identified in our expert survey) covered: Open-mindedness / openness, respectfulness, (cross-cultural) motivation, and social / behavioral flexibility or ≥ 37.5% of the following eight subdomains covered: multicultural attitude, communication ability, emotional sensitivity / empathy, nonjudgmentalness, cultural meta-cognition, curiosity, self-awareness, and emotional resilience.

Table 1k
An overview of the CCC measurement instruments (2/4).

	Step III scale development												Summary Venn diagram			
Reference	Self/ observer	Scaletype	Testpopulation	Country	Factor analysis/ dimensions/ items	# of items (criterion/ general)	Reliability summary	Convergent validity	Discriminant validity	Predictive validity	Validity summary	Measurement invariance countries	Most cited (Google scholar)	Most popular*	HighR/ V/MI**	High coverage***
(Matsumoto et al., 2001)	S	Likert	Students/ Professionals	Japan	Yes/No/Yes	55 (G)	◐	CCAI	LE, PT	CCA	◐	○	282		Yes	Yes
(Mendenhall et al., 2012)	S	Likert	Students/ Professionals	Mixed	Yes/No/Yes	52 (C)	●	NIA	IE, LE	CCE	◐	○	58	Yes		Yes
(Mittal, 2012)	S	Likert	Students	USA	Yes/No/Yes	8 (C)	●	No	IE	CCE	◔	○	2			
(Mumford, 1998)	S	Likert	Students	UK	Yes/Yes/Yes	12 (C)	●	No	No	No	○	○	207	Yes		
(Munroe & Pearson, 2006)	S	Likert	Students	USA	Yes/No/Yes	18 (C)	◐	No	IE	No	◐	○	177			
(OPRA, 2006)	S	Likert	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA			Yes
(Phinney, 1992)	S	Likert	Students	USA	No/No/No	14 (C)	●	No	No	No	○	○	5690			
(Pike, 2002)	S	Likert	Students	USA	No/No/No	8 (G)	○	No	No	No	○	○	166			
(Ponterotto et al., 1996)	S	Likert	Students/ Professionals	USA	Yes/Yes/Yes	45 (C)	●	No	No	No	◔	○	411			
(Ponterotto et al., 2002)	S	Likert	Students/ Professionals	USA	Yes/Yes/Yes	32 (C)	●	MCI, MEIM, SDS	No	No	◔	○	191			
(Prudential_ Relocation, 2015)	S	Likert	NIA	NIA	NIA	62 (G)	NIA	NIA	NIA	NIA	NIA	NIA	NIA			Yes

Note: BMS = boundaryless mindset. CCA = cross-cultural adjustment. CCE = cross-cultural effectiveness. CCK = cross-cultural knowledge. CCTP = cross-cultural training performance. CT = contact theory. EC = ethnocentrism. EF = effective functioning. EQ = emotional intelligence. EI = expatriation intention. GLE = global leader effectiveness. GMA = general mental ability. GSE = general self-efficacy. I = internationalism. IAS = intercultural anxiety scale. IE = international experience. IO = international orientation. JP = job performance. LA = language ability. LE = level of education. LS = leadership success. MC = multiple choice. MCA = multicultural activity. NA = not applicable. NIA = no information available. P = performance. PT = personality traits. RP = role performance. S = Satisfaction. TTP = Top talent prediction in WHO. WB = well-being. WGI = work group involvement. WMS = world mindedness scale. WV = worldviews. S = self-administered, O = observer-based. Reliability legend: ○ = not reported, ◐ = reliability below threshold or not reported for all individual dimensions, ● = reliability above recommended threshold. Validity legend: ○ = not reported, ◔ = equal to or less than two validity tests, ◐ = three validity tests, ◕ = at least four validity tests, ● = six validity tests. R = reliability. V = validity. MI = measurement invariance. Measurement invariance (country) legend: ○ = not reported, ◐ = measurement invariance across countries tested but not confirmed or only indirectly tested, ● = measurement invariance across countries tested and confirmed. *Most popular instruments based on survey results, identified via the procedure described in Section 4.1; all versions of an instrument were coded in the same way. * *High reliability, validity and measurement invariance was assigned if a measurement instrument achieved at least ◐ in reliability, at least ◔ in validity, and at least ◐ in measurement invariance. ***High coverage was identified along two percentages: ≥ 50% of the following four top subdomains (as identified in our expert survey) covered: Open-mindedness / openness, respectfulness, (cross-cultural) motivation, and social / behavioral flexibility or ≥ 37.5% of the following eight subdomains covered: multicultural attitude, communication ability, emotional sensitivity / empathy, nonjudgmentalness, cultural meta-cognition, curiosity, self-awareness, and emotional resilience.

Table 1 l
An overview of the CCC measurement instruments (2/5).

	Step III scale development												Summary Venn diagram			
Reference	**Self/ observer**	**Scaletype**	**Testpopulation**	**Country**	**Factor analysis/ dimensions/ items**	**# of items (criterion/ general)**	**Reliability summary**	**Convergent validity**	**Discriminant validity**	**Predictive validity**	**Validity summary**	**Measurement invariance countries**	**Most cited (Google scholar)**	**Most popular***	**HighR/ V/MI****	**High coverage*****
(Pruegger & Rogers, 1993)	S	Likert	Students/ Professionals	Canada	Yes/No/Yes	24 (C)	●		No	No	○	○	37			
(Punzo, Unpublished)	S	Likert	NIA	NIA	Yes/No/No	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA			
(Ruben, 1976)	O	Likert, MC	Adults	Canada	NA	7 (C)	●	No	No	No	○	○	693	Yes		Yes
(Schnabel et al., 2015)	S	Likert	Students/ Professionals	Brazil/ Germany	Yes/No/No	75 (G)	●	CQS	IE	No	◐	●	28		Yes	Yes
(Stening & Hammer, 1992)	S	Likert	Professionals	Thailand/ USA/ Japan	Yes/No/Yes	12 (G)	◐	No	No	EF, S	◔	○	150	Yes		
(Stevens et al., 2014)	S	Likert	Students/ Professionals	Mixed	Yes/No/Yes	160 (G)	●	No	PT	CCA, JP, LA	◐	●	62	Yes	Yes	Yes
(Stone, 2009)	S	Likert	Professionals	Mixed	Yes/Yes/Yes	44 (G)	●	No	IE, LE, LA	No	◔	○	2			Yes
(Strohmeier et al., 2017)	S	Likert	Students	Austria	Yes/No/Yes	16 (G)	◐	No	No	No	○	○	5			Yes
(Suarez-Balcazar et al., 2011)	S	Likert	Professionals	USA	Yes/Yes/Yes	24 (C)	●	No	No	No	○	○	67			
(Switzer et al., 1998)	other	Likert	Professionals	USA	Yes/No/No	12 (G)	○	No	No	No	○	○	60			
(Thomas et al., 2012)	S/O	Likert	Students/ Professionals	Mixed	Yes/No/Yes	49	●	EC	IE, EQ, LE, LA, PT	CCE	●	●	43	Yes	Yes	

Note: BMS = boundaryless mindset. CCA = cross-cultural adjustment. CCE = cross-cultural effectiveness. CCK = cross-cultural knowledge. CCTP = cross-cultural training performance. CT = contact theory. EC = ethnocentrism. EF = effective functioning. EQ = emotional intelligence. EI = expatriation intention. GLE = global leader effectiveness. GMA = general mental ability. GSE = general self-efficacy. I = internationalism. IAS = intercultural anxiety scale. IE = international experience. IO = international orientation. JP = job performance. LA = language ability. LE = level of education. LS = leadership success. MC = multiple choice. MCA = multicultural activity. NA = not applicable. NIA = no information available. P = performance. PT = personality traits. RP = role performance. S = Satisfaction. TTP = Top talent prediction in WHO. WB = well-being. WGI = work group involvement. WMS = world mindedness scale. WV = worldviews. S = self-administered, O = observer-based. Reliability legend: ○ = not reported, ◐ = reliability below threshold or not reported for all individual dimensions, ● = reliability above recommended threshold. Validity legend: ○ = not reported, ◔ = equal to or less than two validity tests, ◐ = three validity tests, ◕ = at least four validity tests, ● = six validity tests. R = reliability. V = validity. MI = measurement invariance. Measurement invariance (country) legend: ○ = not reported, ◐ = measurement invariance across countries tested but not confirmed or only indirectly tested, ● = measurement invariance across countries tested and confirmed. *Most popular instruments based on survey results, identified via the procedure described in Section 4.1; all versions of an instrument were coded in the same way. * *High reliability, validity and measurement invariance was assigned if a measurement instrument achieved at least ◐ in reliability, at least ◔ in validity, and at least ◐ in measurement invariance. * **High coverage was identified along two percentages: ≥ 50% of the following four top subdomains (as identified in our expert survey) covered: Open-mindedness / openness, respectfulness, (cross-cultural) motivation, and social / behavioral flexibility or ≥ 37.5% of the following eight subdomains covered: multicultural attitude, communication ability, emotional sensitivity / empathy, nonjudgmentalness, cultural meta-cognition, curiosity, self-awareness, and emotional resilience.

Table 1 m
An overview of the CCC measurement instruments (2/6).

	Step III scale development												Summary Venn diagram			
Reference	Self/ observer	Scaletype	Testpopulation	Country	Factor analysis/ dimensions/ items	# of items (criterion/ general)	Reliability summary	Convergent validity	Discriminant validity	Predictive validity	Validity summary	Measurement invariance countries	Most cited (Google scholar)	Most popular*	HighR/ V/MI**	High coverage***
(Thomas et al., 2015)	S	Likert	Students/ Professionals	Various countries (USA, Australia, India, etc.) Mixed	Yes/No/No	10	●	EC	IE, EQ, LA, PT	JP	●	●	153	Yes	Yes	
(Tucker, 1999)	S	Likert	NIA	NIA	Yes/No/No	NIA	NIA	NIA	NIA	NIA	NIA	NIA	20			
(Tucker et al., 2014)	S	Likert	Professionals	13 countries (Australia, Belgium, etc.)	Yes/Yes/Yes	51	●	No	No	LS	◔	○	20		Yes	Yes
(Tucker et al., 2014)	S	Likert	Professionals	13 countries (Australia, Belgium, etc.)	Yes/No/No	12	●	No	No	LS	◔	◐	NIA		Yes	
(Van der Zee & Van Oudenhoven, 2000)	S	Likert	Students	Netherlands	Yes/Yes/No	91	●	No	PT	MCA, IO, EI	◐	○	399	Yes		Yes
(Van der Zee & Van Oudenhoven, 2001)	S	Likert	Students	Netherlands	Yes/Yes/Yes	78	●	No	IE	No	◔	○	728	Yes		Yes
(Van der Zee et al., 2013)	S	Likert	Students	USA	Yes/No/No	40	●	MPQ	EQ	WB	◐	○	362	Yes		Yes
(Van Dyne et al., 2012)	S	Likert	Students/MBAs	Mixed	Yes/Yes/Yes	37	◐	No	No	No	◔	○	122	Yes		Yes
(WorldWork_Global, 2018)	S	Likert	NIA	NIA	NIA	80	NIA	NIA	NIA	NIA	NIA	NIA	NIA			Yes
(Zhou et al., 2018)	S	Likert	NIA	China	No/No/No	18	●	BMS	EQ, LE	RP	◕	○	0			Yes

