Optimizing cultural intelligence development by considering different types of change

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ABSTRACT

Increasing globalization and cultural diversity have accentuated the importance of developing cross-cultural competencies like cultural intelligence (CQ). Typically, scholars and professionals have viewed and operationalized CQ development as a quantitative change in mean CQ scores over time. This work argues that research and practice will benefit from expanding the operationalization of CQ development to include CQ reconceptualization and CQ measurement recalibration because these types of change are also integral to the CQ development process. This work highlights that by not examining the presence of CQ reconceptualization and CQ measurement recalibration before examining changes in mean CQ scores over time, scholars and practitioners could fail to recognize the presence of CQ development when it happens, create a threat to the substantive interpretation offindings, and further contribute to the inconsistent and conflicting research results. Methodologies for assessing different types of change in CQ development are discussed with implications for improving cross-cultural competence research and practice. The main contribution of this work lies in providing ways for improving the rigor of CQ development studies to enhance the quality of CQ development research and practice.

1. Introduction

Increasing globalization and cultural diversity in the workplace has accentuated the importance of developing and enhancing individual cultural intelligence (Andresen & Bergdolt, 2017; Bücker & Korzilius, 2015; Ott & Michailova, 2018; Raver & Van Dyne, 2017). In Western, Northern, and Southern Europe, the share of foreign-born workers has increased to over 24% (ILO, 2015), while the share of foreign-born

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civilian workers is catching up to 17% in the U.S. (BLS, 2019). There are over 80,000 multinational corporations with over 230,000 foreign affiliates that are responsible for about 23% share in the global employment (OECD, 2018). Around 60% of managers in OECD countries regularly complete tasks in international virtual teams (Taras, 2020).

Individual cultural intelligence, or cultural intelligence quotient (CQ), encompasses a system of interactive knowledge, capabilities, and skills that allow individuals to effectively adapt and function successfully in culturally diverse workplaces (Earley & Ang, 2003; Thomas et al., 2008). CQ has been linked to several positive outcomes, including stronger individual and organizational performance (Lee & Sukoco, 2010; Presbitero, 2017; Presbitero & Toledano, 2018; Wu & Ang, 2011), creativity (Xu & Chen, 2017), knowledge sharing (Collins et al., 2017), and voice behavior (Jiang et al., 2018). Two most recent meta-analyses demonstrated the important role of CQ in predicting sociocultural adjustment, psychological well-being, and performance (Rockstuhl & Van Dyne, 2018), as well as the incremental predictive value of CQ over and above key individual characteristics (e.g., personality traits, emotional intelligence, language proficiency, international experience, and general mental ability) for general intercultural effectiveness outcomes such as cross-cultural adjustment, performance, job satisfaction, and expatriation intension (Schlaegel et al., 2021).

In light of these findings and driven by a growing demand for culturally intelligent professionals, scholars and practitioners look for effective ways to develop CQ with various interventions ranging from experiential management education (MacNab et al., 2012) and cultural simulation games (Bücker & Korzilius, 2015) to cross-cultural study tours (Wood & St. Peters, 2014). However, in a recent review of the CQ development literature, Ott and Michailova (2018, p. 112) pointed out that due to the 'inconsistent and often conflicting findings, questions remain about whether and how CQ can be developed'. While many studies reported an improvement in CQ after learning experiences and interventions, some reported a lack of change and even deterioration in CQ (e.g., Eisenberg et al., 2013; Fischer, 2011). Some of these inconsistent and conflicting findings might be related to current conceptual and methodological trends in the CQ development research (Raver & Van Dyne, 2017; Taras, 2020).

One such trend is the evolving and shifting nature of the CQ conceptualization (Richter et al., 2020; Taras, 2020). CQ has been described as a four-dimensional first-order construct (Ang et al., 2007), a three-dimensional second-order construct (Thomas et al., 2008), and an eleven-factor construct with four correlated second-order factors (Van Dyne et al., 2012). To add complexity, some studies found that the

dimensionality and factor structure of CQ may vary as a function of the respondents' cultural background and language (Bücker et al., 2016; Schlägel & Sarstedt, 2016). Importantly, most studies have not confirmed the factor structure of CQ in their contexts and assumed that it remains the same through the CQ development process (even after interventions focused on refining participants' understanding of CQ).

Another trend is the predominant use of the self-reported CQ scales (Liao & Thomas, 2020), which might be prone to response-shift, self-evaluation, and other response biases (for a more detailed discussion see Taras, 2020). Authors of previous CQ development studies have noted that participants might have experienced a shift in their perceptions of CQ or may have overestimated and overreported their self-evaluations of CQ after partaking in cross-cultural training. For example, Fischer (2011) reported an unexpected decrease in the cognitive CQ dimension among cross-cultural training participants, explaining that the training might have provided participants with a 'reality check' regarding what CQ encompasses prompting participants to recalibrate their CQ scores (Fischer, 2011). Eisenberg et al. (2013) reported an unanticipated decrease in the motivational CQ dimension among participants of a cross-cultural management course and suggested that the course might have allowed participants to gain a 'more realistic look' at CQ (Eisenberg et al., 2013). However, most CQ development studies have not been testing whether the interpretation of the CQ scales has changed during the CQ development process, assuming CQ measurement stability.

A related trend is evident in research design (Raver & Van Dyne, 2017). A recent review (Raver & Van Dyne, 2017) reported that about half of the CQ development studies used cross-sectional, correlational designs and measured CQ on one occasion only, substantially limiting conclusions about CQ changes. The other half employed more rigorous quasi-experimental designs and operationalized CQ development as a quantitative change in pre-post CQ means, but most of these studies did not check for changes in the pre and post CQ conceptualization and measurements.

