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## EFFECT OF STUDY ABROAD AND PERSONALITY ON CULTURAL INTELLIGENCE

**The effect of study abroad and personality on cultural intelligence: A deeper understanding using the expanded model of cultural intelligence****Marie Chédru<sup>a,1,\*</sup>, Mariia Ostapchuk<sup>b,2</sup>****<sup>a</sup> Unité de recherche INTERACT UP 2018.C102, Institut Polytechnique UniLaSalle,  
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Campus de Rouen, France****\* Correspondence to: Institut Polytechnique UniLaSalle, 19 rue Pierre Waguët, BP 30313, 60026 Beauvais Cedex, France.****E-mail address: marie.chedru@unilasalle.fr (M. Chédru).****<sup>1</sup> <https://orcid.org/0000-0001-5195-7273>****<sup>2</sup> <https://orcid.org/0000-0002-0180-1614>****Abstract**

Using an expanded assessment of cultural intelligence (CQ), this study provides a detailed analysis of how studying abroad impacts the development of CQ. We examined (1) the effect of a study abroad semester on the development of each of the eleven subdimensions of cultural intelligence – Expanded-CQ or E-CQ over time; and (2) whether personality traits (i.e., extraversion and openness to experience) had a moderating role in the relationship between a study abroad semester and E-CQ in a longitudinal study. Data were collected from 361 students both before (Time 1) and after (Time 2) the study abroad semester. Mixed between-within subjects analysis of variance showed that the study abroad semester did have a statistically significant effect on the development of ten subdimensions of E-CQ over time. Moreover, contrary to our expectations, multiple regression analyses demonstrated that individuals who were low on extraversion improved their metacognitive CQ (awareness) more than did individuals who were high on extraversion. Similarly, individuals who were low on openness to experience improved their metacognitive CQ (awareness), their cognitive CQ (culture-general

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knowledge), and their motivational CQ (intrinsic interest) more than did individuals who were high on openness to experience. Implications for future research and practice are discussed.

*Keywords:* cultural intelligence, CQ, expanded model of cultural intelligence, study abroad, Big Five personality traits, student mobility

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The concept of cultural intelligence (CQ) was introduced in 2002 and has attracted much attention since then (Fang et al., 2018). CQ refers to an individual's capability to function and to manage effectively in cross-cultural contexts (Ang & Van Dyne, 2008; Earley & Ang, 2003). It is a multidimensional construct consisting of four primary factors: metacognitive CQ, cognitive CQ, motivational CQ, and behavioral CQ. Increasing globalization and the interconnectedness of multinational work environments have intensified the demand for graduates demonstrating high levels of CQ (Deardorff, 2006; Jones, 2013). Prior research has confirmed the predictive power of CQ on several aspects of intercultural effectiveness such as: cultural judgment and decision making, cultural adaptation and task performance (Ang et al., 2007), cross-cultural adjustment (Lin et al., 2012), expatriate job performance (Chen et al., 2010), and intercultural negotiation effectiveness (Imai & Gelfand, 2010).

Student mobility programs provide many experiential learning opportunities that contribute to the development of students' CQ (Iskhakova et al., 2021; Ng et al., 2009; Ramirez, 2016). Experiential learning is understood as "the process whereby knowledge is created through the transformation of experience" (D. A. Kolb, 1984, p. 41). Most previous research supports a positive link between studying abroad and overall CQ (Fang et al., 2018). However, inconsistent results across the four dimensions of CQ were found. For example, previous research has shown that studying abroad generated higher levels of both metacognitive and cognitive CQ (McRae et al., 2016; Varela & Gatlin-Watts, 2014; Wood & St. Peters, 2014). In some cases, motivational CQ is positively impacted by studying abroad (Wood & St. Peters, 2014) but it is not always the case (Varela & Gatlin-Watts, 2014) or the impact is not significant (McRae et al., 2016). Mixed results are also observed concerning behavioral CQ with either a positive effect of studying abroad (McRae et al., 2016) or no effect (Varela & Gatlin-Watts, 2014; Wood & St. Peters, 2014). To shed light on these inconsistent results, the effect of numerous factors can be put forward. These factors include participants' initial levels of CQ (Peng et al., 2015) and their prior international experience (McKeown, 2009), program duration (Varela, 2017; Varela & Gatlin-Watts, 2014), destination country and cultural distance (Iskhakova et al., 2021; Varela, 2017), specific program design features such as predeparture training (Paras et al.,

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2019; Peng et al., 2015), cultural mentoring and structured reflection (Vande Berg et al., 2012), etc. Varela (2017, p. 532) pointed out that “the combination of all these features provides a singularity to each experience that must be carefully pondered when interpreting results”.

Rockstuhl and Van Dyne (2018) noted inconsistency in CQ modeling across studies. They argued that this is troubling because it suggests that the results of these studies may not be comparable and, worse, may be misleading. Thus, they investigated the factor structure of CQ and highlighted the benefits of conceptualizing CQ as a bi-factor model where each factor provides both unique and holistic information. Another avenue has been overlooked so far. This avenue consists of the use of the Expanded Cultural Intelligence Scale (E-CQS). Introduced by Van Dyne et al. (2012), the 37-item E-CQS decomposes the four primary CQ dimensions into 11 sub-dimensions. The authors provided psychometric evidence supporting the 11-factor structure of the scale. They argued that this expanded framework provides a better articulated conceptual space for each of four factors of CQ which should facilitate future research by providing more depth to the conceptualization of each CQ factor (Van Dyne et al., 2012, p. 296). Despite its theoretical relevance, very few studies have used this scale for their empirical designs (Richter et al., 2020). In line with Van Dyne et al. (2012), we argue that the more specific facets of CQ delineated in the E-CQS provide a refined framework to shed light on how studying abroad impacts CQ.

Thus, the present study investigates the effect of a study abroad semester on the development of each of the eleven subdimensions of CQ. As stipulated in the literature (Fischer, 2011; Ott & Michailova, 2018; Ramirez, 2016; Şahin et al., 2014), and drawing on trait activation theory (Tett & Guterman, 2000), we also examine whether personality traits (i.e., extraversion and openness to experience) have a moderating role in the relationship between a study abroad semester and E-CQ in a longitudinal design.

### **Theoretical background and hypotheses**

#### **The expanded model of cultural intelligence**

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According to Earley and Ang (2003), CQ, an individual's capability to function effectively in cross-cultural contexts, comprises four key dimensions: metacognitive CQ, cognitive CQ, motivational CQ, and behavioral CQ. Metacognitive CQ refers to an individual's level of conscious cultural awareness before and during cross-cultural interactions (Ang & Van Dyne, 2008). Related abilities include observing and revising mental models of cultural norms and behaviors. Van Dyne and colleagues (2012) delineated three subdimensions of metacognitive CQ: planning, awareness, and checking. Planning is defined as strategizing before a culturally diverse encounter; it is "taking time to prepare for a cross-cultural encounter – anticipating how to approach the people, topic, and situation" (Van Dyne et al., 2010, p. 137). Awareness means knowing about cultural thinking and knowledge of self and others in real time. Checking is reviewing assumptions and adjusting mental maps when actual experiences differ from expectations (Van Dyne et al., 2012).

Cognitive CQ is the knowledge dimension of CQ. It focuses on explicit knowledge of values, norms, practices and conventions in different cultures acquired from education and personal experiences (Ang et al., 2007). In the expanded model of CQ, cognitive CQ includes culture-general knowledge – declarative knowledge of the major elements that constitute the cultural environment; and context-specific knowledge – declarative knowledge of how cultural universals are manifested in a specific domain and procedural knowledge of how to be effective in that domain (Van Dyne et al., 2012).

Motivational CQ reflects the ability to direct attention and energy toward learning about and functioning in situations characterized by cultural differences (Ang et al., 2007). It refers to an individual's level of interest, drive, and energy to adapt cross-culturally (Van Dyne et al., 2010). Van Dyne et al. (2012) specified three sub-dimensions of motivational CQ: intrinsic interest, extrinsic interest, and self-efficacy to adjust. Intrinsic interest is defined as valuing a culturally diverse experience because it is inherently satisfying. It is "the degree to which one individual derives enjoyment from culturally diverse situations" (Van Dyne et al., 2010, p. 135). Extrinsic interest is defined as valuing the tangible, personal benefits that can be derived from culturally diverse

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experiences. Self-efficacy to adjust refers to having task-specific confidence in a cross-cultural encounter (Van Dyne et al., 2012).

Behavioral CQ reflects the ability to exhibit appropriate actions when interacting with people from different cultures (Ang et al., 2007). The expanded model of CQ differentiates three sub-dimensions of behavioral CQ: verbal behavior, nonverbal behavior, and speech acts (Van Dyne et al., 2012). Verbal behavior is defined as flexibility in vocalization (e.g., accent, tone), and non-verbal behavior as flexibility in communication that is conveyed via gestures, facial expressions, and body language, rather than through words. Speech acts refers to flexibility in manner of communicating specific types of messages such as requests, invitations, apologies, gratitude or disagreement.

### **Development of CQ through experiential learning**

A long-term study-abroad program offers a unique and crucial learning context. By living and studying in an unfamiliar culture, students are challenged to make sense of the novelty and ambiguity that they regularly encounter, both within the academic setting of the host institution and in the daily life activities (Dall'Alba & Sidhu, 2015; Passarelli & Kolb, 2012). As a result, they may adopt new ways of thinking, acting and relating in the world. The study abroad experience has the potential to change their worldview and yield a network of mind-expanding relationships (Passarelli & Kolb, 2012). In this sense, a study-abroad program is a form of experiential education and learning (Iskhakova et al., 2021; Ramirez, 2016).