Note: BMS = boundaryless mindset. CCA = cross-cultural adjustment. CCE = cross-cultural effectiveness. CCK = cross-cultural knowledge. CCTP = cross-cultural training performance. CT = contact theory. EC = ethnocentrism. EF = effective functioning. EQ = emotional intelligence. EI = expatriation intention. GLE = global leader effectiveness. GMA = general mental ability. GSE = general self-efficacy. I = internationalism. IAS = intercultural anxiety scale. IE = international experience. IO = international orientation. JP = job performance. LA = language ability. LE = level of education. LS = leadership success. MC = multiple choice. MCA = multicultural activity. NA = not applicable. NIA = no information available. P = performance. PT = personality traits. RP = role performance. S = Satisfaction. TTP = Top talent prediction in WHO. WB = well-being. WGI = work group involvement. WMS = world mindedness scale. WV = worldviews. S = self-administered, O = observer-based. Reliability legend: ○ = not reported, ◐ = reliability below threshold or not reported for all individual dimensions, ● = reliability above recommended threshold. Validity legend: ○ = not reported, ◔ = equal to or less than two validity tests, ◐ = three validity tests, ◕ = at least four validity tests, ● = six validity tests. R = reliability. V = validity. MI = measurement invariance. Measurement invariance (country) legend: ○ = not reported, ◐ = measurement invariance across countries tested but not confirmed or only indirectly tested, ● = measurement invariance across countries tested and confirmed. *Most popular instruments based on survey results, identified via the procedure described in Section 4.1; all versions of an instrument were coded in the same way. * *High reliability, validity and measurement invariance was assigned if a measurement instrument achieved at least ◐ in reliability, at least ◔ in validity, and at least ◐ in measurement invariance. ***High coverage was identified along two percentages: ≥ 50% of the following four top subdomains (as identified in our expert survey) covered: Open-mindedness / openness, respectfulness, (cross-cultural) motivation, and social / behavioral flexibility or ≥ 37.5% of the following eight subdomains covered: multicultural attitude, communication ability, emotional sensitivity / empathy, nonjudgmentalness, cultural meta-cognition, curiosity, self-awareness, and emotional resilience.

Table 2
Domains and subdomains in CCC instruments that relate to *perception management* ($n = 55$).

(Sub)domains adapted from Bird et al. (2010)	**Instruments covering the dimension N**	**Definition**	**Domains** building on Leung et al. (2014)	**Sample dimensions from selected instruments**
(1) Nonjudgmentalness	3	The ability to respond to others in a nonjudgmental, non-evaluating, descriptive way.	Capability	• Interaction posture
(2) Inquisitiveness		The openness towards, and an active pursuit of understanding new or different ideas, values, situations, and behaviors comprising…	Covering personality traits and attitudes / worldviews	• n/a
Open-mindedness / openness	13	An open attitude towards and readiness to learn from other cultures, and…	Personality trait	• Open-mindedness / openness • Perceived group openness to different forms of diversity
Multicultural attitude	15	The attitudes, beliefs, values, assumptions, and recognition of the own and of other cultures.	Attitude / worldview	• Multicultural attitude
(3) Acceptance of risk / uncertainty and ambiguity	9	The acceptance of and ability to handle (cross-cultural-related) risk, uncertainty, and ambiguity.	Personality trait	• Risk-taking • Tolerance for ambiguity
(4) Cosmopolitanism	5	A natural interest in and curiosity about different countries and cultures, as well as the degree of interest in world and international events.	Attitude / worldview	• Motivation to understand human behavior • Cosmopolitan outlook • Intercultural affinity • Comfort with differences
Curiosity	2	The drive to search and explore new situations.	Personality trait	• Adventurousness / curiosity
(5) Category inclusiveness	2	The tendency to cognitively accept people and situations based on commonalities rather than dividing them into categories (even though these categories may be noticeable and may exist).	Attitude / worldview	• n/a
Ethnocentrism vs. ethnorelativism	10	A continuum between centricity around the own cultural perspective and a perspective on culture that is relative to the (cross-cultural) situation.	Attitude / worldview	• Denial / defense; reversal; minimization; acceptance / adaptation; encapsulated marginality • Ethnorelativism
(6) Cultural knowledge / cognition	23	The knowledge of norms, traditions, and customs in different cultures.	Capability	• Cognitive CQ • Culture-general / context-specific knowledge • Cross-cultural/global knowledge
(7) Cultural meta-cognition	19	The ability to plan and monitor cross-cultural interaction and revise mental models based on these observations.	Capability	• Metacognitive CQ • Planning / awareness/checking • Cognitive preparation and learning behavior
(8) Global business savvy	1	Having practical knowledge, good judgment, and common sense about global business.	Capability	• Global business savvy

To organize the large number of different dimensions, we used the framework of Bird and colleagues (2010, 2013, 2019) who distinguished between perception management, relationship management, and self-management. Perception management includes all dimensions that refer to how people cognitively approach cultural differences. This comprises people's mental flexibility when faced with cultural differences, their tendency to make rapid judgments or manage their perceptions of these differences, and their interest in other cultures (Bird et al., 2010). We identified eight subdomains that belonged to perception management, meaning we added three subdomains to the original framework. Table 2 lists these subdomains, their definitions, and examples of the dimensions. In addition, we provide an overview of the number of instruments covering the domains therein. In total, 55 of the 68 instruments (81%) measured at least one facet of perception management. The four dominant subdomains of perception management are cultural knowledge or cognition (34%), cultural metacognition (28%), multicultural attitude (22%), and open-mindedness or openness (19%).

Relationship management refers to people's orientation toward the general relevance of relationships, their awareness of others, their interaction styles and values, and the level of awareness they have of themselves and their impact on others. Hence, it focuses on how mental structures translate into the development and management of intercultural interpersonal relationships (Bird et al., 2010). Bird and colleagues (2010, 2019) outlined five subdomains of relationship management, to which we added a sixth (see the six subdomains in Table 3). In total, 72% of the instruments measured at least one facet of relationship management. The dominant subdomains of the instruments are social/-behavioral flexibility (32%), emotional sensitivity/empathy (21%), interpersonal engagement (19%), and communication ability (19%).

Finally, self-management refers to the strength of one's identity and the ability to effectively manage one's emotions and stress (Bird et al., 2010, 2019). In total, 50% of the instruments measured at least one subdomain of self-management, making self-management the least common subdomain of CCC assessments. We added another facet to the original list, resulting in the eight competencies in Table 4. The dominant subdomains in self-management are self-confidence or efficacy (26%) and, comparatively, less often used emotional resilience (16%).

While Bird and colleagues's framework focuses on particular domains that the competencies address, we complemented this approach with the conceptual lens of Leung et al. (2014) who differentiated between three distinct competency types: traits, attitudes/worldviews, and capabilities (see the seventh column in Table 1a-1g). Using this approach, we determined that perception management covers traits, attitudes and worldviews, and capabilities, whereas relationship management is dominated by capabilities and self-management by traits. Overall, the most frequently used traits are self-confidence or efficacy (26%), emotional sensitivity or empathy (21%), and openness (19%). For attitudes and worldviews, multicultural attitude (22%) and

Table 3
Domains and subdomains in CCC instruments that relate to *relationship management* ($n = 49$).

(Sub)domains adapted from Bird et al. (2010)	**Instruments covering the dimension N**	**Definition**	**Domains** building on Leung et al. (2014)	**Sample dimensions from selected instruments**
(1) Relationship interest	3	The extent to which people exhibit interest in and show an awareness of their (cross-cultural) social environment.	Capability	• Relationship interest
(Cross-cultural) Motivation	10	The attention toward learning about cultures and the drive to engage in cross-cultural interactions.	Capability	• Motivational CQ
(2) Interpersonal engagement	13	The degree to which people have a desire and willingness to initiate and maintain relationships with cross-culturally different (cross-cultural) individuals.	Capability	• Intercultural relationship scale • Interaction engagement
Interaction management	10	Refers to initiating and terminating interaction based on a reasonably accurate assessment of the needs and desires of (cross-cultural) others.	Capability	• Interaction management
Sociability	2	The preference to socialize with (cross-cultural) others, rather than to be alone.	(Capability /) Personality trait	• Socializing
(3) Emotional sensitivity / empathy	14	The ability to empathize with the feelings, thoughts, and behaviors of different (cross-cultural) individuals.	Personality trait	• (Cultural) Empathy
Respectfulness	8	The ability to demonstrate respect for the (cross-cultural) beliefs and values of people.	Capability	• Display of respect • Respect for beliefs / cultural differences
(4) Self-awareness	5	The degree to which people are aware of their strengths and weaknesses, own values, and emotions, as well as an understanding of how one's beliefs, capabilities, and limitations impact others.	Capability	• Affective self-awareness • Self-monitoring
(5) Social / behavioral flexibility	22	The ability to modify ideas and behavior, to compromise, and to be receptive to new ways of doing things (in cross-cultural situations).	Capability	• Behavioral CQ • Flexibility
Social influencing	1	The ability to influence and manipulate others.	Capability	• Influencing
(6) Communication ability	13	The ability to initiate meaningful dialogue with cross-cultural different individuals and to effectively deal with communication misunderstandings.	Capability	• Intercultural communication capacity • Listening and communicative adaption / orientation
Diplomacy	1	The ability to find compromises and reach mutually acceptable solutions with (cross-cultural) others.	Capability	• Diplomacy
Language ability	2	The ability to communicate in the foreign language of an international conversation partner (or partners).	Capability	• Language fluency

ethnocentrism versus ethnorelativism (15%) are most often used. Finally, the most frequently used capabilities are cultural knowledge or cognition (34%), social/behavioral flexibility (32%), and cultural metacognition (28%).

Of the initially identified dimensions, we coded 38 as "diverse/other" and they were not included in the above frameworks. Ten dimensions relate to an over-construct (e.g., cultural intelligence), two dimensions refer to cultural values (e.g., collectivism), and four dimensions deal with experiences (e.g., past experiences). The remaining 22 "diverse/other dimensions" are a broad mixture of aspects ranging from community and family involvement to travel expectations.

With the above, we have identified a comprehensive set of (sub) domains that matter in the measurement of CCC. Leung et al.'s (2014) framework also provides an indication of how these (sub)domains might be associated (i.e., traits influence attitudes and worldviews, and the latter two affect capabilities). The associations between (sub)domains are almost completely ignored in the development of measurement instruments. Indeed, in only five instruments did the authors explain the relationships between the dimensions used to assess CCC. This omission poses a challenge to the design of appropriate multidimensional constructs. In 52 studies the authors at least offered a description of the theoretical relationship between the dimensions and the construct. For example, Thomas et al. (2015) described the relationship between cultural skills and cultural intelligence in the following way: "A key element that is consistent across theories of cultural intelligence is the presence of a skill or behavioral component. Exhibiting cultural intelligence involves skills associated with learning from social experience, appreciating critical differences in culture and background between oneself and others, relating successfully with culturally different others, and being able to adapt behavior appropriate to the particular cultural situation" (Thomas et al. 2015, p. 1102).

