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Exploring the stability of HEXACO-60 structure and the association of gender, age, and social position with personality traits across 18 countries

Luis F. García[1] | Anton Aluja[2] | Jérôme Rossier[3] | Fritz Ostendorf[4] | Joseph Glicksohn[5] | Barry Oumar[6] | Tarek Bellaj[7] | Willibald Ruch[8] | Wei Wang[9] | Zsuzsanna Kövi[10] | Dawid Ścigała[11] | Đorđe Čekrlija[12] | Adam W. Stivers[13] | Lisa Di Blas[14] | Mauricio Valdivia[15] | Sonia Ben Jemaa[16] | Kokou A. Atitsogbe[17,18] | Michel Hansenne[19]

[1]Department of Biological and Health Psychology, Autonomous University of Madrid, Madrid, Spain

[2]Institute of Biomedical Research of Lleida, University of Lleida, Lleida, Spain

[3]University of Lausanne, Lausanne, Switzerland

[4]University of Bielefeld, Bielefeld, Germany

[5]Bar-Ilan University, Ramat Gan, Israel

[6]University Cheikh Anta Diop, Dakar, Senegal

[7]Qatar University, Doha, Qatar

[8]University of Zurich, Zurich, Switzerland

[9]Zhejiang University School of Medicine, Hangzhou, China

[10]Károli Gáspár University, Budapest, Hungary

[11]The Maria Grzegorzewska University in Warsaw, Warsaw, Poland

[12]University of Banja Luka, Banja Luka, Bosnia-Herzegovina

[13]Gonzaga University, Spokane, Washington, USA

[14]University of Trieste, Trieste, Italy

[15]Universidad Autónoma de Chile, Chile

[16]University of Tunis, Tunis, Tunisia

[17]University of Lomé, Lome, Togo

[18]University of Lausanne, Lausanne, Switzerland

[19]University of Liège, Liège, Belgium

Correspondence
Luis F. García, Department of Biological and Health Psychology, Autonomous University of Madrid, Madrid, Spain.
Email: luis.garcia@uam.es

Abstract

Objectives: The present paper tests the cross-national stability of the HEXACO-60 structure across 18 countries from four continents. Gender and age differences across countries will be examined. Finally, this is the first study to explicitly analyze the relationships between the HEXACO and social position.

Method: Ten thousand two hundred and ninety eight subjects (5,410 women and 4,888 men) from 18 countries and 13 languages were analyzed. Confirmatory factor analysis techniques were used to test configural, metric and scalar invariance models. Congruence coefficients with the original structure of the HEXACO-60 were computed for every culture. Effect sizes of gender, age, and social position factors across countries were also computed.

Results: HEXACO-60 demonstrates configural and metric invariance, but not scalar invariance. Congruence coefficients show a great equivalence in almost all countries and factors. Only Emotionality presents a large gender difference across countries. No relevant effect of age is observed. A profile of high scores on Honesty-Humility, Extraversion, Conscientiousness, and Openness to Experience, and low scores on Emotionality increases the likelihood of achieving a higher social position, although the effect sizes are small.

Conclusions: HEXACO-60 is a useful instrument to conduct personality trait research and practice around the world. Implications of gender, social position, and country differences are discussed.

KEYWORDS

cross-national stability, gender differences, HEXACO-60, measurement invariance, social position

1 | INTRODUCTION

The HEXACO is a similar personality model to the Five Factor Model (FFM), also constructed on the grounds of lexical research and established by factor analysis (Ashton & Lee, 2007). HEXACO is the acronym for Honesty-Humility, Emotionality, eXtraversion, Agreeableness, Conscientiousness, and Openness to Experience (Ashton, & Lee, 2001, 2005). There are some differences from the FFM, the main one being the inclusion of an additional sixth trait, Honesty-Humility (Ashton & Lee, 2008). Besides this, the components and meaning of Emotionality and Agreeableness traits are somewhat different from their counterparts in the FFM, Neuroticism and Agreeableness, respectively (Ashton & Lee, 2020; Ludeke et al., 2019). HEXACO emotionality resembles FFM Neuroticism, but excludes anger and includes sentimentality, whereas HEXACO Agreeableness excludes sentimentality and includes a lack of anger accompanied by patience and forgiveness (Ashton & Lee, 2007; Zhao & Smillie, 2015).

According to many authors, the six-factor structure has been found lexically in many languages, including Chinese, Croatian, Dutch, English, Filipino, French, German, Greek, Hungarian, Italian, Korean, Polish, Spanish, Turkish and others (e.g., Ashton & Lee, 2007; Ashton et al., 2004). Although the generalizability of the HEXACO is still under debate (e.g., De Raad et al., 2010), the six-factor model has received significant attention in the literature (Ashton & Lee, 2020; Zettler et al., 2020).

These six personality dimensions have demonstrated their usefulness in predicting many practical outcomes such as academic and workplace performance (e.g., De Vries et al., 2011; Pletzer et al., 2019), clinical constructs (e.g., Ashton et al., 2012; McGrath et al., 2018; Roncero et al., 2014), and other life outcomes (e.g., Johnson et al., 2011; Thalmayer et al., 2011; Thielmann et al., 2020). This predictive validity has been compared with that of the FFM. For instance, Anglim et al. (2020) reported that both the FFM and HEXACO are quite good predictors of psychological and subjective well-being, although the FFM seems to be a slightly better predictor of well-being than HEXACO. Other studies, however, show that the HEXACO model may add between 5% and 15% more explained variance than the FFM on various outcomes (Ashton & Lee, 2008; Ashton et al., 2000; Kajonius & Dåderman, 2014). This higher predictive ability is usually obtained in regard to behavioral variables where the Honesty-Humility trait plays a relevant role in accounting for individual differences (Gaughan et al., 2012; Muris et al., 2017; Zhao & Smillie, 2015).

After a review of six-factor structures of personality descriptive adjectives from eight languages (Ashton et al., 2004), Lee and Ashton introduced the HEXACO Personality Inventory (HEXACO-PI) to measure the six dimensions, including 24 facets (four by dimension). Later, Lee and Ashton

(2006) developed the HEXACO-PI-R. This instrument has two versions of 200 and 100 items. These psychometric instruments have demonstrated an appropriate cross-national factor stability. Thus, Ion et al. (2017) reported that the factor structure (configural and metric) of the longer version (200 items) of the HEXACO-PI-R was largely invariant (with some exceptions for the Honesty-Humility factor) across five cultures (language in brackets): India (Hindi), Indonesia (Indonesian), Oman (Arabic), Romania, (Romanian), and Thailand (Thai). Later, Thielmann et al. (2019) also supported the configural and metric invariance of the 100-item version of the HEXACO-PI-R across 16 different language versions. Results from the two studies imply that both the factor structure of the long versions of the instruments measuring HEXACO dimensions and the meaning of the latent HEXACO factors are comparable across cultures. However, both studies rejected scalar invariance, suggesting that item intercepts are not equivalent across cultures.