Experiential learning theory (ELT; D. A. Kolb, 1984) highlights the critical role that experience plays in impacting learning and change. It defines learning as a continuous process of adapting to the environment by acquiring new information, challenging existing knowledge and relearning, and integrating new knowledge into action. ELT outlines four fundamental stages that individuals experience during the experiential learning cycle: concrete experiences, reflective observation, abstract conceptualization, and active experimentation (A. Y. Kolb & Kolb, 2005). Concrete experiences refer to tangible experiences associated with new environments or events. Reflective observation involves thinking about the concrete experiences and reexamining existing

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assumptions or beliefs. Abstract conceptualization focuses on more general and deeper level theorizing that may guide future actions. Active experimentation refers to implementing new knowledge in interacting with the environment. During the experience in a different culture, individuals cycle through the four experiential learning modes and thus develop their CQ (Iskhakova et al., 2021; Li et al., 2013). Li et al. (2013, p. 35) argued that “the immediate cultural experience serves as the basis for observation and reflection, in which the cultural experience is subsequently assimilated into cultural knowledge, and then formed into active experimentation towards forming culturally appropriate behaviors”. Thereby, a study-abroad program offers an ideal immersion environment facilitating intense experiential learning, which ultimately impacts CQ development (Earley & Peterson, 2004; Iskhakova et al., 2021).

We posit that the experiential learning environment associated with a long-term study-abroad program will contribute to the development of each subdimension of student’s metacognitive CQ. Before the interaction, students can ask themselves what they hope to accomplish (planning). During the interaction, they can pay attention to how cultural aspects of the situation influence what is happening (awareness), and double check the accuracy of their cultural knowledge (checking). It is therefore expected that each subdimension of students’ metacognitive CQ will increase after their study abroad semester. The following hypothesis is therefore expected.

*Hypothesis 1.* Student’s levels of metacognitive CQ, i.e., planning (H1a), awareness (H1b), and checking (H1c), will be higher after the study abroad semester (Time 2) than pre-departure (Time 1).

Several studies (McRae et al., 2016; Varela & Gatlin-Watts, 2014; Wood & St. Peters, 2014) have shown that by integrating novel cultural facts and getting more familiar with similarities and differences among cultures, students abroad enhance their cognitive CQ.

*Hypothesis 2.* Student’s levels of cognitive CQ, i.e., culture-general knowledge (H2a), and context-specific knowledge (H2b), will be higher after the study abroad semester than pre-departure.

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Research suggests that abroad experiences support the enhancement of students' interest in other cultures (Mohajeri Norris & Gillespie, 2009) and self-efficacy (Cubillos & Ilvento, 2012; Mohajeri Norris & Gillespie, 2009; Petersdotter et al., 2017). It has also been shown that students make clear associations between perceived outcomes of international experience and graduate employability. The main benefits of international experience include enhanced networking and career prospects, additional language acquisition, and the development of soft skills (Crossman & Clarke, 2010). For all these reasons, it is expected that each subdimension of students' motivational CQ should increase after a study abroad semester.

*Hypothesis 3.* Student's levels of motivational CQ, i.e., intrinsic interest (H3a), extrinsic interest (H3b), and self-efficacy to adjust (H3c), will be higher after the study abroad semester than pre-departure.

Living abroad for one semester should enhance understanding of appropriate practices and behaviors in nonnative contexts. It is therefore expected that each subdimension of students' behavioral CQ will increase after their study abroad semester.

*Hypothesis 4.* Student's levels of behavioral CQ, i.e., verbal behavior (H4a), non-verbal behavior (H4b), and speech acts (H4c), will be higher after the study abroad semester than pre-departure.

### **Moderating role of personality**

The Big Five personality dimensions (i.e., openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism), are the most frequently examined traits in the CQ literature (Fang et al., 2018). Among these five dimensions, studies highlight the central role of openness to experience and extraversion in predicting intercultural outcomes in individuals as diverse as students, global leaders, military personnel, or expatriates (Ang et al., 2006; Caligiuri & Tarique, 2012; Fischer, 2011; Huang et al., 2005; Ramirez, 2016; Şahin et al., 2014).

Openness to experience describes the degree to which individuals are original, imaginative, innovative, curious, and willing to take risks (Costa & McCrae, 1992). Burke et al. (2009) identified

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openness as a key factor in students' adjustment to life abroad. Using a sample of global leaders, Caligiuri and Tarique (2012) demonstrated that openness is positively related to dynamic cross-cultural competencies such as cultural flexibility and tolerance of ambiguity. Individuals with a greater openness are more likely to engage in international experiences and multicultural opportunities because of their natural curiosity and interest in novel experiences (Caligiuri & Tarique, 2012). Fischer (2011) found that students who were high on open-mindedness were more likely to report increases in motivational CQ following an intercultural training. Similarly, Şahin et al. (2014) reported that following an international assignment, individuals who were high on openness to experience improved their motivational CQ more than did individuals who are low on openness to experience. Being confronted with new opportunities to consciously examine their own cultural assumptions and values and learn the knowledge of norms, practices, and conventions in other cultures, individuals who are high on openness to experience are expected to increase their metacognitive and cognitive CQ (Ang et al., 2006; Şahin et al., 2014). Finally, international experience offers those with high openness to experience opportunities to extend their repertoire of behaviors beyond the daily habits and thus increase their behavioral CQ (Ang et al., 2006; Ramirez, 2016; Şahin et al., 2014).

Extraversion reflects the degree to which individuals are sociable, assertive, talkative, and seek social activities (Costa & McCrae, 1992). Extroverts have a natural ease with social demands and may be more willing to make the effort necessary to interact effectively with peers from different countries (Caligiuri & Tarique, 2012). Throughout a study abroad experience, the ability to interact with others is a fundamental factor in developing intercultural competence (Ramirez, 2016). Burke et al. (2009) found that extraversion was related to performance dimensions that directly concern interactions with students from other countries and host nationals, e.g., developing social and personal relations with host nationals and facilitating peer and group activities. Şahin et al. (2014) demonstrated that highly extroverted individuals improved their metacognitive CQ and behavioral CQ more than did individuals who were less extroverted. Ang et al. (2006) found significant links between extraversion and cognitive, motivational, and behavioral CQ. In the process of interacting with host nationals, highly extroverted individuals have the opportunity to learn the knowledge of norms, practices, and

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conventions in other cultures (Ang et al., 2006; Ramirez, 2016). Not only do they have the opportunity to acquire greater cultural knowledge, but they are also more likely to examine their own cultural assumptions and values. Thus, they are expected to increase both their cognitive and metacognitive CQ. Extroverts, by definition, are bold, sociable, and self-confident. They may seek opportunities to interact with people from different cultural backgrounds and be willing to exhibit flexible behaviors that put others at ease during the interaction (Ang et al., 2006; Şahin et al., 2014). This, in turn, suggests that experiences in cross-cultural environment should lead extroverts to develop both their motivational and behavioral CQ (Ramirez, 2016; Şahin et al., 2014).

Referring to person-situation theories, such as trait activation theory (TAT) (Tett & Guterman, 2000), sheds light on how individuals with certain personality types may adjust more or less successfully to life in a cultural environment different from their own (Roy et al., 2018). The principle of trait activation formalizes the trait–situation relationship by asserting that the behavioral expression of a trait requires stimulation of that trait by trait-relevant situational cues (Tett & Guterman, 2000). For example, “aggressive behavior is generally expected as a response to aggression-inducing stimuli, but people high in aggression will show a quicker or heightened response or greater sensitivity to weaker cues” (Tett & Guterman, 2000, p. 398). On the basis of TAT and the previous literature review, we argue that individuals high in openness to experience (or extraversion) will respond more positively to mobility experiences than those low in openness to experience (or extraversion), because they will feel more comfortable in new situations and are therefore more likely to benefit from them. Thus, we posit that individuals who are high in openness to experience (or extraversion) will benefit more from their study abroad semester.

*Hypothesis 5.* The personality trait openness to experience moderates the relationship between the study abroad semester and CQ, such that individuals who are high on openness to experience are more likely to increase their CQ (modeled in its expanded form E-CQ) following their study abroad semester.

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*Hypothesis 6.* The personality trait extraversion moderates the relationship between the study abroad semester and CQ, such that individuals who are high on extraversion are more likely to increase their CQ (modeled in its expanded form E-CQ) following their study abroad semester.

## Method

### Participants

A total of 361 engineering students participated in the study. Each of them spent one compulsory study semester abroad. This was the fifth semester of a five-year degree. This mandatory study abroad semester was introduced into the curriculum after students' enrollment. This means that the students were not aware of this requirement when they entered the curriculum. The average age of the students was 19.6 years ( $SD = 0.8$  years) at Time 1 and 20.4 years ( $SD = 0.7$  years) at Time 2. The majority (99.2%) were French, studying either Agronomy (78%) or Food and Health Science (22%). Females represented 55% of the respondents ( $n = 199$ ) and males 45% ( $n = 162$ ). The study semester abroad took place in partner universities either in the Philippines ( $n = 114$ ), Mexico ( $n = 97$ ), Colombia ( $n = 87$ ), Brazil ( $n = 24$ ), Costa Rica ( $n = 21$ ), the United States ( $n = 17$ ), or in the Netherlands ( $n = 1$ ). Before departure, students were prepared for academic and administrative aspects of their sojourn (curriculum and everyday life issues). They were taught by faculty members of the partner university in the native or official language of the host country. The destination country depended mainly on the student's language proficiency level, and on the adequation between the study program offered by the partner university and the student's personal and professional project. Students were housed in university residences or independently. We were able to match records from 356 students across both time points.