3.2. Step II: development of empirical meaning and measurement approaches

The theoretical meaning underlying measurement instruments serves as the foundation for developing empirical meaning in CCC instruments and informs the appropriate empirical conceptualization. The weaknesses identified above, such as the lack of distinctiveness of the constructs as defined in studies developing measurement instruments, the lack of concise definitions in some of them, and the lack of associations defined between (sub)domains and with the construct translate into weaknesses at the empirical level.

In the second step of scale development, researchers used their set of relevant dimensions to develop latent constructs and items. To do so, they are advised to integrate experts (academic experts or practitioners) into the scale development process by conducting interviews or focus groups. These experts can provide critical input about relevant dimensions or domains that the authors identified by reviewing past research and theoretical literature and potential additional domains. This approach is useful in identifying the key (sub)domains that are comprised in CCC (and not in other constructs), making it a crucial step in scale development. In addition, the input of experts can help ensure that the construct is measured accurately and that the scale items are relevant and comprehensive. Regarding the latter, scale development processes may also involve focus group interviews with individuals who are representative of the target population. They provide an opportunity to explore the perspectives of individuals from different backgrounds

Table 4
Domains and subdomains in CCC instruments that relate to *self-management* ($n = 34$).

(Sub)domains adapted from Bird et al. (2010)	**Instruments covering the dimension N**	**Definition**	**Domains** building on Leung et al. (2014)	**Sample dimensions from selected instruments**
(1) Optimism	1	The extent to which people maintain a positive, buoyant outlook toward other (cross-cultural) people, events, situations, and outcomes.	Personality trait	• n/a
(2) Self-confidence / efficacy	18	The degree to which people have confidence in themselves and exhibit a tendency to take action to overcome (cross-cultural) obstacles and to master the challenges.	Personality trait	• Self-efficacy (to adjust) • Self-confidence • Interaction confidence
Proactive initiative	1	Tendency to take action, show initiative, and address problems proactively.	Personality trait	• Orientation to action / attitude act
(3) Self-identity	5	The extent to which people maintain personal values independent of situational factors and have a keen sense of personal identity.	Personality trait	• (Ethnic) Identity
(4) Emotional resilience	11	The extent to which a person has emotional strength and resilience to cope with challenging cross-cultural situations.	Personality trait	• Emotional stability / strength • Culture shock • Even disposition
(5) Stress ability / non-stress tendency	6	The degree to which someone possesses an innate disposition to respond with calmness and serenity to the stressors that are encountered.	Personality trait	• Patience • Intercultural stress ability
(6) Stress management	2	The degree to which individuals actively utilize techniques to reduce (cross-cultural) stress.	Capability	• Life balance
(7) Interest flexibility	1	The willingness to substitute important personal interests from one's own background and culture with similar, yet different interests in the host culture.	Personality trait	• n/a
(8) Creativity	3	The ability to find creative, novel, unusual solutions for complex (cross-cultural) challenges.	Personality trait	• Creativity

and can help identify potential sources of bias or cultural insensitivity in scale items. They can also help identify areas that may need to be clarified or modified in order to make the scale more relevant and appropriate for the target population.

In only 24 cases did the instrument developers report that they involved experts in the process of creating the scale. Most researchers consulted experts at the stage of evaluating items on the scale. While the involvement of subject experts at this point is useful, this approach provides only a very narrow perspective, as it remains focused on the set of subdimensions identified. The comprehensive set of (sub)domains that we compiled in our review (see Tables 2–4) goes far beyond these more specific sets in scope. Half of the instruments were developed without reporting on the inclusion of experts or focus group interviews. The limited use of experts in the development of measurement instruments makes it difficult to create constructs that involve the core (sub)domains from a full set of potentially relevant aspects and also include (sub)domains that are distinct features of the constructs under study (as we argue next).

Comparing the instrument labels in Table 1a-1g with their subdomains covered revealed what we earlier referred to as contamination, meaning that the same subdomains are used in instruments with different labels. For example, the subdomain open-mindedness is utilized in instruments that refer to intercultural effectiveness (e.g., Stone, 2009) and in instruments that refer to cross-cultural adaptability/adjustment (e.g., Pike, 2002) as well as in instruments that refer to multicultural personality (e.g., Van der Zee et al., 2013). The same pattern is evident in other subdomains, such as cultural knowledge. This contamination of subdomains is problematic. From a theoretical point of view, using the same subdomains can create confusion and ambiguity in the interpretation of findings. A subdomain should capture a specific aspect of a construct. When the same subdomain is used to measure different constructs, it can blur the boundaries between the empirical meaning of constructs, thereby making it difficult to distinguish between them. Another issue is that using the same subdomain to measure multiple constructs can create problems with construct validity. If the same subdomain is used to measure multiple constructs, it may not be clear if the domain is actually capturing the intended aspect of each construct or if it is measuring something else entirely.

Finally, empirical meaning is reflected in the conceptualization of the instrument, that is the specification of relationships between different (sub)dimensions of CCC and the construct. Empirical measures are, after all, empirical representations of or proxies for theoretical constructs, and those representations are invariably incomplete (Dubin, 1978). There is an ongoing discussion in the literature that revolves around the use of either individual CCC dimensions or an aggregated overall construct (see for instance, Rockstuhl & Van Dyne, 2018). Therefore, we coded the conceptualization of the overall construct by following the taxonomy of Law et al. (1998). They identified four forms of multidimensional constructs: 1) a latent model in which the constructs are higher-order abstractions behind their dimensions; 2) an aggregate model in which constructs are formed as a mathematical function of their dimensions (e.g., additive or multiplicative); 3) a profile model in which constructs are formed as various combinations of their dimensional characteristics; and 4) unclassified models (i.e., constructs without a clear specification of their relationships).

According to this taxonomy, in four instruments, the authors referred to the idea of a latent model (Thomas et al., 2012), 26 instruments reported the use of an aggregate model that calculates either an average (e.g., Matsumoto et al., 2001) or the sum of all of the items (e.g., Bhawuk & Brislin, 1992), and three instruments use a profile model (e.g., OPRA, 2006). However, the majority of instruments lacked precise information on conceptualization. As a result, we coded 10 instruments as unclassified. Twenty-five instruments reported the individual dimension scores, of which 19 involved scores on individual dimensions without a comprehensive discussion of this procedure.

Thus, the heterogeneity in the definition of CCC, the ambiguity surrounding its content domain, and the often-lacking theoretical foundation are also evident in the conceptualization of CCC as a construct, more specifically, the lack thereof. Ultimately, the choice of conceptualization and, thus, between an aggregate, latent, or profile model depends on the theoretical assumptions underlying the CCC construct. Specifically, if the authors decide that CCC is a

Table 5
Experts' awareness and use of CCC instruments.

Reference	Instrument name	Overall			Key academics			Academics			Businesspractitioners		
		Aware (%)	Use (d) (%)	Future (%)	Aware (%)	Use (d) (%)	Future (%)	Aware (%)	Use (d) (%)	Future (%)	Aware (%)	Use (d) (%)	Future (%)
(Alon et al., 2016)	**Business Cultural Intelligence Quotient (BCIQ)**	24	10	**10**	31	*13*	9	**19**	**7**	**11**	**28**	***11***	**11**
(Ang et al., 2007)	**(20-item) Cultural Intelligence Scale (CQS)**	**48**	**32**	**21**	**56**	***48***	**26**	**44**	**23**	**19**	**39**	***28***	**17**
(Bhawuk & Brislin, 1992)	Intercultural Sensitivity Inventory (ICSI)	21	6	4	28	7	4	16	4	5	22	6	0
(Braskamp et al., 2014)	Global Perspective Inventory (GPI)	16	3	3	22	4	6	12	1	3	11	6	0
(Brinkmann & Van Weerdenburg, 2019)	Intercultural Readiness Check	17	5	6	0	0	0	0	0	0	0	0	0
(Briones et al., 2009)	Cultural Self-efficacy Scale for Adolescents (CSES-A)	6	2	3	9	6	6	5	0	3	0	0	0
(Caligiuri et al., 2000)	Attitudinal and Behavioral Openness Scale (ABOS)	17	2	4	31	6	6	7	0	4	11	0	0
(Chen & Starosta, 2000)	**Intercultural Sensitivity Scale**	16	3	6	15	7	9	16	0	4	17	0	0
(Clarke, 2000)	Global Leadership Assessment	13	2	5	19	7	7	8	0	4	17	6	6
(Fantini, 2000)	Intercultural Competence (ICC): A YOGA Form	10	1	3	19	4	7	5	0	1	0	0	0
(Fantini & Tirmizi, 2006)	Intercultural Competence (ICC)	18	5	6	20	9	6	16	3	7	17	0	6
(Guyton & Wesche, 2005)	Multicultural Efficacy Scale (MES)	7	3	4	11	7	4	4	0	5	6	0	0
(Hammer et al., 2003)	**Intercultural Development Inventory (IDI)**	**27**	***12***	8	35	*17*	9	**20**	5	8	**28**	***22***	6
(Hobman et al., 2004)	Group Openness to Diversity Scale	7	2	3	13	6	6	3	0	3	6	0	0
(Holcomb-McCoy & Day-Vines, 2004)	Multicultural Counseling Competence and Training Survey-Revised (MCCTS-R)	6	1	3	13	2	6	3	0	3	0	0	0
(Javidan et al., 2010)	**Global Mindset Inventory**	**36**	***11***	**10**	**41**	***19***	**15**	**33**	**7**	**9**	**33**	6	6
(Jeffreys & Dogan, 2012)	Transcultural Self-Efficacy Tool	6	1	5	7	4	6	5	0	5	0	0	0
(Kelley & Meyers, 1987)	**Cross-Cultural Adaptability Inventory (CCAI)**	24	5	5	**37**	9	6	13	1	5	28	6	0
(KnowledgeWorkx, no date)	Inter-Cultural Intelligence (ICI)	15	3	3	20	6	6	11	1	3	17	0	6
(Koester & Olebe, 1988)	The Behavioral Assessment Scale for Intercultural Communication (BASIC) Effectiveness	12	2	4	13	4	7	9	1	3	22	0	0
(Mendenhall et al., 2012)	**Intercultural Effectiveness Scale (IES)**	19	***11***	**11**	30	***22***	**19**	12	4	7	17	6	6
(Matsumoto et al., 2001)	Intercultural Adjustment Potential Scale (ICAPS)	10	1	6	13	4	7	9	0	5	6	0	0
(Mumford, 1998)	**Culture Shock**	21	8	8	30	*15*	11	17	4	5	17	0	**11**
(Munroe & Pearson, 2006)	Munroe Multicultural Attitude Scale Questionnaire (MASQUE)	10	2	4	20	6	7	4	0	1	6	0	6
(OPRA, 2006)	Overseas Preparation Indicator (OPI)	9	1	3	17	2	6	5	0	1	0	0	0
(Phinney, 1992)	Multigroup Ethnic Identity Measure (MEIM)	8	2	3	15	6	6	5	0	3	0	0	0
(Ponterotto et al., 1996)		7	1	3	15	4	6	3	0	3	0	0	0

