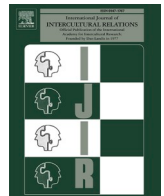




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# Are some individuals more susceptible to intercultural education than others? Multicultural personality predicts the effects of an intercultural training on cultural intelligence

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## ABSTRACT

The development of intercultural competences has become a prominent goal for many study programs in higher education. A widely used frame to measure intercultural competence is Cultural Intelligence (CQ). While empirical research has focused extensively on the development of CQ by means of (student) mobility and long-term training, the effects of short-format trainings – a more cost-effective intervention that can be provided to a large number of participants – remain understudied. Existing findings are inconclusive, and it remains unclear under which conditions, and for whom, short-format interventions are effective in improving participants' CQ. We propose that CQ development is contingent upon individual differences in multicultural personality traits (operationalized through the Multicultural Personality Questionnaire, MPQ). More specifically, in this study we investigate (1) whether a short-format (6-hour) training improves CQ among higher education students ( $n = 108$ ), and (2) whether the development of CQ is moderated by students' social-perceptual and stress-related MPQ trait scores prior to the training. Using a pre and post-test design we found that across the whole sample, all four facets of the CQ increased after the training. We also found that some social-perceptual traits of the MPQ moderated the development of CQ: Social initiative on Metacognitive CQ, Openmindedness on Cognitive CQ, and Social initiative and Openmindedness on Motivational CQ. Additionally, we did not find a moderator effect of stress-related MPQ traits on the development of Behavioral CQ. Based on our findings, we conclude that multicultural personality influences individuals' susceptibility to intercultural education, underscoring the importance of individualized approaches in intercultural education.

## Introduction

As the world becomes more globalized, and societies become more culturally diverse, it is essential for individuals to develop the skills to interact effectively with others in intercultural settings. As a result, the development of intercultural competences has become a prominent goal for many study programs in higher education (de Wit & Altbach, 2021; Hofhuis et al., 2023; Lantz-Deaton, 2017), as

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well as in training programs aimed at professionals in a variety of organizations and contexts (see [Dalsky & Landis, 2013](#)).

One of the most widely used frameworks for measuring intercultural competences is *Cultural Intelligence* (CQ; [Earley & Ang, 2003](#)), consisting of four subdimensions which have been shown to predict a myriad of psychological, behavioral and performance outcomes related to intercultural effectiveness (see also [Chen & Gabrenya, 2021](#); [Ott & Michailova, 2018](#)). According to Ang and colleagues (2020), a main selling point of the CQ model is that it reflects capabilities that can be improved, for example through training and education, or through intercultural exchange. Review studies confirm that intercultural experience and interventions can facilitate CQ development ([Fang et al., 2018](#); [Ott & Michailova, 2018](#)). However, while empirical research has focused extensively on the development of CQ by means of (student) mobility and long-term training, the effects of short-format trainings – a more cost-effective intervention that can be provided to a large number of participants – remain understudied.

Furthermore, empirical evidence suggests that not everyone undergoing intercultural training develops their intercultural competences as predicted ([Ott & Michailova, 2018](#)). Although an increase in cultural knowledge is often observed, improving intercultural attitudes and behaviors has proven more difficult to achieve ([Mendenhall et al., 2004](#)). So far, it remains unclear why some interventions appear to be more successful than others, and why some individuals appear to benefit more from intercultural training than others. One of the promising avenues of exploration that scholars have identified, is to examine individual-level factors that may enhance or inhibit intercultural learning ([Alexandra, 2018](#); [Morris & Robie, 2001](#); [Zhang & Zhou, 2019](#)).

In the present study, we answer this call by investigating whether individual variance in CQ development may be explained through participants' *Multicultural Personality*; personality traits that predict an individual's intercultural attitudes, behavior and cognitions. We focus on the five traits conceptualized in the *Multicultural Personality Questionnaire* (MPQ; [Van der Zee & Van Oudenhoven, 2000, 2001](#)), which have previously been shown to relate to intercultural effectiveness in educational and training settings ([Hofhuis et al., 2020](#); [Van der Zee & Van Oudenhoven, 2013](#)). Specifically, we examined whether participants' scores on the five dimensions of the MPQ predict their change in CQ scores after participating in a 6-hour intercultural training module.

## Theoretical framework

### *Intercultural competence*

In general terms, intercultural competence can be defined as 'the appropriate and effective management of interaction between people who, to some degree or another, represent different or divergent affective, cognitive, and behavioral orientation to the world' ([Spitzberg & Changnon, 2011](#), p. 7). However, definitions of intercultural competence vary among the many models used in different disciplines and for different objectives. These models also use different constructs to operationalize and measure intercultural competence ([Chen & Gabrenya, 2021](#); [Matsumoto & Hwang, 2013](#)). In a review of the field, [Leung and colleagues \(2014\)](#) noted three general domains that can cover the variety of constructs used in the literature. Firstly, intercultural traits refer to more stable patterns of behaviors in intercultural contexts. Secondly, intercultural attitudes and worldviews refer to individuals' perceptions of cultures outside their own cultural worlds. Thirdly, intercultural capabilities refer to what a person can do to succeed in intercultural interactions.

### *Cultural intelligence*

Cultural intelligence (CQ; [Earley & Ang, 2003](#)) is one of the most commonly used and well-established frameworks. It refers to an individual's capability to function and manage effectively in culturally diverse settings ([Ang et al., 2007](#), p. 336). Following [Leung and colleagues' \(2014\)](#) model, CQ therefore falls under the third dimension of intercultural capabilities. CQ is grounded within the multiple intelligence framework and is a multidimensional construct conformed by four subdimensions that may overlap, but conceptually refer to different capabilities. *Metacognitive CQ* refers to the mental process used to acquire and understand knowledge. *Cognitive CQ* reflects the specific cultural knowledge about different cultures. *Motivational CQ* expresses the capability of an individual to direct energy for learning about different cultures, and to function in culturally diverse environments ([Ang et al., 2007](#)). *Behavioral CQ* shows the "individual's capability to enact a wide repertoire of verbal and nonverbal actions when interacting with people from different cultures" ([Van Dyne et al., 2012](#), pp. 304).

### *Developing cultural intelligence through training*

The CQ model is often used when evaluating the effects of intercultural interventions, mainly because its scores are relatively dynamic, and have been shown to capture changes in intercultural competence across relatively short time periods ([Ang et al., 2020](#)). Although the majority of studies focusing on CQ development evaluate the effects of long-term interventions such as studying abroad or participating in intercultural education, some empirical work exists that also reports favorable effects of short-term interventions such as intercultural training. For example, [Majda and colleagues \(2021\)](#) assessed the effect of a two-week teaching program among Nursing students in Poland, and found a significant improvement in cognitive and behavioral CQ. A similar study among business students in the Netherlands showed an improvement in metacognitive, cognitive and behavioral CQ after an intercultural simulation game ([Bücker & Korzilius, 2015](#)). A notable exception is a study by [Fischer \(2011\)](#), who reported an increase in motivational CQ along with a decrease in cognitive and meta-cognitive scores following a short intercultural training intervention, which illustrates that short-form interventions may not always reach their intended outcomes. So far, it remains unclear why some interventions may be more effective than others. Scholars have subsequently called for more research into factors that may enhance or inhibit CQ

development (Alexandra, 2018; Morris & Robie, 2001; Zhang & Zhou, 2019). One possible factor that has not been studied in great detail, is the potential influence of individual differences in susceptibility to intercultural training. The present study aims to contribute to this field of research by examining the role of participants' multicultural personality in this regard.