### Measures

*Cultural intelligence.* Participants rated the 37-item French version of the Expanded Cultural Intelligence Scale (Gagné-Deland, 2017; Van Dyne et al., 2012). The French version of the E-CQ Scale demonstrates good psychometric properties. It is a valid and reliable scale suitable for use in a Francophone context (Gagné-Deland, 2017). Answers were recorded on a 7-point Likert-type scale,

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ranging from 1 (strongly disagree) to 7 (strongly agree). This scale includes 9 items for metacognitive CQ, 10 items for cognitive CQ, 9 items for motivational CQ, and 9 items for behavioral CQ. Sample items from each of the subdimensions are as follows: i) Metacognitive CQ, planning (3 items;  $\alpha$  Time 1 = .71,  $\alpha$  Time 2 = .72), “I think about possible cultural differences before meeting people from other cultures.”; awareness (3 items;  $\alpha$  Time 1 = .72,  $\alpha$  Time 2 = .83), “I am aware of how my culture influences my interactions with people from different cultures”; checking (3 items;  $\alpha$  Time 1 = .70,  $\alpha$  Time 2 = .73), “I update my cultural knowledge after a cultural misunderstanding”; ii) Cognitive CQ, culture-general knowledge (5 items;  $\alpha$  Time 1 = .77,  $\alpha$  Time 2 = .79), “I can describe the different cultural value frameworks that explain behaviors around the world”; context-specific knowledge (5 items;  $\alpha$  Time 1 = .87,  $\alpha$  Time 2 = .87), “I can describe different ways to motivate and reward people across cultures”; iii) Motivational CQ, intrinsic interest (3 items;  $\alpha$  Time 1 = .82,  $\alpha$  Time 2 = .85), “I truly enjoy interacting with people from different cultures”; extrinsic interest (3 items;  $\alpha$  Time 1 = .64,  $\alpha$  Time 2 = .72), “I value the status I would gain from living or working in a different culture”; self-efficacy to adjust (3 items;  $\alpha$  Time 1 = .80,  $\alpha$  Time 2 = .86), “I am confident that I can persist in coping with living conditions in different cultures”; iv) Behavioral CQ, verbal behavior (3 items;  $\alpha$  Time 1 = .78,  $\alpha$  Time 2 = .75), “I vary my verbal behaviors (accent, tone, rate of speaking) to fit specific cultural contexts.”; non-verbal behavior (3 items;  $\alpha$  Time 1 = .76,  $\alpha$  Time 2 = .73), “I modify how close or far apart I stand when interacting with people from different cultures”; and speech acts (3 items;  $\alpha$  Time 1 = .87,  $\alpha$  Time 2 = .86), “I modify the way I disagree with others to fit the cultural setting”. Except for extrinsic interest at Time 1, all Cronbach’s alphas were above the recommended threshold of .70 (Nunnally & Bernstein, 1994). Except for extrinsic interest, the subscales could therefore be regarded as reliable.

*Personality.* The Big Five traits of personality were measured using the 45-item French version of the Big Five Inventory – BFI-Fr (John et al., 1991; Plaisant et al., 2010). Answers were recorded on a 5-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The scale included eight items for extraversion (e.g., “I see myself as someone who is outgoing, sociable”), ten items for agreeableness (e.g., “I see myself as someone who is helpful and unselfish with others”), nine items for conscientiousness (e.g., “I see myself as someone who perseveres until the task is

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finished”), eight items for neuroticism (e.g., “I see myself as someone who gets nervous easily”), and ten items for openness (e.g., “I see myself as someone who is original, comes up with new ideas”). All Cronbach’s alphas (.84 for extraversion, .76 for agreeableness, .81 for conscientiousness, .83 for neuroticism, and .74 for openness) were above the recommended threshold of .70 (Nunnally & Bernstein, 1994). The subscales could therefore be considered as reliable.

### **Procedure**

Participants completed all measures (cultural intelligence, personality) and demographic questions in May (Time 1), one to two months before starting their semester abroad, and again in February (Time 2) the following year, i.e., one to two months after their return. The questionnaires were made available online and completed in class so as to be able to answer any question of clarification. In accordance with the principles of the "French charter of ethics for research professions", the students completed a consent form which specifies that there are no right or wrong answers and that the answers are treated confidentially and anonymously.

### **Analyses**

We used a within-subject ANOVA to test whether the scores on any of the E-CQ variables differed between Time 1 and Time 2. This will test Hypotheses 1 to 4, whether the study abroad semester improved E-CQ dimensions. As the literature found mixed results regarding gender effects on the intent to study abroad (Salisbury et al., 2010), we controlled for gender, entered as a between-subject variable (Varela & Gatlin-Watts, 2014).

To test whether students high on openness and extraversion would acquire more CQ, eleven hierarchical regression analyses were conducted, i.e., one regression per E-CQ dimension. In the first step, gender and country variables were included as control variables. In the second step, we introduced any of the E-CQ dimensions and personality traits at Time 1. In the third step, the interaction term between any of the E-CQ dimensions and personality traits at Time 1 were included in the regression equation to predict changes in the dependent variable at Time 2. A significant interaction shows that the change in scores of any of the E-CQ dimensions from Time 1 to Time 2 depends on the level of personality traits at Time 1 (Aiken et al., 1991).

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All statistical analyses were performed using Stata (StataCorp, 2019) and SPSS (Arbuckle, 2019).

## Results

### Confirmatory factor analysis of the E-CQ scale

Confirmatory factor analyses, conducted with AMOS (Arbuckle, 2019), were utilized to test the factor structure of the E-CQS. Results confirmed an acceptable fit of the pre-departure data to the 11-factor correlated model. Similar results were obtained when the 11-factor structure was used to reproduce the after-return data (Table 1). The 11-factor model (Model 1) had significantly better fit than a 4-factor model of the four correlated primary CQ factors (Model 3). Besides, similar to Van Dyne et al. (2012), we verified that the fit of an 11-factor model with four correlated second-order factors (Model 2) was a significantly better fit than a four correlated first-order factor model (Model 3).

**Table 1**

*Fit indices at Time 1 and Time 2 for the different models tested*

|             | Time 1  |         |         | Time 2  |         |         |
|-------------|---------|---------|---------|---------|---------|---------|
|             | Model 1 | Model 2 | Model 3 | Model 1 | Model 2 | Model 3 |
| CFI         | .91     | .89     | .77     | .90     | .88     | .77     |
| IFI         | .91     | .89     | .77     | .90     | .88     | .77     |
| GFI         | .86     | .84     | .74     | .84     | .81     | .69     |
| RMSEA       | .05     | .05     | .08     | .06     | .06     | .08     |
| SRMR        | .06     | .06     | .07     | .06     | .07     | .08     |
| $\chi^2/df$ | 1.93    | 2.03    | 3.17    | 2.18    | 2.32    | 3.56    |

Note: Model 1 = 11-factor correlated model.

Model 2 = 11-factor model with four correlated second-order primary CQ factors.

Model 3 = 4-factor model of the four correlated primary CQ factors.

### The effect of the study abroad semester

The means, standard deviations, scale reliabilities, and inter-correlations of the variables are presented in Table 2. Means and standard deviations for E-CQ dimensions at Time 1 and Time 2 depending on gender are shown in Table 3.

Mixed between-within subjects ANOVA results indicated that the study abroad semester did have a statistically significant effect on planning [ $F(1, 354) = 4.70, p < .05, \eta^2 = .01$ ], awareness [ $F(1,$

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354) = 4.46,  $p < .05$ ,  $\eta^2 = .01$ ], and checking [F(1, 354) = 5.67,  $p < .05$ ,  $\eta^2 = .02$ ]. This supports Hypothesis 1. The main effect of gender was significant on awareness [F(1,354) = 16.54,  $p < .000$ ,  $\eta^2 = .04$ ], and checking [F(1, 354) = 6.20,  $p < .05$ ,  $\eta^2 = .02$ ], but not on planning. Women had higher awareness and checking means at both time points than men. None of the interactions between gender and time were significant ( $p > .06$ ), therefore, men and women react similarly to the study abroad semester pertaining to their levels of metacognitive CQ (Table 3).

Sojourn did have a statistically significant effect on culture-general knowledge [F(1, 354) = 64.86,  $p < .000$ ,  $\eta^2 = .16$ ], and context-specific knowledge [F(1, 354) = 105.40,  $p < .000$ ,  $\eta^2 = .23$ ]. The main effect of gender on cognitive CQ factors was not significant. However, there was a significant interaction between gender and time for culture-general knowledge [F(1,354) = 11.66,  $p < .005$ ,  $\eta^2 = .03$ ], indicating that time effect was greater for women than for men (Table 3). Therefore, Hypothesis 2 was supported.