(*continued on next page*)

Table 5 (*continued*)

Reference	Instrument name	Overall			Key academics			Academics			Businesspractitioners		
		Aware (%)	Use (d) (%)	Future (%)	Aware (%)	Use (d) (%)	Future (%)	Aware (%)	Use (d) (%)	Future (%)	Aware (%)	Use (d) (%)	Future (%)
	Multicultural Counseling Awareness Scale (MCAS)												
(Prudential_Relocation, 2015)	Global Assessment Inventory (GAI)	8	3	3	13	6	4	4	1	4	11	6	0
(Pruegger & Rogers, 1993)	Cross-Cultural Sensitivity Scale (CCSS)	21	3	4	26	7	6	17	1	4	22	0	0
(Punzo, Unpublished)	Richardson Global Cultural Style Inventory (RGCSI)	3	1	4	9	2	7	0	0	3	0	0	0
(Ruben, 1976)	**Communication Competency for Intercultural Adaptation / Intercultural Behavioral Assessment Indices**	12	5	3	17	*11*	6	11	1	3	6	0	0
(Stening & Hammer, 1992)	**Expatriate Adaptation Scale**	16	2	8	19	4	**15**	15	1	4	11	0	0
(Stevens et al., 2014)	**Global Competence Inventory (GCI)**	**27**	10	8	**37**	***20***	**17**	**19**	3	4	**28**	6	0
(Thomas et al., 2012)	**Cultural Intelligence Assessment**	**42**	***18***	8	**50**	***22***	7	**37**	***15***	**9**	**44**	***17***	0
(Van der Zee & Van Oudenhoven, 2000)	**Multicultural Personality Questionnaire (MPQ)**	23	9	6	**37**	*15*	7	17	**7**	7	11	6	0
(WorldWork_Global, 2018)	The International Profiler (TIP)	9	3	3	19	6	4	1	1	4	11	0	0

Note: Experts were presented with a list of instruments and asked to report their awareness of them (1 = aware, 0 = not aware), past/present usage (1 = used, 0 = not used), as well as intended usage in the future (1 = use in the future, 0 = no use in the future). The five highest percentages are in bold; usage rates above 10% are in italics. The 13 most popular instruments (as identified via the procedure described in Section 4.1) are in bold.

multidimensional construct, they must decide whether it exists at the same level as its dimensions (i.e., the relational level) and how the CCC dimensions are related to each other (i.e., the relational form).

3.3. Step III: instrument characteristics, scale refinement, and statistical properties

In the third step of our evaluation of the CCC instruments we reviewed the main assessment approaches of the instruments and evaluated the instrument developers' discussion of the processes for refining the scale and its statistical properties.

The majority of the instruments use a self-assessment approach. They typically ask individuals to rate their own levels of various competencies. There are also several instruments in which observers such as supervisors, colleagues, or external examiners assess CCC by observing the participants' cross-cultural behaviors (i.e., Koester & Olebe, 1988; Ruben, 1976). One instrument included an adaptation that observers could use (Van Dyne et al., 2008). Four instruments allowed to include both a self-report and an assessment by another individual (i.e., Byram et al., 2014; Kupka et al., 2011; Lievens et al., 2003; Thomas et al., 2012). For instance, Lievens et al. (2003) developed a test that measures the relevant dimensions using exercises that focus on assessment and a behavior description interview. Finally, Rockstuhl et al. (2015) proposed including explicit assessments of situational judgment in situational judgement tests (i.e., they proposed a test practice rather than a concrete instrument). They demonstrated their proposal using a verbal protocol analysis of people's thought processes when completing a test (i.e., respondents are asked to think aloud when they respond to the questions).

The clear majority of instruments use Likert-type scales, but some instruments include multiple-choice or true/false questions. For instance, there are instruments that include factual questions about different cultures that have right and wrong answers (e.g., "Is Saudi Arabia a monarchy?"; an item from Alon et al., 2016). Bartel-Radic and Giannelloni (2017) developed a test relying on the description of critical (cross-cultural) incidents in which the respondents were asked to indicate whether an individual's behavior was acceptable.

We then reviewed the type of sample and the countries that the developers used to refine and evaluate the quality of the instrument. These are important factors with respect to the generalizability of the findings, cultural sensitivity, and validity and reliability. Most instruments have been tested with student and MBA samples (27) and professionals (14) or a mix of both (11). Also, most instruments have been tested with participants from the U.S. (22), followed by instruments that have been tested with a sample of participants with different nationalities (17 mixed samples). Those instruments that have been tested in a single non-U.S. country have been assessed in China, the Netherlands, Singapore, Canada, and Australia. Only six instruments have been tested with samples in different countries. Hence, instrument developers have relied heavily on samples of people of different nationalities in one country or from the U.S. This approach gives rise to possible cultural, language, and/or selection biases that might influence the CCC instruments. In 50 cases, the researchers conducted a factor analysis to evaluate and adjust the dimensions (in 24 instruments) and/ or to assess and refine the measurement items (in 37 instruments). On average, researchers used 39 items per instrument – ranging between six (Hobman et al., 2004) and 160 items (Stevens et al., 2014).

To evaluate the instruments' statistical properties, we coded and evaluated 10 criteria related to internal consistency, reliability, convergent validity, discriminant validity, (incremental) predictive validity, social desirability, and measurement invariance (across cultures, time, and groups, such as gender; see Table 1h-1m). Overall, 52 instruments provided information on reliability and 40 instruments provided information on validity. However, the amount of information given differed considerably. Thirty-nine studies reported less than five of the main reliability and validity characteristics that we coded. Eight

Table 6
Relevance of subdomains according to expert opinions.

Dimensions	Relevance for the measurement of CCC				Relevance in cross-cultural business context			
	Overall expert sample *N* = 160	Key academic experts *N* = 53	Academic experts *N* = 89	Business practice experts *N* = 18	Overall expert sample *N* = 160	Key academic experts *N* = 53	Academic experts *N* = 89	Business practice experts *N* = 18
Perception management								
(1) Nonjudgmentalness*	5.97 (1.20)	**6.04 (1.27)**	5.90 (1.17)	**6.11 (1.08)**	5.82 (1.23)	5.81 (1.26)	5.74 (1.25)	**6.22 (1.08)**
(2) Inquisitiveness								
Open-mindedness / openness*	**6.35 (1.03)**	**6.26 (1.15)**	**6.35** (0.99)	**6.61** (0.84)	**6.13** (1.03)	**6.02** (1.04)	**6.12** (1.06)	**6.44** (0.77)
Multicultural attitude	**6.23 (1.10)**	5.96 (1.35)	**6.35** (0.90)	**6.44** (1.07)	5.91 (1.19)	5.81 (1.34)	5.94 (1.10)	**6.00** (1.15)
(3) Acceptance of risk / uncertainty and ambiguity	5.53 (1.40)	5.60 (1.42)	5.46 (1.40)	5.67 (1.56)	5.66 (1.25)	5.58 (1.40)	5.67 (1.20)	5.83 (1.29)
(4) Cosmopolitanism	5.79 (1.29)	5.62 (1.41)	5.85 (1.19)	5.89 (1.35)	5.46 (1.28)	5.43 (1.34)	5.43 (1.28)	5.67 (1.00)
Curiosity*	5.58 (1.41)	5.92 (1.17)	5.27 (1.52)	**6.11** (1.10)	5.53 (1.35)	5.47 (1.38)	5.46 (1.35)	**6.00** (1.43)
(5) Category inclusiveness	5.26 (1.47)	4.94 (1.50)	5.42 (1.50)	5.39 (1.22)	5.20 (1.43)	5.19 (1.45)	5.16 (1.43)	5.44 (1.57)
Ethnocentrism vs. ethnorelativism	5.59 (1.57)	5.55 (1.62)	5.63 (1.54)	5.50 (1.80)	5.14 (1.51)	5.13 (1.61)	5.11 (1.23)	5.28 (1.73)
(6) Cultural knowledge / cognition	5.76 (1.26)	5.57 (1.33)	5.89 (1.16)	5.67 (1.49)	5.63 (1.21)	5.58 (1.18)	5.67 (1.30)	5.56 (1.26)
(7) Cultural meta-cognition*	5.84 (1.40)	**6.02 (1.43)**	5.72 (1.34)	5.94 (1.58)	5.79 (1.33)	5.94 (1.28)	5.63 (1.11)	**6.11** (1.53)
(8) Global business savvy	4.94 (1.55)	4.68 (1.71)	5.07 (1.26)	5.06 ()	5.81 (1.25)	5.74 (1.44)	5.87 (1.18)	5.72 (1.27)
Relationship management								
(1) Relationship interest	5.42 (1.34)	5.36 (1.36)	5.40 (1.36)	5.67 (1.41)	5.54 (1.13)	5.64 (1.08)	5.46 (1.20)	5.61 (1.30)
(Cross-cultural) Motivation*	**6.09 (1.10)**	**6.11 (1.10)**	**6.01** (1.14)	**6.39** (0.83)	5.85 (1.22)	5.87 (1.17)	5.81 (1.18)	**6.00** (1.45)
(2) Interpersonal engagement	5.73 (1.21)	5.74 (1.31)	5.65 (1.17)	**6.11** (1.05)	5.54 (1.22)	5.51 (1.32)	5.60 (1.26)	5.39 (1.43)
Interaction management	5.18 (1.38)	5.13 (1.51)	5.19 (1.33)	5.22 (1.42)	5.52 (1.32)	5.23 (1.45)	5.70 (1.43)	5.50 (1.22)
Sociability	5.00 (1.44)	4.68 (1.40)	5.08 (1.52)	5.56 (0.96)	5.06 (1.36)	4.94 (1.30)	5.04 (1.41)	5.44 (1.07)
(3) Emotional sensitivity / empathy	**6.01 (1.20)**	5.92 (1.26)	**6.01** (1.02)	**6.28** (0.65)	5.56 (1.36)	5.75 (1.34)	5.35 (0.95)	**6.00** (1.22)
Respectfulness*	**6.28 (1.06)**	**6.21 (1.12)**	**6.29** (1.02)	**6.44** (1.02)	**6.15** (1.04)	5.96 (1.20)	**6.25** (1.29)	**6.22** (1.21)
(4) Self-awareness*	5.66 (1.51)	5.89 (1.47)	5.43 (1.54)	**6.11** (1.54)	5.65 (1.36)	5.70 (1.49)	5.54 (0.99)	**6.06** (1.27)
(5) Social / behavioral flexibility*	**6.09 (1.12)**	**6.09 (1.07)**	**6.02** (1.13)	**6.44** (0.90)	5.90 (1.03)	5.83 (1.10)	5.85 (1.42)	**6.33** (1.00)
Social influencing	3.66 (1.65)	3.83 (1.53)	3.67 (1.70)	3.11 (1.81)	4.47 (1.55)	4.32 (1.66)	4.61 (0.93)	4.22 (1.77)
(6) Communication ability	**6.21 (1.07)**	**6.23 (1.29)**	**6.30** (0.87)	5.72 (1.48)	**6.21** (1.07)	**6.17** (1.32)	**6.30** (1.11)	5.89 (1.20)
Diplomacy	5.66 (1.17)	5.51 (1.30)	5.71 (1.08)	5.89 (1.41)	5.78 (1.25)	5.55 (1.39)	5.93 (1.24)	5.67 (1.57)
Language ability	5.08 (1.48)	4.85 (1.40)	5.33 (1.47)	4.56 (1.64)	5.17 (1.42)	4.83 (1.62)	5.44 (1.28)	4.83 (1.38)
Self-management								
(1) Optimism	5.01 (1.57)	4.94 (1.65)	4.93 (1.54)	5.56 (1.43)	5.24 (1.31)	5.32 (1.40)	5.16 (1.18)	5.44 (1.46)
(2) Self-confidence / efficacy	5.15 (1.54)	5.26 (1.56)	5.00 (1.56)	5.56 (1.50)	5.41 (1.26)	5.40 (1.40)	5.40 (1.33)	5.50 (1.46)
Proactive initiative	4.64 (1.51)	4.49 (1.49)	4.61 (1.53)	5.28 (1.33)	5.33 (1.36)	5.17 (1.47)	5.37 (1.63)	5.61 (1.26)
(3) Self-identity	4.75 (1.61)	4.75 (1.47)	4.60 (1.69)	5.50 (1.39)	4.77 (1.57)	4.74 (1.46)	4.66 (1.23)	5.39 (1.46)
(4) Emotional resilience	5.60 (1.28)	5.64 (1.33)	5.48 (1.30)	**6.06** (0.91)	5.64 (1.27)	5.57 (1.39)	5.58 (1.41)	**6.17** (0.99)
(5) Stress ability / non-stress tendency	4.83 (1.51)	5.11 (1.45)	4.65 (1.55)	4.83 (1.49)	4.92 (1.45)	4.85 (1.60)	4.91 (1.35)	5.17 (1.29)
(6) Stress management	4.92 (1.56)	5.00 (1.61)	4.83 (1.50)	5.11 (1.66)	4.96 (1.39)	4.89 (1.45)	5.02 (1.25)	4.89 (1.49)
(7) Interest flexibility	5.34 (1.25)	5.19 (1.25)	5.30 (1.25)	5.94 (1.13)	5.21 (1.27)	4.98 (1.36)	5.24 (1.18)	5.72 (1.28)
(8) Creativity	5.04 (1.42)	4.94 (1.39)	5.06 (1.44)	5.22 (1.38)	5.33 (1.32)	5.23 (1.36)	5.40 (1.31)	5.28 (1.58)