### *Multicultural personality*

Whereas CQ is often the framework of choice for investigating development of intercultural competence across time, scholars who are interested in more stable and robust aspects of intercultural competence often make use of the concept of multicultural personality, commonly operationalized through the Multicultural Personality Questionnaire (MPQ; Van der Zee & Van Oudenhoven, 2000, 2001). Anchored in organizational and cross-cultural psychology, the MPQ was initially developed to predict intercultural effectiveness of sojourners, such as international students and expatriates. Since its inception, its use has been extended to many other contexts including intercultural education and training (Hofhuis et al., 2020; Liang & Schartner, 2020).

The instrument consists of five subscales: *Cultural Empathy* (CE) refers to the individuals' ability to empathize with the feelings, thoughts, and behaviors of individuals from a different culture; *Emotional Stability* (ES) reflects the individual's ability to stay calm under novel and stressful conditions; *Flexibility* (FX) is the ability to switch easily from one behavioral strategy to another; *Social Initiative* (SI) refers to a tendency to actively approach social situations, initiating communication rather than waiting and watching; *Openmindedness* (OP) refers to an open and unprejudiced attitude toward cultural differences.

Through a growing body of work, the MPQ has been established as one of the most robust instruments for assessing trait aspects of intercultural competence (Chen & Gabrenya, 2021; Leung et al., 2014). Earlier studies link MPQ scores to a myriad of intercultural outcomes, such as sojourner adjustment (Leong, 2007), collaboration in diverse teams (Hofhuis, Schilderman, et al., 2020; Wöhrle et al., 2015), foreign language learning (Korzilius et al., 2011; Van Niejenhuis et al., 2018), and attitudes towards workplace diversity (Hofhuis et al., 2015).

### *Interplay between multicultural personality and cultural intelligence development*

Developmental models of intercultural competence suggest that the learning process is progressive over time, based on one's reaction to various experiences and one's ability to reflect on new knowledge (Kolb et al., 2001; Saunders et al., 2015). Empirical research shows that negative intercultural attitudes (especially those based on social or societal norms) are the most difficult to change (Gawronski & Bodenhausen, 2011). As a result, intercultural training may be less effective for individuals with negative prejudices towards other cultures, or those who see diversity as threatening (Alexandra, 2018). Using the same argumentation, possessing positive attitudes and prior intercultural competences could be seen as a catalyst for the development of cultural intelligence. This suggests that different facets of intercultural competence may not merely be different conceptualizations of the same concept, but instead may be independent constructs. As such, the present study will examine how multicultural personality traits and cultural intelligence dimensions may interact with each other to predict intercultural learning and effectiveness.

Several studies have examined cross-sectional associations between personality traits and the four dimensions of CQ. For example, Ang and colleagues (2006) examined their relationship with the Big Five personality traits (Costa & McCrae, 1992), and report links between conscientiousness and metacognitive CQ, agreeableness and emotional stability with behavioral CQ, extraversion with cognitive, motivational, and behavioral CQ, and openness with all four factors of CQ. These findings are particularly interesting because they show that specific personality traits may be linked to different CQ dimensions. Moreover, a study by Hofhuis and colleagues (2020) investigated the role of MPQ traits in participants' effectiveness in an intercultural training simulation game, showing that emotional stability and social initiative are key traits that help individuals navigate difficult intercultural interactions in a training setting.

Based on these prior findings, it is feasible to assume that multicultural personality traits may also affect the degree to which CQ dimensions develop as a result of intercultural experience. Only limited research exists that uses a longitudinal (e.g. pre- and post-test) design to examine these processes. The abovementioned study by Fischer (2011) is one of the few to use such a method, and reports a stronger increase in motivational CQ among students who scored high on the MPQ dimension openmindedness. Unfortunately, the other four dimensions were not included in this study. More distant work confirms the influence of personality traits on the development of other intercultural constructs such as adaptation (Demes & Geeraert, 2015; Hua et al., 2019), social justice behavior (Fietzer et al., 2016), diversity attitudes (Hofhuis et al., 2015) and cultural identities (Luijters et al., 2006), but no previous work has investigated how the five MPQ traits affect the longitudinal development of CQ.

### **The present study**

To answer the question posed above, we developed and implemented a 6-hour intercultural training module, which aims to enhance CQ of students in higher education. The training module consisted of three sections, each of which provided students with insights on a different approach towards intercultural competence. The first section examined intercultural contact from an emic perspective, aiming to enhance students' ability to understand and evaluate cultural behaviors, norms, and assumptions, using the method described by Schein (1990). The second section examined cultural differences from an etic perspective, focusing on how cultural dimensions such as individualism-collectivism (Hofstede, 2001), tightness-looseness (Gelfand et al., 2011) and high-low context communication (Hall, 1989; Kittler et al., 2011) may affect intercultural interactions. The third section focused on participants' self-awareness regarding their own cognitive and emotional reactions to intercultural contact and provided background

information on intercultural competences, including the MPQ. All three sections included interactive elements, such as group assignments, role playing, and simulation games, to enhance the experiential learning effects of the module (Kolb et al., 2001; Swift & Denton, 2003).

To answer our research question, we first examined changes in participants' CQ scores before and after participation. The main aim of our training module was to foster a development in all four subdimensions of the CQ. Metacognitive CQ and Cognitive CQ were especially targeted in the first two sections of the module, where students were challenged to understand and reflect on cultural differences and how they relate to individual thoughts and behaviors. Motivational CQ was targeted in section three of the module, where students were asked to reflect on their own intercultural competences, and encouraged to think about how intercultural learning may have benefits for their daily lives. Behavioral CQ was targeted in all three sections, through the interactive simulations and role-playing games that enabled students to experience and experiment with different intercultural behaviors in a safe environment.

**Hypotheses 1a-d.** A short-format training (6-hours) in intercultural communication improves (a) Metacognitive, (b) Cognitive, (c) Motivational, and (d) Behavioral CQ among higher education students.

Furthermore, the main premise of the present study is that participants who score high on the five traits of the MPQ are more likely to benefit from intercultural learning, and will enhance their CQ scores more than those who score lower on the MPQ. A theoretical basis for our expectations was provided by Van der Zee and Van Oudenhoven (2013), who review the different mechanisms that are responsible for the effects of the MPQ dimensions on intercultural outcomes and interactions. They divide the five MPQ traits into two subsets: social-perceptual and stress-related traits. The social-perceptual traits, Cultural Empathy, Openmindedness, and Social Initiative, increase the likelihood that individuals perceive intercultural interactions as a challenge rather than a threat. The stress-related traits, Emotional Stability and Flexibility, are said to reduce the sense of threat that individuals experience as a result of being confronted with different cultures.