Results indicated that the study abroad semester did have a statistically significant effect on intrinsic interest [F(1, 354) = 4.71,  $p < .05$ ,  $\eta^2 = .01$ ], and self-efficacy to adjust [F(1, 354) = 9.58,  $p < .005$ ,  $\eta^2 = .03$ ]. However, there was no significant effect on extrinsic interest [F(1, 354) = 0.00, n.s.]. Hypothesis 3 was partially supported. The main effect of gender was significant on intrinsic interest [F(1,354) = 8.60,  $p < .005$ ,  $\eta^2 = .02$ ], but not on self-efficacy to adjust. Women had higher intrinsic interest means at both time points than men. None of the interactions between gender and time were significant ( $p > .20$ ), therefore, men and women react similarly to the study abroad semester pertaining to their levels of motivational CQ (Table 3).

Results indicated that the study abroad semester did have a statistically significant effect on verbal behavior [F(1, 354) = 10.67,  $p < .005$ ,  $\eta^2 = .03$ ], non-verbal behavior [F(1, 354) = 15.18,  $p < .000$ ,  $\eta^2 = .04$ ], and speech acts [F(1, 354) = 20.7,  $p < .000$ ,  $\eta^2 = .05$ ]. This supports Hypothesis 4. The main effect of gender was significant on non-verbal behavior [F(1,354) = 3.92,  $p < .05$ ,  $\eta^2 = .01$ ], but not on verbal behavior and speech acts. Women had higher non-verbal behavior means at both time points than men. None of the interactions between gender and time were significant ( $p > .50$ ),

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therefore, men and women react similarly to the study abroad semester pertaining to their levels of behavioral CQ (Table 3).

As a result, our findings supported Hypothesis H1, H2, H3a, H3c, and H4 which predicted that students' levels of metacognitive CQ (H1), cognitive CQ (H2), motivational CQ-intrinsic interest (H3a), motivational CQ-self efficacy to adjust (H3c), and behavioral CQ (H4) would be higher after the study abroad semester than at the beginning of the study abroad semester. Hypothesis H3b was not supported, as the scores on motivational CQ-extrinsic interest at Time 2 were not significantly higher than at Time 1. As shown in Table 3, except for extrinsic interest, the mean change scores of E-CQ factors were significantly higher at Time 2 than at Time 1.

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**Table 2***Means, standard deviations, scale reliabilities, and inter-correlations*

| Variables                     | M    | SD   | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    | 13    | 14    | 15    | 16    | 17    | 18    | 19    | 20    | 21    | 22    | 23    | 24    |  |  |
|-------------------------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|--|
| <b>Time 1</b>                 |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| <b>Metacognitive CQ</b>       |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 1.Planning                    | 4.30 | 1.11 | (.71) |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 2.Awareness                   | 5.50 | .87  | .33** | (.72) |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 3.Checking                    | 5.22 | .96  | .33** | .52** | (.70) |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| <b>Cognitive CQ</b>           |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 4.Culture-general knowledge   | 4.82 | .96  | .21** | .31** | .34** | (.77) |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 5.Context-specific knowledge  | 3.88 | 1.11 | .31** | .22** | .31** | .60** | (.87) |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| <b>Motivational CQ</b>        |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 6.Intrinsic interest          | 5.38 | 1.08 | .18** | .33** | .37** | .32** | .32** | (.82) |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 7.Extrinsic interest          | 4.70 | 1.18 | .13*  | .15** | .15** | .29** | .24** | .49** | (.64) |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 8.Self-efficacy to adjust     | 5.34 | 1.09 | .12*  | .30** | .33** | .38** | .39** | .43** | .30** | (.80) |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| <b>Behavioral CQ</b>          |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 9.Verbal behavior             | 4.51 | 1.21 | .30** | .21** | .43** | .30** | .46** | .28** | .24** | .32** | (.78) |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 10.Non-verbal behavior        | 4.61 | 1.23 | .23** | .29** | .38** | .20** | .35** | .28** | .24** | .25** | .62** | (.76) |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 11.Speech acts                | 4.60 | 1.22 | .26** | .29** | .36** | .20** | .36** | .33** | .22** | .27** | .63** | .68** | (.87) |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| <b>Personality variables</b>  |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 12. Openness                  | 3.47 | .59  | 0.01  | .24** | .23** | .28** | .19** | .31** | .17** | .26** | .13*  | 0.10  | 0.10  | (.74) |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 13. Extraversion              | 3.22 | .74  | -0.04 | 0.03  | 0.02  | 0.09  | .27** | .22** | 0.10  | .31** | .18** | .13*  | 0.10  | .23** | (.84) |       |       |       |       |       |       |       |       |       |       |       |  |  |
| <b>Time 2</b>                 |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| <b>Metacognitive CQ</b>       |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 14.Planning                   | 4.46 | 1.12 | .30** | .14** | .15** | .09   | .18** | .18** | .20** | .07   | .15** | .17** | .12*  | .11*  | .07   | (.72) |       |       |       |       |       |       |       |       |       |       |  |  |
| 15.Awareness                  | 5.63 | .99  | .10   | .39** | .33** | .14** | .09   | .33** | .13*  | .20** | .12*  | .16** | .18** | .18** | .02   | .37** | (.83) |       |       |       |       |       |       |       |       |       |  |  |
| 16.Checking                   | 5.36 | .95  | .08   | .33** | .38** | .17** | .11*  | .32** | .15** | .22** | .21** | .14** | .15** | .25** | .03   | .36** | .64** | (.73) |       |       |       |       |       |       |       |       |  |  |
| <b>Cognitive CQ</b>           |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 17.Culture-general knowledge  | 5.29 | .91  | .07   | .28** | .33** | .37** | .22** | .41** | .18** | .28** | .16** | .17** | .16** | .26** | .09   | .30** | .55** | .53** | (.79) |       |       |       |       |       |       |       |  |  |
| 18.Context-specific knowledge | 4.53 | 1.02 | .14** | .15** | .20** | .29** | .39** | .37** | .24** | .28** | .25** | .28** | .25** | .24** | .27** | .43** | .34** | .36** | .58** | (.87) |       |       |       |       |       |       |  |  |
| <b>Motivational CQ</b>        |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 19.Intrinsic interest         | 5.51 | 1.14 | 0.08  | .27** | .34** | .24** | .15** | .55** | .27** | .24** | .17** | .18** | .16** | .31** | .12*  | .25** | .48** | .49** | .57** | .42** | (.85) |       |       |       |       |       |  |  |
| 20.Extrinsic interest         | 4.71 | 1.26 | .04   | .11*  | .12*  | .27** | .24** | .33** | .40** | .21** | .14** | .19** | .14** | .20** | .13*  | .30** | .26** | .29** | .39** | .42** | .51** | (.72) |       |       |       |       |  |  |
| 21.Self-efficacy to adjust    | 5.55 | 1.10 | .06   | .24** | .21** | .20** | .16** | .33** | .16** | .36** | .09   | .12*  | 0.06  | .19** | .21** | .21** | .49** | .47** | .55** | .38** | .61** | .37** | (.86) |       |       |       |  |  |
| <b>Behavioral CQ</b>          |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |  |
| 22.Verbal behavior            | 4.74 | 1.15 | .14** | .19** | .22** | .19** | .21** | .36** | .25** | .21** | .38** | .32** | .31** | .1**5 | .10*  | .37** | .37** | .48** | .40** | .49** | .39** | .32** | .24** | (.75) |       |       |  |  |
| 23.Non-verbal behavior        | 4.89 | 1.17 | .19** | .22** | .24** | .14** | .21** | .29** | .15** | .18** | .27** | .35** | .29** | .10   | .16** | .33** | .40** | .42** | .37** | .44** | .32** | .31** | .28** | .61** | (.73) |       |  |  |
| 24.Speech acts                | 4.94 | 1.14 | .18** | .23** | .23** | .18** | .20** | .32** | .17** | .18** | .28** | .26** | .29** | .19** | .08   | .38** | .46** | .44** | .43** | .48** | .40** | .31** | .26** | .62** | .68** | (.86) |  |  |

Note: CQ = cultural intelligence. Reliability coefficients are in parentheses along the diagonal.

\* p &lt; .05 and \*\*p &lt; .01.

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**Table 3***Means and standard deviations for E-CQ factors' scores over time*