From the HEXACO-PI-R 100-item version, Ashton and Lee (2009) developed a short 60-item version (HEXACO-60). HEXACO-60 includes 10 items per trait (with at least 2 items representing each of the facets), and showed appropriate internal consistency reliabilities despite its brevity and breadth of content (Ashton & Lee, 2009). When six factors were extracted, all items (or all facets) of a given scale showed their primary loadings on the same factor. HEXACO-60 Extraversion, Conscientiousness, and Openness to Experience scales correlated strongly with their NEO-FFI counterparts. In addition, the HEXACO-60 Emotionality and Agreeableness scales showed moderately strong relations with NEO-FFI Neuroticism and Agreeableness, respectively. Finally, HEXACO-60 Honesty-Humility showed its highest correlation with NEO-FFI Agreeableness, although lower in magnitude than the other five traits (Ashton & Lee, 2009). This point provides further evidence to support differentiating between the Honesty-Humility and Agreeableness traits in the HEXACO personality space.

1.1 | Socio-demographic variables: Age, gender, and social position

When summarizing the evidence about gender differences, Ashton and Lee (2007) remarked that women got higher levels of Emotionality in both lexical and questionnaire instruments, with the size of the difference being about one standard deviation (e.g., Yoo et al., 2004). They emphasized that Emotionality showed by far the largest and most consistent gender difference. Performing a meta-analysis, Moshagen et al. (2019) analyzed the relationships between various demographic variables and HEXACO traits across different instruments. In regard to gender differences, women scored higher on Emotionality and Honesty-Humility, but not on the remaining dimensions. Recently, Lee and Ashton (2020) analyzed gender differences in the HEXACO-PI-R across 48 countries. They confirmed the findings of previous studies in that women scored higher in Emotionality and in Honesty-Humility with mean differences across countries showing large (Cohen's $d = 0.95$) and medium ($d = 0.40$) effect sizes, respectively.

With regard to age, Ashton and Lee (2016), analyzing a very large sample of more than 100,000 people, reported the largest age effect for Honesty-Humility. This trait increased with age in adulthood. They also reported that emotionality decreased with age (Kawamoto, 2016), whereas extraversion increased, and no clear pattern for Conscientiousness, Agreeableness, Openness was observed, since different patterns were reported by facet and age range. It is noteworthy that Ashton and Lee (2016) found that age trends were quite similar for men and for women with few exceptions. Moshagen et al. (2019) also reported that the trait most related with age was Honesty-Humility ($r = .25$). Extraversion, Conscientiousness, and Openness to Experience also obtained significant (although smaller) positive correlations with age. Most evidence refers to the relationship between age and the FFM. In a revision of the cross-sectional and longitudinal studies, Roberts and Mroczek (2008) reported that only some traits changed with age. What is interesting from this revision is that change is observed mainly from the 20–40 age interval.

In spite of the large increase in the amount of research about the HEXACO model in the last decade, as far as we know no previous study has analyzed the relationships between the HEXACO model and social position. This relationship has been investigated with regard to the FFM. For instance, Bucciol et al. (2015) reported that Openness and Conscientiousness were positively associated with objective social status, whereas Agreeableness, Extraversion, and Neuroticism presented negative relationships, although lower in magnitude. With regard to theoretical expectations, Conscientiousness would positively predict social position, a prediction based on the well-established relationships between this domain and educational and job achievement (Matthews et al., 2009). Focusing on the trait that mainly differentiates HEXACO from FFM, subjects with very high scores on Honesty-Humility are defined as uninterested in lavish wealth and luxuries, and feel no special entitlement to elevated social status (Ashton & Lee, 2007). Thus, a negative relationship between social position and Honesty-Humility may be hypothesized. Finally, Moshagen et al. (2019) found that Openness to Experience was the HEXACO trait most related (although weakly) with educational level. These pieces of data suggest that this trait may also play a role in the social position achieved.

1.2 | Aims of the present paper

The main aim of the present paper is to replicate the structural invariance for the short version of the HEXACO-PI-R (HEXACO-60) to confirm its practical usefulness all over the world. Although the cross-national stability of longer versions of the HEXACO instrument has proved to be adequate (Ion et al., 2017; Thielmann et al., 2019), there are some issues to address regarding the short version: (1) There are previous examples (such as NEO-FFI; Aluja et al., 2005; Egan et al., 2000) that short versions could present problems of cross-national stability in spite of good fit in countries where they were originally used, and (2) the literature on the cross-national stability of the HEXACO measures mainly refers to East-Asian, European, and North-American samples. Evidence from other parts of the world (Africa, Oceania, South-America, and West-Asia) is scarce, but compulsory to establish the universality and cross-national usefulness of personality models (Bizumic, & Monaghan, 2020). According to previous cross-national studies conducted with the long versions of HEXACO-PI-R (Ion et al., 2017; Thielmann et al., 2019), it is expected that HEXACO-60 will reach structural (configural) and metric invariance across different language and country versions, including Western and Non-Western countries. On the contrary, given that the long versions have not reached scalar invariance in these studies (Ion et al., 2017; Thielman et al., 2019), the same is expected for the HEXACO-60.

The present study also seeks to replicate the gender differences across countries reported by Lee and Ashton (2020), who compared the English version of the HEXACO-PI-R across 48 countries. The mother tongue version was not, therefore, applied in the different countries. Addressing this point, Lee and Ashton (2020) stated that "*In future research, the present results should be compared with those obtained from translated versions of the HEXACO-PI-R" (p. 14*). Following this suggestion, the present study sets out to test if Lee and Ashton's findings are replicated with the HEXACO-60 using the mother tongue version of each country.

Comparing different countries is essential to discuss the reasons for such gender differences (Costa et al., 2001). In this case, comparing countries from different parts of the world allows us to test the Gender-Equality-Personality Paradox (the finding that gender differences in personality are at their largest in the most gender equal countries; Connolly et al., 2020). In this way, it is expected that European and North-American samples would show larger gender differences than African, Asian, and South-American samples, since the former are more gender equal (Lee & Ashton, 2020; Schmitt et al., 2008), and that the Gender-Equality-Personality Paradox would be replicated with the HEXACO-60. Regarding age, only an increase on Honesty-Humility with age is predicted. Previous literature does not suggest clear patterns for the other five traits. As with the gender variable, cross-national comparison on countries from four continents might be useful to establish the low association between age and personality traits.

Finally, as far as we know, this the first study which explicitly focuses on the relationship between HEXACO and social position. Two characteristics of the present study allow us to properly test this issue. The first one is that this topic will be analyzed across several countries. A replicated pattern across different countries differing in political and economic variables would reinforce the reported role of personality in the social position of individuals. The second one is that we will analyze whether Honesty-Humility might play a relevant role in the observed differences on social position. If this hypothesis is supported, it would represent an advance in our understanding of the relationships between personality and social position and social mobility, and provide further evidence in favor of using the HEXACO model to predict social and economic outcomes.