In the present study, we expect that the social-perceptual traits will have a significant positive influence on the overall effectiveness of the training module. Previous work has already established that Openmindedness is a key trait that enables many kinds of intercultural learning (Ang et al., 2006; Fischer, 2011). Cultural Empathy and Social Initiative both have been shown to enable participants to benefit more from the intercultural interactions (Hofhuis, Schilderman, et al., 2020; Van Oudenhoven & Van der Zee, 2002). In sum, participants who score high on these traits are expected to approach the training as an interesting challenge, creating the right mindset for developing all four CQ dimensions.

Furthermore, we expect that the stress-related traits of the MPQ may specifically influence the behavioral subdimension of CQ. It has been established that emotional stability is essential for coping with the stress of intercultural interactions, and that individuals who score high on this trait are better able to regulate their (negative) emotions (Ward et al., 2004). Since (simulated) intercultural interaction is one of the main components of experiential learning in the current training, staying calm is likely to be a major predictor of interaction quality, and should directly affect the participants' ability to practice new intercultural behaviors. Finally, we predict that flexibility will further enhance participants' ability to adjust behavior in the different interactive elements of the training, thereby increasing their effectiveness (Van der Zee & Van Oudenhoven, 2000).

**Hypothesis 2a-c.** : The improvement in CQ scores after the training is related to social-perceptual traits of the MPQ: Participants who score high on (a) Cultural Empathy, (b) Social Initiative, and (c) Openmindedness will show more development in Metacognitive CQ, Cognitive CQ, Motivational CQ, and Behavioral CQ.

**Hypothesis 3a-b.** The improvement in Behavioral CQ is related to stress-related traits of the MPQ: Participants who score high on (a) Emotional Stability, and (b) Flexibility will show more development.

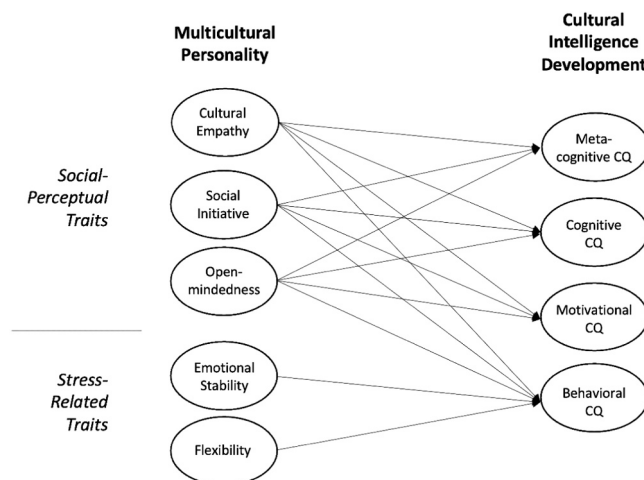


Fig. 1. Hypothesized relationships between multicultural personality traits and development of cultural intelligence dimensions.

Hypothesis are summarized in Fig. 1 below.

## Methods

### Procedure

In the second half of 2021, 168 undergraduate students in humanities and 91 graduate students in health sciences were offered the intercultural training module described above, as part of the formal curriculum of their study program at a major research university in the Netherlands. Because of the Covid-19 pandemic, the training was provided fully online, and all activities were adapted to be used in an online videoconferencing environment. Between 10–25 participants attended each individual session. The module was taught by experienced intercultural trainers, who had received detailed instructions for all teaching materials, as well as 16 h of online training from the researcher who developed the module.

Participants were contacted digitally, three weeks prior to (T1) and directly after (T2) participating in the training. At both time points, participants received an email to their institutional email address, which included an explanation of the objectives of the study and an invitation to complete a survey. Weekly reminders were sent to non-responders. The study was approved by the Ethics Review Board of the authors' institution. Informed consent was obtained from all participants. All communication and surveys were provided in English. Both study programs are taught fully in English and require students to prove English proficiency through a certified test. We therefore assumed all were able to understand our materials.

### Sample

The final sample used in this study consists of 108 students who fully participated in the training and responded to at least one of the questionnaires. A total of 60 participants completed both questionnaires, 48 only participated once. The mean age was 24.1 years (SD = 5.5 years, ranging from 18 to 49), the majority (75%) were female. Respondents represented 41 different countries: 40.1% from the Netherlands, 17.6% from other Western European countries, 12% from Asia, 10% from Eastern European countries, 8% from China, and the rest from countries across America, Africa and Oceania.

To examine the missingness mechanism, we compared sex, age, and parental socioeconomic status of respondents that completed only the survey at T1 and those that completed both surveys. No significant differences were found, allowing us to assume our data to be missing at random (MAR; Graham, 2009) and to further implement Full Information Maximum Likelihood (FIML) to maximise the utility of the available data.

Because our sample size was limited by response rates, a post-hoc power analysis was conducted using GPower 3.1 (Faul et al., 2009), revealing varying levels of power across our analyses. With a total of 15 predictors, and effect sizes ranging from 0.20 to 0.27 in models 1 to 3, our sample size yielded statistical power ranging between .95 and .99, thus exceeding the conventionally desired level of 0.80. However, for model 4, with an effect size of 0.09, the statistical power was below the desired level, at 0.61. We should therefore exercise caution in interpreting the findings of this final model, because our sample size may not have been adequate to reveal more subtle effects.

### Measures

*Cultural intelligence* was measured at both T1 and T2 using the Cultural Intelligence Scale (CQS; Earley & Ang, 2003), which consist of 20 items, combined with a 7-point Likert Scale (1 = strongly disagree; 7 = strongly agree). Metacognitive (MC) CQ was measured using 4 items, such as 'I check the accuracy of my cultural knowledge as I interact with people from different cultures'. Cognitive (CG) CQ was measured using 6 items, such as 'I know the cultural values and religious beliefs of other cultures'. Motivational (MT) CQ was measured using 5 items, such as 'I enjoy interacting with people from different cultures'. Behavioral (BH) CQ was measured using 5 items, such as 'I change my nonverbal behavior when a cross-cultural situation requires it'.

*Multicultural Personality* was assessed at T1 and T2, using the 40-item short form of the Multicultural Personality Questionnaire (MPQ-SF; Van der Zee et al., 2013) which was recently validated for use in this context (Hofhuis et al., 2023; Hofhuis et al., 2020). Respondents self-report whether the five personality traits are applicable to themselves, on a 7-point Likert Scale (1 = not at all applicable; 7 = completely applicable). Cultural Empathy (CE) was measured using 8 items, such as 'Pays attention to the emotions of others'; Emotional Stability (ES) was measured using 8 items, such as 'Keeps calm when things don't go well'; Flexibility (FX) was measured using 8 items, such as 'Looks for regularity in life' (Reversed); Openmindedness (OP) was measured using 8 items, such as 'Seeks people from different backgrounds'; Social Initiative (SI) was measured using 8 items, such as 'Is inclined to speak out'.

Subscales of both instruments showed good internal consistency with Cronbach's alphas ranging between 0.77 and 0.93. All descriptive statistics and reliabilities are provided in Table 1.