All in all, most CQ development studies have assumed the uniformity and stability of CQ conceptualization and CQ scales' interpretation among participants over time. Only a handful tested this assumption, which often does not hold for competencies like CQ because individuals tend to gain different meanings of competencies or may change how they calibrate themselves on various aspects making up competencies over time, especially after training or first-hand experiences (Howard & Dailey, 1979). These types of change in the conceptualization and interpretation of scales should be expected during the development of competencies like CQ (Golembiewski et al., 1976). These types of change may explain how

participants gain a 'more realistic look' of CQ or experience a 'reality check' with regards to what CQ entails following cross-cultural training and experiences (e.g., Fischer, 2011; Eisenberg et al., 2013). If not explicitly addressed, the violation of the stability of CQ conceptualization and CQ measurement interpretation assumptions may create a threat to the substantive interpretation of the CQ development findings and lead to inconsistent and conflicting results (Vandenberg & Lance, 2000).

To advance the rigor and improve outcomes in the CQ development research, this work takes a detailed look at the CQ development process by focusing on the conceptual, measurement, and quantitative types of change individuals may experience. Further, this work considers issues that may arise when the three types of change are not explicitly accounted for and examined. Importantly, this work discusses methods for assessing the three types of change using well-accepted statistical methods. Expanding the operationalization of CQ to include the conceptual, measurement, and quantitative types of change will help scholars and practitioners capture CQ development more accurately, reduce inconsistencies and conflicts in findings, gain more confidence in results, and improve the quality of the CQ development research and practice.

2. CQ and its development process

Since the introduction of CQ, two most popular CQ frameworks have proliferated– the original Earley and Ang (2003) four-dimensional CQ and a more recent Thomas et al. (2008) three-dimensional CQ. Most of the CQ development studies have relied on Earley and Ang's (2003) framework, which views CQ as a four-dimensional first-order aggregated construct consisting of correlated cognitive, metacognitive, motivational, and behavioral dimensions. Grounded in Sternberg and Detterman's (1986) multifaceted view of intelligence, this framework represents the *cognitive* dimension as cultural knowledge, the *metacognitive* dimension as higher-order cognitive processes (e.g., awareness, reflection, adjustment) that play a role in the development of cultural knowledge, the *motivational* dimension as drive and efficacy to successfully navigate cross-cultural experiences and learning, and the *behavioral* dimension as an ability to display appropriate verbal and non-verbal behaviors in different cultural contexts. Earley and Ang (2003) conceptualization served as a foundation for the most popular CQ scale—the self-reported 20-item CQS (Ang et al., 2007). Over 90% of quantitative CQ studies reviewed by Fang et al. (2018) adapted the CQS or its revised version. Out of twenty-eight CQ development studies reviewed by Raver & Van Dyne, twenty-six were quantitative and all but one used CQS (Ang et al., 2007).

A more recent conceptualization of CQ, which has been gaining considerable attention, was developed by Thomas et al. (2008; 2015). Arguing that CQ is more than an aggregated set of correlated first-order dimensions, Thomas et al. (2008) represented CQ as a second-order latent construct emerging from three first-order dimensions of cultural knowledge, metacognition, and skills. The cultural knowledge and meta-cognition dimensions are similar to Earley and Ang (2003) cognitive and metacognitive CQ dimensions. The cultural skills dimension includes perceptual, relational, and adaptive skills and behaviors. Thomas et al. (2008) argued against including motivation in the conceptualization of CQ because, although related, motivation is not a part of intelligence. Based on this framework, Thomas et al. (2015) introduced a 10-item SFCQ scale.

While many studies have examined CQ development (Raver & Van Dyne, 2017), literature reviews of these studies agree that the question of 'How is CQ developed?' remains largely unanswered (Ott & Michailova, 2018, p. 112) because 'the process of CQ learning and development was rarely discussed' (Fang et al., 2018, p. 18). Among exceptions are some early works on CQ conceptualization which provide high-level narratives of the CQ development stages and profiles.

Specifically, Thomas (2006) offered a brief description of the CQ development process grounded in iterative experiential learning. The process encompasses five stages and resembles a series of s-curves, starting with a base level of cultural knowledge that by means of meta-cognition gets updated with new and alternative cultural perspectives and gets accommodated into cultural skills as individuals pass through the stages:

1. The reactive stage involves individuals mindlessly following their cultural norms and unconsciously using their cultural frameworks to perceive and interpret the behaviors of culturally different others. It often results in miscommunications, resentments, and the inability to recognize cultural differences.
2. The recognition stage includes individuals becoming more aware of cultural mosaics through cross-cultural experiences. Greater awareness, however, may result in an overwhelming amount of information and the inability to make appropriate attributions and explanations due to the lack of theoretical knowledge, leaving many individuals in this stage to use stereotypes and 'rules of thumb' to sort through cultural complexity.
3. The accommodation stage encompasses the expansion of the individual cultural knowledge to include new culture-general (e.g.,

individualism-collectivism) and culture-specific (e.g., guanxi) frameworks so that individuals can consciously adjust their culture-related cognitions, make attributions about why something works or doesn't, and know what to say and do in diverse cultural contexts, albeit with some effort and not habitually.

4. The assimilation stage implicates individuals developing capabilities to function habitually and effortlessly in culturally diverse contexts. Individuals become 'naturals'.