|       | n   | Time 1           |               |               |               |                |                 |                |                |                |                |                | Time 2           |                |                |               |                |                 |                |                |                |                |                |
|-------|-----|------------------|---------------|---------------|---------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|------------------|----------------|----------------|---------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|
|       |     | Metacognitive CQ |               |               | Cognitive CQ  |                | Motivational CQ |                |                | Behavioral CQ  |                |                | Metacognitive CQ |                |                | Cognitive CQ  |                | Motivational CQ |                |                | Behavioral CQ  |                |                |
|       |     | Pl.              | Aw.           | Ch.           | C-g K.        | C-s K.         | Int. I.         | Ext. I.        | S-e A.         | V. B.          | N-v. B.        | Sp. A.         | Pl.              | Aw.            | Ch.            | C-g K.        | C-s K.         | Int. I.         | Ext. I.        | S-e A.         | V. B.          | N-v. B.        | Sp. A.         |
|       |     | M                | M             | M             | M             | M              | M               | M              | M              | M              | M              | M              | M                | M              | M              | M             | M              | M               | M              | M              | M              | M              | M              |
| Men   | 160 | 4.37<br>(1.01)   | 5.38<br>(.90) | 5.13<br>(.91) | 4.89<br>(.96) | 4.02<br>(1.07) | 5.23<br>(1.12)  | 4.74<br>(1.28) | 5.34<br>(1.02) | 4.47<br>(1.18) | 4.50<br>(1.12) | 4.54<br>(1.18) | 4.42<br>(1.10)   | 5.39<br>(1.07) | 5.22<br>(1.00) | 5.15<br>(.99) | 4.57<br>(1.03) | 5.32<br>(1.27)  | 4.73<br>(1.29) | 5.47<br>(1.12) | 4.73<br>(1.17) | 4.78<br>(1.07) | 4.84<br>(1.10) |
| Women | 196 | 4.24<br>(1.19)   | 5.60<br>(.83) | 5.29<br>(.99) | 4.77<br>(.97) | 3.76<br>(1.14) | 5.50<br>(1.02)  | 4.66<br>(1.09) | 5.34<br>(1.14) | 4.54<br>(1.24) | 4.70<br>(1.31) | 4.64<br>(1.25) | 4.49<br>(1.13)   | 5.82<br>(.88)  | 5.48<br>(.89)  | 5.40<br>(.82) | 4.50<br>(1.01) | 5.65<br>(1.00)  | 4.68<br>(1.24) | 5.63<br>(1.07) | 4.74<br>(1.14) | 4.99<br>(1.24) | 5.02<br>(1.16) |
| Total | 356 | 4.30<br>(1.11)   | 5.50<br>(.87) | 5.22<br>(.96) | 4.82<br>(.96) | 3.88<br>(1.11) | 5.38<br>(1.08)  | 4.70<br>(1.18) | 5.34<br>(1.09) | 4.51<br>(1.21) | 4.61<br>(1.23) | 4.60<br>(1.22) | 4.46<br>(1.12)   | 5.63<br>(.99)  | 5.36<br>(.95)  | 5.29<br>(.91) | 4.53<br>(1.02) | 5.51<br>(1.14)  | 4.71<br>(1.26) | 5.55<br>(1.10) | 4.74<br>(1.15) | 4.89<br>(1.17) | 4.94<br>(1.14) |

Note: Pl. = Planning; Aw. = Awareness; Ch. = Checking; C-g K. = Culture-general knowledge; C-s K. = Context-specific knowledge; Int. I. = Intrinsic interest; Ext. I. = Extrinsic interest; S-e A.

= Self-efficacy to adjust; V. B. = Verbal behavior; N-v. B. = Non-verbal behavior; Sp. A. = Speech acts.

### The effect of personality

To test the moderating role of personality (openness and extraversion) on the relationship between the study abroad semester and E-CQ dimensions, we conducted eleven hierarchical regressions, i.e., one for each E-CQ dimension (Tables 4–7).

The F-test of joint significance of destination dummies for each sub-dimension was carried out. F test can be used to define, as a group, if the destination dummies affect E-CQ dimensions. “If the null is not rejected, then the variables are jointly insignificant, which often justifies dropping them from the model” (Wooldridge, 2002). As a group, the destination dummies were jointly significant in the majority of models.

Results showed that the interaction terms entered in step 3 accounted for statistically significant increases in explained variance on awareness at Time 2 ( $\Delta R^2 = .038$ ,  $F(2, 341) = 5.84$ ,  $p < .005$ ), culture-general knowledge at Time 2 ( $\Delta R^2 = .011$ ,  $F(2, 341) = 2.66$ ,  $p = .07$ ) and intrinsic interest at Time 2 ( $\Delta R^2 = .01$ ,  $F(2,343) = 2.45$ ,  $p = .08$ ). The interaction effects are shown in Figures 1–4. We obtained heteroskedasticity robust standard errors given that heteroscedasticity was suspected.

**Table 4**

*Hierarchical regression results testing the moderating role of personality (openness and extraversion) on the relationship between study abroad and metacognitive CQ dimensions: awareness, planning and checking*

| Variables                                 | Awareness <sub>Time2</sub> | Planning <sub>Time2</sub> | Checking <sub>Time2</sub> |
|---|----------------------------|---------------------------|---------------------------|
| Gender                                    | .340***<br>(.0987)         | .0884<br>(.113)           | .204**<br>(.0949)         |
| Country dummies                           | Yes                        | Yes                       | Yes                       |
| Openness                                  | 1.563**<br>(.615)          | .156<br>(.427)            | .950*<br>(.484)           |
| Extraversion                              | .963**<br>(.444)           | .283<br>(.299)            | .135<br>(.393)            |
| Awareness <sub>Time1</sub>                | 1.808***<br>(.437)         |                           |                           |
| Awareness <sub>Time1</sub> × openness     | -.254**<br>(.108)          |                           |                           |
| Awareness <sub>Time1</sub> × extraversion | -.170**<br>(.0784)         |                           |                           |

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|  |          |         |         |
|--|----------|---------|---------|
| Planning <sub>Time1</sub>                |          | .427    |         |
|  |          | (.353)  |         |
| Planning <sub>Time1</sub> × openness     |          | .00813  |         |
|  |          | (.0926) |         |
| Planning <sub>Time1</sub> × extraversion |          | -.0468  |         |
|  |          | (.0668) |         |
| Checking <sub>Time1</sub>                |          |         | .874**  |
|  |          |         | (.395)  |
| Checking <sub>Time1</sub> × openness     |          |         | -.130   |
|  |          |         | (.0936) |
| Checking <sub>Time1</sub> × extraversion |          |         | -.0314  |
|  |          |         | (.0746) |
| Constant                                 | -5.243** | 1.932   | .0598   |
|  | (2.495)  | (1.672) | (2.032) |
| Observations                             | 356      | 356     | 356     |
| R <sup>2</sup> step 1                    | .068     | .015    | .049    |
| R <sup>2</sup> step 2                    | .191     | .121    | .192    |
| R <sup>2</sup> step 3                    | .228     | .123    | .199    |

Note: Robust standard errors in parentheses.

\*  $p < .1$ , \*\*  $p < .05$ , and \*\*\*  $p < .01$ .

**Table 5**

*Hierarchical regression results testing the moderating role of personality (openness and extraversion) on the relationship between study abroad and cognitive CQ dimensions: culture-general knowledge and culture-specific knowledge*

| Variables  | Culture-general knowledge <sub>Time2</sub> | Culture-specific knowledge <sub>Time2</sub> |
|--|--|---|
| Gender   | .289***                                    | -.00981                                     |
|  | (.0905)                                    | (.0982)                                     |
| Country dummies  | Yes  | Yes   |
| Openness   | 1.079***                                   | .282  |
|  | (.378)                                     | (.380)                                      |
| Extraversion   | -.125                                      | .134  |
|  | (.319)                                     | (.221)                                      |
| Culture-general knowledge <sub>Time1</sub>                 | .790***                                    |   |
|  | (.277)                                     |   |
| Culture-general knowledge <sub>Time1</sub> × openness      | -.173**                                    |   |
|  | (.0752)                                    |   |
| Culture-general knowledge <sub>Time1</sub> × extraversion  | .0346                                      |   |
|  | (.0658)                                    |   |
| Culture-specific knowledge <sub>Time1</sub>                |  | .254  |
|  |  | (.330)                                      |
| Culture-specific knowledge <sub>Time1</sub> × openness     |  | -.00736                                     |
|  |  | (.0889)                                     |
| Culture-specific knowledge <sub>Time1</sub> × extraversion |  | .0215                                       |
|  |  | (.0550)                                     |

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|                       |                 |                  |
|-----------------------|-----------------|------------------|
| Constant              | .555<br>(1.408) | 1.943<br>(1.339) |
| Observations          | 356             | 356              |
| R <sup>2</sup> step 1 | .065            | .026             |
| R <sup>2</sup> step 2 | .213            | .222             |
| R <sup>2</sup> step 3 | .224            | .222             |

Note: Robust standard errors in parentheses.

\*  $p < .1$ , \*\*  $p < .05$ , and \*\*\*  $p < .01$ .

**Table 6**

*Hierarchical regression results testing the moderating role of personality (openness and extraversion) on the relationship between study abroad and motivational CQ dimensions: self-efficacy to adjust, intrinsic interest and extrinsic interest*

| Variables   | Self-efficacy to<br>adjust <sub>Time2</sub> | Intrinsic<br>interest <sub>Time2</sub> | Extrinsic<br>interest <sub>Time2</sub> |
|---|---|--|--|
| Gender  | .156<br>(.110)                              | .157<br>(.105)                         | -.0499<br>(.124)                       |
| Country dummies   | Yes   | Yes                                    | Yes                                    |
| Openness  | .104<br>(.568)                              | 1.273***<br>(.448)                     | .0619<br>(.512)                        |
| Extraversion  | .374<br>(.312)                              | -.155<br>(.364)                        | .283<br>(.424)                         |
| Self-efficacy to adjust <sub>Time1</sub>                | .421<br>(.306)                              |  |  |
| Self-efficacy to adjust <sub>Time1</sub> × openness     | .00838<br>(.103)                            |  |  |
| Self-efficacy to adjust <sub>Time1</sub> × extraversion | -.0450<br>(.0586)                           |  |  |
| Intrinsic interest <sub>Time1</sub>                     |   | 1.073***<br>(.333)                     |  |
| Intrinsic interest <sub>Time1</sub> × openness          |   | -.185**<br>(.0834)                     |  |
| Intrinsic interest <sub>Time1</sub> × extraversion      |   | .0242<br>(.0661)                       |  |
| Extrinsic interest <sub>Time1</sub>                     |   |  | .416<br>(.418)                         |
| Extrinsic interest <sub>Time1</sub> × openness          |   |  | .0344<br>(.105)                        |
| Extrinsic interest <sub>Time1</sub> × extraversion      |   |  | -.0394<br>(.0898)                      |
| Constant  | 2.394<br>(1.685)                            | -.965<br>(1.819)                       | 2.036<br>(2.026)                       |
| Observations  | 356   | 356                                    | 356                                    |
| R <sup>2</sup> step 1                                   | .0445                                       | .078                                   | .0381                                  |
| R <sup>2</sup> step 2                                   | .182  | .347                                   | .215                                   |

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|                       |      |      |      |
|-----------------------|------|------|------|
| R <sup>2</sup> step 3 | .184 | .357 | .216 |
|-----------------------|------|------|------|

Note: Robust standard errors in parentheses.