Note: *If mentioned more than three times in the total sample, they were considered to be among the top five dimensions for measuring CCCs. Scale: 1 =not relevant at all, 7 =highly relevant. Standard deviations are reported in brackets.

studies covered at least five characteristics (e.g., Alon et al., 2016), three covered seven characteristics (Javidan et al., 2010; Thomas et al., 2012; Thomas et al., 2015), one study covered eight characteristics (Matsumoto et al., 2001), and one study covered nine out of 10 characteristics (Ang et al., 2007).

Reliability statistics were provided for 52 instruments, most typically as internal consistency reliabilities (e.g., Cronbach's alpha and composite reliability). Using the commonly accepted 0.7 threshold for Cronbach's alpha and composite reliability,[3] 36 instruments demonstrated acceptable reliability in all dimensions, seven in at least 75% of dimensions, four in about half of the dimensions, and one instrument demonstrated acceptable reliability in less than 25% of the dimensions. Thus, the reported reliability of most instruments exceeded the recommended thresholds. The developers of seven instruments reported their test-retest reliability, and self and other ratings were examined in four instruments. For both the test/retest and the self-/other ratings, the

[3] We classified the instruments into five categories: 1 = none of the dimensions had acceptable reliability; 2 = less than 25% of the dimensions had acceptable reliability; 3 = about half of the dimensions had acceptable reliability; 4 = more than 75% of the dimensions had acceptable reliability; 5 = all dimensions had acceptable reliability.

instruments showed acceptable to good reliability.

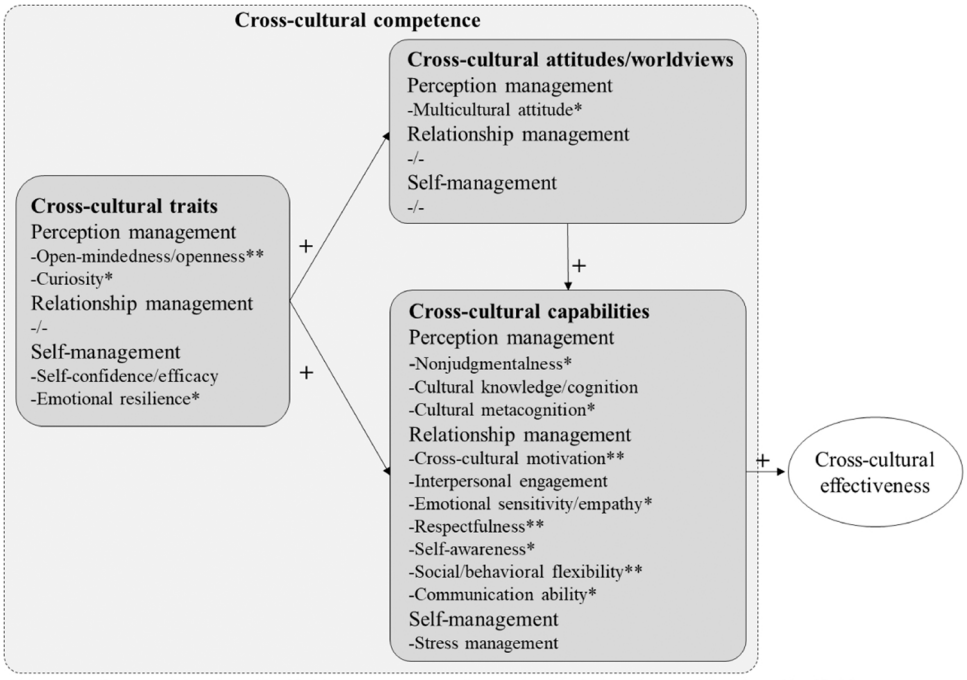
The convergent validity of an instrument is the extent of its similarity with another instrument that is understood to measure the same theoretical concept. Thus, a moderate to high correlation (i.e., correlations > .50) should be expected between instruments purporting to measure the same construct. Thirteen instruments reported findings of an instrument's validity in relation to other CCC instruments. In total, 14 different CCC instruments were used to assess convergent validity, including the Cross-Cultural Adaptability Inventory (CCAI) (Kelley & Meyers, 1987), the (20-item) CQS (Ang et al., 2007), and the Intercultural Effectiveness Scale (IES) (Mendenhall et al., 2012). Eleven studies assessed convergent validity using a single CCC instrument, one study used two CCC instruments, and two studies used three CCC instruments. In assessing convergent validity, the only CCC instruments used in more than one study were the (20-item) CQS (two studies) and different ethnocentrism scales (four studies). The correlations with the instruments used to assess convergent validity ranged from -0.13 to 0.78, with an average correlation of 0.33, with high positive correlations for more similar instruments.

Discriminant validity refers to the extent to which a measurement instrument differs from an instrument that measures a different but related concept. It is important because one criticism leveled at CCC instruments is that they measure a blend of established dimensions (e.g., the personality trait of openness, international exposure in the form of previous international experience, etc.) rather than a separate, narrowly targeted construct specific to the cross-cultural context or that CCC instruments essentially lump together independent constructs, which should be measured separately. We defined an adequate degree of discriminant validity as having a correlation below 0.5. Discriminant validity was assessed for 26 instruments using a wide range of variables including international experience (26%), personality traits (15%), language skills (7%), level of education (9%), emotional intelligence (7%), general mental ability (6%), and general self-efficacy (4%). Although the instruments in general showed sufficient discriminant validity, the degree to which the instruments and their related constructs correlated with each other varied widely, with some CCC subdomains showing higher intercorrelations with related constructs (still below 0.5).

Predictive validity refers to the extent to which an instrument predicts a particular outcome. Incremental predictive validity is conceptually identical to predictive validity, with the addition that the instrument of interest must demonstrate some unique ability in predicting an outcome (i.e., explain variance in an outcome over and above established predictors). Eighteen of the instruments reported their predictive validity. Studies that involved these kinds of validations used 20 different outcomes to examine the predictive validity, with cross-cultural effectiveness (12%), job performance (7%), cross-cultural knowledge and language acquisition (7%), cross-cultural adjustment (6%), well-being (6%), and intention/willingness to work abroad (3%) being the outcomes used more than once. Eight instruments tested and reported their incremental predictive validity. In their test of incremental predictive validity, studies used established variables comparable to those used in the assessment of discriminant validity (i.e., international experience, personality traits, and skills) with two to seven variables in an analysis. The CCC instruments explained zero to 36% of the variance in the respective outcome (9% on average), which is comparable with meta-analytic studies that examined the outcomes of Ang et al.'s (2007) CQ scale (Rockstuhl & Van Dyne, 2018; Schlaegel et al., 2021).

Finally, we reviewed whether a test for the social desirability of answers was reported for an instrument (e.g., by using intercorrelations with a social desirability scale). The association of the respective CCC instrument with social desirability was reported in 10% of the instruments, showing low to moderate correlations (0.01–0.36).

Given that CCC instruments are used in different cultural contexts, it is crucial that the instruments function the same way in populations representing different cultural groups or demographics. Only in six cases did the developers report that they tested the measurement invariance statistically across countries. One study (Tucker et al., 2014) indicated that the instrument functioned differently in samples representing different countries, while the other studies detected no measurement invariance issues. Similarly, five of the instruments that assessed measurement invariance across different groups (e.g., age, gender, and/or level of education) and three studies that assessed measurement



**Among the four top subdomains as identified in our expert survey; *among the eight further relevant subdomains as identified in our expert survey. Subdomains without a star entered the figure as they are frequently used in instrument designs (>10 instruments).

Fig. 3. Key domains of CCC.

invariance across time reported no concerns.