5. The proactive stage involves individuals staying attuned to potential changes in various cultural contexts and automatically adjusting their cultural knowledge and behaviors to effectively facilitate interactions.

A central premise of this approach is that CQ evolves and changes over time as individuals progress from the *reactive* to *proactive* stages. The process starts with *reactive* individuals having an ethnocentric understanding of what it takes to adapt to cultural diversity (i.e., the ethnocentric conceptualization of CQ). Many reactive individuals may believe that they have high levels of CQ because they do not see differences and treat everyone the same (i.e., overestimation or miscalibration of the CQ scale). As individuals progress through the stages of CQ development, their conceptualization of CQ becomes more culturally complex through various metacognitive processes, which support the development, accommodation, and manifestation of new culture-general and culture-specific knowledge and skills. Through metacognitive awareness and self-reflection, individuals may also recalibrate their levels of CQ as they move from the unconscious *reactive* stage to the more conscious *recognition* and *assimilation* stages. As Thomas (2006) pointed out, metacognition, which involves the adjustment of conceptualizations, stereotypes, and other cultural cognitive structures, plays a central role in the CQ development process. The reinforcing effect of the metacognitive CQ dimension has been demonstrated in a meta-analytical study by Schlaegel et al. (2021), which applied the mutualism perspective to argue that CQ dimensions are interrelated simultaneously and sequentially to promote reciprocal change and development.

In another early CQ conceptualization paper, Earley and Mosakowski (2004) took a slightly different approach to describe the CQ development process through six profiles:

1. The provincial is effective in working with people of similar backgrounds but breaks down when faced with something or someone different. This is a very effective engineering team leader in a Japanese car manufacturing factory, who abruptly ends his

expatriation assignment to lead a project at an American car manufacturing factory because he has not been able to organize and motivate a team of American engineers.

2. The natural has strong cultural metacognition, adapting intuitively by carefully observing cultural differences, but lacks the knowledge of cultural frameworks and theories to attribute the intuitive adaptations. Naturals get a general sense of how to respond by watching others, but they won't be able to explain why they adapt their responses. When faced with culturally ambiguous situations, they might falter due to disorientation resulting from the lack of cultural knowledge.

3. The analyst consciously and systematically decodes and organizes cultural differences to develop new cultural learning strategies and adjust cultural cognition; however, the analyst feels lost in situations requiring behavioral adaptation due to the lack of practice and skills. This is a product manager who carefully interviews customers from culturally different backgrounds to understand why and how they use the products differently in order to develop features that reflect these culturally different use scenarios.

4. The mimic can easily imitate the new behaviors of culturally different others. Not to be confused with mockery, mimicking can predispose others, build trust, and facilitate interactions effectively. However, the mimics have a hard time attributing or explaining differences in behaviors due to limited theoretical cultural knowledge and metacognition.

5. The ambassador is not very knowledgeable about cultural diversity but is very confident and convincing about belonging in culturally diverse contexts. The ambassadors are motivated to succeed in cross-cultural interactions, but they may experience a great deal of discomfort in situations characterized by high cultural complexity due to the lack of cultural knowledge, metacognition, and skills. According to Early and Mosakowski (2004), this profile is the most common among the managers of multinational companies.

6. The chameleon boasts excellent cultural knowledge, metacognition, motivation, skills, and behavioral adaptation. They can easily be mistaken for a native of the culture, but they might be more adept to achieve results than the natives because of their 'insider's skill and outsider's perspective' (Early & Mosakowski, 2004). This profile is the most uncommon but one that all individuals should aspire to.

While many people would fall into one of the CQ profiles, many people are a hybrid of two or more profiles, especially as they work on

enhancing their weaker CQ dimensions through targeted training (Earley & Mosakowski, 2004). For example, *analysts* may engage in cross-cultural training involving role-playing or planned cross-cultural contact to practice and improve relational, communication, and adaptive skills necessary to adjust their behaviors. Role-playing and planned cross-cultural contact would also help the *analysts* to build motivation and behavioral skills.

There appear to be many parallels between the CQ development stages (Thomas et al., 2006) and profiles (Earley & Mosakowski, 2004). The *reactive* stage is likely to be found among the *provincials*, and the *recognition* stage among the *naturals* as they hone their metacognition through greater awareness of cultural diversity. The *accommodation* stage is likely to be common among individuals who have been able to develop a hybrid *natural-analyst* CQ profile, such that in addition to being able to observe and reflect on cultural diversity, these individuals develop enough cultural knowledge and learning strategies to attribute why certain cognitive and behavioral adjustment and accommodations are necessary.

Both approaches suggest that as individuals move through the CQ development stages or profiles, their understanding of what it takes to effectively function in and adapt to cultural diversity might change (i.e., CQ reconceptualization). Individuals might also change their perception and interpretation of CQ scales (i.e., CQ measurement recalibration) as they gain more cross-cultural knowledge and experience. The next section will clarify how these types of change are likely to occur in the CQ development process.

3. Types of change in CQ development

Research in organizational behavior and development has long been concerned with capturing how individuals change their competencies and attitudes due to either natural progression or planned organizational development interventions (e.g., Millsap & Hartog, 1988; Riordan et al., 2001; Terborg et al., 1980; Thompson & Hunt, 1996; Vandenberg and Self, 1993). In a seminal article on the types of change inherent in the development of competencies like CQ, Golembiewski et al. (1976) offered a useful framework for distinguishing between three types of change. First is an *absolute quantitative change (alpha change)* in the level of a variable from one measurement time to another (e.g., change in mean scores over time) given 1) stable interpretation and calibration of its measurements and 2) stable conceptualization of the variable over time. Alpha change has been commonly assumed in most CQ development studies that used pre-post design and CQ mean difference scores to operationalize CQ development.

