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Short form measure of cultural intelligence: A Portuguese validation

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ABSTRACT

More and more workplaces need employees who can work effectively with people of diverse cultural contexts. Cultural intelligence is a core social ability to interact successfully in cross-cultural environments. The Short Form measure of *Cultural Intelligence* (SFCQ) has been validated in several countries, although not for Portuguese-speaking countries. This paper describes the findings of three studies conceived to validate the SFCQ in the Portuguese language. The first study supports the SFCQ scale as unidimensional with three intermediate facets and possessing adequate internal consistency in a sample of college students (N = 217). In favor of construct validity, the instrument is weakly associated with but dissimilar to ethnocentrism and personality and is positively related to various markers of multicultural experience. Regarding criterion-validity, the SFCQ is related, as expected, to sociocultural adaptation and having a close friend from another culture. The second study supports the construct validity and the concurrent validity of the Portuguese SFCQ scale using a different sample of national college students (N = 195). The final study (N = 181) also supported the construct, the convergent, and the criterion-related validities of the Portuguese SFCQ scale in a sample of international students. It merits noting that in these three studies cultural intelligence emerged as a second-order single factor with three first-order factors, in particular, cultural knowledge, cultural skills, and cultural metacognition. These results substantiate the validity of the SFCQ and demonstrate this Portuguese version as a tool with substantial evidence for easily assessing cultural intelligence.

Introduction

The concept of cultural intelligence emerged in the early 21 st century and has received much attention. A recent review of the research on cultural intelligence (also known as cultural quotient, CQ) examined 186 studies (Fang, Schei, & Selart, 2018). These scholars observed that cultural intelligence encompasses a broad range of research domains (e.g., business, management, education, psychology, information science, and public administration), and concerns different levels as well (individual, dyadic, and organizational ones). In management literature cultural intelligence is often mentioned as a main intercultural competency (Andresen & Bergdolt, 2017; Hu, Liu, Zhang, & Wang, 2020; Schwarzenthal, Juang, Schachner, & van de Vijver, 2019; Ward & Fischer, 2008; Young, Haffegee, & Corsun, 2017). CQ is a construct in relation with intercultural effectiveness (Pekerti & Arli, 2017; Thomas & Inkson, 2003). In fact, the cultural intelligence construct represents an important realm of cross-cultural workplaces (Dollwet &

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Reichard, 2014). The main goal of this current work is to scrutinize the psychometric properties of the Portuguese version of the Short Form measure of Cultural intelligence (SFCQ). This measure "captures the original theoretical intent of a multifaceted culture general form of intelligence that is related to effective intercultural interactions" (Thomas et al., 2015, p. 2).

Cultural intelligence theory

CQ concerns "a person's capability to adapt effectively to a new cultural context" (Earley & Ang, 2003, p. 59). CQ draws upon the increasing attention to "real-world" layperson intelligences that highlight peculiar aspects, including social intelligence (Thorndike, 1920), emotional intelligence (Petrides & Furnham, 2006; Salovery & Mayer, 1990), multiple intelligences (Furnham, 2001; Gardner, 1999), practical intelligence (Sternberg & Wagner, 2000), and reversal multiple intelligences (Neto, Mullet, & Furnham, 2009; Neto, Mullet, & Furnham, 2016). CQ is propelled by globalisation (Earley & Ang, 2003).

In accordance with Ott and Michailova (2018) there are two ways of conceptualizing CQ: one established by Earley and Ang (2003), and the other by Thomas et al. (2008). Earley and Ang (2003) argued that CQ is a multidimensional construct containing 3 facets: cognitive (including metacognitive), motivational, and behavioral. They proposed the cognitive and metacognitive being together, but the two facets have subsequently been separated and CQ is regarded as a construct with four factors (Ang et al., 2007).

The cognitive facet concerns knowledge and information about other cultural contexts that people acquire and archive for subsequent utilization. The metacognitive CQ refers to the way people process and use this information. The behavioral facet allows people to make adequate verbal and behavioral actions in intercultural interactions. Lastly, the motivational CQ drives people to intercultural interactions, and reflects the person's valuing of interacting in cross-cultural contacts. For Earley and Ang (2003) the facets work together for an individual to be able to present adequate cross-cultural interactions. Therefore, the necessary components of cultural intelligence are "having relevant knowledge, being able to process the knowledge, knowing how to adapt and portray that knowledge, and being motivated to use this knowledge" (Ott & Michailova, 2018, p. 104).

According to the second CQ conceptualization, CQ concerns "a system of interacting knowledge and skills linked by cultural metacognition that allows people to adapt to, select, and shape the cultural aspects of their environment" (Thomas et al., 2008, p. 126). The accomplishment of global CQ is a function of three primary CQ dimensions comprising cultural knowledge, cross-cultural skills and cultural metacognition that positively influence effective cross-cultural interactions in different contexts. For these authors CQ is a higher-order construct emerging from the interaction of lower-order facets.

CQ includes both particular culture content knowledge and global process knowledge about the cultural effect on behavior (Thomas et al., 2008). Cultural knowledge involves understanding diverse cultures and complexity knowledge (Thomas et al., 2015). The skills or behavioral component remains consistent across theories of CQ. Lastly, cultural metacognition covers: "(a) awareness of the cultural context, (b) conscious analysis of the influence of the cultural context, and (c) planning courses of action in different cultural contexts" (Thomas et al., 2015, p. 4).