4. Evaluation of instruments by experts

4.1. Relevance of the instruments

To assess the relevance of measurement instruments, we used two sources related to recognition in the field. First, we used Google Scholar count citations of the paper that introduced the instrument (the column Most cited in Table 1h-1m). Some of these numbers are somewhat biased as at times the instrument was introduced in a textbook offering a variety of further relevant content. Second, we used findings from our expert survey. For the survey, we pre-selected 36 instruments. In addition to the author teams' evaluations, we based the selection of instruments on the number of count citations over time, but excluded different instrument versions (e.g., short vs. long forms). We presented these instruments in a survey and evaluated them with regard to awareness of them, their use, and possible future use (see Table 5). We then identified the most popular instruments using the following criteria: 1) instruments that were among the top five in any of the awareness, past usage, and intended future usage categories, 2) instruments that showed a usage rate of more than 10% in any of the subsamples, or 3) instruments that were rated top of mind in the spontaneous (open-ended) awareness question. We included the last category to consider any possible instruments whose exclusion might have been unwarranted based on our pre-selection and the count citations. We indicated the most popular instruments in bold in Table 5. (In addition, in Table 1h-1m we marked these in the column Most popular; here we also marked instrument versions, such as short vs. long forms as most popular though we did not differentiate between versions in the survey.)

The three instruments that scored highest on awareness are the (20-item) CQS (Ang et al., 2007), the Cultural Intelligence Assessment (Thomas et al., 2012), and the Global Mindset Inventory (Javidan et al., 2010). In terms of future use, the instruments with the highest scores are the (20-item) CQS (Ang et al., 2007), the Intercultural Effectiveness Scale (Mendenhall et al., 2012), the Global Mindset Inventory (Javidan et al., 2010), and the Business Cultural Intelligence Quotient (BCIQ) (Alon et al., 2016). The Cultural Intelligence Assessment (Thomas et al., 2012) is not part of this ranking, probably because the original version of the scale is not easy to use, a limitation that the authors themselves acknowledged. For this reason, a short-form version was subsequently proposed (Thomas et al., 2015). There are only a few differences among the different groups of experts, and 12 instruments emerged as known and used by experts, regardless of their background.

When we asked about the experts' awareness of the instruments before presenting the list, most of the participants confirmed the popularity rankings of the instruments. Noted exceptions are the three instruments without high top-of-mind scores, namely, the Expatriate Adaptation Scale (Stening & Hammer, 1992), the Intercultural Behavioral Assessment Indices (Ruben, 1976), and Culture Shock (Mumford, 1998). In contrast, one scale scored particularly high in the unaided question, namely, the Intercultural Sensitivity Scale (Chen & Starosta, 2000). Therefore, we added it to our list. Ultimately, we had a list of the 13 most popular instruments (and 19 when we included instrument versions). The list appears in the column Most popular in Table 1h-1m.

4.2. Relevance of the instruments' dimensions and content domains

Given that the instruments assessed numerous dimensions of CCC, it is difficult to determine which dimensions should be included in an instrument. Thomas et al. (2008) noted that the challenge in operationalizing CCC is to compile a "greatest hits" list, "…that is, a small collection of the most important and mostly uncorrelated skills contributing to cultural intelligence" (Thomas et al., 2008, p. 137). To evaluate the importance of the dimensions, we solicited the expert opinions.

Table 7
Overview of recommendations to improve the development of CCC instruments.

Core Step	Recommendations
Step 1	Engage more with theory and put stronger **focus on** the front-end process of **defining the construct and its underlying subdimensions**; develop a clear **understanding of how these subdimensions interrelate and relate to the construct.** To support this process: • Use our organizing scheme of CCC subdomains and definitions (in Tables 2–4) as a starting point that ensures a joint terminology • Actively decide whether the instrument should mix different types of competencies and or different content domains (e.g., perception management etc.), for instance, based on considerations that revolve around the main purpose or objective of the instrument • Pay attention to avoiding undesired overlaps with related constructs (refer to our Table 1); review the literature for new instruments that could have been suggested since the publication of this article and match them to our organizing scheme
Step 2	**Develop empirical meaning and measurement approaches** (the form of the multidimensional construct) that fit the idea of how subdomains are related to the construct and interrelate with each other and critically compare different conceptualizations. To support this process: • Consider instrument refinement rather than creating a completely new instrument (see Herman et al., 2010 for one example of this approach) • Use our findings on the relevance of CCC subdomains (see Fig. 3) to evaluate the relevance of dimensions being considered • Actively decide on the design of the construct (e.g., consider differences between latent and composite constructs) • Assess available measurement items for the dimensions that you aim to measure; use our overview of the reliability of measurement instruments (see Table 1) to identify promising items • Involve subject matter experts and focus group interviews/feedback to evaluate whether dimensions and items identified are a good reflection of the defined meaning and whether any new realities that you aim to reflect are adequately addressed
Step 3	Follow best practices to engage in **instrument refinement and statistical testing**. To support this process: • Collect pilot test data and perform initial assessments of the internal reliability and (depending on the measurement model) factor structure of the data; refine the dimensions and item list as needed • Convergent validity: assess how well the scores generated by your instrument correlate with the scores generated by other instruments designed to measure the same subdomains of CCC • Discriminant validity: make sure that the scores generated by your instrument are distinct from the scores generated by instruments designed to measure concepts that are related to CCC but conceptually different, such as emotional intelligence and general cognitive ability • Criterion validity: assess if the scores generated by your instrument correlate with criteria that the theory suggests should correlate with CCC • Predictive validity: evaluate how well the scores generated by your test correlate with cross-cultural performance criteria relevant to your study (e.g., effectiveness of communication and collaboration in international teams, adjustment to a new culture, expatriate success) • If the instrument is to be administered in different languages, or the respondents differ in their proficiency in the language of the instrument, or if they vary in terms of their demographics, test the measurement invariance of the instrument in different languages or for different demographic groups • Consider whether or not the respondents have the incentive to provide socially desirable responses and whether or not it is easy to predict what kind of answers would provide a favorable test score and consider embedding items that help detect random responses and other biases

We gave them a list of subdomains and their brief definitions (in randomized order). They used a seven-point Likert scale to assess the relevance of each subdomain in measuring CCC. The results in Table 6 indicate that the following subdomains were evaluated as most relevant in measuring CCC: open-mindedness/openness, respectfulness, cross-cultural motivation, and social/behavioral flexibility and we

subsequently refer to them as the four top subdomains.

Next, we gave the participants a list of the subdomains that they said were relevant or very relevant (by rating them as 6 or 7 on the importance scale) and asked them to select the top subdomains. We combined the answers to these two questions (a subdomain that scored 6 or higher across all expert groups and was flagged as a top subdomain more than three times) and identified eight further relevant subdomains to measure CCC: multicultural attitude, communication ability, emotional sensitivity/empathy, nonjudgmentalness, as well as cultural meta-cognition, curiosity, self-awareness, and emotional resilience. We subsequently refer to these eight subdomains as the eight supporting subdomains. We used this classification to indicate the instruments with High coverage in Table 1h-1m.

Interestingly, the subdomains associated with perception management had the highest average relevance score (5.7), closely followed by relationship management (5.5). Comparatively, the self-management subdomains received the lowest rating (5.1). This low score suggests that many experts seem to downplay the importance of self-management. Using a similar procedure, scores in the subsequent evaluation of relevance in the cross-cultural business context accorded with the findings above.

Finally, we asked the experts to list other potentially important dimensions that were missing from our list. Of the 94 experts who responded to this question, 27% explicitly stated that our list was comprehensive and they could not think of any other relevant CCC dimensions, 12% offered no comment, and the remainder provided specific suggestions. With the exception of negotiation skills (mentioned five times) and cultural values (three times), most of the proposed dimensions were mentioned only once (e.g., willingness to work abroad, biculturalism), suggesting no systemic omissions.

4.3. Evaluation of the instruments' conceptualizations

We also questioned the experts about their opinions on conceptualization. The majority of experts surveyed believe that CCC is best operationalized by individual dimensions (43%), followed by a bi-factor model (34%) that includes the effects of both the overall construct and individual dimensions. Only 9% of the experts opted for the operationalization of an overall construct. The remaining 15% were indifferent or had no opinion. The experts could also comment on their choices. Experts favoring operationalization based on individual dimensions frequently argued along the lines of the individual contributions of dimensions for different outcomes (e.g., "…it is a complex construct applied to a wide range of contexts that display significant variation" and "…although these dimensions may be related, they are not the same thing…"). For instance, one expert stated that "…it is important to be able to distinguish the various dimensions to be able to analyze the effect of specific aspects on certain outcomes…" Experts preferring an overall construct argued, among other things, that "…an overall construct may be more useful for business application…" as it is "…less confusing to users," whereas other experts merely referred to "simplicity". One noted that "…when looking deeper into the measures of CCC and their items, we see many overlaps and borrowed dimensions…."

5. Recommendations for future research

Our review makes three core contributions. First, it helps align the theoretical and empirical meaning of CCC constructs. The systematic review of the meaning of the constructs in empirical measurement instruments informs and thereby advances the refinement of the conceptualization of CCC constructs. Second, our findings can help improve measurement instruments by identifying subdomains that are very relevant for CCC, pinpointing overlaps between instruments in terms of subdomains, and indicating deficiencies in various steps of the instrument development process. Third, we contribute to better practices in using instruments including considerations of popularity of instruments in contrast to strongest psychometric properties and best coverage of relevant subdomains of CCC.

5.1. An agenda for improving the conceptualization of CCC (aligning the theoretical and empirical meaning)

One notable finding of our review is that there has not been adequate focus on the front-end process of instrument development as it relates to the provision of and agreement on the constituent definitional components of CCC. Several of the instruments reviewed are not theoretically well-grounded, or the researchers who developed them have not provided a detailed theoretical basis or even a definition of the construct that they purport to measure. Additionally, when an underlying theoretical foundation is provided, researchers have tended to adopt a narrow view of specific subdomains rather than including them in the broader, existing domains of CCC. Researchers often rely on Bandura's social cognitive theory (Bandura, 2002), Kolb's experiential learning theory (Kolb, 2015), Sternberg's multiple intelligences (Sternberg, 1999), theories of motivation (e.g., Ryan & Deci, 2000), and self-efficacy theory (Bandura, 1986) for theoretical support for their instruments. However, none of these theories explicitly addresses the conceptualization of CCC. More frequently, they are invoked to inform some aspect of learning. For example, Kolb's (1984) experiential learning theory is frequently presented as one type of process model through which people can learn cross-culturally appropriate ways of behaving (e.g., Ng et al., 2009; Yamazaki & Kayes, 2004).

Another issue that has received insufficient attention is understanding how a construct differs from other related constructs for which there are existing definitions. In addition, little attention is paid to the various subdimensions involved. Previous reviews of construct definitions that go above and beyond single constructs indicated, for instance, a stronger focus of GM constructs on mastering global management and business challenges, and a stronger focus on communication and personality traits in CCC constructs. However, these (sub)domains are not fully reflected in the content of the instruments, creating a misalignment between the theoretical and empirical meaning. Identifying these misalignments can inform researchers developing new instruments and can also inform researchers working on an overarching conceptualization of CCC.