\*  $p < .1$ , \*\*  $p < .05$ , and \*\*\*  $p < .01$ .

**Table 7**

*Hierarchical regression testing the moderating role of personality (openness and extraversion) on the relationship between study abroad and behavioral CQ dimensions: non-verbal behavior, verbal behavior and speech acts*

| Variables   | Non-verbal<br>behavior <sub>Time2</sub> | Verbal<br>behavior <sub>Time2</sub> | Speech acts <sub>Time2</sub> |
|---|---|-------------------------------------|------------------------------|
| Gender  | .144<br>(.117)                          | -.0291<br>(.116)                    | .153<br>(.117)               |
| Country dummies                                     | Yes                                     | Yes                                 | Yes                          |
| Openness  | -.162<br>(.365)                         | -.254<br>(.391)                     | .279<br>(.406)               |
| Extraversion  | .0893<br>(.309)                         | -.0178<br>(.291)                    | -.0549<br>(.333)             |
| Non-verbal behavior <sub>Time1</sub>                | .0909<br>(.327)                         |                                     |                              |
| Non-verbal behavior <sub>Time1</sub> × openness     | .0454<br>(.0777)                        |                                     |                              |
| Non-verbal behavior <sub>Time1</sub> × extraversion | .0163<br>(.0662)                        |                                     |                              |
| Verbal behavior <sub>Time1</sub>                    |   | -.0136<br>(.310)                    |                              |
| Verbal behavior <sub>Time1</sub> × openness         |   | .0939<br>(.0814)                    |                              |
| Verbal behavior <sub>Time1</sub> × extraversion     |   | .00810<br>(.0617)                   |                              |
| Speech acts <sub>Time1</sub>                        |   |                                     | .176<br>(.320)               |
| Speech acts <sub>Time1</sub> × openness             |   |                                     | .00176<br>(.0860)            |
| Speech acts <sub>Time1</sub> × extraversion         |   |                                     | .0201<br>(.0694)             |
| Constant  | 3.831**<br>(1.532)                      | 4.087***<br>(1.458)                 | 2.822*<br>(1.474)            |
| Observations  | 356                                     | 356                                 | 356                          |
| R <sup>2</sup> step 1                               | .052                                    | .022                                | .016                         |
| R <sup>2</sup> step 2                               | .174                                    | .161                                | .118                         |
| R <sup>3</sup> step 3                               | .175                                    | .165                                | .118                         |

Note: Robust standard errors in parentheses.

\*  $p < .1$ , \*\*  $p < .05$ , and \*\*\*  $p < .01$ .

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Contrary to our expectations, Figure 1 reveals that individuals who were high on openness improved their awareness less than did individuals who were low on openness. The slope in Figure 1 was significantly steeper for individuals who were low on openness ( $\beta = .52, t = 5.61, p < .001$ ) compared to those who were high on openness ( $\beta = .22, t = 2.36, p < .05$ ). Similarly, Figure 2 shows that individuals who were high on openness improved their culture-general knowledge less than did individuals who were low on openness. The slope in Figure 2 was significantly steeper for individuals who were low on openness ( $\beta = .40, t = 6.11, p < .001$ ) compared to those who were high on openness ( $\beta = .19, t = 2.52, p < .05$ ). As shown in Figure 3, individuals who were high on openness improved their intrinsic interest less than did individuals who were low on openness. The slope in Figure 3 was significantly steeper for individuals who were low on openness ( $\beta = .62, t = 7.94, p < .001$ ) compared to those who were high on openness ( $\beta = .39, t = 6.10, p < .001$ ). Therefore, Hypothesis 5 was not supported.

As can be seen in Figure 4, it appears that individuals who were high on extraversion improved their awareness less than did individuals who were low on extraversion. The slope in Figure 4 was significantly steeper for individuals who were low on extraversion ( $\beta = .50, t = 5.70, p < .01$ ) compared to those who were high on extraversion ( $\beta = .25, t = 2.76, p < .01$ ). Therefore, Hypothesis 6 was not supported.

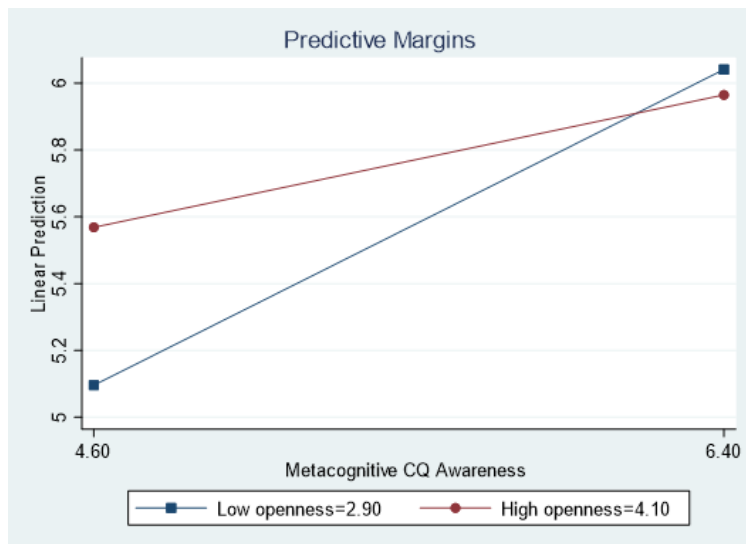
For the sake of completeness, we tested the effects of other personality traits (conscientiousness, agreeableness and neuroticism) on the relation between study abroad and E-CQ. No interaction effects were found.

### **Figure 1**

*The moderating role of openness on the relationship between study abroad and awareness.*

*Note. Low score equals one standard deviation below the mean; high score equals one standard deviation above the mean. Only scores plus or minus one standard deviation from the mean of awareness scores at Time 1 are plotted*

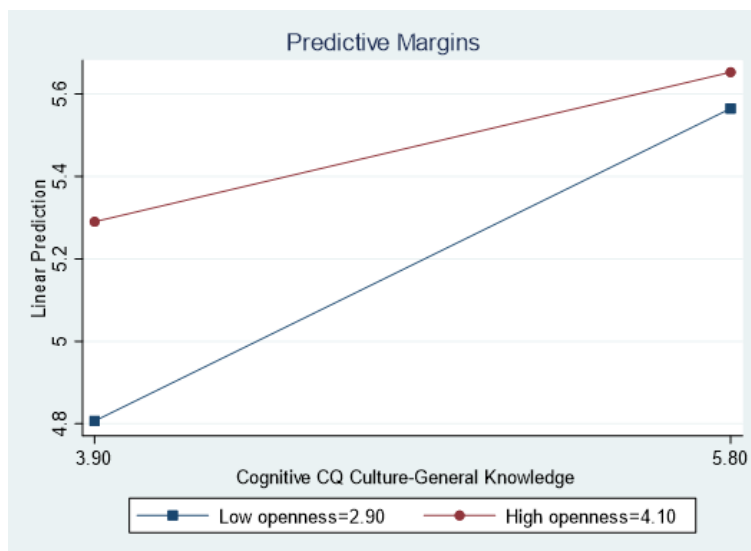
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**Figure 2**

*The moderating role of openness on the relationship between study abroad and culture-general knowledge.*

*Note. Low score equals one standard deviation below the mean; high score equals one standard deviation above the mean. Only scores plus or minus one standard deviation from the mean of culture-general knowledge scores at Time 1 are plotted*

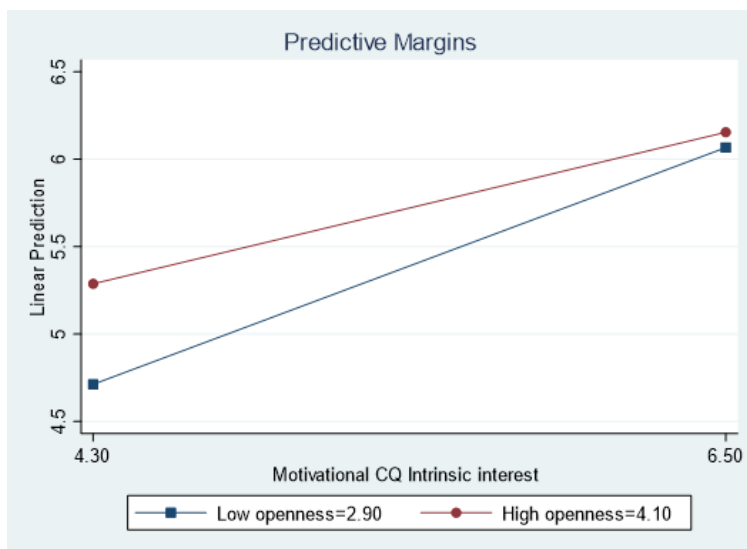


**Figure 3**

*The moderating role of openness on the relationship between study abroad and intrinsic interest.*