Cultural intelligence should be differentiated from other constructs of intelligence, such as emotional intelligence and social intelligence (Earley, 2002; Thomas, 2006). Cultural intelligence allows individuals to "look beyond their own cultural lens" (Earley, 2002, p. 285) and is suggested as being crucial for cross-cultural interactions, which points out a difference from social and emotional intelligence. Thomas (2006) has also observed that cultural intelligence shares features with emotional intelligence and social intelligence; however, it is different as what is meaningful in one cultural context may not apply in another. Cultural intelligence has also been differentiated from personality traits. As a kind of competence, cultural intelligence "is state-like and malleable and can be predicted by personality traits that are more stable" (Fang et al., 2018, p. 150).

Measurement of cultural intelligence

Grounded on Earley and Ang's (2003) conceptualisation of CQ, Ang et al. (2007) created the Cultural Intelligence Scale (CQS). The CQS aims to assess people's ability to successfully cope with situations marked by cultural diversity. This instrument contains 20 items covering four components of CQ: cognitive, metacognitive, behavioral, and motivational. The authors validated this measure by demonstrating that "CQ is conceptually and empirically distinct from other individual differences, including emotional intelligence and personality" (Ang et al., 2007, p. 363). Ward, Fisher, Lam, and Hall (2009) demonstrated convergent and discriminant validity of the CQS among sojourners in New Zealand. The CQS was adapted to the Portuguese population by Sousa, Gonçalves, Reis, and Santos (2015). This adaptation showed satisfactory psychometric characteristics.

Based on their 2008 conceptualization, Thomas et al. (2015) created a 10-item short form CQ (SFCQ) scale in 5 languages: English, French, Indonesian, Turkish, and traditional Chinese. The SFCQ scale was designed to capture the multifaceted conceptualizations of intelligence as a higher-order construct that appears through the interaction of lower-order factors: knowledge (2 items), skills (5 items), and metacognition (3 items).

The authors validated this measure by showing that CQ is dissimilar to personality traits and emotional intelligence and shows negative correlations with ethnocentrism and positive correlations with various markers of multicultural experience. Furthermore, the authors found that the SFCQ scale is able to predict intercultural effectiveness which includes "sociocultural adaptation, the development of long-term relationships with culturally different others, job performance in a multicultural environment, and the ability to make accurate causal attributions for cross-cultural interactions" (Thomas et al., 2015, p. 11).

Currently, short scales are increasingly used to measure psychological constructs, and the prevalent reasons for using them are saving evaluation time and related costs (Kemper, Trapp, Kathmann, Samuel, & Ziegler, 2019; Rammstedt, Kemper, & Schupp, 2013). Indeed, it has been demonstrated that short forms can be just valid as long and sophisticated ones (Burisch, 1997).

The SFCQ is a promising tool for evaluating intercultural competence, but to the best of our knowledge it has not yet been systematically validated for Portuguese-speaking countries (Angola, Brazil, Cape Verde, East-Timor, Equatorial Guinea, Guinea-Bissau, Macau, Mozambique, Portugal, and S. Tome and Principe).

A Portuguese validation of SFCQ

Portugal is becoming a more ethnically diverse country. This county has a long history of emigration and is a nation with mixed migratory patterns. In 2015 Portuguese migrants across the world numbered more than 2.3 million, which corresponds to about 20 percent of the population living in Portugal. Furthermore, more than 260 million people around the globe are native Portuguese speakers.

Portugal has recently had a surge in the number of foreigners who have come to study and work. In the 2000/01 academic year the proportion of international students attending Portuguese institutions of higher education was 3%, but in 2017/18 this number increased to 13.1 % (General Directorate of Education and Science Statistics, 2017). In 2018, according to the Foreign and Borders Service (SEF, 2019), 480,300 foreign people resided legally in Portugal, representing 4.7 % of the entire population. The rapid growth of the immigrant population has been from the 1990s onwards, when there were only approximately 100,000 immigrants.

These modifications in the structure of Portuguese society point to the need for implementing intercultural competencies. The development of skills such as CQ is considered a relevant ability to function effectively in a culturally diverse setting (Thomas et al., 2008, 2015). In light of the recent increases in cultural diversity there is a need for psychometrically sound measurements of cultural intelligence.

The present work aims to scrutinize the psychometric characteristics of the Portuguese version of the SFCQ scale. The main research question is, therefore: does the SFCQ scale provide reliability and validity in a Portuguese cultural context?

In this sense, the current research has four objectives. First, in order to examine the construct validity, we investigate the internal structure of the SFCQ scale by means of CFA concerning the theoretical expectations of the relationships among various items. In this regard we expect to find a second-order single factor with three first-order factors for the SFCQ: knowledge, skills, and metacognition (Thomas et al., 2015).

Second, given that a reliable scale is required for construct validity (Pedhazur & Schmelkin, 1991) we estimate internal consistency using the composite reliability and the Cronbach's α. In line with the original study (Thomas et al., 2015) we expect to find high internal consistency.