2 | METHOD

2.1 | Participants

In this study participants were 10,298 subjects (5,410 women and 4,888 men), from 18 countries and 13 languages (Note, several samples are from regions not officially recognized as countries, but will be referred to as countries in this paper for simplicity). Table A1 in the Supporting Information shows sociodemographic data (percentages of gender, and age statistics) from the different countries and languages. In most countries, the average age was around 40 years old (mean of 40.31 years for the total sample [$SD = 17.32$]), with the exception of China and Togo (mean ages of 24.75 and 30.03, respectively). Senegal only provided age ranges. Average age was 39.81 years ($SD = 17.37$) for women, and 40.87 years ($SD = 17.41$) for men. The total sample was distributed in age ranges as follows: [18–30 years: 3,758 (36.5%); 31–45 years: 2,378 (23.1%); 46–60 years: 2,413 (23.4%) and >60 years old: 1,748 (17%), with one missing].

2.2 | Measures

2.2.1 | HEXACO-60

This measure was developed by Ashton and Lee (2009) from a longer form of the HEXACO Personality Inventory-Revised (Lee & Ashton, 2004, 2006). The HEXACO-60 is a short 60-item inventory that assesses the six personality factors of the HEXACO model of personality: Honesty-Humility (HH), Emotionality (EM), Extraversion (EX), Agreeableness

versus anger (AG), Conscientiousness (CO), and Openness to Experience (OE). Items were selected with the aim of covering a wide range of content, so at least 2 items represent each of the four HEXACO-PI-R facets of every trait (Ashton & Lee, 2009). Thus, facet-level scales can be computed from the HEXACO-60, but these are very short, consisting of only two or three items per scale, and thus rather unreliable (Ashton & Lee, 2009). The response format is a 5-point Likert: 1 (*strongly disagree*) to 5 (*strongly agree*). The internal consistency reliabilities ranged from .73 to .80, and correlations between the long and short form range from .83 to .92 in a community sample (Ashton & Lee, 2009). Validated translations available at www.hexaco.org were used, except for the Arabic, Polish and Hebrew versions, which were specially translated and adapted for this study. An independent English version was sent to one of the HEXACO-60 authors to verify the equivalence of these versions. Both versions in English, the original and the backtranslated version were analyzed and discrepancies were resolved until the two English versions were equivalent, according to the procedure used in the article by Rossier Aluja et al. (2016), and also described in detail in Blanch and Aluja (2016).

2.2.2 | Hollingshead's social position index

In this study, information about social position was included using the Hollingshead Social Position Index (SPI; Hollingshead, 1957; Hollingshead & Redlich, 1958). This index is based on two 7-point scales: An Occupation Scale (1: -higher executives- to 7: -unskilled employees-) and an Education Scale (1: -graduate professionals- to 7: -less than seven years of school-). The formula for obtaining the SPI score was the following [SPI = (Occupation score * 7) + (Education score * 4)]. The range of scores provided by the authors is: upper: <17; upper-middle: 17–31; middle: 32–47; low-middle: 48–63; and low: >63 (Hollingshead & Redlich, 1958). Note that lower scores represent higher Social Position. This non-expected metric of the Social Position variable has been retained because it is the original metric of the index, and to allow for comparisons with examples in the literature where this SPI was used (e.g.,. Aluja, Sayans-Jiménez, et al., 2020).

2.3 | Procedure

The present study is a part of a larger study in which HEXACO-60, Short Dark Triad (SD3; Jones & Paulhus, 2014), and the Zuckerman-Kuhlman-Aluja Personality Questionnaire shortened form (ZKA-PQ/SF; Aluja et al., 2018) were applied in 17 of 18 samples (Aluja, Rossier, et al., 2020). Only HEXACO-60 data were reported here. In 17 out of 18 countries, the HEXACO-60 were filled in by adult volunteers of both genders using the snowball method. For this, we relied on the help of undergraduate students who received credits for their personality psychology course. Each student was instructed to administer the questionnaire in paper and pencil form to eight participants, four men and four women from the community, with the following age range: (a) 18 to 30 years, (b) 31 to 45 years, (c) 46 to 60 years, and (d) more than 60 years old. Approximately 400 participants from each country (50% of each gender) was the target. In the U.S. sample, participants were recruited and paid through Amazon's Mechanical Turk crowd sourcing platform, using the same age and gender criteria as the other samples. The data, SPSS syntax and results files, and multigroup structural equation models and details that support the findings of this study are available from the corresponding author.

2.4 | Statistical analyses

In order to test the cross-national stability of the HEXACO-60 factor structure, several analyses were conducted. Firstly, in order to test the invariant nature of the factors across countries, we computed congruence coefficients (rc). The congruence coefficient is the cosine of the angle between the two vectors, and can be interpreted as a standardized measure of proportionality of elements in both vectors. This coefficient, based on Exploratory factor analysis (EFA), might be more appropriate as a basis for factor comparisons than the Confirmatory Factor Analysis (CFA) approach in large multidimensional solutions that do not approach very simple structures (Lorenzo-Seva & ten Berge, 2006). Note that rc compares the proportionality of loadings, not the sizes of loadings. An rc below 0.85 is indicative of lack of any factor similarity at all. A value in the range [0.85–0.94] means that the two factors compared display a fair degree of similarity. A value of rc above 0.90 is considered a high degree of factor similarity; and a value greater than 0.95 is generally interpreted as factors being practically identical (Lorenzo-Seva & ten Berge, 2006; MacCallum et al., 1999). Congruence coefficients between the original HEXACO-60 and factor matrix considering all countries were provided. Congruence coefficients for each country and each personality factor were also computed. All congruence coefficients were computed on the six-factor solution using Principal Axis extraction method and Varimax rotation. Subsequently, the level of HEXACO invariance across the eighteen countries was calculated using multi-group structural equation modeling including all factors in a single model and, thus, assessing

the invariance of the factor structure. This approach facilitates the comparison with earlier research on the invariance of the HEXACO (i.e., Ion et al., 2017; Thielmann et al., 2019). Although these studies used ESEM and the present study used CFA, some authors have suggested that results from these two analytic methods are almost identical (Booth & Hughes, 2014). In fact, Thielmann et al. (2019) reached a similar conclusion using both analytic strategies. Various goodness-of-fit indices are considered: The χ^2 per degree of freedom (χ^2/df), the goodness of fit index (GFI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). A χ^2/df bellow 5 reflects an acceptable model, GFI and CFI values above .95 indicate a good fit, and values ranging between .90 and .95 indicate an acceptable fit, RMSEA values below .08 indicate an acceptable fit, and values below .05 indicate a good fit. In order to analyze configural, metric, and scalar invariance, changes in model fit statistics were considered (Rossier & Duarte, 2019). To provide evidence of invariance, change in CFI values should be lower than .01, and change in RMSEA lower than .05 (Byrne & Van de Vijver, 2010; Rossier et al., 2016).

Later, the level of HEXACO invariance across the 18 countries was calculated using multi-group structural equation modelling for each factor successively, following the method used by Rossier et al. (2016). Parcels were defined by grouping the 2 or 3 items belonging to the same facet. Note that number of items (2 or 3) depended on the number of items by facet included in the HEXACO-60 (Ashton & Lee, 2009). For each dimension, four facets were considered observed variables. This approach is complementary with the analysis of the all factors in a single model and allow for testing the measurement invariance of every HEXACO factor separately.