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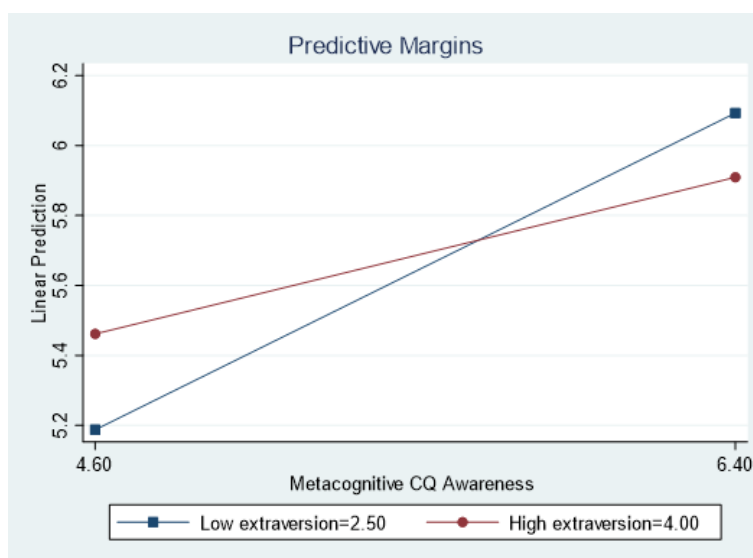
*Note. Low score equals one standard deviation below the mean; high score equals one standard deviation above the mean. Only scores plus or minus one standard deviation from the mean of intrinsic interest scores at Time 1 are plotted*



**Figure 4**

*The moderating role of extraversion on the relationship between study abroad and awareness.*

*Note. Low score equals one standard deviation below the mean; high score equals one standard deviation above the mean. Only scores plus or minus one standard deviation from the mean of awareness scores at Time 1 are plotted*



**Discussion**

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Using a refined theoretical conceptualization of CQ, our aim was to provide a deeper understanding of the effect of a study abroad semester on the development of CQ. We also examined whether personality traits (extraversion and openness to experience) had a moderating role in the relationship between a study abroad semester and E-CQ.

Our results indicate that a study abroad semester has a positive and statistically significant effect on the development of ten out of eleven sub-dimensions of E-CQ. Extrinsic interest is the only sub-dimension to remain unchanged after the study abroad experience. In addition, personality traits do have a moderating role in the relationship between study abroad and E-CQ. However, contrary to our expectations, our analyses show that individuals who are low on extraversion improved their metacognitive CQ (awareness) more than did individuals who are high on extraversion, as a result of a study abroad semester. Similarly, individuals who are low on openness to experience improved their metacognitive CQ (awareness), their cognitive CQ (culture-general knowledge), and their motivational CQ (intrinsic interest) more than did individuals who are high on openness to experience, after the study abroad experience.

One of the primary contributions of our results is to show and reaffirm that study abroad has a positive and significant impact on CQ development. Previous research demonstrated a positive link between studying abroad and overall CQ (Fang et al., 2018; Van Dyne et al., 2017). Using E-CQS, our study extends the findings from previous research and provides empirical evidence that studying abroad offers a crucial and unique context for CQ development.

To the best of our knowledge, the present study is the first to examine the effect of study abroad on the development of CQ using an expanded assessment of CQ. Thus, it responds to calls for a better understanding of CQ by closely investigating the specific capabilities that constitute each CQ primary factor (Van Dyne et al., 2012). Previous studies (McRae et al., 2016; Varela & Gatlin-Watts, 2014; Wood & St. Peters, 2014) examined the impact of study abroad on CQ development using the CQ Scale (CQS) by Ang et al. (2007). The CQS considers each primary factor as a unidimensional construct. For example, in CQS, intrinsic interest is combined with self-efficacy to adjust in a single factor to describe motivational CQ. In E-CQS, intrinsic interest, self-efficacy to adjust and extrinsic

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interest delineate three sub-dimensions of motivational CQ which is thus considered as a multidimensional construct. Therefore, not only the three sub-dimensions of motivational CQ can be distinguished in the analysis, but a new facet of motivational CQ has been introduced in E-CQS: extrinsic interest. Similarly, using E-CQS, three sub-dimensions of behavioral CQ can be distinguished in the analysis: verbal behavior, nonverbal behavior, and speech acts. Speech acts is a new facet of behavioral CQ which has been introduced in E-CQS. Context-specific knowledge (cognitive CQ) and planning (metacognitive CQ) are also new facets of CQ which were not included in CQS (for a detailed comparison of E-CQS with CQS see Richter et al. (2020)). From a theoretical perspective, the additional value of E-CQS above and beyond CQS in our study is twofold: it includes new facets of CQ and it allows fine-grained exploration of how study abroad impacts CQ.

Given the multidimensional nature of CQ primary factors in E-CQS, our results can differ from earlier studies. As previously mentioned, prior research (McRae et al., 2016; Varela & Gatlin-Watts, 2014; Wood & St. Peters, 2014) used the CQ Scale that includes four primary factors, each is conceptualized as a unidimensional construct. This may have led to unexpected results, such as no effect of studying abroad on students' motivational and behavioral CQ, as associations that are true for only some aspects of a primary factor might not be true for the overall factor. In other words, "collapsing the multidimensional nature of these constructs into a unidimensional construct potentially may hinder a more fine-grained exploration of associations and may therewith make theorizing less accurate" (Richter et al., 2020, p. 383). In addition, since it is obligatory for our students to participate in this study abroad semester, the self-selection bias is thus avoided. Students willing to participate in international programs are usually those who are already (before departure) high in overall CQ (Varela & Gatlin-Watts, 2014) or at least in motivational CQ (McRae et al., 2016). Due to a ceiling effect, the ability to find evidence of CQ developments may thus be restricted, which is not our case. Likewise, McKeown (2009) developed the concept of "first time effect". He suggested that study abroad had greater benefits for students who started out with little intercultural knowledge and experience. It is precisely these students who may experience the biggest gains in CQ, compared to their peers with

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higher initial levels of CQ. Initial levels of CQ and prior international experience are therefore features that should be carefully considered and further explored.

It is worth noting that some of the variability in outcomes may also be due to the program duration. Both studies of Varela and Gatlin-Watts (2014) and Wood and St. Peters (2014) referred to short-term study abroad programs, i.e., programs that lasted eight weeks or less. Previous research showed that the longer the duration of study abroad, the stronger the learning outcomes (Behrnd & Porzelt, 2012; Genkova & Kruse, 2020). This is especially true for cognitive aspects of intercultural learning that advance linearly with time through stages of knowledge accumulation (Varela, 2017). Motivational and behavioral learning are more complex and might deviate from such linearity by following a variety of social and emotional episodes (e.g., excitement of the honeymoon stage followed by frustrations of the culture shock stage) (Varela, 2017, p. 553). Some authors argued that specific interventions (e.g., cultural mentoring) were necessary to purposely increase motivational and behavioral CQ, especially during short-term study abroad programs (Vande Berg et al., 2012; Varela & Gatlin-Watts, 2014). This is another contribution of the present study, as previous research on CQ has mainly focused on shorter stays abroad (Goldstein, 2022; Iskhakova & Bradly, 2022). Thereby, like Li et al. (2013), we argue that the longer the duration of immersion (one semester in our study), the more opportunities the students have to cycle through the four experiential learning modes and thus to increase each dimension or subdimension of their CQ, whether cognitive, metacognitive, motivational, or behavioral.

Extrinsic interest is the only sub-dimension that remains unchanged after the study abroad experience. For students who are still young when they experience a study abroad semester, i.e., in the middle of their curriculum (fifth semester out of ten), the benefits of working in a different culture, e.g., status, reputation, promotion, higher income etc., as outlined in the present subscale's items for extrinsic interest, may seem too distant and not meet their current preoccupations. We suggest that the extrinsic interest items be modified to better address students' shorter-term concerns. New items could highlight benefits such as enhanced networking, career prospects and employability, for example. In

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addition, more relevant items could improve the reliability of this subscale, which is currently quite low.

It is usually supposed that exposure to new cultural environment will have a greater impact on the development of each CQ primary factor for individuals who are high in extraversion compared to those who are low in extraversion (Ramirez, 2016; Şahin et al., 2014). This assumption is based on the fact that extroverts are considered to be particularly sociable, adventuresome, and that their need for interaction will lead them to benefit more from their stay abroad than introverts. Our results do not support this assumption. On the contrary, they show that the more introverted students are, the greater the increase in their metacognitive CQ (awareness) after their study abroad semester, compared to more extroverted students. This makes sense when we take a closer look at the metacognitive component of CQ. Metacognitive CQ implies making sense of culturally diverse experiences and involves “slowing down long enough to carefully observe what’s going on inside our own and other people’s heads. It allows us to draw upon our cultural understanding so we can interpret what’s going on in diverse contexts” (Van Dyne et al., 2010). For example, awareness refers to paying attention to how cultural aspects of a situation influence what is happening in that situation. This ability requires time for reflection and an interest in one’s own mental states. These characteristics are typical of introverts who tend to be quiet and introspective, i.e., focused on internal thoughts, feelings and moods. Thus, our study shows that the magnitude of the improvement in metacognitive CQ (awareness) resulting from studying abroad may depend on the extent to which individuals are low in extraversion.