To remove other possible sources of variability in our dependent variables, a number of control variables were included. Firstly, previous research shows that female students often display higher intercultural competence (Tompkins et al., 2017), and are more likely to participate in international student mobility (Tompkins et al., 2017; Van Mol, 2022) than male students. Therefore, Sex was

**Table 1**  
Descriptive statistics of CQS and MPQ subscales at T1 and T2, and control variables.

	M	SD	min	max	# of items	$\alpha$
<i>CQS Dimensions</i>						
MC T1	5.29	1.03	2.50	7.00	4	0.82
MC T2	5.37	0.99	2.25	7.00	4	0.85
CG T1	4.18	1.06	2.00	6.67	6	0.84
CG T2	4.34	1.15	1.83	7.00	6	0.91
MT T1	5.38	0.99	2.20	7.00	5	0.80
MT T2	5.43	0.97	2.40	7.00	5	0.83
BH T1	4.65	1.18	1.60	7.00	5	0.83
BH T2	5.01	1.28	1.80	7.00	5	0.92
<i>MPQ-SF Dimensions</i>						
CE T1	5.76	0.72	3.75	7.00	8	0.84
CE T2	5.63	0.96	2.00	7.00	8	0.93
SI T1	4.63	0.93	2.12	6.38	8	0.82
SI T2	4.65	1.01	2.00	6.75	8	0.85
OP T1	5.07	0.81	2.75	7.00	8	0.77
OP T2	5.18	0.94	2.50	7.00	8	0.86
ES T1	4.10	1.18	1.38	6.75	8	0.87
ES T2	4.19	1.11	2.00	6.75	8	0.85
FX T1	3.55	1.07	1.12	6.00	8	0.88
FX T2	3.43	1.07	1.25	6.25	8	0.89
<i>Control Variables</i>						
Sex (1 = female, 0 = male)	0.75	0.44	0.00	1.00		
Age (in years)	24.06	5.49	18.00	49.00		
Parental HE background	0.69	0.47	0.00	1.00		
Satisfaction with the training	3.69	0.96	1.00	5.00		

included as a control variable (female = 1, male = 0).<sup>1</sup> Secondly, CQ is conceptualized as a malleable capability susceptible to exposure to international experiences and cultural exposure (Ott & Michailova, 2018). Students with higher parental socioeconomic status (PSES) are more likely to undergo international experiences and intercultural exposure than those with lower PSES, due to higher economic resources, better academic performance, and larger social capital (Lórz et al., 2016; Simon & Ainsworth, 2012). Because socioeconomic status (SES) is defined by occupational position, which is highly correlated with educational attainment, we use as a proxy whether one of the parents has attained at least a bachelor's degree (1 = yes, 0 = no).

Thirdly, overall *satisfaction with the training* can impact students' predisposition towards the content of the training. By adding this construct to our analyses, we make sure to account for the differences in students' experiences during the training, such as those related to group composition, quality of the trainer, and scheduling. Students reported satisfaction on a scale of 1 to 5, at T2. Table 1 displays descriptive statistics of all control variables. Correlations with the other variables in the study are provided in the appendix.

## Analyses

To test whether the training module had an effect on cultural intelligence, we replicate paired t-tests in a structural equation framework making use of univariate latent change score (ULCS) models (Coman et al., 2013; Kievit et al., 2018). Following Kievit and colleagues (2018), we estimate two similar ULCS for each CQ dimension. One in which the latent change variance is freely estimated, and another in which it is constrained to zero. Models are then compared using likelihood ratio tests, Akaike Weights, and Schwarz Weights. This approach has some benefits over traditional ways of testing mean differences, for instance, it allows to maximize the utility of the existing data by implementing FIML. Additionally, this approach includes two other parameters of interest, namely, the variance in the change factor that indicates the homogeneity of change across participants before and after the intervention; and an autoregressive parameter which captures the dependency of change on scores at Time 1 (Kievit et al., 2018). We employ the same ULCS to test our assumption that MPQ traits are more stable across time.

To examine the effects of MPQ traits on the trainability of CQ dimensions, we followed the steps of Fischer (2011) and Şahin, and colleagues (2014). Separate models were constructed for each of the four CQ dimensions. Our dependent variable is the score on the CQ dimension at Time 2. Predictors were entered in three steps: 1) In the initial step, control variables – including sex, age, parental higher education background, and overall satisfaction with the training – were added to the model; 2) subsequently, we entered the T1 score of the relevant CQ dimensions to control for autocorrelation, and the T1 scores of the MPQ traits to control for their main effects on the dependent variable; 3) in the final step, we added the interaction terms between the CQ dimension and MPQ traits at Time 1. A significant interaction term would indicate that a specific MPQ dimension moderates the change in a corresponding CQ dimension between Time 1 and Time 2. We reported  $R^2$  and  $\Delta R^2$ , as well as Cohen's effect sizes ( $F^2$ ). To reduce multicollinearity between main effects and their interactions, CQ and MPQ variables are mean centered (Iacobucci et al., 2017). To ease the interpretation of results,

<sup>1</sup> The questionnaire asked separately for sex and gender identity, only two students (a male and a female) identified themselves as 'non-binary'. However, due to the small size they were included in the group of the reported sex.

control variables – age and overall satisfaction – are also centered.

All analysis were conducted in R (R Team Core, 2018) using the *lavaan* package (Rosseel, 2012), and Full Information Maximum Likelihood (FIML) was used to account for missing data.

**Results**

Table 2. shows the estimates from the univariate latent change score models for each of the CQ subscales. We observed a statistically significant positive mean change in all four CQ dimensions over time. This provides support to Hypotheses 1a-d. Across the whole sample, our training appears to have a positive effect on Cultural Intelligence. However, we also examined the variance estimates of the latent change scores, which were all significant as well. This indicates that while there is a general trend of improvement, the magnitude of change varied significantly among participants. Finally, the autoregressive coefficients of the CQ scores at T1 and T2 were all significantly negative. This shows that participants with a higher initial score reported smaller improvements than those with a lower initial score, indicating the presence of ceiling effects in CQ development.

In the same Table 2, regarding the MPQ traits, we observed that social-perceptual MPQ traits – Cultural empathy, Social initiative, and Openmindedness – remained unchanged by our training. Unexpectedly, there were significant positive changes observed for the stress-related MPQ traits – Flexibility and Emotional stability. This finding underscores the impact of our training, showing that in addition to improving participants’ cultural intelligence, it also affected their scores on certain personality traits. We also found significant individual variance in the development of MPQ scores, as well as the presence of ceiling effects in the development of Flexibility and Emotional Stability, mimicking the findings for CQ dimensions reported above.

Next, we examined the moderator effects of multicultural personality traits (MPQ) on the development of cultural intelligence (CQ), in four separate models. In these models, we regressed CQ scores at Time 2 on control variables (shown in panel 1), both CQ scores and MPQ scores at Time 1 (panel 2), and interactions between CQ and MPQ scores at Time1 (panel 3). The estimates of all four models are shown in Table 3, but for brevity only the key coefficients – those of primary interest – are displayed. We focused on the interpretation of the interaction terms that test the moderator effect of multicultural personality traits on cultural intelligence trainability.