Third, we analyze the relationships between the SFCQ tool and other constructs in order to construct a nomological network (Cronbach & Meehl, 1955). One component of a nomological network is convergent validity which will be examined by assessing the relationships of SFCQ measure with multicultural experience. Another component of the nomological network is discriminant validity. This is investigated through examining whether the SFCQ scale is dissimilar from ethnocentrism and personality.

One useful trait model for examining the relationship between CQ and personality is the Five Factor model (Big Five) (Costa & McCrae, 1992). This model includes five factors which synthetize more detailed personality traits: Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. The relation between personality and CQ was researched by Ang, Van Dyne, and Koh (2006). They found that openness was positively associated with cognitive, meta-cognitive, behavioral and motivational components of CQ. Furthermore, extraversion was related to motivational, behavioral, and cognitive components; agreeableness was linked to the behavioral component; and conscientiousness was related to the meta-cognitive component. In contrast to what was expected, neuroticism was related to the behavioral component. More recently, Thomas et al. (2015) reported significant and positive correlations with the SFCQ scale and openness, agreeableness, extraversion, and conscientiousness. In addition, these scholars showed a significant and negative correlation between the SFCQ scale and neuroticism.

Fourth, we investigate the criterion-related validity. We examine whether the SFCQ scale is associated with variables that were often related to intercultural effectiveness. We taste whether the SFCQ scale is related to intercultural adjustment (i.e. sociocultural adaptation) and to having a close friend from other cultures.

To achieve these objectives, we conducted three studies. The first one examines the proposed structure of the SFCQ scale among national college students. In addition, it examines the internal consistency of the SFCQ and its convergent, discriminant and criterion validity. The second study explores the construct validity and the concurrent validity of the Portuguese SFCQ scale in a different sample of national college students. Lastly, the third study involves international students to analyze whether the satisfactory psychometric characteristics of the SFCQ scale can be generalized to this group.

Globally, in the current set of studies we thoroughly and carefully examine the construct validity, reliability, convergent validity, discriminant validity, criterion validity, and concurrent validity of the SFCQ. Descriptive statistics, CFA, internal consistencies, Pearson's correlations, and t-tests were performed were performed in the three studies.

Confirmatory Factor Analysis (CFA) was conducted to evaluate the adequacy of the unidimensional model for the SFCQ. Various criteria were utilized to assess overall fit of the tested models. A good model fit is indicated by a non-significant $\chi 2$ test, but since $\chi 2$ is sensitive to a large sample size we also examined other recommended model fit indices to assess model fit, including goodness of fit index (GFI), comparative fit index (CFI), standardized root mean square residual (SRMR) and root mean square error of approximation (RMSEA). Models with CFI and GFI values in the .90 s or greater denote an acceptable fit; RMSEA and SRMR with respective values close to .06 and .08 or lower denote an acceptable fit, and values up to .10 denote a reasonable fit (Browne & Cudeck, 1993; Hu & Bentler, 1999).

Internal consistency of the SFCQ was evaluated by composite reliability (CR) and ordinal alpha (α). Values of CR and $\alpha > 0.70$ are deemed adequate (Hair, Black, Babin, & Anderson, 2010). The AVE (average variance extracted) was performed to evaluate

convergent validity. AVE values equal to or greater than .50 evidence convergent validity (Hair et al., 2010; Marôco, 2014). The Pearson's correlations allowed examining the associations between SFCQ and the other measures, such as ethnocentrism, personality, sociocultural adaptation and markers of multicultural experience. Differences between groups were checked using *t*-test. All analyses were calculated using IBM SPSS AMOS (version 25). Significance levels were set at .05.

Study 1

The first study aimed to examine whether the SFCQ scale is unidimensional with three intermediate facets and possesses adequate internal consistency in a sample of national college students. Besides construct validity, it explored whether other kinds of validity, such convergent, discriminant and criterion validity of the SFCQ are supported.

Method

Participants

A total of 217 college students from the Instituto Politécnico of Bragança took part in this study. The sample included 169 women and 48 men. The average ages of the respondents was 20.59 years (*SD* = 3.52; range: 18–42 years). All indicated Portuguese nationality.

Instruments

Beyond the background information (age, gender, nationality, total of languages spoken and countries visited, and whether they have a close friend from another country) the survey comprised the following instruments:

Cultural intelligence

Cultural intelligence was assessed by means of the 10 items of the Short Form Cultural Intelligence (SFCQ; Thomas et al., 2015) about one's experiences when interacting with people from other cultures. The SFCQ scale was translated into Portuguese. The translation of tools constitutes a key methodological challenge of cross-cultural psychology (van de Vijver & Hambleton, 1996). In designing the Portuguese version of the SFCQ, the authors followed the guidelines suggested by the literature on cross-cultural psychology (Brislin, 1980). Two bilinguals translated the SFCQ scale into Portuguese, and then two other bilinguals back-translated into English. Minor differences were corrected by agreement among the translators. The agreed translation was then pilot-tested with eight Portuguese college students. The final version of the SFCQ can be seen in Table 1. The SFCQ scale comprises statements to measure three components. Cultural knowledge was evaluated with two statements. A sample statement is: "I know the ways in which cultures around the world are different". Cultural skills were evaluated with five statements. A sample statement is: "I enjoy talking with people from different cultures". Cultural metacognition was evaluated with three statements. A sample statement is: "I am aware of the cultural knowledge I use when I am interacting with someone from another culture". Each statement response was graded on a five-point Likert-type format (1 = "*not at all*", 5 = "*extremely well*"). Greater scores denote greater levels of cultural intelligence. Past research has evidenced adequate reliability coefficients of the SFCQ scale ranging from .77 to .91 (Thomas et al., 2015).