Means, deviations and alpha internal consistency for each country were computed for the HEXACO-60 dimensions. HEXACO-60 partial inter-correlation networks in which all non-significant edges were set to zero were considered for domains and facets (GLASSO algorithm, EBIC, and mgm—the last for estimating explained variance; Haslbeck & Waldorp, 2020). We obtained HEXACO-60 partial correlations with age controlling for gender and SPI, and effect sizes (partial η^2) of gender differences controlling for age and SPI after a GLM Multivariate analysis between subjects were carried out with the six HEXACO-60 dimensions. Since the three sociodemographic variables could be related (e.g., SPI with age and gender), when one sociodemographic variable was the target of the analysis, we controlled for the remaining two so as not to bias the analysis and interpretation. We also computed effect sizes (partial η^2) separately for age, gender and SPI variables on HEXACO personality dimensions in each country. Computing effect sizes is essential to standardize the role of each independent variable (Age, Gender, and SPI) in the observed differences of HEXACO dimensions in every country. Finally, standardized z-scores of HEXACO personality dimensions by country controlling for age, gender, and SPI were provided to test the role of the country factor. The differences in standardized *z*-score by country and dimension were obtained after comparing with the average of each dimension in the total sample. Statistical packages for these analyses were: SPSS version 20, FACTOR.EXE version 9.2 (Lorenzo-Seva & Ferrando, 2013) and *qgraph* from R Core Team.

3 | RESULTS

3.1 | Descriptive statistics and reliability by country

Table A2 in the Supporting Information shows means, standard deviations and alpha internal consistency of the HEXACO-60 dimensions. Average alpha internal consistency was about .70 for the six factors. It should be noted that alpha consistency values tended to be low in Qatar, Senegal, Togo, and Tunisia. Descriptive and alpha coefficients by gender and country for the HEXACO-60 dimensions and facets and partial inter-correlation networks are presented in the Supporting Information (Tables A3–A10 and Figure A1). Note that most of the reliability coefficients of facets were not appropriate (values normally lower than .60).

3.2 | HEXACO factor structure and congruence coefficients factors

Table 1 shows the original HEXACO-60 matrix and the factorial matrix including total sample from all countries in the present study. The principal axis extraction with Varimax rotation of six factors was used in both matrices (Ashton & Lee, 2009). After a Procrustes orthogonal rotation between both matrices, the congruence coefficients were obtained. The total consistency was between .92 and .96 for the six factors. Only two facets obtained low congruence coefficients: Modesty (.75) and Social Self-Esteem (.88).

We further analyzed the factor solution for each country and computed congruence coefficients for the 18 countries. Table 2 shows the congruence coefficients with the original HEXACO-60 matrix (Table 1) for each country. The average congruence coefficient by country and factor was .92. Only five countries got an average lower than .90 (China, Qatar, Senegal, Togo, and Tunisia). Senegal and Togo presented lower congruence coefficients in the majority of dimensions, but the results for China, Qatar, and Tunisia reflected a pattern of similarity, since most of the factors presented rc equal to or larger than .90 (or .89).

TABLE 1 Factor matrices of the original HEXACO-60 (Ashton & Lee, 2009) and total sample from all countries, as well as congruence coefficients between dimensions and facets of both solutions

	Original HEXACO-60 factor matrix (Ashton & Lee, 2009)					
	Honesty-Humility	**Emotionality**	**Extraversion**	**Agreeableness**	**Conscientiousness**	**Openness to Experience**
Sincerity	**.50**	−.04	−.06	.09	.15	.14
Fairness	**.57**	.13	−.05	.13	.23	.06
Greed-Avoidance	**.64**	.01	−.07	.12	−.04	.14
Modesty	**.50**	.12	−.11	.14	−.02	.09
Fearfulness	−.13	**.63**	−.19	−.01	.15	−.13
Anxiety	.12	**.45**	−.23	−.20	.19	.03
Dependence	.05	**.68**	.02	−.01	−.05	−.06
Sentimentality	.17	**.63**	.15	.02	.04	−.04
Social Self-Est.	−.06	−.15	**.61**	.06	.17	−.08
Social boldness	−.09	−.13	**.55**	−.15	.04	.21
Sociability	−.12	.15	**.55**	.09	−.03	.02
Liveliness	−.01	−.01	**.79**	.16	.04	−.02
Forgiveness	.25	−.11	.16	**.48**	−.02	−.02
Gentleness	.20	−.02	.04	**.61**	−.05	−.04
Flexibility	−.02	.08	−.03	**.64**	−.02	.02
Patience	.38	−.05	.06	**.59**	.08	.04
Organization	−.02	.07	.07	.02	**.58**	−.06
Diligence	.14	.02	.26	−.02	**.68**	.08
Perfectionism	.12	.09	.08	−.04	**.60**	.03
Prudence	.03	−.01	−.17	.03	**.60**	.00
Aesthetic Appr.	.11	.06	−.03	−.01	.04	**.68**
Inquisitiveness	.11	−.10	−.08	−.03	−.02	**.54**
Creativity	.07	−.01	.13	.07	−.02	**.53**
Unconventionality	.08	−.12	.05	−.02	.04	**.67**
Congruence Coeffi.						

Note: Factorial loadings are presented with two decimal points.

Loadings larger than ±.40 are in bold type.

Average congruence coefficients are in italics.

3.3 | Invariance of HEXACO-60 structure

When a model including all factors simultaneously was fitted in the total sample, the results were as follows: χ^2 (9,013.40; *df*: 235), GFI: .925, CFI: .772, and RMSEA: .060. Configural, metric, and scalar invariance models across countries produced the following results: Configural: χ^2 (15,160.05; *df*: 4,230), χ^2/dfs: 3,58, GFI: .884, CFI: .752, and RMSEA: .016. Metric: χ^2 (16,722.68; *df*: 4,536), χ^2/dfs: 3,69, GFI: .873, CFI: .724, and RMSEA: .016. Scalar: χ^2 (19,207,13; *df*: 4,893), χ^2/dfs: 3,93, GFI: .855, CFI: .675, and RMSEA: .017. Results with the entire instrument show that configural and metric models obtained similar results (Delta CFI from metric model is close to .01), but not the scalar one (Delta CFI = .049).