Table 3 shows that in each model, the explained variance ( $R^2$ ) is higher in panel 3 compared to panel 2. However, the increase in  $R^2$  ( $\Delta R^2$ ) is statistically significant only in model 3, related to Motivational CQ. This suggests that interactions in Model 3 offer generalizable insights to a broader population. While the overall incremental variance ( $\Delta R^2$ ) between the reduced and full models was not statistically significant for Models 1 and 2, certain interactions within these models did achieve significance. These individual interactions are of substantial importance, their statistically significant nature, combined with notable effect sizes ( $F^2$ ), suggests that they have specific, meaningful impacts on the dependent variable. We will therefore include them in the discussion of our results. To facilitate the interpretation of the moderator effects, we offer visual representations of the significant moderation effects in Figs. 2–6. These figures illustrate the change in a given CQ dimension for high ( $\leq +1$  SD) and low ( $\leq -1$  SD) scores in a given MPQ dimension. The high scores are represented by solid lines, and the low scores are represented by dashed lines.

In model 1, panel 3 depicts statistically significant interaction between Metacognitive CQ, and MPQ Social initiative and Emotional stability dimensions. In line with our expectations, we observed that high scores in MPQ Social initiative showed a stronger increase in Metacognitive CQ (Fig. 2), indicated by the steeper slope of the solid line – high scorers – against the dashed line – low scores. Furthermore, we also found an unexpected effect of MPQ Emotional stability on the development of Metacognitive CQ (Fig. 3). Even though we did not hypothesize that the stress-related traits of the MPQ would affect this CQ dimensions, our results show that emotional stability does indeed contribute to the impact of the training on metacognitive CQ.

Next, in Model 2 for Cognitive CQ, we observed in our sample a significant interaction solely for MPQ Openmindedness. As depicted in Fig. 4, high scores in MPQ Openmindedness demonstrated a higher increase in Cognitive CQ (solid line), compared with low scorers (dashed line). This finding partially supports our Hypothesis 2a, which posits that a stronger social-perceptual aspect of the multicultural personality would facilitate better development of cultural intelligence. However, this was found true only for high Openmindedness.

In Model 3, we found that MPQ Social initiative and Openmindedness traits moderate the development of Motivational CQ. Despite our initial predictions, we observed a higher increase in Motivational CQ for low scorers in MPQ Social initiative (Fig. 5). Similarly, we

**Table 2**  
Estimates from univariate latent change scores models.

	$\Delta$	$p$	$\sigma$	$p$	$\beta$	$p$
Metacognitive CQ	2.171	< 0.001	0.563	< 0.001	-0.392	< 0.001
Cognitive CQ	1.466	< 0.001	0.759	< 0.001	-0.312	< 0.001
Motivational CQ	1.900	< 0.001	0.544	< 0.001	-0.340	< 0.001
Behavioral CQ	1.779	< 0.001	0.810	< 0.001	-0.296	< 0.001
MPQ Cultural empathy	0.448	0.617	0.413	< 0.001	-0.097	0.508
MPQ Flexibility	0.973	< 0.001	0.541	< 0.001	-0.284	< 0.001
MPQ Social initiative	0.419	0.145	0.179	< 0.001	-0.076	0.202
MPQ Emotional stability	1.513	0.022	0.683	0.003	-0.358	< 0.016
MPQ Openmindedness	0.963	0.070	0.402	< 0.001	-0.155	0.119

Note: Estimates reported above were calculated using bootstrapping with 1000 replications.

**Table 3**  
Regression models.

<b>1. DV: Metacognitive T2</b>		<i>B</i>	$\beta$	<i>p</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>p</i>	<i>F</i> <sup>2</sup>
1 Controls	Sex	0.487	0.217	0.045	0.068			
	PSES	0.258	0.123	0.318				
	Age	0.014	0.080	0.531				
	Overall sat.	0.015	0.014	0.907				
2 Main effects: MC T1 and MPQ T1	Metacognitive CQ T1	0.430	0.469	0.000	0.565	0.497	0.000	
	Cultural empathy MPQ	0.273	0.205	0.100				
	Social initiative MPQ	0.347	0.338	0.009				
	Openmindedness MPQ	-0.024	-0.020	0.893				
	Emotional stability MPQ	-0.082	-0.099	0.339				
	Flexibility MPQ	0.223	0.246	0.015				
3 Interactions: MPQ T1 x MC T1	CE x MC	0.173	0.140	0.188	0.640	0.075	0.148	0.20
	SI x MC	-0.342	-0.311	0.019				
	OP x MC	0.227	0.197	0.136				
	ES x MC	0.202	0.246	0.022				
	FX x MC	0.081	0.084	0.410				
<b>2. DV: Cognitive T2</b>		<i>B</i>	$\beta$	<i>p</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>p</i>	<i>F</i> <sup>2</sup>
1 Controls	Sex	0.319	0.121	0.259	0.084			
	PSES	0.164	0.067	0.566				
	Age	-0.007	-0.031	0.802				
	Overall sat.	0.306	0.253	0.038				
2 Main effects: CG T1 and MPQ T1	Cognitive CQ T1	0.642	0.601	0.000	0.460	0.376	0.000	
	Cultural empathy MPQ	0.360	0.229	0.085				
	Social initiative MPQ	0.091	0.075	0.595				
	Openmindedness MPQ	-0.127	-0.090	0.576				
	Emotional stability MPQ	-0.033	-0.035	0.762				
	Flexibility MPQ	0.209	0.196	0.068				
3 Interactions: MPQ T1 x CG T1	CE x CG	-0.113	-0.074	0.547	0.561	0.101	0.145	0.23
	SI x CG	-0.018	-0.017	0.906				
	OP x CG	0.354	0.281	0.045				
	ES x CG	-0.179	-0.170	0.132				
	FX x CG	0.125	0.121	0.228				
<b>3. DV: Motivational T2</b>		<i>B</i>	$\beta$	<i>p</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>p</i>	<i>F</i> <sup>2</sup>
1 Controls	Sex	0.595	0.269	0.012	0.094			
	PSES	0.064	0.031	0.799				
	Age	-0.013	-0.071	0.570				
	Overall sat.	0.142	0.140	0.258				
2 Main effects: MT T1 and MPQ T1	Motivational CQ T1	0.488	0.490	0.000	0.629	0.535	0.000	
	Cultural empathy MPQ	0.346	0.252	0.024				
	Social initiative MPQ	0.206	0.192	0.103				
	Openmindedness MPQ	0.071	0.058	0.691				
	Emotional stability MPQ	-0.065	-0.077	0.417				
	Flexibility MPQ	0.072	0.077	0.397				
3 Interactions: MPQ T1 x MT T1	CE x MT	-0.252	-0.188	0.132	0.708	0.079	0.021	0.27
	SI x MT	-0.267	-0.266	0.011				
	OP x MT	0.303	0.307	0.046				
	ES x MT	0.095	0.113	0.309				
	FX x MT	0.047	0.050	0.540				
<b>4. DV: Behavioral T2</b>		<i>B</i>	$\beta$	<i>p</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>p</i>	<i>F</i> <sup>2</sup>
1 Controls	Sex	0.344	0.118	0.281	0.054			
	PSES	0.416	0.153	0.195				
	Age	-0.008	-0.035	0.783				
	Overall sat.	0.162	0.123	0.325				
2 Main effects: BH T1 and MPQ T1	Behavioral CQ T1	0.626	0.609	0.000	0.537	0.483	0.000	
	Cultural empathy MPQ	0.232	0.136	0.300				
	Social initiative MPQ	0.256	0.193	0.163				
	Openmindedness MPQ	-0.126	-0.082	0.604				
	Emotional stability MPQ	0.033	0.031	0.773				
	Flexibility MPQ	0.049	0.042	0.683				
3 Interactions: MPQ T1 x BH T1	CE x BH	0.328	0.264	0.098	0.574	0.037	0.582	0.09
	SI x BH	-0.078	-0.072	0.578				
	OP x BH	-0.258	-0.199	0.187				
	ES x BH	0.108	0.111	0.274				
	FX x BH	0.065	-0.075	0.530				