Personality

The Portuguese version of the *NEO-FFI* was used (Portuguese version by Barros & Marques, 1996; Neto & Mullet, 2004). The

Table 1
Portuguese translation of the SFCQ scale.

Item English version	Item Portuguese version
1 I know the ways in which cultures around the world are different.	Eu conheço as formas pelas quais as culturas ao redor do mundo são diferentes.
2 I can give examples of cultural differences from my personal experience, reading, and so on.	Eu posso dar exemplos de diferenças culturais da minha experiência pessoal, leitura, e etc.
3 I enjoy talking with people from different cultures.	Eu gosto de falar com pessoas de culturas diferentes.
4 I have the ability to accurately understand the feelings of people from other cultures.	Tenho a capacidade de compreender com exatidão os sentimentos das pessoas de outras culturas.
5 I sometimes try to understand people from another culture by imagining how something looks their perspective.	Às vezes eu tento entender as pessoas de outra cultura imaginando a sua perspetiva.
6 I can change my behaviour to suit different situations and people.	Eu posso mudar o meu comportamento para se adequar a diferentes situações culturais e pessoas.
7 I accept delays without becoming upset when in different cultural situations and with culturally different people.	Eu aceito atrasos sem ficar aborrecido quando estou em situações culturais diferentes e com pessoas culturalmente diferentes.
8 I am aware of the cultural knowledge I use when interacting with someone from another culture.	Estou ciente do conhecimento cultural que uso quando interajo com alguém de outra cultura.
9 I think a lot about the influence that culture has on my behaviour and that of others who are culturally different.	Penso muito na influência que a cultura tem no meu comportamento e no de outras pessoas que são culturalmente diferentes.
10 I am aware that I need to plan my course of action when in different cultural situations and with culturally different people.	Estou ciente de que preciso planear o decurso do meu comportamento quando estou em diferentes situações culturais e com pessoas culturalmente diferentes.

NEO-FFI evaluates Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness with twelve items each (Costa & McCrae, 1992). Each statement is answered on a five-point Likert-type format (1 = "*strongly disagree*" to 5 = "*strongly agree*"). In this study, Cronbach's alphas were .69 for Extraversion, .73 for Agreeableness, .77 for Conscientiousness, .84 for Neuroticism, and .66 for Openness.

Ethnocentrism

The short Portuguese version of the revised Generalized Ethnocentrism (GENE) scale (Neuliep & McCroskey, 1997) was used (Neto & Neto, 2021). This scale comprises 7 items (SFGENE-7) (e.g., "I do not trust people who are different"). Response choices range from 1 ("*Strongly disagree*") to 7 ("*Strongly agree*"). Greater scores indicate higher ethnocentrism. In this study, Cronbach coefficient alpha was .83.

Sociocultural adaptation

This was evaluated by means of the Sociocultural Adaptation Scale (SCAS, Ward & Kennedy, 1999; Portuguese version by Sequeira Neto, 2014). Participants reported the level of difficulty (from "*no difficulty*", 1 to "*extreme difficulty*", 5) they experienced in twenty social situations (e.g., "the pace of life", "going to social gatherings"). Greater scores denote higher levels of difficulty. In this study, the Cronbach coefficient alpha was .93.

Procedure

The survey was applied during regular courses by the one of the authors. Respondents were told about the purpose of the work and informed consent was given. Respondents took approximately 25 min to complete the survey. Upon completion, the respondents were debriefed and thanked. No potential risks to respondents were anticipated in this research.

Data analyses

Descriptive statistics, CFA, internal consistencies, Pearson's correlations, and *t*-tests were performed.

Results and discussion

Item-level analyses

The items' distributional properties, summary measures, skewness (Sk), kurtosis (Ku) for the ten items of SFCQ are presented in Table 2. There is no strong deviation from normal distribution, as the values of Sk are lower than 1 and of Ku are lower than 2. Mardia's multivariate kurtosis for the ten items of SFCQ was 20.45 ($p < .001$). Following Kline (2005), these values indicate no strong deviation from normal distribution. Therefore, they do not seem to weaken the findings of confirmatory factor analyses.

Confirmatory factor analysis

To analyze construct validity of the SFCQ scale we performed a CFA using AMOS from IBM SPSS statistical software, with maximum likelihood estimation and mean structure analysis to compare a one-factor model vs a theoretically grounded model proposed by Thomas et al. (2008, 2015) with one second-order factor (CQ) and the three first-order factors (knowledge, skills, and metacognition). Fig. 1 presents the second-order factor structure. The one-factor structure showed a poor model fit, with χ^2 (35) = 122.14, $p < .001$, CFI = .85, GFI = .90, SRMR = .08, and RMSEA = .11, [90 % CI = (.09, .13)]. However, the second factor structure showed that all indicators were in an acceptable range, with χ^2 (32) = 79.19, $p < .001$, CFI = .92, GFI = .93, SRMR = .06, RMSEA = .08, [90 % CI = (.06, .11)]. The completely standardized factor loadings were substantial, ranging from .50 to .92 (Diamantopoulos & Siguaw, 2000). Therefore, the results fit the theoretically driven second-order factor structure supporting the construct validity of the scale.