The second type of change entails *a recalibration of the intervals on a measurement continuum* (*beta change*) resulting in a change in the scale interpretation across different time points. For example, many participants rank themselves high on CQ before a cross-cultural experience or intervention (e.g., '6' on a scale from 1 = low to 7 = high); however, after being struck by sometimes challenging realities of cross-cultural contexts and interactions, these participants recalibrate their perceptions of what it means to rank high on CQ and rank themselves lower (e.g., '4' on a scale from 1 = low to 7 = high).

The third type of change encompasses a *change in the meaning or a reconceptualization of a construct (gamma change).* For example, before a cross-cultural learning experience or intervention, participants often think that CQ simply encompasses knowledge of different cultures and cultural differences. However, after the experience or intervention, these participants often realize that just knowing about cultures and cultural differences is not enough. They find that CQ also requires conscious adjustment of one's cognitive and behavioral responses to cultural differences.

As evident from the above examples, all three types of change might be a part of the CQ development process. However, in a recent comprehensive review of the CQ development studies, Raver and Van Dyne (2017) reported that most studies of CQ development were correlational and relied on a single, one-time CQ measure, not considering any types of change in CQ. A few of the recent CQ development studies focused on the alpha change by examining the absolute quantitative change in pre and post CQ means over time using *t*-tests (e.g., Bücker & Korzilius, 2015; Eisenberg et al., 2013; Ramsey and Lorenz, 2016; Wood & St. Peters, 2014) or forms of ANOVA (e.g., Fischer, 2011; Reichard et al., 2015). Only a handful of these pre-post-design studies explicitly discussed and tested the assumptions of conceptual and measurement invariance of CQ before reporting quantitative changes in CQ means over time. For example, out of twenty-eight CQ development studies covered in a recent research review (Raver & Van Dyne, 2017), only four tested CQ invariance (e.g., Rosenblatt et al., 2013; Shokef & Erez, 2008; Van Dyne et al., 2008; Varela & Gatlin-Watts, 2014).

This omission of conceptual and measurement invariance testing may mean that researchers did hold these assumptions but didn't explicitly test them or that they were naïve to the existence and implications of conceptual (gamma change) and measurement (beta change) invariances in CQ overtime. The untested invariance assumptions may pose threats to the validity of the results. If either beta or gamma change is present, any obtained changes in mean values of the variable might not be due to the true alpha change (Vandenberg & Self, 1993; Golembiewski et al.,

1976). Further, the interpretation of mean-level differences would be meaningless if the variable's scale is not interpreted in the same way and its conceptualization is not the same across the testing occasions (Riordan et al., 2001). Interestingly, these kinds of methodological issues are not only common to CQ research. Riordan et al. (2001) reviewed over 266 longitudinal studies in five top management and psychology journals and found that 94% of the studies only focused on examining alpha change, while intensionally or naively assuming, but not testing, the presence of gamma or beta change.

This work argues that the change in CQ conceptualization (gamma change) and the change in the interpretation of the CQ scale (beta change) are inherent parts of the CQ development process and must be explicitly considered as part of the CQ development theory and testing. An understanding of the CQ development stages (Thomas, 2006) and profiles (Earley & Mosakowski, 2004) clarify how these types of change might occur.

3.1. Change in CQ conceptualization

Let's start by examining how gamma change might occur during CQ development. Many individuals start their CQ process in the *reactive* stage because of being socialized to value their cultural practices and to 'think ethnocentrically that our way is the best way' (Bhawuk et al., 2009, p. 349). When asked questions about their ability to function and interact in culturally diverse settings (i.e., CQ), individuals in the *reactive* stage often say things like 'I don't see differences…and I treat everyone the same' (Thomas, 2006, p. 91). They are likely to completely ignore these differences as anomalies instead of being aware and reflective of them (Bhawuk et al., 2009). Thus, cultural knowledge and metacognition might not be salient aspects of CQ for some individuals in the *reactive* stage because they do not seem to associate adaptation and effectiveness in culturally diverse settings with awareness, knowledge, and adjustment of cultural cognitions. Further, behavioral skills development and adjustment, which are important for accommodation and assimilation of diverse cultural norms and beliefs, is another unlikely factor in CQ for some individuals in the *reactive* stage because before being able to change culturally shaped behavior, individuals must be able to adjust their culturally shaped cognition (Thomas, 2006). Thus, in the *reactive* stage, individuals might not perceive CQ as a multidimensional construct or they might perceive CQ as consisting of some but not all dimensions depending on their developmental and social experiences. Importantly, their understanding of CQ is likely to be heavily shaped by their cultural norms and beliefs.

As individuals move to the *recognition* stage of CQ development, cultural knowledge and metacognition are likely to become more salient and important. Through diverse cultural experiences or cross-cultural training, individuals in the *recognition* stage become more aware of different cultures and associated elements, such as values, norms, and beliefs. Sorting through the cultural complexities, individuals in this stage are likely to understand the important role of self-reflection and adjustments of cultural cognition in CQ. Through cultural awareness, self-reflection, and cognitive adjustments, individuals in the self-reflection stage are likely to recognize the diverse cultural knowledge base and cultural metacognition as important aspects of CQ. Thus, the meaning and factor structure of CQ is likely to change for individuals moving from the *reactive* stage to the *recognition* stage.