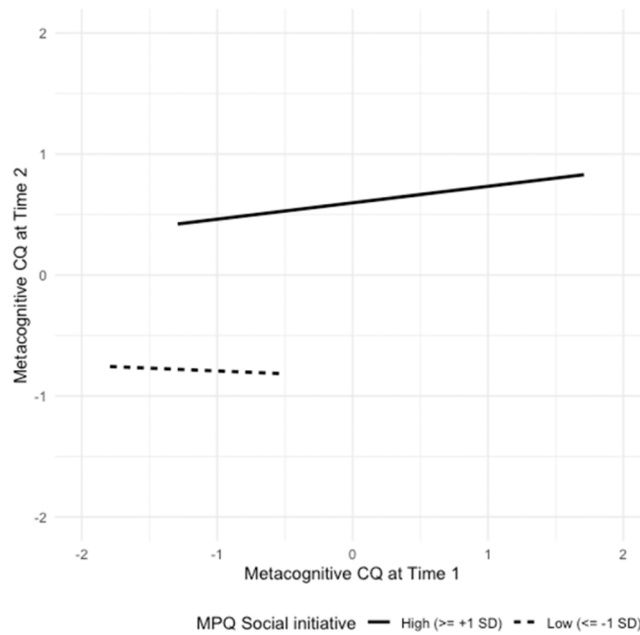


Fig. 2. Moderation effects of MPQ Social initiative on Metacognitive CQ development.

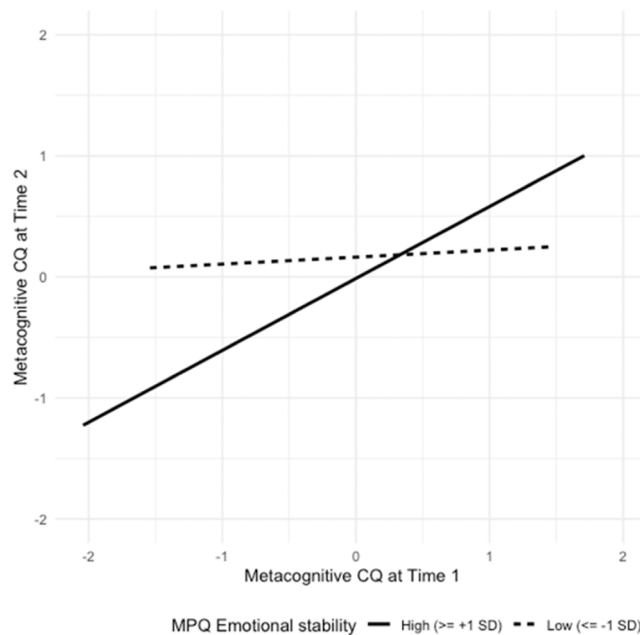


Fig. 3. Moderation effects of MPQ Emotional stability on Metacognitive CQ development.

noted that students scoring low in MPQ Openmindedness showed a steeper increase in their motivational CQ. In contrast, the slope line for high scorers in MPQ Openmindedness is flat, or even slightly negative (Fig. 6). These findings might indicate ceiling effects due to initially high Motivational CQ levels among high MPQ Openmindedness scorers, leaving little to no room for improvement.

In contrast with previous models, Model 4 – for Behavioral CQ – revealed no statistically significant interaction across any of the five MPQ subdimensions. One should keep in mind that for this specific model, the statistical power was low which indicates higher chances of not detecting a true moderation effect of the stress-related traits of the MPQ on Behavioral CQ.

To examine the consistency of our findings, we performed a robustness test using a smaller sample comprising only complete cases. We found that our findings are robust, as they also hold true across different sample conditions, emphasizing the reliability of our research.

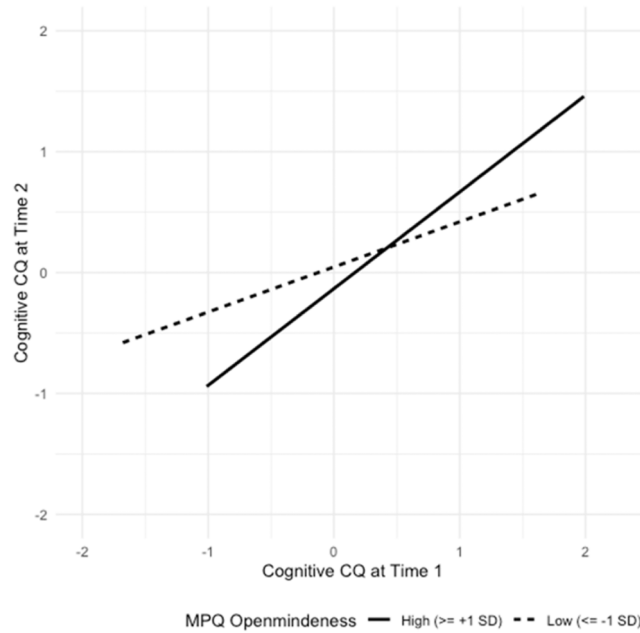


Fig. 4. Moderation effects of MPQ Openmindedness on Cognitive CQ development.

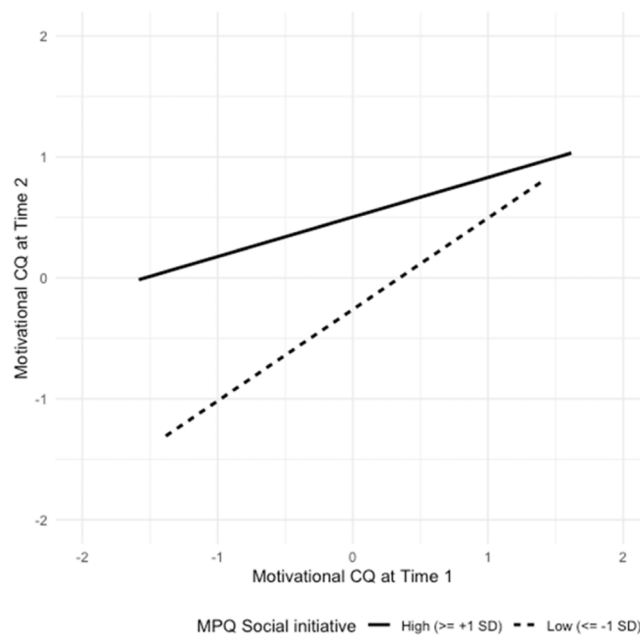


Fig. 5. Moderation effects of MPQ Social initiative on Motivational CQ development.