Table 2
SFCQ's items: descriptive statistics.

SFCQ's items	M	SD	SEM	Min	Max	Mode	Sk	Ku
CQ1^{K}	3.51	.89	.06	1	5	3	−.04	−.53
CQ2^{K}	3.29	.92	.06	1	5	3	−.14	−.12
CQ3^{S}	4.15	.74	.05	1	5	4	−.59	.13
CQ4 ^{S}	3.49	.82	.06	1	5	4	−.42	.46
CQ5 ^{S}	3.94	.77	.05	1	5	4	−.69	1.20
CQ6 ^{S}	3.66	.95	.06	1	5	4	−.48	−.13
CQ7 ^{S}	3.33	1.01	.07	1	5	3	−.25	−.39
CQ8 ^{M}	3.41	.84	.06	1	5	3	−.27	.20
CQ9 ^{M}	3.72	.90	.06	1	5	4	−.46	−.31
CQ10 ^{M}	3.80	.92	.06	1	5	4	−.59	.26

K = Knowledge, S = Skills. M = Metacognition.

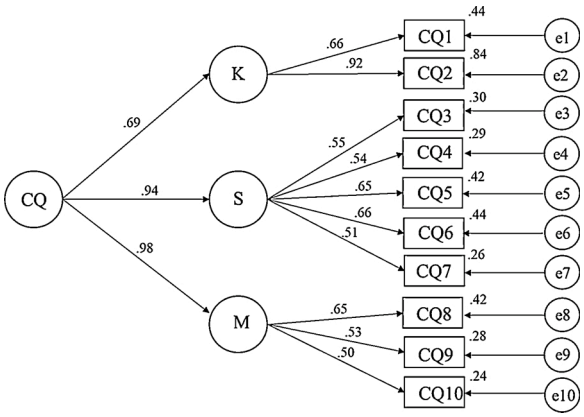

Fig. 1. SFCQ's second-order factor.
K = Knowledge, S = Skills. M = Metacognition.

Reliability estimation

For the purpose of examining the internal consistency of the SFCQ, composite reliability was performed. The composite reliability value for SFCQ was .93, indicating high reliability. Cronbach's α (.82) for the SFCQ was satisfactory. This provides support to the internal consistency of the SFCQ scale. The corrected item-total correlations displayed values from .44 to .61. The mean inter-item correlation coefficient was .32. Hence, findings support good internal consistency in the current study. Given these results, it makes sense to proceed and test discriminant and convergent validity of the SFCQ scale.

Convergent validity and discriminant validity

We performed the average variance extracted for SFCQ (AVE = .81). These findings suggest good convergent validity evidence for SFCQ. In order to examine a nomological net we assessed the relationships of the SFCQ measure with personality, ethnocentrism, and markers of multicultural experience (total of languages spoken and countries visited). Correlations of these variables can be observed in Table 3. The SFCQ measure showed a negative and small correlation with ethnocentrism, and positive and small to moderate correlations with personality traits (correlations ranged from .17 to .31). It is noted that the SFCQ scale did not correlate with neuroticism. In spite of the fact that the SFCQ scale correlated with all personality traits but neuroticism, the findings suggest that they measure different things. In order to demonstrate that SFCQ is different from ethnocentrism and personality traits, CFAs were performed with a χ^2 difference test to scrutinize whether the correlations between SFCQ and ethnocentrism as well as personality traits are different from 1 (Bagozzi, Yi, & Phillips, 1991). In the first CFA model testing ethnocentrism, the correlation between latent factors SFCQ and ethnocentrism were calculated. The model showed good fit, with χ^2 (113) = 176.70, p < .001, CFI = .94, GFI = .91, SRMR = .06, RMSEA = .05, [90 % CI = (.04, .07)]. In the second model, the correlation between SFCQ and ethnocentrism was fixed to 1. χ^2 significantly increased ($\Delta\ \chi^2 = 145.47$, $\Delta df = 1$, <.01), showing the model to be significantly different from 1. Following the same procedure, the correlations between SFCQ and personality traits were also different from 1. This supports the discriminant validity of cultural intelligence.

The results also demonstrate convergent validity. Markers of multicultural experience, in particular total languages spoken and countries visited, correlated positively with the SFCQ scale (see Table 3).

Table 3
Correlations between SFCQ, personality, and multicultural experiences variables.