While it is beyond the scope of the present study to propose such an overarching theory of CCC, our findings and conclusions serve as a steppingstone for such future advances in theorizing and conceptualizing CCC. First, as demonstrated throughout this review, the subdomains listed in Tables 2–4 cover the range of potential CCC content and confirm most of the conceptual work of Bird and colleagues (2010, 2019). We added several subdomains that were not explicitly part of their conceptualization. Most importantly, these subdomains include cultural knowledge and metacognition (in perception management) and communication ability (in relationship management). Overall, the enriched perception-management, relationship-management, and self-management framework we propose provides a more comprehensive overview and understanding of the similarities and differences between the various instruments. This understanding can be the basis for further conceptualizations on what should constitute different constructs.

Second, we contribute to theorizing with our list of (sub)domains that are key from an empirical perspective (Fig. 3) and can sharpen future investigations. Fig. 3 depicts the subdomains that are used most often in the instruments and that experts acknowledge as most relevant. It comprises the following subdomains of perception management: nonjudgmentalness, open-mindedness/openness, multicultural attitude, curiosity, cultural knowledge/cognition, and cultural metacognition. It comprises the following subdomains of relationship management: cross-cultural motivation, interpersonal engagement, emotional sensitivity/empathy, respectfulness, self-awareness, social/ behavioral flexibility, and communication ability. Finally, the key subdomains of self-

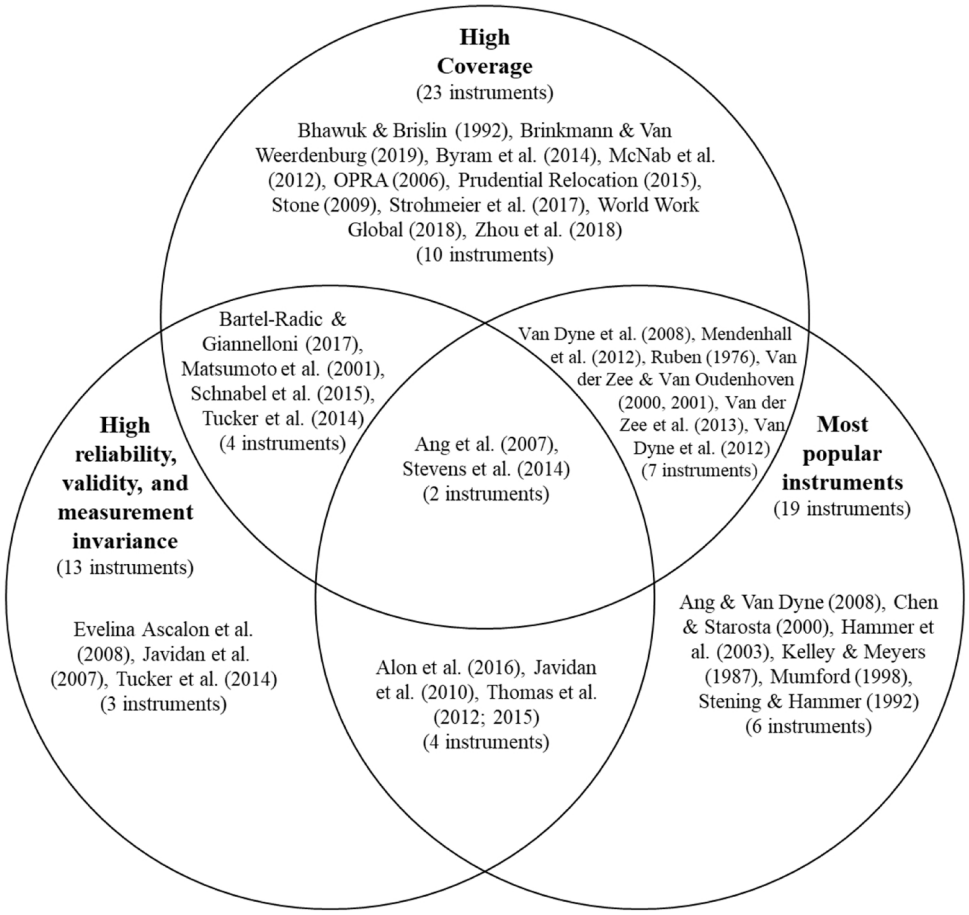


Fig. 4. Summary of the evaluation of the CCC instruments. Note: We identified 19 popular instruments (based on the evaluations in the last three columns of Table 1); 13 instruments with high reliability, validity, and generalizability across contexts; 23 instruments with high coverage.

management include self-confidence/efficacy, stress management, and emotional resilience. This list adds to theory in the field by focusing attention on dimensions that have not received sufficient consideration in past theorizing attempts. It also opens up dialogues on whether the empirical focus is appropriately set, considering the theoretical relevance of some domains. For example, it is striking that the self-management domain has received relatively little attention in measurement attempts, particularly given its conceptual criticalness for effective functioning in intercultural contexts that are associated with high levels of stress. There is clearly a need for further theoretical discussion regarding the role of this subdomain. Hence, we hope that our framework of subdomains will trigger further theoretical justification and delimitation of the constituent subdomains of CCC.

Third, including Leung et al.'s (2014) types of competencies and their associations into our framework may trigger further theorizing on the associations between subdomains of CCC. There are authors who contend conceptually that the subdomains of CCC influence each other and jointly influence cross-cultural outcomes. For instance, Thomas et al. (2008) referred to a system of interacting capabilities in developing their CQ measure (see also Thomas, 2006). Similarly, Ang et al. (2006) identified reciprocal relationships between their dimensions of CQ. Finally, a recent meta-analysis in the field of CQ also tested the joint effects of CQ dimensions (Schlaegel et al., 2021). Hence, there have been initial approaches to theorize about the joint effects between subdomains that can reinforce the impact on specific outcomes or that reinforce each other. Likewise, researchers who develop measurement instruments have started working on the nomological network between different subdomains of CCC (e.g., Bartel-Radic and Giannelloni (2017) who explored how CCC traits are associated with the cognitive dimension of CCC). We believe that it is valuable to conceptualize further on these associations between subdomains, both within competency types (e.g., between capabilities) and beyond different competency types (e.g., between traits and capabilities). Our overview of relevant subdomains will facilitate these endeavors by providing an initial organizing framework. Finally, theory building may build on arguments of necessity of specific dimensions (Richter et al., 2020; Richter & Hauff 2022).

Fourth, our framework may help identify the boundary or context conditions that are of specific relevance in various cultural contexts. For instance, the focus of Corner et al. (2021) on the cultural context of emerging markets might lead to the identification of qualifying or boundary conditions with regard to the efficacy of specific dimensions of CCC identified within this new framework of domains and subdomains.

In sum, our review focused on moving the field toward a clearer and better organization of the domains that comprise CCC. Specifically, we encouraged a more coherent taxonomy of CCC domains. This taxonomy is theory-based, drawing as it does on a model of intercultural adaptation (Black et al., 1991), and provides an ordered set of classifications – in this case (sub)domains – that can serve as the basis for future middle-range theory-building (Pinder & Moore, 1979; Richter et al., 2020).

5.2. *An agenda for improving the measurement instruments of CCC*

Our review also makes several contributions to the further development of measurement instruments of CCC, including the testing of instruments that are already available (see Table 7).

First, the framework we propose may encourage future researchers to take a more theoretical approach to instrument development and

refinement, particularly with regard to concise definitions of the construct and subdomains. In this context, we hope that our review creates an awareness about how subdomains can be categorized and defined, and the impact that decisions about these issues may have on measuring CCC. Currently, the existing instruments appear not to pay sufficient attention to certain subdomains that experts consider relevant. These subdomains include nonjudgmentalness, curiosity, respectfulness, cross-cultural motivation, and self-awareness. Hence, we encourage future instrument development that further evaluates these subdomains from a theoretical perspective and future developers to enrich their instruments accordingly. There are several popular instruments that report and perform well with respect to statistical reliability, validity, and measurement invariance but do not fully cover the most relevant CCC subdomains illustrated in Fig. 3. These instruments are the BCIQ (Alon et al., 2016), the Global Mindset Inventory (Javidan et al., 2010), and the CQ Assessment by Thomas et al. (2012, 2015). It may be worthwhile to assess whether these instruments can be complemented or refined to improve their coverage of relevant subdomains while simultaneously leveraging their strong statistical qualities.

Our review also revealed that few instrument developers have discussed how the CCC dimensions relate to each other and how they are together associated with CCC as a construct. Given the broad consensus that CCC is multidimensional it is important to – based on theoretical justification – empirically substantiate the nature of the interrelations between CCC dimensions. Do they work in parallel or together collectively in influencing outcomes? If the dimensions work together collectively, how do they do so? Do they interact with each other, or do they function in a circular and/or cascading order, as researchers dealing with the dimensions of emotional intelligence have proposed (Gunkel et al., 2014; Joseph & Newman, 2010)? Whether and to what degree CCC dimensions work in parallel or work collectively may vary with the situation and with the individual level of CCC, requiring us to define the boundary conditions of the theoretical framework. Researchers seeking to develop new CCC instruments or to refine existing ones need to engage in more discussion with theory on these aspects.

Second, we recommend more integration of subject matter experts in instrument development. They are an important source of information not only with respect to the actual items that are used to measure a subdomain but also early on in identifying and selecting relevant CCC subdomains. We provide a first overview of the relevance of (sub)domains by our expert survey; future instrument development may further contextualize this approach to different environments or new developments, for instance, in the cross-cultural work environment (e.g., more global virtual teamwork, CCC measurement in specific country contexts). In particular, we maintain that forward-looking information or information that processes recent developments or phenomena is easier to collect by involving subject matter experts than by reviewing past literature.

Third, our review showed that the assessment of instrument reliability, validity, and generalizability needs improvement. This helps to assess the instruments available and can inform future theorizing as it assists in disentangling subdomains with statistical overlap/ contamination and in identifying the subdomains that are of specific relevance for predicting specific outcomes.

More specifically, we advise future researchers to use test-retest reliability or inter-rater reliability (if applicable) assessments to demonstrate that the instrument can measure changes in CCC after interventions (e.g., Alexandra, 2020), and distinguish random differences from true improvements of CCC scores. In the assessment of convergent validity, we recommend selecting two or three regularly used CCC instruments that cover a comparable content domain and that have been used to assess similar outcome variables. Previous approaches using ethnocentrism for the evaluation of convergent validity are problematic, as ethnocentrism and CCC can hardly be considered two ends of a continuum. In addition, we also recommend that researchers conduct more tests about discriminant validity and move beyond the typically tested constructs of international experience, language proficiency, and broad personality traits, to aspects such as emotional intelligence (e.g., Crowne, 2009; Lin et al., 2012) and bi/multi-culturalism (e.g., Korzilius et al., 2017; Nguyen et al., 2018). Furthermore, while several meta-analytic studies confirmed the relationships between the CQS of Ang et al. (2007) and various outcomes (Akhal, 2019; Rockstuhl & Van Dyne, 2018; Schlaegel et al., 2021), we need more evidence to support the predictive validity of other instruments. Tests of pre- and post-training and improvement in CCC pre- and post-international assignment (e.g., Raver & Van Dyne, 2017; Varela, 2017) are of particular relevance in this respect. An example of such a study is that of Furuya et al. (2009) who found that the GCI (Stevens et al., 2014) predicted better job performance abroad and upon repatriation and documented increases in general global managerial competence. Moreover, tests may refer to outcomes such as the ability to adjust and perform well when working in an international context. Finally, it may be worthwhile to determine whether instruments that involve different subdomains such as traits versus capabilities have more or less power to predict specific outcomes.