Fig. 7 condenses all these results together. First, we find no support for Hypothesis 2a as we did not observe a moderator effect of MPQ Cultural empathy on the development of any of the CQ dimensions. However, we did find partial support for hypothesis 2b-c. While we found significant moderator effects of some social-perceptual traits of the MPQ on specific facets of the cultural intelligence. For example, Openmindedness moderates Cognitive CQ development, and Social initiative moderates Metacognitive CQ development. Yet, not all predicted moderation effects were observed. Moreover, some observed moderator effects, occurred in the opposite direction; for instance, Motivational CQ developed better among low scorers in Social initiative and Openmindedness MPQ. Additionally, an unexpected moderation effect was found with a stress-related MPQ trait (Emotional stability) on Metacognitive CQ. Lastly, we reject Hypothesis 3a-b, as change in Behavioral CQ appeared to be unrelated to the stress-related traits of the multicultural personality.

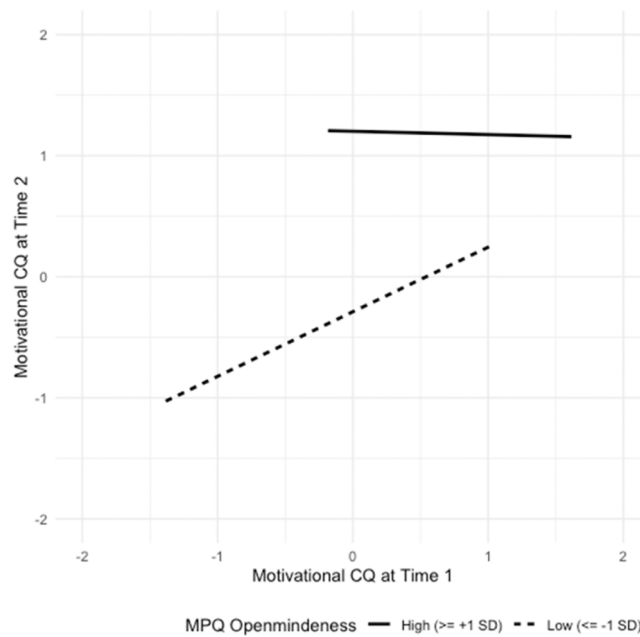


Fig. 6. Moderation effects of MPQ Openmindedness on Motivational CQ development.

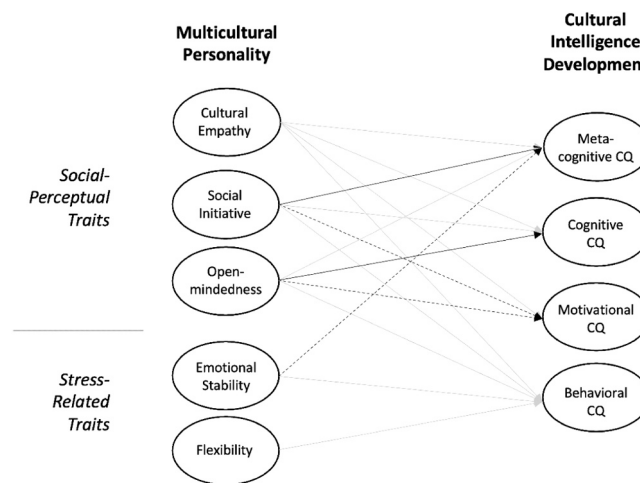


Fig. 7. Overview of relationships between MPQ traits and development of CQ dimensions. Note: Solid black lines indicate confirmed hypotheses; solid grey lines indicate rejected hypotheses; dashed lines indicate unexpected findings.

**Discussion**

*Summary of findings*

In this study, we first aimed to test the effects of a short-format intercultural training on the development of cultural intelligence among higher education students. We hypothesized that the 6-hour training would positively affect participants’ scores on the Cultural Intelligence Scale (CQS). Indeed, univariate latent change score models revealed a significant average increase for all four CQ sub-dimensions. This finding aligns with previous research that has shown improvement of cultural intelligence after short-format interventions (Bücker & Korzilius, 2015; Majda et al., 2021), and may alleviate some of the concerns raised by Zhang and Zhou (2019), who report limited effectiveness of short-term training in comparison with long-term or mobility-based interventions, particularly for behavioral skills (Mendenhall et al., 2004).

Another noteworthy finding is that the initial CQ score is a negative predictor of improvement during the training, suggesting the presence of ceiling effects in CQ development. This is consistent with previous work that shows similar effects in intercultural

competence development (e.g. Hofhuis et al., 2023) and underlines the need to control for T1 scores when investigating differences across time.

Next, we tested the assumption that MPQ scores are more stable across time. However, contrary to previous research (e.g., Leong, 2007; Hofhuis et al., 2023) we found that our training positively impacted the stress-related traits of the MPQ – Flexibility and Emotional stability. This may indicate that our training provided participants with some new behavioral strategies that they can use (Flexibility) and taught them how to approach cultural differences in a more non-threatening way (Emotional stability). An alternative explanation for these findings may be that participants responded differently to the scales after taking the training, constituting a potential test-retest bias. However, longitudinal measurement invariance has been previously established for the MPQ with this particular population (see Hofhuis, Jongerling, et al., 2020), which increases the likelihood that our training did increase these particular multicultural personality traits.

Subsequently, we investigated the role of multicultural personality traits in individuals' susceptibility to the training. We hypothesized that development of all four facets of cultural intelligence may be more pronounced in individuals who score high on the social-perceptual traits of the MPQ – Cultural empathy, Social initiative and Openmindedness. While the development of Behavioral CQ may be more pronounced in high scorers on the stress-related traits of the MPQ – Emotional stability and Flexibility. We found partial support for our hypotheses.

Firstly, Cultural empathy did not appear to affect development of any dimensions of cultural intelligence, suggesting that this trait is less important in the context of intercultural training than was previously assumed. Secondly, participants with higher scores on Social initiative displayed a stronger increase in Metacognitive CQ. This suggests that individuals who are more likely to initiate contact with different others, may have been better able to engage with the materials of the intercultural training, which in turn may have enhanced acquisition of new information and insights. This finding could be partly ascribed to the characteristics of the training itself, specifically its use of group-based elements such as simulation games and role playing. Participants who score high on Social initiative may be more likely to proactively approach such tasks, thus facilitating intercultural learning (Tadmor et al., 2012). This also supports the notion that experiential learning may be the key to enhancing intercultural competence through short-term interventions (Saunders et al., 2015).

Thirdly, our results show that students with higher scores in Openmindedness were more likely to improve their Cognitive CQ. This finding is in line with our predictions (see also: Van der Zee & Van Oudenhoven, 2013) that openminded individuals display more curiosity towards other cultures, and are thus more likely to engage with new cultural knowledge during a training.