	Mean	SD	1	2	3	4	5	6	7	8	9
1 SFCQ	3.62	.54	—								
2 Extraversion	3.57	.52	.23**	—							
3 Agreeableness	3.55	.52	.19**	.41***	—						
4 Conscientiousness	3.78	.47	.17*	.33***	.39***	—					
5 Neuroticism	3.18	.65	−.04	−.40***	−.32***	−.23**	—				
6 Openness	3.40	.56	.31***	.02	.13	.15*	.04	—			
7 Ethnocentrism	2.11	.99	−.15*	−.03	−.25***	−.33***	.07	−.19**	—		
8 Number of languages spoken	2.25	.84	.19**	.09	−.02	−.05	.01	.13	.09	—	
9 Number of countries visited	2.75	.84	.15*	−.06	.01	−.09	.07	.18*	−.07	−.20**	—

Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

Criterion-related validity

The criterion-related validity of the SFCQ scale was scrutinized, examining its relationship with intercultural effectiveness. One key marker of intercultural effectiveness is the competency of people to adapt to their culture (Thomas & Fitzimmons, 2008). In the present study sociocultural adaptation correlated significantly with the SFCQ scale ($r = -.17$, $p < .05$). Greater problems of adaptation in the society were related to lower cultural intelligence.

Another marker of effective cross-cultural interaction is the competency to build a long-term relationship with individuals from other cultures. In fact, it could be expected that CQ would be related to having a close friend from another cultural context. Results showed that students who had a close friend from another cultural context displayed significantly greater scores of CQ ($M = 3.76$; $SD = .59$) than those who did not ($M = 3.55$; $SD = .51$) ($t = 2.54$, $p < .05$).

In sum, this study supported the factorial validity of the Portuguese SFCQ measure tested through confirmatory factor analysis, which evidenced its unidimensionality with three intermediate facets. Our results provided empirical evidence for SFCQ reliability. Moreover, it found support for convergent, discriminant and criterion-related validities of the Portuguese SFCQ scale.

Study 2

The major goal of Study 2 was to analyze the concurrent validity of the SFCQ measure. To accomplish this purpose, we considered the associations between the SFCQ scale, and CQ evaluated by the Cultural Intelligence Scale (CQS), which includes four components: metacognitive, cognitive, motivational, and behavioral CQ. Van Dyne, Ang, and Koh (2008) found that the structure of the CQS is stable over time across multiple samples and different countries. We expected to find positive associations between the SFCQ and the CQS scores. We also analyzed the construct validity of the SFCQ scale.

Method

Participants

A total of 195 students from the University of Porto took part in this study. The sample included 154 women and 41 men. The average age of the respondents was 20 years ($SD = 2.26$; range: 18–32 years). All indicated Portuguese nationality.

Instruments

Beyond the background information (age, gender, country of origin, nationality), the survey comprised the following instruments:

Short form cultural intelligence scale (SFCQ)

The Portuguese version of this scale was also used in Study 1.

Cultural intelligence (CQS)

This was assessed by the CQS created by Van Dyne et al. (2008). The scale includes 20 items measuring four dimensions. In line with the original scale, 4 items assessed the metacognitive CQ subscale (e.g., "I am conscious of the cultural knowledge I use when interacting with people from different cultural backgrounds"); 6 items evaluated the cognitive CQ subscale (e.g., "I know the cultural values and religious beliefs of other cultures"); 5 items evaluated the motivational CQ subscale (e.g., "I enjoy interacting with people from different cultures"); and 5 items evaluated the behavioral CQ subscale (e.g., "I vary the rate of my speaking when a cross-cultural situation requires it"). Each statement was answered on a seven-point Likert-type format from 1 ("*Strongly disagree"*) to 7 ("*Strongly agree"*). Past research has evidenced in general adequate reliability of the 4 subscales ranging from .89 to .92 (Imai & Gelfand, 2010). There is a Portuguese adaptation of the CQS which evidenced adequate psychometric properties (Sousa et al., 2015). In the current study, Cronbach's alphas for metacognitive CQ, cognitive CQ, motivational CQ, and behavioral CQ were .81, .86, .82, .92, respectively.

Procedure

The procedure was the same used in Study 1.

Data analyses

Descriptive statistics, confirmatory factor analysis (CFA), internal consistencies, and Pearson product-moment correlations were performed.

Results and discussion

Confirmatory factor analysis

Mardia's multivariate kurtosis for the ten items of SFCQ was 21.85 ($p < .001$). These values indicate no strong deviation from

normal distribution. Therefore, they do not seem to damage confirmatory factor analyses findings.

According to findings of the first study, the one-factor structure showed a poor model fit, with χ^2 (35) = 128.52, $p < .001$, CFI = .82, GFI = .88, SRMR = .08, RMSEA = .12, [90 % CI = (.10, .14)]. However, the second-factor structure showed that all indicators were in an acceptable range, with χ^2 (32) = 77.38, $p < .001$, CFI = .91, GFI = .93, SRMR = .06, RMSEA = .08, [90 % CI = (.06, .11)]. The completely standardized factor loadings were substantial ranging from .50 to .95. Therefore, the results fit the theoretically driven second-order factor structure supporting the construct validity of the SFCQ.

Reliability

Composite reliability value for the SFCQ score was .92, and Cronbach's alpha was .83. These values are satisfactory, thus the next step was to test the convergent validity of the SECQ measure.

Convergent validity

We performed the average variance extracted for SFCQ (AVE = .81). This finding suggests a good convergent validity evidence for SFCQ.