Later, the structure for each factor was assessed by computing a confirmatory factor analysis in the entire sample. Fit indices were usually adequate, except the χ^2/df, which were too high, in all likelihood due to the very large total sample (N = 10,298). The overall structure of each factor was supported by the following fit indices: Honesty-Humility (allowing the error terms of fairness and modesty to covary; χ^2/df = 52.93, GFI = .997, CFI = .985, RMSEA = .071). Emotionality (χ^2/df = 17.07, GFI = .998, CFI = .993, RMSEA = .040), Extraversion (allowing the error terms of social boldness and sociability to covary; χ^2/df = 36.18, GFI = .998, CFI = .993, RMSEA = .058), Agreeableness (χ^2/df = 64.35, GFI = .994, CFI = .966, RMSEA = .078), Conscientiousness (χ^2/df = 92.09, GFI = .991, CFI = .962,

Current factor matrix (all countries)						
Honesty-Humility	**Emotionality**	**Extraversion**	**Agreeableness**	**Conscientiousness**	**Openness to Experience**	**Congruence coefficients**
.55	−.03	.04	.01	.19	.09	*.96*
.54	.10	.15	.13	.27	.00	*.93*
.40	.00	−.07	.18	−.03	.03	*.96*
.31	−.04	−.11	.23	.25	.13	*.75*
−.01	**.52**	−.09	−.02	−.01	−.15	*.95*
.02	**.48**	−.27	−.10	.13	.11	*.97*
−.06	**.56**	.02	−.03	−.15	−.06	*.97*
.08	**.59**	.12	.04	.08	.05	*.98*
.11	−.20	**.45**	.14	.37	.04	*.88*
−.06	−.09	**.55**	−.10	.09	.16	*.99*
−.02	.17	**.54**	.08	−.07	.07	*.98*
.08	−.13	**.54**	.14	.19	.06	*.94*
.22	.03	.23	**.32**	−.07	.00	*.92*
.20	.06	.08	**.53**	−.01	.02	*.98*
.01	−.04	−.02	**.52**	.06	.00	*.98*
.09	−.12	.05	**.53**	.21	.13	*.97*
.04	.02	.06	.06	**.60**	−.06	*.98*
.20	.03	.25	−.01	**.49**	.17	*.96*
.08	.06	.05	−.04	**.44**	.13	*.98*
.08	−.10	−.04	.16	**.59**	.09	*.91*
.12	.03	.02	.08	.07	**.49**	*.98*
.17	−.08	.12	.02	.14	**.48**	*.97*
−.01	.04	.14	.01	.04	**.58**	*.98*
−.06	−.08	.01	.04	.04	**.50**	*.98*
.93	*.96*	*.94*	*.96*	*.92*	*.96*	*.94*

RMSEA = .094), and Openness to experience ($\chi^2/df = 62.80$, GFI = .994, CFI = .976, RMSEA = .077). Note that in two traits (Honesty-Humility and Extraversion) error terms between two facets were allowed to covary since the modification index of these covariations was above 100 in both cases.

Finally, results of the HEXACO-60 invariance across the eighteen countries for each personality factor are reported in Table 3. All GFIs and CFIs indicated a good or adequate fit, expect the CFIs for the scalar invariance level of Conscientiousness and Openness. The RMSEA were all very low. The χ^2/dfs were slightly too high for Conscientiousness and Openness, and for the scalar invariance level for all factors. Change in GFI ranged from .007 to .016 (*Mdn* = .010), change in CFI ranged from .019 to .067 (*Mdn* = .038), and change in RMSEA ranged from .001 to .022 (*Mdn* = .004). Changes in RMSEAs were all below the established threshold, whereas changes in CFIs were all above it. Changes in CFI suggested that the metric invariance model might indeed not hold for some language versions. In contrast, RMSEA and GFI changes indicated that the metric invariance model would be retained if model parsimony is taken into account (Marsh, 2007). On this point, the results reported by Thielmann et al. (2019) are quite similar to those depicted in Table 3, which indicate that metric invariance is reached for the 100-item version of the HEXACO-PI-R. We can therefore assume that HEXACO-60 also reaches metric invariance. Finally, changes on CFI as well as changes on four factors for GFI and three for RMSEA did not support scalar

invariance, indicating that facet intercepts are not equivalent across countries.

The fact that the configural model fits well across countries suggests that relationships among dimensions are invariant across countries. However, this approach could fail to identify the interesting ways that the nature of the structure of HEXACO-60 might vary across countries. Hence, we have computed the average of the scale-based intercorrelations among the HEXACO dimensions across the 18 countries. We have based our analysis on the scale-based intercorrelations to allow for comparison with results reported by Thielmann et al. (2019). Average cross-national coefficients of the present study and the results from Thielmann et al. (2019) are reported in Table A10 in the Supporting Information. Note that the results of both studies are quite similar. It should also be remarked that the average of every standard deviation of every intercorrelation across countries was .08, suggesting that the pattern of intercorrelations across HEXACO dimensions is greatly invariant and confirms CFA results.

3.4 | HEXACO-60 correlations with age in each country

On the left-hand side of Table 4, correlations between the six personality dimensions with age controlling for gender and SPI are shown. Note that 14 out of 18 correlations are positive and significant with the Honesty-Humility trait, 9 out of 18 with Agreeableness, 5 out of 18 with Extraversion, although with a different sign, 4 out of 18 with Conscientiousness and Openness to Experience (also with differences in the sign), and only one country presented a significant correlation with Emotionality. The relationships of HEXACO-60 with age are observed in more detail in Figure A2 in Supporting Information, which compares different age groups by gender. It should be noted that only Honesty-Humility scores increase from 18 to 60 years in both genders, being higher in women. In the other five traits, the largest difference is lower than 4 points in the same scale, suggesting a negligible effect. What should be highlighted is that women and men tend to show the same pattern with age in the six factors.

3.5 | Gender differences in HEXACO-60

The right-hand side of Table 4 shows the gender differences by country in the six dimensions of the HEXACO-60, controlling for the effect of age and SPI. Women score higher than men on Honesty-Humility, Emotionally, and Openness to Experience, with some differences between countries. Only five countries present gender differences in Extraversion with medium-large effect sizes: Chile, Hungary, Switzerland (F), Togo, and USA. In Agreeableness, only Chile presents significant gender differences, and in Conscientiousness the most important differences between women and men occur in Chile and the USA. The average of effect sizes (partial η^2) of the significant comparisons were .090, .187, .056, .040, .049, and .064 for Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience, respectively. Thus, the gender factor only shows a large effect on Emotionality, and medium on Honesty-Humility and Openness to Experience.

3.6 | Social position differences in HEXACO-60

The differences among the different ranges of SPI and the HEXACO-60 dimensions can be seen graphically in Figure 1. Scores on Honesty-Humility tend to decrease as the SPI is lower in both genders, although this trend is significantly greater in men. People with a low SPI (high social position) are less emotional than those with a high SPI (low social position). Poor social position is reported by more introverted subjects without gender differences. No relationship is observed between Social position and Agreeableness. Conscientiousness scores decrease in lower social position groups for both genders. Similarly, people of both genders with low Openness scores tend to have lower social positions.

3.7 | Effect of age, gender and SPI on HEXACO-60 personality dimensions

In order to establish the effect of age, gender and SPI, a GLM Multivariate analysis was carried out with the six HEXACO-60 dimensions. Table 5 shows the effect sizes of the association of these three variables for each country. The mean effect of age is low, with the exception of Honesty-Humility in the USA ($\eta^2 = .140$), and Agreeableness in Chile ($\eta^2 = .072$). Gender has a large effect in most countries on Emotionality, except Bosnia H ($\eta^2 = .015$), Chile ($\eta^2 = .025$), and Senegal ($\eta^2 = .056$). SPI has a medium association in eight countries with Openness to Experience and a minor association with Conscientiousness, particularly in Chile ($\eta^2 = .071$), Israel ($\eta^2 = .053$) and Italy ($\eta^2 = .047$). Some countries also present some SPI effect on Honesty-Humility (Germany, Israel, Spain).