In addition, we encourage further investigations of the invariance of instruments across different groups, including a stronger focus on working professionals. Such a focus might be more appropriate for testing the instruments in situations involving employee selection or development. Likewise, we advise testing the measures' invariance across different languages and cultures. To date, few instruments are tested statistically for measurement invariance across countries or cultural clusters (e.g., Ang et al., 2007; Stevens et al., 2014; Thomas et al., 2015). In addition, some studies have reported that the instruments function differently in different cultures (e.g., Survey of Global Business Experience by Tucker et al., 2014). Moreover, only a few instruments have versions available in multiple languages beyond English (e.g., 10 languages for the GCI, Stevens et al., 2014). Given that previous studies report challenges to measurement invariance across countries (e.g., Bücker et al., 2016; Schlägel & Sarstedt, 2016), this aspect needs more attention. More than any other types of measures, CCC instruments are likely to be used in different countries, and languages. Therefore, the field will be well-served by instrument invariance across these contexts.

To offer more concrete recommendations on testing specific instruments, we identified seven popular instruments with good coverage that could profit from more comprehensive testing and reporting of psychometric properties (Mendenhall et al., 2012; Ruben, 1976; Van der Zee & Van Oudenhoven, 2000, 2001; Van der Zee et al., 2013; Van Dyne et al., 2008; 2012). The instruments show sufficient reliability and validity (except for Ruben, 1976). However, they lack a statistical test (or reporting thereof) of measurement invariance across cross-cultural groups. For example, Ruben's (1976) instrument has the highest coverage of relevant CCC subdomains and, thus, is an excellent candidate for conducting more comprehensive tests of reliability and, in particular, of validity and generalizability. Finally, Bartel-Radic and Giannelloni's (2017) measure, which demonstrates good coverage of the relevant subdomains could profit from further testing of its reliability and validity. In fact, the authors even called for such tests in their study.

5.3. An agenda for better practices in using measurement instruments

Finally, our review aims to improve empirical research using CCC measurement instruments. We recommend richer and more frequent exchanges of knowledge between researchers using different constructs but the same subdomains in their studies. Having researchers identify instruments that share meanings involved in the (sub)domains will ultimately advance our understanding of the relationships when contrasting their findings with those of previous studies.

To facilitate this knowledge transfer further, we critically reflected on the current measurement practices vis-a-vis best practices. More specifically, we evaluated the most popular instruments and contrasted them with less popular alternatives in terms of their coverage of relevant

subdomains and statistical properties. We used a Venn diagram (Fig. 4) to highlight the instruments that may or may not overlap in the three categories. Two popular instruments show a high coverage and sound psychometrical properties (20-item CQS, Ang et al., 2007; the GCI, Stevens et al., 2014). While the CQS has been used extensively, the GCI has been used much less often, which may be due to the focus on international leadership in the article that introduced the instrument or to its length. However, the items included in the GCI measure CCC in a general context. It has been used in approximately 40 empirical studies that span a wide range of contexts and communities. Thus, it can be used in a broader international business context.

We identified four instruments that provide comparably high coverage and sound psychometric properties and may therefore be of interest for future studies (Bartel-Radic & Giannelloni, 2017; Matsumoto et al., 2001; Schnabel et al., 2015, Tucker et al., 2014). The ICAPS (Matsumoto et al., 2001) has a relatively large number of items (55) that are comparatively less CCC specific (e.g., covering items for openness, such as "I like to wonder about the origins of the universe"), which can be an advantage for studies aiming to develop a more generic profile and a disadvantage for studies seeking to predict CCC outcomes. The GLTAP (Tucker et al., 2014) provides a stronger focus on international leadership. Schnabel et al.'s (2015) instrument is more recently developed which might explain why researchers seem less aware of it. Similarly, the CCC measure of Bartel-Radic and Giannelloni (2017) is also rather new. It can provide scores for individual subdomains, but the instrument itself is not designed to create an overall score.

Four popular instruments report and perform well with respect to statistical properties, but do not fully cover the relevant CCC (sub)domains: the BCIQ (Alon et al., 2016), the Global Mindset Inventory (Javidan et al., 2010), and the CQ assessments by Thomas et al. (2012, 2015). Researchers who are using these instruments in their empirical designs might want to complement them with relevant subdomains from other instruments; either based on our Fig. 3, or along more specific considerations that relate to the research context or phenomena addressed.

Finally, we note that the popularity of six instruments seems less warranted, as they do not offer high coverage or sound measurement properties (one being a short form version of an otherwise strong instrument). This finding underscores the need for a re-evaluation of empirical practices, as the use of these instruments may be less fruitful as compared to other available instruments (see Fig. 4).

In addition to these considerations about best practices, there is a further consideration that may be of specific relevance in practical settings that typically have one of two purposes for measuring CCC: selection and development. If the aim is candidate selection, we recommend the use of instruments that involve (quasi) objective self-reports or tests. Examples include the prospective candidates' recall of the frequency or types of past behavior in certain situations (e.g., "While living abroad, I spend most of my personal time with people from my own country" from Bhawuk & Brislin, 1992), requests to provide specific examples (e.g., of cross-cultural knowledge) as an open-ended statement added to self-reports (e.g., Thomas et al., 2012), or tests that include questions with right and wrong answers (e.g., Alon et al., 2016; Bartel-Radic & Giannelloni, 2017). The challenge with these tests is that the cultural contexts of the incidents or knowledge questions must fit the selection situation. Alternatively, there are two instruments with a stronger focus on traits that were developed for recruitment and selection. The GCI (Stevens et al., 2014) and the MPQ (Van der Zee and Van Oudenhoven, 2001) contain items that, although self-reported, are worded in more neutral terms. To the inexperienced respondent, they focus less on obviously desirable personality facets, so that it is more difficult to guess the desired answers. In addition, as traits are hard to develop because they are less mutable than attitudes or worldviews, and capabilities, it is cost-effective to recruit or select candidates who already possess the desired traits. Finally, the instruments that involve external observers are an obvious choice for this purpose (e.g., Koester & Olebe, 1988; Lievens et al., 2003; Ruben, 1976; Van Dyne et al., 2008).

In contrast, when the purpose of testing is to develop training programs, we recommend focusing on instruments that involve capabilities that are deemed to be easier to develop. Researchers are advised to concentrate on instruments covering the key capabilities outlined in Fig. 3. Two instruments have this specific focus, namely the CQS (Ang et al., 2007) and the BCIQ (Alon et al., 2016). Nevertheless, it should also be noted that recent research on personality traits (Dweck, 2008; Robinson, 2009) point to their malleability, particularly with regard to the influence of personal beliefs and social factors. This finding reinforces the recommendation that the alignment between the instrument and the developmental approach be carefully considered.

6. Conclusion

Our review of 68 CCC instruments provides an overview of the approaches to measuring CCC. First, the study clarifies the important core subdomains that constitute CCC that are the subject of measurement instruments and highlights important directions for future theorizing on CCC. Second, it offers advise on advancing measurement instruments. Third, it enables researchers and practitioners to select instruments that are valid, reliable, and appropriate for the intended purpose. Finally, it enables the identification of similar subdomains used in empirical research that will advance the transfer of research findings above and beyond constructs with different labels.

Data availability

Data will be made available on request.

Appendix 1. Characteristics of the expert sample

Characteristic	Overall sample ($N = 160$)		Key academic experts ($N = 53$)		Academic experts ($N = 89$)		Business practice experts ($N = 18$)	
	N	%	*N*	%	*N*	%	*N*	%
Position								
Full professor	42	26.3	26	47.3	16	18.0	0	0
Associate professor or equivalent	48	30.0	16	29.1	32	36.0	0	0
Assistant professor or equivalent	23	14.4	7	12.7	16	18.0	0	0
PhD student or equivalent	9	5.6	0	0	9	10.1	0	0
Other positions in academia	17	10.6	3	5.4	14	15.7	0	0
Consultant	11	6.9	0	0	0	0	11	57.9
Manager	3	1.9	0	0	0	0	4	21.1
Other positions in business practice	1	0.6	0	0	0	0	1	5.3
Other	5	3.1	0	0	2	2.2	2	11.1
Main research area								

(continued on next page)

(*continued*)

Characteristic	Overall sample ($N = 160$)		Key academic experts ($N = 53$)		Academic experts ($N = 89$)		Business practice experts ($N = 18$)	
	N	**%**	***N***	**%**	***N***	**%**	***N***	**%**
Strategic management	9	5.6	3	5.5	6	6.7	0	0
International business	43	26.9	15	27.3	28	33.7	0	0
International management	27	16.9	16	29.1	11	13.3	0	0
Human resource management	12	7.5	4	7.3	8	9.6	0	0
Psychology	5	3.1	3	5.5	2	2.4	0	0
Communication	2	1.3	1	1.8	1	1.1	0	0
Sociology	1	0.6	1	1.8	0	0	0	0
Culture	2	1.3	1	1.8	1	1.1	0	0
Other	32	20.0	5	9.0	25	28.1	0	0
Gender								
Female	78	48.8	26	47.3	46	51.7	6	5.3
Male	77	48.1	26	47.3	42	47.2	12	31.6
Diverse	1	0.6	1	1.8	0	0	0	63.2
No information	4	2.5	0	0	1	1.1	0	0
	Mean	***SD***	**Mean**	***SD***	**Mean**	***SD***	**Mean**	***SD***
Age	48.95	12.11	54.94	12.27	45.18	9.57	51.37	16.69
Expertise								
Peer-reviewed academic journals	2.35	1.45	3.82	1.20	1.49	0.74	2.21	1.32
Books	1.61	1.05	2.29	1.26	1.11	0.32	2.05	1.55
Practitioner journals	1.91	1.23	2.60	1.31	1.40	0.77	2.32	1.73
Taught courses/workshops	3.75	1.30	4.25	1.08	3.37	1.28	3.95	1.55
Own measurement instrument	1.44	0.93	1.67	1.04	1.11	0.41	2.42	1.50
Use of measurement instruments	2.62	1.35	3.25	1.32	2.10	1.11	3.11	1.49
Keynote speaker, panelist, etc.	2.43	1.55	3.53	1.39	1.58	1.00	3.32	1.73
Number of instruments aware of	4.06	1.95	4.84	1.78	3.43	1.82	4.74	2.16

Note: Expertise items 1–7 are based on a 5-point scale with 1 = no/none; 2 = yes, 1; 3 = yes, 2–3; 4 = yes, 4–5; 5 = yes, 5 + . The number of items measuring expertise is based on an 8-point scale with 1 = none; 2 = 1; 3 = 2; 4 = 3; 5 = 4; 6 = 5; 7 = 6 or more

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