Concurrent validity

To test the concurrent validity of the SFCQ Portuguese version, correlations between the SFCQ scores, and the 4 CQ subscales scores were calculated. Table 4 shows that the SFCQ scores correlated significantly and positively with all four CQ scores. The correlation coefficients were moderate to large ranging from .34 to .56.

In sum, this study supported the construct validity of the Portuguese SFCQ measure tested through confirmatory factor analysis, which evidenced its unidimensionality with three intermediate facets. Moreover, it supported the convergent and the concurrent validity of the Portuguese SFCQ scale.

Study 3

The major goal of Study 3 was to analyze reliability and validity of the SFCQ among international students from Brazil sojourning in Portugal. Sojourners are "people who travel internationally to achieve a particular goal or objective with the expectation that they return to their country of origin after the purpose of their travel has been achieved" (Safdar & Berno, 2016, p. 173). International students are one of the most important sojourners (Neto, 2020b). We expected that the SFCQ will show added evidence about the psychometric properties in Brazilian IS. In addition to internal consistency and dimensionality of the SFCQ scale, its convergent validity was tested through AVE, and the criterion-related validity by examining its relationship with intercultural effectiveness.

Method

Participants

One hundred and eighty-one international students from Brazil attending the University of Porto took part in this research. The sample included 115 women and 66 men. The average ages of the respondents was 24.70 years (*SD* = 5.61; range: 18–40 years). The mean duration of sojourn in Portugal was 14.03 months (*SD* = 12.88).

Instruments

Beyond background information (age, gender, nationality, duration of sojourn in the new country, total of languages spoken, and whether they have contacts with native people or a best friend from another country), the survey comprised the following instruments:

Table 4
Means, standard deviations, correlations, and Cronbach's alphas.

	Mean	SD	1	2	3	4	5
1 Cultural intelligence (SFCQ)	3.64	.54	(.83)				
2 Metacognitive CQ	4.84	.94	.56***	(.81)			
3 Cognitive CQ	3.79	1.07	.36***	.44***	(.86)		
4 Motivational CQ	4.94	1.06	.38***	.54***	.30***	(.82)	
5 Behavioral CQ	4.65	1.31	.34***	.47***	.32***	.48***	(.92)

Note: Cronbach's alpha on the diagonal.
*** $p < .001$.

Short form cultural intelligence scale (SFCQ)

The Portuguese version of this scale was also used in Study 1.

Intercultural contacts

To evaluate intercultural contacts of international students with native people we asked respondents about the number of close friends and frequency of contact with them (e.g., "How often do you meet with Portuguese people?") (Neto, 2020a). In this study, Cronbach's alpha was .83.

Procedure

The procedure followed was the same as in the two previous studies. International students from Brazil were recruited by a research assistant from Brazil in the University of Porto.

Data analyses

Descriptive statistics, CFA, internal consistencies, Pearson product-moment correlations, and *t*-tests were performed.

Results and discussion

Confirmatory factor analysis

Mardia's multivariate kurtosis for the ten items of SFCQ was 12.79 ($p < .001$). These values indicate no strong deviation from normal distribution. Therefore, they do not seem to weaken confirmatory factor analyses findings.

The one-factor structure showed a poor model fit, with χ^2 (35) = 94.83, $p < .001$, CFI = .86, GFI = .90, SRMR = .07, RMSEA = .10, [90 % CI = (.07, .12)]. However, the second-factor structure showed that all indicators were in an acceptable range, with χ^2 (32) = 62.93, $p < .001$, CFI = .93, GFI = .94, SRMR = .06, RMSEA = .07, [90 % CI = (.05, .10)] (Table 5). The completely standardized factor loadings were substantial, ranging from .41 to .84. Hence, the findings fit the theoretically driven second-order factor structure supporting the construct validity of the scale.

Reliability estimation

For the purpose of examining the internal consistency of the SFCQ, composite reliability was checked. The composite reliability value for SFCQ was .93, indicating high reliability. Cronbach's alpha (.81) for the SFCQ score was satisfactory. This provides support to the reliability of the SFCQ. The corrected item-total correlations displayed values from .34 to .60. The mean inter-item correlation coefficient was .30. Findings support satisfactory internal consistency in the current study. Therefore, we could proceed and test the convergent validity of the SECQ measure.

Convergent validity

We performed the average variance extracted for SFCQ (AVE = .82). These findings suggest a good convergent validity evidence for SFCQ. Furthermore, a marker of multicultural experience, total of languages spoken, correlated positively with the SFCQ measure ($r = .24$, $p < .01$).

The criterion-related validity

The criterion-related validity of the SFCQ measure was scrutinized, examining its relationship with intercultural effectiveness. Two indicators of intercultural effectiveness were considered: intercultural contact with Portuguese natives, and to have a best friend from

Table 5
Goodness-of-fit statistics from confirmatory factor analyses.