Furthermore, as individuals move to the *accommodation* and *assimilation* CQ development stages, they are more likely to consider the importance of cultural skills and the ability to enact appropriate behaviors in culturally different contexts. This is especially likely after cross-cultural training focused on behavioral modification or first-hand cross-cultural experiences (Bhawuk et al., 2009). Building on cultural knowledge and metacognition, these individuals would be more likely to expand their repertoire of adaptive skills and behaviors. At first, they would be more conscious about modifying their behaviors, but with time culturally adaptive skills and behaviors would become automatic or habitual. Importantly, the meaning and factor structure of CQ is likely to further change as individuals recognize the essential role of cultural skills and behaviors in CQ.

Considering Earley and Mosakowski's (2004) CQ profiles, the conceptualization of CQ for an *analyst* would focus on cognitive and metacognitive dimensions, but not motivational, behavioral, and skills dimensions. For a *mimic*, CQ conceptualization would emphasize behavioral or skills dimensions but not cognitive or metacognitive dimensions. For an *ambassador*, CQ conceptualization would be centered around the motivational dimension but not so much around cognitive and skills dimensions.

All in all, cross-cultural experiences and training might result in individuals gaining a different conceptualization of CQ as they move through the stages and profiles of CQ development. For example, theory-based training targeting changes in how participants attribute cultural differences might impact the conceptualization of the metacognitive CQ dimension, whereas behavioral modification training might have a greater impact on the meaning of cultural skills and the behavioral CQ dimension. In either case, simply comparing pre- and post-training CQ mean scores might miss the opportunity to capture

the real changes and gains in an individual ability to adapt to cross-cultural diversity (i.e., CQ) resulting from a more developed perspective of what that ability entails. Importantly, not accounting for the change in CQ conceptualization might pose threats to the interpretation of mean CQ scores across the CQ testing occasions.

3.2. Change in CQ scale calibration

Now, let's explore how beta change might occur during CQ development. Prior to cross-cultural training or experiences, unconsciously incompetent individuals in the *reactive* CQ development stage may believe that they can easily adapt and function successfully everywhere in the world. Subconscious cultural blinders or parochialism (Adler, 2002) might result in these individuals strongly agreeing with items assessing the cognitive CQ dimension (e.g., 'I know the cultural values and religious beliefs of other cultures') and metacognitive CQ dimension (e.g., 'I am conscious of the cultural knowledge I apply to cross-cultural interactions'). Subconscious cultural blinders involve individuals perceiving and interpreting various cross-cultural phenomena through the lens of their cultural norms or stereotypes, while subconscious parochialism leads individuals to inaccurately perceive culturally different others as more similar than they are (Adler, 2002). People often learn about other cultures through social institutions, such as schools, universities, religious organizations, and media, but since these institutions are also grounded in cultural roots, the information people receive about different cultures may be influenced by their culture (Leung & Ang, 2009). For example, in one study described by Adler (2002), English Canadians were asked to describe French Canadians after listening to a recording of a French Canadian describing himself. One recording used a description that was heavily grounded in the Francophone stereotype, and another used a description that strongly contradicted the Francophone stereotype. Surprisingly, even those who listened to a description that strongly contradicted the Francophone stereotype still used the Francophone stereotype to describe French Canadians, suggesting that people may maintain cultural stereotypes they previously developed even in the face of contradictory information (Adler, 2002).

Similarly, individuals in the *reactive* CQ development stage may rank themselves high on questions assessing the motivational CQ dimension (e.g., 'I am confident that I can socialize with locals in a culture that is unfamiliar to me') and behavioral CQ dimension (e.g., 'I change my nonverbal behavior when a cross-cultural situation requires it') because they have not had a chance to experience culture shock. For many individuals, the experience of culture shock starts with a honeymoon

stage with feelings of fascination and enthusiasm about cultural differences, but after some time these feelings change to anxiety, inefficacy, confusion, and feelings of impotence due to not being able to coop with all cultural complexities (Furnham, 2019).

Thus, prior to participating in cross-cultural training or experience, individuals in the *reactive* stage might rank themselves high on all CQ dimensions (ranking themselves '7' on a scale of 1 = low to 7 = high) largely due to their incompetence (Kruger & Dunning, 1999). However, after partaking in cross-cultural training and experiences designed to introduce individuals to the concepts of CQ, culture, and cultural differences, the same individuals may move to a higher stage of CQ development and realize that they may not always adapt and function correctly and effectively in culturally different environments (ranking themselves '4' on a scale of 1 = low to 7 = high). Although the negative differences in these individuals' pre and post mean CQ scores demonstrate a significant decline in CQ, the decline might be meaningless due to the change in the interpretation of the CQ scale (i.e., beta change). Importantly, this beta change might be a product of individuals developing greater CQ. Not being able to capture the beta change might pose threats to the interpretation of the CQ development results.

All in all, as individuals move from the *reactive* stage to the *recognition* stage of CQ development, they become more aware of the cultural mosaics, including different cultural values, beliefs, norms, customs, rules, and institutions. This is possible due to a heightened sense of mindfulness (Thomas, 2006), which allows individuals to become more aware of their culture and the cultures of others. They reflect on their cultural stereotypes and habits while observing and learning about the cultural stereotypes and habits of others. This greater awareness of cultural diversity may result in an individual changing their previous interpretation of items measuring the cognitive CQ dimension (e.g., 'I know the ways in which cultures around the world are different') and the behavioral CQ dimension (e.g., 'I alter my facial expressions when a cross-cultural interaction requires it'). This mechanism was demonstrated by Kruger and Dunning (1999), who showed that incompetent and unskilled individuals failed to show insight into how deficient their knowledge and skills were, but once they went through training focused on improvement, the individuals seemed to provide more pessimistic views of their knowledge and skills, although their knowledge and skills levels had risen.