The average of partial η^2 for age were lower than .03, .01, .01, .02, .01, and .01 for Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience, respectively. Thus, only a small effect is observed for Honesty-Humility. With regard to gender, the averages were lower than .03, .15, .01, .01, .01 for Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to

TABLE 2 Congruence coefficients for each HEXACO factor by country

Country	Honesty-Humility	Emotionality	Extraversion	Agreeableness	Conscientiousness	Openness to Experience	Average
Belgium	0.89	0.95	0.95	0.95	0.92	0.94	*0.93*
Bosnia H.	0.95	0.94	0.96	0.95	0.93	0.95	*0.95*
Catalonia	0.92	0.94	0.97	0.91	0.93	0.96	*0.94*
Chile	0.86	0.90	0.87	0.94	0.90	0.90	*0.90*
China	0.91	0.80	0.90	0.91	0.90	0.93	*0.89*
Germany	0.95	0.94	0.98	0.96	0.96	0.97	*0.96*
Hungary	0.91	0.94	0.96	0.96	0.91	0.94	*0.94*
Israel	0.90	0.92	0.97	0.95	0.94	0.95	*0.94*
Italy	0.95	0.92	0.94	0.97	0.96	0.95	*0.95*
Poland	0.93	0.95	0.96	0.92	0.95	0.94	*0.94*
Qatar	0.85	0.83	0.92	0.92	0.93	0.89	*0.89*
Senegal	0.80	0.93	0.77	0.87	0.66	0.90	*0.82*
Spain	0.92	0.95	0.97	0.97	0.94	0.96	*0.95*
Switzerland (F)	0.94	0.96	0.91	0.92	0.97	0.95	*0.94*
Switzerland (G)	0.94	0.94	0.96	0.98	0.97	0.96	*0.96*
Togo	0.86	0.87	0.79	0.75	0.85	0.85	*0.83*
Tunisia	0.80	0.89	0.89	0.90	0.93	0.91	*0.89*
USA	0.92	0.94	0.91	0.95	0.93	0.97	*0.94*
Average	*0.90*	*0.92*	*0.92*	*0.93*	*0.92*	*0.93*	*0.92*

Note: Average congruence coefficients are in italics.

Experience, respectively. A large difference is observed for Emotionality, small for Honesty-Humility and negligible for the remaining dimensions. Finally, average effect sizes for the association of SPI with Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience were about .01, .02, .02, .00, .02, and .04, respectively.

3.8 | Country differences in HEXACO-60 dimensions

We examined personality differences across countries using a GLM Multivariate procedure for the HEXACO-60 factors controlling for age, gender, and SPI. A test of between-subjects effects based on a corrected model informs that the scores for all six personality dimensions were significantly different between countries ($p < .001$). Nevertheless, considering the effect size, Emotionality ($\eta^2 = .126$) and Openness to Experience ($\eta^2 = .137$) reported large effect sizes according to Cohen (1988). Honesty-Humility ($\eta^2 = .082$), Extraversion ($\eta^2 = .064$) and Conscientiousness ($\eta^2 = .077$) obtained medium effect sizes. Note that this is the effect of the country factor without controlling for age, gender, and SPI. In Figure 2, *z*-standardized personality factors between countries were plotted controlling for age, gender, and SPI. Reported differences were negligible and no country exceeds a standard deviation of .56. The countries approaching or slightly exceeding ±.4 were (dimensions and sign of difference between brackets): China (CO−), Qatar (OP−), and Belgium (CO+). Hungary (OP+), Switzerland French speaking (HH+), and the USA (EX− and CO+).

4 | DISCUSSION

The present paper set out to test the cross-national stability of the HEXACO-60 to evaluate its usefulness in practical settings around the world. Comparing results in 18 countries also allowed us to properly test the association between HEXACO personality dimensions and several sociodemographic variables (gender, age, social position, and country). Factorial (both exploratory and confirmatory) and multivariate analyses enabled us to achieve these aims.

TABLE 3 Level of HEXACO invariance across the eighteen countries for each personality factor

HEXACO factor	χ^2	*df*	χ^2/df	GFI	CFI	RMSEA	$\Delta\chi^2$	Δdf	*p*	ΔGFI	ΔCFI	ΔRMSEA
Honesty-Humility												
Configural invariance	59.60	18	3.31	.997	.990	.013						
Metric invariance	217.16	69	3.15	.990	.963	.017	157.56	51	<.001	.007	.027	.004
Scalar invariance	443.22	86	5.15	.980	.911	.039	226.06	17	<.001	.010	.052	.022
Emotionality												
Configural invariance	13.48	36	3.62	.994	.981	.016						
Metric invariance	307.83	87	3.54	.985	.956	.016	177.35	51	<.001	.009	.025	<.001
Scalar invariance	519.27	104	4.99	.976	.916	.020	211.44	17	<.001	.009	.040	.004
Extraversion												
Configural invariance	5.52	18	2.81	.998	.994	.013						
Metric invariance	207.64	69	3.01	.975	.975	.014	157.12	51	<.001	.008	.019	.001
Scalar invariance	547.60	86	6.37	.916	.916	.023	339.96	17	<.001	.016	.059	.009
Agreeableness												
Configural invariance	101.02	36	2.81	.995	.986	.013						
Metric invariance	304.88	87	3.50	.985	.952	.016	203.86	51	<.001	.010	.034	.003
Scalar invariance	549.72	104	5.29	.974	.902	.020	244.84	17	<.001	.011	.050	.004
Conscientiousness												
Configural invariance	314.27	36	8.73	.984	.945	.027						
Metric invariance	557.51	87	6.41	.973	.907	.023	243.24	51	<.001	.011	.038	<.001
Scalar invariance	767.34	104	7.38	.965	.869	.025	209.83	17	<.001	.008	.038	.002
Openness												
Configural invariance	25.75	36	6.97	.988	.957	.024						
Metric invariance	427.92	87	4.92	.980	.931	.020	177.17	51	<.001	.008	.026	<.001
Scalar invariance	776.44	104	7.47	.965	.864	.025	348.52	17	<.001	.015	.067	.005

Abbreviations: CFI, comparative fit index; GFI, goodness of fit index; RMSEA, root mean square error of approximation.