Fourthly, some unexpected effects were found regarding the improvement of Motivational CQ. Contrary to our predictions, low scorers on Social Initiative and Openmindedness were more likely to improve this dimension of cultural intelligence. We suspect that this may be due to the previously mentioned ceiling effects. Participants who scored high on these traits already displayed relatively high scores on Motivational CQ, and improvement was only observed among those with a lower initial score. These findings suggest that individuals with lower tendency to initiate intercultural communication, as well as those with a more prejudiced attitude towards cultural differences, may in fact benefit most from intercultural training, since it provides more opportunities to enhance their motivation.

Additionally, an unexpected moderation effect was found of Emotional stability on Metacognitive CQ. We predicted that the stress-related traits of the MPQ would mostly affect participants ability to learn new behavior strategies for dealing with intercultural interaction. However, this finding suggests that this particular trait may also aid participants in learning how to reflect on intercultural differences. This finding is in line with previous work that shows that emotional stability may increase intercultural effectiveness in a training context (e.g. Hofhuis, Schilderman, et al., 2020), and may thus enhance intercultural learning beyond the effect of stress reduction.

Finally, we did not find support for effects of the stress-related MPQ traits on the development of Behavioral CQ. Emotional stability is generally considered important in dealing with intercultural anxiety or culture shock (Hofhuis et al., 2020; Van der Zee & Van Oudenhoven, 2013), yet our training was not designed to initiate such a response, which may explain why this trait did not show hypothesized effects. For training with a more confrontational or critical approach, these specific traits could be a more relevant. We recommend future scholars replicate our findings in different types of training or educational settings, to better understand the processes at play in different contexts.

### *Theoretical implications*

A major contribution of the present study is the empirical evidence for the influence of multicultural personality traits on the effectiveness of short-term intercultural training. Individual differences in trainability have not been widely studied before (see Alexandra, 2018 for an exception), despite calls by scholars to explain divergent findings on the effectiveness of intercultural education (e.g. Zhang & Zhou, 2019). Furthermore, our findings have implications for the use of CQ as a measure of intercultural competence, to assess effectiveness of intercultural interventions. As the development of different CQ subscales appears to be contingent on personality, researchers evaluating such processes are encouraged to take into account individual characteristics, and control for them in future studies.

On a more general level, our findings provide support for Leung and colleagues' (2014) distinction between different frameworks for assessing intercultural competence. Our study shows that intercultural traits and cultural intelligence are not merely different conceptualizations of the same competences, but instead are different independent constructs, that may interact with each other to predict intercultural learning and effectiveness.

### Limitations and future research

This study was limited by its sample size, due to external factors such as academic programs' budget to implement the training, and participants' willingness to complete our surveys. Consequently, we were unable to assess measurement invariance of the CQS and MPQ within this dataset, and implemented mean scores on each subscale as variables in our models. However, both scales have previously been validated in different populations, with both correlational and longitudinal data (see also [Chen & Gabrenya, 2021](#); [Hofhuis et al., 2020](#)), which increases our confidence that they are able to accurately measure the constructs under investigation.

While our power analysis indicated that the sample was sufficient to evaluate the effects of personality on most dimensions of cultural intelligence, our model predicting changes in Behavioral CQ would have benefited from more statistical power. Future work with a larger sample may reveal more subtle effects of stress-related traits of the MPQ, for which no evidence was found in the current study.

Another limitation of this study is its reliance on self-reported data. A more accurate evaluation of the development of intercultural competence should include more divergent measures, such as other-rating or observed behaviors in intercultural situations (e.g. [Hofhuis et al., 2020](#)).

A final limitation of our study is that our T2 measure was collected at different time intervals, over a period of several weeks. While most respondents (75%) completed the survey directly after the training, some may have completed this survey only after being sent a reminder. Nevertheless, in additional analysis, we did not find a statistically significant effects of time between the end of the training and the response and cultural intelligence scores at Time 2. Future studies would benefit from a more constrained time period for collecting responses, or could include the time interval as a control variable. In similar vein, we also acknowledge that while we did detect some improvements in CQ scores, we cannot determine for how long those changes in CQ might last. Further research is needed to establish the durability of the effects of a short-term intercultural training over a longer time period.

### Practical implications

The results of this study have practical implications in the context of increasing internationalization and growing interest in intercultural training in higher education. Many institutions aim to broaden their methods for promoting intercultural competence beyond student mobility, and are focusing on creating 'internationalization at home' through diversifying curricula and study programs ([Soria & Troisi, 2014](#)). Our findings suggest that short-term intercultural training may be effective in enhancing students' cultural intelligence. Moreover, such trainings may also have additional benefits for students with a particular set of multicultural personality traits. Our findings show the importance of tailoring interventions towards the need of the individuals. For example, an interactive training such as the one described in this study appears to be more effective for students who are scoring lower on Openmindedness and Social initiative, whereas a training based around cultural knowledge, for example using self-directed training, may be more effective for students who score high on Openmindedness. Our advice to professionals in intercultural education is to be aware of such differences and adjust their interventions to match the needs of the target population.

### Declaration of Competing Interest

None'.

### Acknowledgements

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### Appendix

**Table A.1**  
FIML correlation matrix: CQ subscales at T1 and T2, and MPQ T1 subdimensions.

	MC.t1	MC.t2	CG.t1	CG.t2	MT.t1	MT.t2	BH.t1	BH.t2	CE	FX	SI	ES
MC T1												
MC T2	0.633											
CG T1	0.583	0.522										
CG T2	0.498	0.618	0.637									
MT T1	0.557	0.412	0.484	0.408								
MT T2	0.655	0.792	0.548	0.634	0.649							
BH T1	0.623	0.605	0.650	0.430	0.451	0.644						
BH T2	0.561	0.843	0.521	0.665	0.488	0.756	0.692					
CE T1	0.422	0.387	0.233	0.295	0.335	0.445	0.409	0.435				
FX T1	-0.097	0.042	0.014	0.114	0.172	0.021	-0.110	-0.077	-0.250			

(continued on next page)

Table A.1 (continued)

	MC.t1	MC.t2	CG.t1	CG.t2	MT.t1	MT.t2	BH.t1	BH.t2	CE	FX	SI	ES
SI T1	0.429	0.576	0.320	0.244	0.368	0.534	0.319	0.426	0.397	0.008		
ES T1	0.169	0.142	0.196	0.167	0.300	0.139	0.144	0.192	0.078	0.233	0.348	
OP T1	0.551	0.499	0.419	0.335	0.645	0.594	0.559	0.458	0.602	0.020	0.581	0.141
Age	-0.088	0.047	-0.085	-0.002	-0.084	-0.096	-0.041	-0.082	-0.156	-0.107	-0.162	0.030
Sex	0.213	0.216	0.197	0.104	0.194	0.276	0.115	0.127	0.057	0.211	0.198	-0.066
Parent HE background	0.128	0.113	0.149	0.120	-0.025	0.038	0.147	0.165	0.189	-0.026	0.067	-0.014
Overall training satisfaction	0.034	0.039	0.138	0.196	-0.047	0.098	0.100	0.101	-0.007	-0.225	-0.134	-0.076

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