It is also possible that individuals might change their interpretation of the items measuring the motivational CQ dimension (e.g., 'I am confident that I can socialize with locals in a culture that is unfamiliar to me') as they move from the *reactive* stage to the *recognition* stage.

According to Thomas (2006), greater awareness and self-reflection of cultural diversity often results in individuals feeling overwhelmed with new information. Individuals might struggle to sort through the complexity of the cultural environments and lose confidence in their ability to deal with it. They might reassess their motivation and drive to engage and adapt to cultural diversity.

As individuals progress to other stages of CQ development, they may experience additional changes in the interpretation of the CQ scales. All things considered, it is important to account for beta changes in CQ to ensure that scholars and practitioners are comparing apples to apples when comparing pre and post mean CQ scores to assess CQ development.

4. Testing for changes in CQ reconceptualization and CQ scale calibration

Since the alpha, beta, and gamma types of change were defined in the seminal work of Golembiewski et al. (1976), different methodological techniques have been proposed to statistically detect their existence (for detailed review, see Riordan et al., 2001). The confirmatory factor analysis (CFA) approach has garnered the most support among researchers (Riordan et al., 2001). This approach was also used by authors of a few CQ development studies that tested CQ invariance prior to examining the change in the mean CQ scores over time (e.g., Alexandra, 2018a, 2018b; Alexandra et al., 2021; Rosenblatt et al., 2013; Varela & Gatlin-Watts, 2014). Thus, this work will review the CFA approach, but scholars and practitioners are encouraged to test and report different methods for testing beta and gamma types of change in CQ.

The CFA method was originally described by Schmitt (1982), who suggested that there are at least four steps in the detection of the beta and gamma change (Riordan et al., 2001). The first step is to establish the invariance of the variance-covariance matrices between different time points (e.g., Time 1, Time 2) as a possible indicator that either beta change or gamma change might be present.

The second step focuses on gamma change by examining the equality of factor structures across time points. Also known as the test of configural invariance, this step ensures that the a priori pattern of free and fixed factor loadings imposed on the scale items is equivalent across the measurement occasions. The test is based on the assumption that a factor structure represents an empirical map of a construct (Vandenberg & Lance, 2000). Differences in the factor structure at different time points show evidence of construct reconceptualization. Configural invariance can be tested by fitting the measurement model to the data at different measuring occasions simultaneously and examining the model's

fit. A poor fit would indicate a lack of configural invariance and a presence of gamma change (Riordan et al., 2001).

The third step also concerns gamma change by examining the equality of factor covariances across time points. The rationale for this test is based on the argument that the relationships among factors in a construct should remain the same across time if the construct's conceptualization is stable over time. It is accomplished by constraining the covariances of the like factor pairs to be equal across the measuring occasions (e.g., the covariance between metacognitive CQ and cognitive CQ at T1 is equal to the covariance between metacognitive CQ and cognitive CQ at T2) and examining the change in the fit of the constrained and an unconstrained model. A significant change in the fit of the models would indicate a lack of factor covariance invariance and serve as another indicator of the presence of gamma change (Riordan et al., 2001).

The fourth step focuses on beta change by examining the equivalence of factor loadings of the like scale items across measuring occasions (e.g., factor loadings at T1 are equal to the factor loadings at T2). This step, which is also known as the test of metric invariance, involves equalizing scaling units in the factors by setting factor loadings to be equal at different time points. A factor loading represents a regression slope relating an observation of a participant's score on a measurement scale to its corresponding latent variable; thus, it translates into an expected change in the observed item's score per unit change in the latent variable (Vandenberg & Lance, 2000). To the extent that the fit of the model with factor loadings constrained is significantly worse than the fit of the model with unconstrained factor loadings, beta change is said to have occurred (Riordan et al., 2001).

In a more recent review of the CFA method, Vandenberg and Morelli (2016) argued that not all of the four steps might be necessary. Specifically, the authors stated that the rarely undertaken test of the variance-covariance matrices between different time points (i.e., step one) is not needed. This test appears to be redundant and does not provide additional value for detecting gamma change or beta change beyond the more focused tests of configural and metric invariance. Another step that might be redundant is the test of the equality of factor covariances across time points (i.e., step three) because, if the presence of configural invariance could not be established, factor covariances are also likely to vary (Vandenberg & Lance, 2000). Furthermore, even if the configural invariance is established, but factor covariances are found to be significantly different across time points, it would be difficult to make a strong argument that the construct's conceptual domain has changed when a more stringent test of configural invariance is indicating otherwise (Vandenberg & Lance, 2000).

Given these most recent developments in the CFA method, it remains clear that the use of the configural invariance test to determine the presence of gamma change and the use of the metric invariance test to determine the presence of beta change continue to be a requirement in studies evaluating alpha and beta types of change in constructs like CQ across times (Vandenberg & Morelli, 2016).