TABLE 4 Correlations with age controlling for gender and SPI for each HEXACO dimensions and country. Gender differences controlling for age and SPI

	Partial correlations with age controlling for gender and SPI												Effect sizes of significant gender differences controlling for age and SPI (partial η^2)											
	HH		EM		EX		AG		CO		OP		HH		EM		EX		AG		CO		OP	
Country	r	*p*	r	*p*	r	*p*	r	*p*	r	*p*	r	*p*	*p*	η^2	*p*	η^2	*p*	η^2	*p*	η^2	*p*	η^2	*p*	η^2
Belgium	.14	.020	−.06	.352	−.01	.865	.18	.003	.06	.306	−.05	.457	<.010	.042	<.001	**.306**	.481	.009	.015	.039	.377	.012	<.001	**.069**
Bosnia H.	−.02	.628	−.03	.540	−.10	.044	−.00	.977	−.08	.110	−.17	.001	.514	.005	.059	.017	.181	.011	.405	.007	.027	.021	<.001	**.086**
Catalonia	.18	.001	.15	.001	−.15	.001	.16	.001	.11	.016	.05	.291	<.001	**.067**	<.001	**.230**	<.001	.042	.001	.033	.004	.025	<.001	.053
Chile	−.21	.001	.08	.160	−.11	.068	.27	.001	−.22	.001	.06	.342	<.001	**.077**	.002	.051	<.001	**.147**	<.001	**.120**	<.001	**.157**	.028	.032
China	.03	.714	−.03	.669	.06	.401	.08	.296	−.00	.943	−.05	.561	.356	.019	<.001	**.118**	.362	.019	.653	.010	.785	.006	.178	−029
Germany	.23	.001	−.01	.960	−.03	.414	.13	.002	.03	.527	.08	.052	<.001	**.097**	<.001	**.246**	<.001	.047	.001	.030	.014	.020	<.001	**.127**
Hungary	.31	.001	−.03	.499	.16	.001	.12	.014	.06	.212	−.00	.963	<.001	**.145**	<.001	**.187**	<.001	**.078**	.042	.021	<.001	.053	.050	.020
Israel	.15	.030	−.03	.691	−.03	.653	.20	.004	−.08	.270	.10	.156	<.001	**.087**	<.001	**.247**	.262	.019	.033	.042	.009	.055	.094	.031
Italy	.21	.001	.11	.088	.02	.758	.10	.107	.02	.809	−.00	.980	<.001	**.115**	<.001	**.168**	.025	.035	.139	.021	.002	.055	<.001	**.068**
Poland	.11	.020	−.05	.247	.03	.508	.07	.109	.03	.029	−.10	.030	<.001	**.066**	<.001	**.251**	.493	.005	.244	.009	.133	.012	<.001	.049
Qatar	.19	.001	.07	.077	.02	.657	.10	.009	.04	.265	−.04	.272	<.001	.035	<.001	**.086**	.027	.014	.011	.017	<.001	.036	<.001	**.084**
Senegal	.02	.407	−.01	.591	.01	.967	.01	.681	−.03	.231	−.09	.001	.022	.006	<.001	**.064**	.023	.006	<.001	.018	.006	.018	<.001	.019
Spain	.18	.001	.08	.077	−.04	.420	.09	.037	−.03	.581	−.06	.180	<.001	**.078**	<.001	**.193**	.001	.033	.118	.012	.196	.009	<.001	**.085**
Switz. (F)	.22	.002	−.08	.281	.15	.039	.22	.002	−.05	.528	.07	.345	<.001	**.095**	<.001	**.295**	.004	**.065**	.014	.052	.056	.038	.001	**.077**
Switz. (G)	.11	.060	.00	.973	.01	.935	.06	.305	.14	.016	.01	.904	<.001	**.068**	<.001	**.208**	.031	.028	.480	.008	.008	.037	.006	.039
Togo	.07	.413	−.02	.790	.08	.387	.02	.822	.09	.312	−.23	.007	.649	.013	<.001	**.191**	.002	**.109**	.264	.030	.034	.064	.003	**.104**
Tunisia	.11	.055	.07	.217	−.03	.578	.05	.343	.04	.439	−.04	.451	.067	.023	<.001	**.196**	.240	.013	.327	.011	.476	.008	<.001	**.065**
USA	.37	.001	−.08	.097	.16	.001	.16	.002	.18	.001	.12	.018	<.001	**.206**	<.001	**.153**	<.001	**.071**	.003	.033	<.001	**.058**	<.001	.048

Note: η^2 equal or above .058 are given in boldface type. η^2 < .0099 = negligible; η^2 > .01: small; $\eta^2 \geq .0588$ medium; $\eta^2 \geq .1379$: large effect size (Cohen, 1988, pp. 274–288). Note that Women score higher than men in all significant differences.

Abbreviations: AG, Agreeableness; CO, Conscientiousness; EM, Emotionality; EX, Extraversion; (F), French; (G), German; HH, Honesty-Humility; OP, Openness to Experience; SPI, Social Position Index.

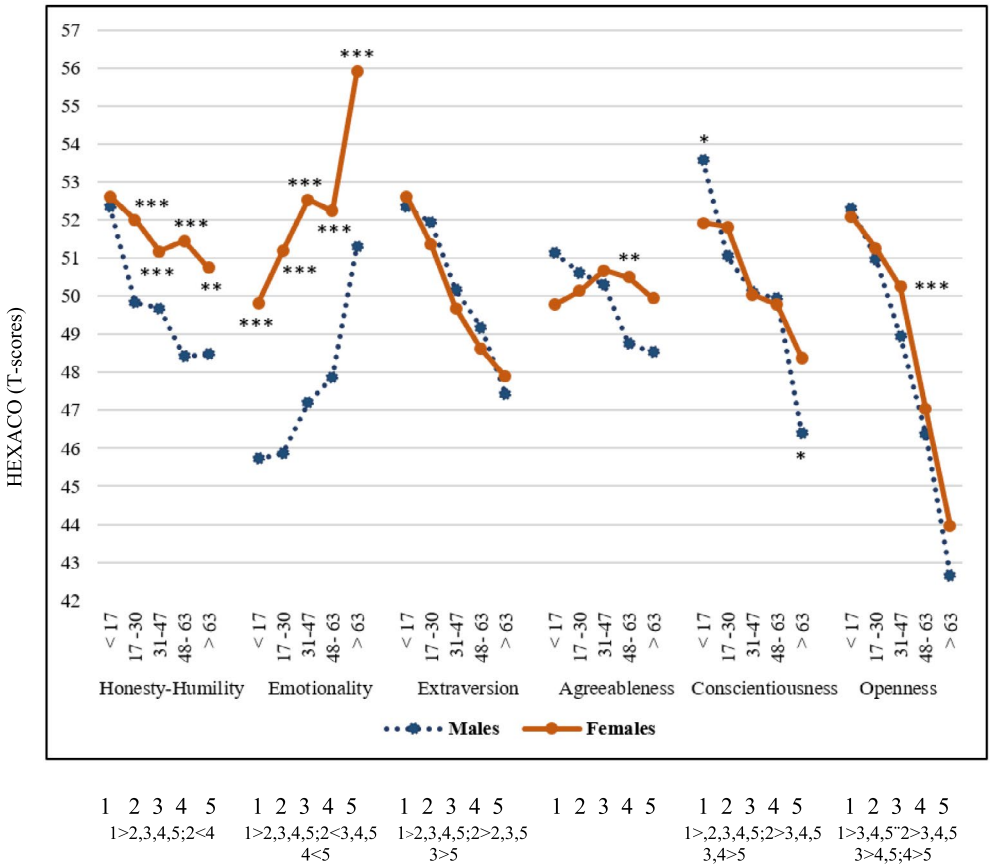


FIGURE 1 Social Position Index range differences in HEXACO-60 adding all countries. Upper: <17; upper-middle: 18–31; middle: 32–47; low-middle: 48–63; and low: >63. In the lower row you can find which SPI group comparisons were significant (p <.01). Gender differences: *p < .05; **p < .01; ***p < .001 [Color figure can be viewed at wileyonlinelibrary.com]