	Study 1	Study 2	Study 3
χ^2/df	79.19/32 = 2.47	77.38/32 = 2.42	62.93/32 = 1.97
RMSEA	.08	.08	.06
SRMR	.06	.06	.06
GFI	.93	.93	.94
CFI	.92	.91	.93

Note: *df* = degree of freedom.
GFI = Goodness of Fit Index.
CFI = Comparative Fit Index.
RMSEA = Root Mean Square Error of Approximation.
SRMR = Standardized Root Mean Square Residual.

another culture. According to expectations, findings showed that international students who had more contacts with Portuguese people reported higher cultural intelligence ($r = .19, p < .05$). Furthermore, international students who had a best friend from another cultural context reported significantly greater scores of CQ ($M = 4.11$; $SD = .58$) than those who did not ($M = 3.83$; $SD = .51$) ($t = 2.19$, $p < .05$).

In sum, this study supported the construct validity of the Portuguese SFCQ measure tested through confirmatory factor analysis among international students. Moreover, it supported the convergent and the criterion-related validity of the Portuguese SFCQ.

General discussion

The Short Form of Cultural Intelligence (SFCQ) was originally developed by Thomas et al. (2015) and it represents a promising approach to define and assess intercultural competence. The SFCQ has been validated internationally, but not in Portuguese-speaking countries. Therefore, to address this gap, the main purpose of the set of studies presented in this paper was to contribute to the validation of the SFCQ scale in the Portuguese language. To this end, procedures that are part of classical test theory were adopted. In particular, the original English SFCQ version was translated into Portuguese, and the factorial structure of SFCQ scale, its reliability, and its relation with other theoretically linked measures were scrutinized.

In line with the CFA, the one-dimensional model of the SFCQ exhibits an adequate adjustment, with factorial loads varying from .41 to .92. It merits noting that in the three studies presented here, cultural intelligence emerged as a second-order single factor with three first-order factors: cultural knowledge, cultural skills, and cultural metacognition. These results are consistent with what is indicated in the original research (Thomas et al., 2015), and congruent with the underlying theoretical model of the scale construction of the scale, that is a single latent factor including 3 facets.

The internal consistency of the SFCQ scale was verified by composite reliability and alpha coefficient values. Our results provided strong evidence that the SFCQ had satisfactory internal consistency. The Cronbach' alphas (higher than .80) were in the same line as the average Cronbach' alpha reported in the original SFCQ scale validation study conducted with people from fourteen samples across the globe (Thomas et al., 2015). Obtaining adequate indicators of internal consistency is relevant as it permits more accurate interpretations of the relations between one construct and another. Globally, the findings of the confirmatory factor analysis and the internal consistency demonstrate that the items of the SFCQ scale assessed cultural intelligence in a consistent way.

Furthermore, the correlations between the SFCQ scores and ethnocentrism and personality traits support the discriminant validity of the SFCQ instrument. Namely, the SFCQ scores correlated negatively with ethnocentrism, which represents the tendency to consider their own culture as the centre of the world. Investigation on ethnocentrism indicates that "being closed-minded toward other cultures can be an obstacle for building successful working relationships across cultures" (Dollwet & Reichard, 2014, pp. 1690–1691). Small to moderate correlations were found between personality traits and SFCQ scores, except for neuroticism. Previous research has also shown that CQ is unrelated to neuroticism (e. g., Ang et al., 2007; Greischel, Zimmermann, Mazziota, & Rohmann, 2021). In addition, the relation between the SFCQ scale and the indicators of cross-cultural efficacy (sociocultural adaptation and having a close friend from another country) also supported the criterion related validity.

Concurrent validity of the SFCQ measure was demonstrated through moderate to large correlations between subscales of the CQS and the SFCQ. These findings confirm use of the SFCQ as a tool to assess cultural intelligence.

The current work adds support to the psychometric characteristics of the SFCQ scale in a Portuguese cultural context. This study presents relevant practical implications for intercultural management as it can contribute to helping human resource professionals to develop a more culturally competent workplace. The SFCQ scale can also be used to assess the efficacy of intercultural training programmes.

Obviously, the current study is not without limitations. First, the data comes from self-reporting measures and is therefore subject to the criticism levelled at such instruments (Spector, 1994). In particular, acquiescence bias could not be avoided. Second, the respondents were students of higher education. Hence, it is necessary to perform additional research with more diverse samples, such as employees in public and private service areas to generate a greater external validity of the results. More research on the measurement equivalence and invariance of the SFCQ scale in the Portuguese cultural context is required.

Aside from these limitations, the present research finds that the SFCQ scale shows internal consistency, satisfactory one-dimensional structure, and empirical relations with other theoretically linked constructs. The SFCQ can be considered an appropriate tool to assess cultural intelligence in Lusophone cultural contexts. The performance of the measure in the Portuguese language lends support to its universality, in addition to the five language groups used in past research which contributed to develop this instrument (Thomas et al., 2015). This is consonant with the etic approach which considers CQ as "a general idea that does not depend on the specific cultural context in which it was developed" (Thomas et al., 2015, p. 12). The results of the current research point out the use of the SFCQ to measure cultural intelligence by human resource managers in Lusophone countries.

Conclusion

In conclusion, the present research presents a substantial demonstration for the validation of the SFCQ to the Lusophone cultural context. Using three diverse samples, the SFCQ scale was validated with respect to its internal factor structure, along with its concurrent, convergent and discriminant validity. In addition, the brevity and easy administration of the SFCQ scale allows its use for human resource managers to select, develop, and train employees more effectively in cross-cultural settings resulting from global mobility.

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