A relevant issue for the CFA method is the testing of the partial invariance of factor loadings when examining beta change. Scholars argued that because some scales might be specific to a context, it might be impossible to attain full metric invariance, recommending to relax equality constraints on a minority of factor loadings to test partial metric invariance (Byrne, 2001). For example, Steenkamp and Baumgartner (1998) suggested that at least two factor loadings should remain constrained to be equal per construct when the purpose of the study is to relate the constructs in a nomological net. Vandenberg and Lance (2000) suggested a stricter requirement for a minority of factor loadings to be invariant (e.g., if a construct is measured with six items, at least four should be constrained to be equal). Most recently, Vandenberg and Morelli (2016) cautioned that partial invariance testing should not be conducted or conducted carefully only in specific circumstances because it appears to be extremely sensitive to a lack of invariance for the item selected as the reference item.

5. Discussion

Synergizing work on the types of change in individual competencies (Goleman, 1985; Golembiewski et al., 1976; Schaubroeck & Green, 1989) with research on CQ development (Thomas, 2006; Earley & Mosakowski, 2004), this work explains how the process of CQ development may involve not only a change in the mean CQ scores over time but also CQ reconceptualization (i.e., gamma change) and recalibration of CQ scales (i.e., beta change). Although methods like CFA have been widely recommended (Vandenberg & Lance, Riordan et al., 2001, Vandenberg & Morelli, 2016) for establishing the stability of CQ conceptualization and CQ scales' calibration over time, only a small handful of CQ development studies took the opportunity to do so. This omission of the CQ conceptual and measurement invariance testing suggests that researchers were either naïve to the existence of the potential beta and gamma changes or simply assumed the lack of beta and gamma changes without explicitly testing for them.

This omission could possibly explain the inconsistent and often conflicting findings in previous CQ development studies reporting a lack of change in CQ or deterioration of CQ after cross-cultural training and

education interventions focused on CQ development. It is plausible that the decline in CQ could be explained by participants changing their calibration (i.e., interpretation) of CQ scales as they learned and gained experience with cross-cultural knowledge, skills, and adaptation during interventions. This change in the interpretation of CQ scales, which could be determined by testing the nonequivalence of factor loadings of the pre- and post-intervention CQ scale items, would indicate the presence of beta change. It is also plausible that participants may have changed their conceptualization of CQ during interventions. They might have learned about new factors required for cross-cultural adaptation that they had not previously considered. For example, before training, participants might have thought that cross-cultural adaptation requires knowledge about different customs and norms; however, after engaging in cross-cultural training, they might have reconceptualized CQ to include not only knowledge but behavioral skills and motivation to adapt. This reconceptualization of CQ, which could be determined by testing the nonequivalence of CQ factor structures before and after interventions, would indicate the presence of gamma change. If beta change or gamma change is present, it would be incorrect to conclude that there was a lack of change in CQ when the change in CQ means is insignificant and vice versa. On the contrary, the presence of gamma change or beta change may indicate that participants experienced CQ development.

5.1. Implications for research

Testing for the presence of gamma change in CQ development studies may provide helpful and necessary data for research making strides on CQ conceptualization. Scholars put forth different conceptualizations of CQ with different types and number of dimensions, arguing that some dimensions might be more important than others (Earley & Ang, 2003; Rockstuhl & Van Dyne, 2018, Thomas et al., 2008). Looking for the presence of gamma change by examining before- and after-intervention factor structures of CQ would help scholars understand how the conceptualization of CQ evolves as individuals move through the different stages of CQ development. It would also help in determining which dimensions are more likely to undergo a conceptual change under various types of training. Plausibly experiential training might result in participants gaining an enhanced conceptualization of the behavioral CQ dimension as they gain different skills and expand their behavioral repertoire. On the other hand, training grounded in the analyses of scenarios and case studies might result in participants reconceptualizing the metacognitive CQ dimension as they reconstruct their understanding of what mindfulness, awareness, and reflection entail.

Testing for the presence of beta change in CQ development studies will help rule out the presence of various biases associated with the self-reported CQ scales. An undetected change in the interpretation of self-reported CQ scales (i.e., beta change) could entail a response-shift bias or a self-evaluation bias that could pose threats to the validity of the CQ development results (Taras, 2020). More research is needed to untangle various biases that the self-reported CQ scales might be prone to from the recalibration of the CQ scales resulting from CQ development.

Future research could then combine qualitative and quantitative methods to investigate the presence of beta and gamma change in the CQ development process. Scholars could probe whether certain stages of the CQ development process are more likely to result in beta change and gamma change. Scenario-based and open-ended questions could be effective in identifying the stages of participants' CQ development.

While most CQ development studies examined face-to-face interventions (e.g., cross-cultural contact, classroom-based programs), a few demonstrated that CQ development is possible in virtual cross-cultural teams (e.g., Erez et al., 2013; Shokef & Erez, 2008). Recent technological advances and social transformations provide opportunities for scholars to examine whether the process of CQ development and the presence of the three types of change in CQ transpire differently depending on whether cross-cultural training and experiences occur in face-to-face or virtual modalities.

Furthermore, CQ development research could benefit from a better understanding of variables that could enable and support CQ reconceptualization and recalibration during CQ development. For example, multiculturalism and previous intercultural experience may influence how people approach and progress through the various stages of CQ development and, plausibly, influence the presence of CQ reconceptualization and CQ measurement recalibration.