Similarly, it is generally assumed that the more open-minded the individuals are, i.e., the more curious and broad-minded they are, the more the different facets of their CQ increase after a stay abroad. For example, Şahin et al. (2014) showed that individuals who were high on openness improved their motivational CQ more than did individuals who were low on openness. Surprisingly, our results show the contrary. Not only do the students who are low on openness improve their motivational CQ (intrinsic interest) more than do students who are high on openness, but this is also true for their metacognitive CQ (awareness) and their cognitive CQ (culture-general knowledge). Two

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elements can be put forward to explain the apparent contradiction of these results. First, openness is a personality trait that distinguishes students who choose to study abroad from those who prefer not to. Indeed, research has shown that students with high levels of openness are more likely to study abroad (Niehoff et al., 2017; Ramirez, 2016). In our study, no personality predisposition to participate in an international exchange can be suspected, as the study abroad semester is mandatory and was introduced into the curriculum after students' enrollment. This means that our sample includes students who, given the choice, would have preferred not to study abroad. Those with low levels of openness may be among them. Second, with an average age of 19.6 years, the students in our study are young adults. Their prior experience of living abroad is limited. In fact, for the majority of them, the study abroad semester is their first significant experience abroad. Studying abroad implies the discovery of a new environment and a drastic change in living conditions. In such context, one can imagine that the benefits of studying abroad are even greater for the students who are less open-minded and have little prior experience of living abroad. For them, the shock of discovery is even greater and impactful. As described by McKeown (2009), this phenomenon is equivalent to a "first time effect" or an eye-opening experience. This is one of the primary objectives of mandatory international stays: to allow students who are less inclined to leave their comfort zone to discover new horizons. In this sense, our results are particularly encouraging because they reveal that compulsory study abroad benefits mostly students who need it the most, i.e., those who have a lower level of openness before departure. In their case and as our results show, compared to students with higher level of openness, everything is exacerbated: their awareness of how their culture influences their interactions with people from different cultures, i.e., metacognitive CQ (awareness), how much they can thrive on the differences in cultures that are new to them i.e., motivational CQ (intrinsic interest), but also their knowledge of the major elements that constitute the cultural environment, i.e., cognitive CQ (culture-general knowledge).

Thus, our results indicate that initial levels of personality traits, prior international experience, and age are characteristics that should be carefully considered. In the study of Şahin et al. (2014), participants consisted of military personnel. The average age was 32 years, that is individuals with

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about 10 years of professional experience, and half of them had completed several previous military missions abroad. We argue that once a certain level of maturity and experience is reached, then, as is commonly assumed and as Şahin et al. (2014) have shown, the more open-minded and extroverted individuals are, the more they benefit from their experience abroad because they are willing to expose themselves to new and unfamiliar cultural environment. In our study, with a young population with little prior experience abroad, we can assume that the less open-minded or extroverted individuals are, the greater the impact of the experience abroad on them, as it acts as an eye-opening experience or a “first time effect” (McKeown, 2009). Therefore, future studies on the effect of personality on CQ should consider individual characteristics of participants such as age, prior overseas experience, initial levels of personality traits, and CQ.

Finally, the moderating role of extraversion or openness in the relationship between study abroad and other facets of CQ is not confirmed (e.g., extraversion or openness and self-efficacy to adjust). As argued by Şahin et al. (2014), this may be attributed to the diversity of individual’s CQ profiles: some profiles may be high on all factors, some high only on cognitive or motivational factors, or other combinations. A next step to better seize the effect of study abroad and personality on CQ would thus be to use a more holistic approach of CQ, i.e., a configurational approach that would emphasize an individual’s CQ profile across the eleven sub-dimensions (Van Dyne et al., 2012). Similarly, Li et al. (2016) suggested that rather than treating personality traits as independent, it was meaningful to consider the combination of personality traits when evaluating individuals’ CQ. For example, they found openness to be positively related to CQ when agreeableness was high but not when agreeableness was low (Li et al., 2016). Thus, an avenue for future research is to explore how the interactive effect of personality traits and/or different CQ profiles could shed light on CQ development as a result of a study abroad semester.

**Implications for research and practice**

As previously mentioned, to the best of our knowledge, the present study is the first to examine the effect of study abroad on the development of CQ using an expanded assessment of CQ. With its 11 sub-dimensions, E-CQS considers the multidimensional nature of the four primary CQ

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factors. It helps shed light on the exact nature of the link between study abroad and CQ development and prevents inconsistent results to arise. New facets for each primary factor are also highlighted. For these reasons, and in accordance with recent studies (Richter et al., 2020), researchers and practitioners are advised to consider the E-CQS as a more accurate scale, compared to the most widely used 20-item CQS in previous studies.

This research demonstrates the value of a study abroad semester in developing students' E-CQ. All specific capabilities that constitute each CQ primary factor, except extrinsic interest, are strengthened as a result of studying abroad. A central implication is that educators can consider study abroad as a key contribution to preparing students for the culturally diverse assignments that await them upon graduation. Among other benefits, this will significantly boost their employability prospects (Messelink et al., 2015; Nada & Legutko, 2022).

Furthermore, since our results support the moderating role of personality traits (extraversion and openness) in relationship between study abroad and certain facets of CQ, educational institutions can be assured that the efforts and resources devoted to implementing study abroad experiences benefit all students. Indeed, our results show that the students who benefit most from the experience are those who need it most. These students have lower levels of openness and extraversion. Given the choice, they might have decided not to study abroad. Yet, they are the ones whose CQ sub-dimensions improved the most upon returning from study abroad. By extrapolation, these findings may call into question how personality traits and CQ facets should be taken into account when selecting candidates for international assignments or expatriation (Richter et al., 2020; Şahin et al., 2014).

### **Limitations and future directions**

One limitation of this study is the use of self-assessments to determine students' CQ and personality. This approach possibly exposes data to bias because students may feel pressured to report socially desirable gains from their experience abroad (Ogden, 2015). To counter this limitation, future research should use a mixed-methods approach. Interviews conducted with participants before and at the end of their semester abroad would be very instructive to corroborate or refute the results obtained quantitatively. They would enrich the analysis and possibly bring new insights. Another limitation of

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this study is the lack of a control group. Because the study abroad semester is mandatory, it was not possible to compare differences in CQ development and personality traits with a sample of students who stayed at home. Therefore, our results should be interpreted with caution, as the observed changes may not be solely due to the study abroad experience, but also to maturation, i.e., any naturally occurring growth or change in individuals (Ogden, 2015).

Using E-CQS, our study is a first step towards a deeper understanding of the effect of study abroad and personality on CQ. Although it would lead to length constraints and respondent fatigue bias, we suggest future research should consider including both measures (CQS and E-CQS) in a same survey. This strategy would make it possible to rule out the many differences that make comparisons between studies difficult and complex (e.g., sample, age of participants, experience duration, etc.). It would allow to strictly focus on the similarities and the differences between the two instruments and to emphasize the extent to which the E-CQS allows for a finer exploration of associations and more accurate theorizing.

To explain our surprising results regarding the moderating role of openness and extraversion in the relationship between study abroad and CQ, we underlined some specific features of our population, namely youth with limited prior international experience. McKeown (2009) showed that students who had lacked meaningful international exposure prior to studying abroad were precisely those who benefited most from studying abroad (what he called the “first-time effect”). Our results seem to corroborate McKeown’s thesis and they add a supplementary dimension, namely personality. We argue that the “first time effect” would be even greater for students who are less open-minded and/or less extroverted, as studying abroad acts as an eye-opening experience for them. In other words, the experience abroad has a disproportionate impact on them, compared to their more open-minded or extroverted peers, because they started their study abroad semester at lower levels of open-mindedness and extraversion. We advise researchers to further explore how personality traits combined with prior international experience impact the relationship between study abroad and CQ. A first step could be to investigate the links between personality and travel experience, as studies have shown, for example, that openness to experience had a significant positive influence on travel curiosity (Jani, 2014). Another avenue would be to examine whether CQ developments for students who are low in both

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openness to experience and extraversion, are greater than for other students with different personality profiles.

We suggest that the items of the subscale extrinsic interest be modified to better address students' shorter-term concerns. In addition to a literature review to provide statements in line with student's concerns, an exploratory qualitative phase could be conducted (e.g., semi-structured interviews with the students) to identify and generate further items that are relevant to the student population. In this way, the reliability of this subscale, which is currently quite low, should be improved. We did not address potential Type 1 error that might arise because we tested multiple hypotheses regarding E-CQS. Future research might need to address this issue. More research is needed to confirm our findings with cohorts of students from different countries, and to test our hypotheses across different fields of study and program types. Finally, it would be worthwhile for future research to examine profile or configurational approaches to CQ (Van Dyne et al., 2012) as well as personality traits not in isolation, but in interaction (Li et al., 2016).

### **Conclusion**

Using a refined theoretical conceptualization of CQ, our study provides empirical evidence that study abroad significantly improves CQ. Specifically, ten of the eleven E-CQ sub-dimensions are improved after a study abroad semester. The use of the E-CQS is recommended to deepen our understanding of each of the four CQ factors and to avoid the occurrence of inconsistent results. Furthermore, our results reveal that personality traits (extraversion and openness) moderate the relationship between study abroad and CQ. A surprising aspect is that students with lower levels of openness or extraversion improve CQ facets more than did students with higher levels of these traits, as a result of their study abroad semester. Given the importance of CQ in today's workplace and the subsequent responsibility of educational institutions to prepare graduates to be culturally competent, further research on the effect of personality on the relationship between study abroad and CQ is crucial.

**Conflict of interest**

The authors declare no conflict of interest.

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