5.2. Implications for practice

Accounting for the presence of CQ reconceptualization and CQ measurement recalibration, practitioners will have more confidence in their CQ development results, avoid the threat of misinterpreting their findings, achieve more comprehensive and consistent comparisons of results across studies, and be more effective in advancing their CQ development efforts. Furthermore, knowing that reconceptualization and measurement recalibration are inherent in the CQ development process, practitioners will be able to design management learning and education interventions that target specific outcomes. For example, some practitioners might want to strengthen participants' capabilities given the pre-established

meaning (i.e., conceptualization) of CQ. In this case, practitioners will want to rule out the presence of CQ reconceptualization and CQ measurement recalibration by establishing configural and metric invariance of the CQ scales before evaluating changes in the mean CQ scores over time. Other practitioners might be looking for participants to experience CQ reconceptualization and CQ measurement recalibration as outcomes of certain interventions. This would be especially beneficial for participants in the early stages of CQ development with a limited understanding of the capabilities and skills required for effective adaptation in culturally diverse contexts. For example, practitioners could design modules focused on explaining the concept of cultural metacognition and providing opportunities for participants to expand their awareness of cultural differences, to reflect on their own and others' cultural cognitions (e.g., beliefs, stereotypes, biases), and to practice adjusting their cultural cognitions. These modules are likely to result in the reconceptualization of the metacognitive CQ dimension or its measurement recalibration. Similarly, practitioners could focus on explaining the concept of behavioral CQ and provide opportunities for participants to practice adjustments in their verbal and non-verbal behaviors, to hone their conflict resolution skills, or to sharpen their negotiation skills fit for culturally different contexts using role-playing or actual cross-cultural contact. These modules are likely to result in the reconceptualization of the behavioral CQ dimension or its measurement recalibration. Designing modules that could provide opportunities to experience and effectively navigate 'culture-shock' and similar other challenges of cross-cultural interactions could help participants gain a renewed understanding of the drive and efficacy required for cross-cultural interactions, potentially leading to the reconceptualization of the motivational CQ dimension or its measurement recalibration. Importantly, examining all three types of CQ change in the context of different types of cross-cultural training interventions and experiences could help practitioners gain a better understanding of how CQ develops.

6. Conclusion

This work aims to improve the rigor and quality of the CQ development research and practice by acknowledging that CQ development encompasses more than one type of change. In addition to the typically examined quantitative change in mean CQ scores over time, CQ could show up as a change in individuals' conceptualizations of CQ and as a change in individuals' interpretations of CQ scales. Scholars and practitioners will benefit from expanding the operationalization of CQ development to include these types of change in order to enhance the methodological

rigor in research and to improve the design and outcomes of training and education aiming to improve CQ. Table 1 summarizes the current CQ development research practices, potential associated issues, and recommendations for future research and practice brought forth in this work. Simple and accessible methodologies are available for examining the presence of CQ reconceptualization and CQ measurement recalibration. The CFA approach has garnered strong support among researchers (Riordan et al., 2001), most recently recommending to test configural invariance to determine the presence of gamma change (e.g., CQ reconceptualization) and metric invariance to determine the presence of beta change (e.g., CQ measurement recalibration) (Vandenberg & Morelli,

Table 1. Current practices, potential issues, and recommendations for the CQ development research and practice.

Current research practices	Potential issues	Recommendations
Many CQ development studies used cross-sectional, correlational designs and measured CQ on one occasion only, substantially limiting conclusions about CQ changes (Raver & Van Dyne, 2017). Some CQ development studies employed more rigorous quasi-experimental designs and operationalized CQ development as a quantitative change in pre-post mean CQ scores (Raver & Van Dyne, 2017). However, most of these studies assumed the uniformity and stability of the CQ construct and scales among participants over time, relying on t-test and ANOVA techniques to test the pre-post differences in CQ means. Some studies reported that during the CQ development process participants might have gained a more realistic understanding of what CQ entails and self-assessed differently on the pre and post CQ measures (e.g., Fischer, 2011; Eisenberg et al., 2013).	• Inconsistent and conflicting findings across CQ development studies (Ott & Michailova, 2018). • Inconsistent findings due to changes in the number of factors and dimensions of the CQ construct.(Bücker et al., 2016; Schlägel & Sarstedt, 2016).Self-reported CQ scales might be prone to response-shift, self-evaluation, and other response biases (Taras, 2020). • Threats to the substantive interpretation of CQ development findings due to the violation of the conceptual and measurement stability assumptions (Vandenberg & Lance, 2000).	• Changes in the conceptualization of CQ and changes in the interpretation of its scales should be expected parts of the CQ development process. • Explicitly test the presence of change in CQ conceptualization (i.e., gamma change) when examining CQ development. While many statistical procedures have been proposed (Riordan et al., 2001), the use of the CFA approach to assess the configural invariance of the CQ construct across testing times has garnered the most support and recommendations (Vandenberg & Morelli, 2016). • Explicitly test the presence of change in the interpretation (i.e., calibration) of CQ scales (i.e., beta change) when examining CQ development. While many statistical procedures have been proposed (Riordan et al., 2001), the use of the CFA approach to assess the metric invariance of the CQ scale across testing times has garnered the most support and recommendations (Vandenberg & Morelli, 2016). • Examine the change in pre and post mean CQ scores (i.e., alpha change) by using t-test or ANOVA techniques only after ruling out the presence of CQ reconceptualization (i.e., gamma change) or CQ measurement recalibration (i.e., beta change).

2016). Testing the presence of gamma and beta changes in addition to the alpha change (i.e., change in mean CQ scores) when examining CQ development, will not only help mitigate biases related to the self-assessed nature of the CQ constructs but significantly improve the methodological rigor and enhance the quality of CQ development research and practice.

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