4.1 | Cross-national stability

With regard to cross-national stability, the HEXACO-60 presented the same structure across countries all over the world. As expected, both the configural and metric invariance were reached, meaning that HEXACO-60 measures the same underlying constructs across countries. This pattern is congruent with results of long versions (Ion et al., 2017; Thielmann et al., 2019). Indeed, the results obtained with the HEXACO-60 are even better, since no problem is observed for any trait. For instance, Ion et al. (2017) reported that Honesty-Humility was not successfully retrieved in all languages for the longest version of the HEXACO-PI-R. In general, our results confirm the conclusion by Moshagen et al. (2019) that shorter versions capture the structural properties of the HEXACO-200 and, therefore, results clearly support the item selection procedure of the HEXACO-60 (Ashton & Lee, 2009). Results suggest that doubts about the robustness of the HEXACO model reported at the psycholexical approach (emic studies; e.g., De Raad et al., 2010) diminish when questionnaires are used (etic studies).

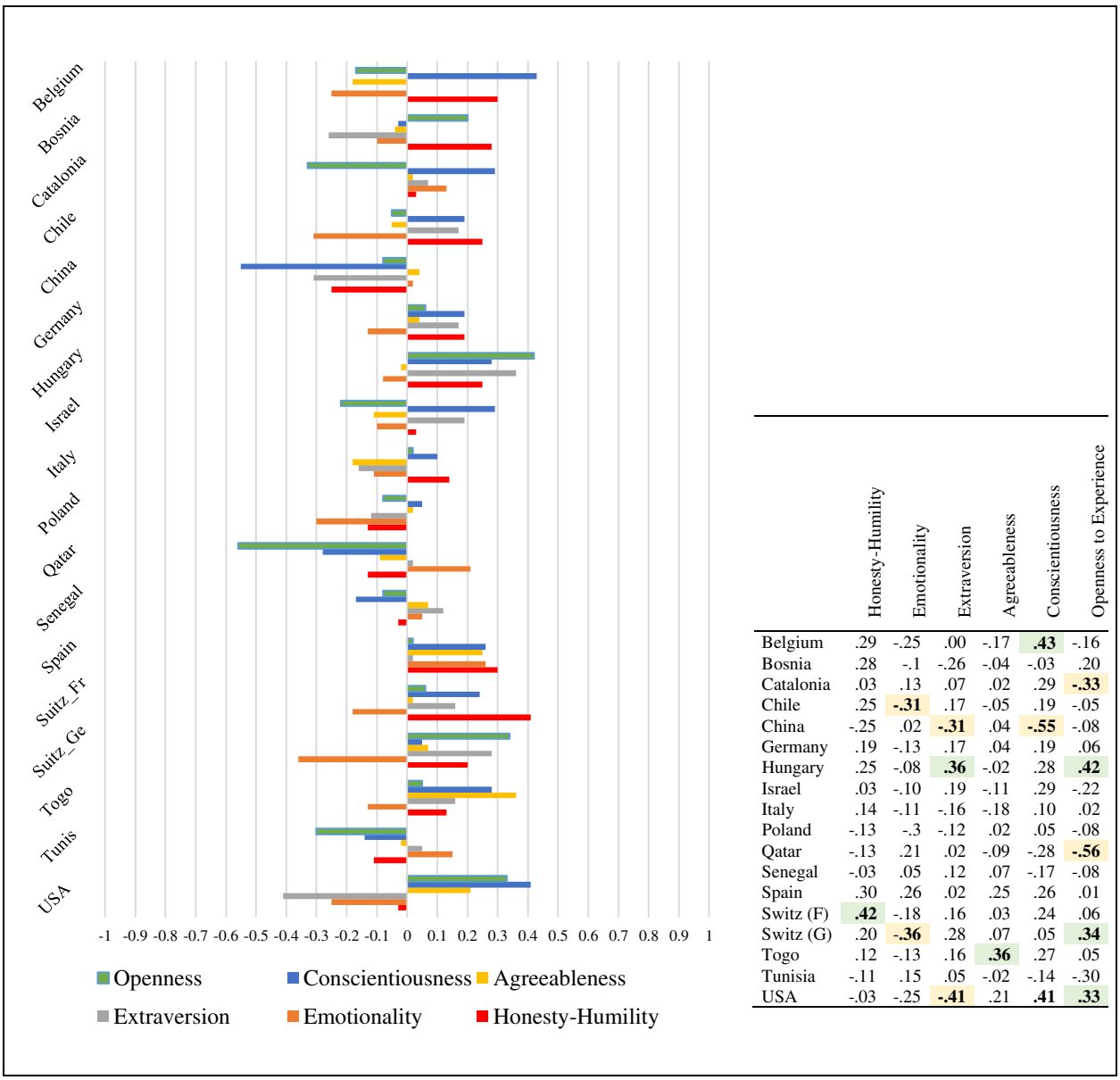
As expected, total scalar invariance was not supported since the fit was worse when the configural and metric models were compared. However, more detailed discussion of this topic is required. When long versions of HEXACO-PI-R were applied, fit indices in the scalar model were also not acceptable. Thus, Ion et al. (2017) reported CFIs lower than .70 in the models testing invariance at the intercept level. Thielmann et al. (2019) reported values of CFI in the scalar models lower than .80. On the contrary, the present study reported an acceptable fit (CFI > .90) in scalar models for Honest-Humility, Emotionality, Extraversion, Agreeableness, and a marginal fit (CFI > .85) for Conscientiousness and Openness to Experience. Note that the more items there are, the worse the fit of scalar models. Hence, although strong scalar invariance is not supported, the scalar models of the HEXACO-60 fit better than in the long versions. In addition, the HEXACO-60 seems to have better measurement invariance than NEO-FFI. For instance, Rollock and Lui (2016) rejected even the assumption of metric invariance in the NEO-FFI comparing Euro-American and Asian samples.

Some authors have argued that scalar invariance is required to compare mean scores across countries or groups (Church et al., 2011; Steinmetz, 2013). This viewpoint, however, virtually rules out the possibility of cross-national mean comparisons, given that no cross-national study using

TABLE 5 Effect sizes (η^2) of age, gender, and SPI factors on HEXACO personality dimensions in each country

	Age						Gender						SPI					
	HH	**EM**	**EX**	**AG**	**CO**	**OP**	**HH**	**EM**	**EX**	**AG**	**CO**	**OP**	**HH**	**EM**	**EX**	**AG**	**CO**	**OP**
Belgium	.021	.003	.000	.033	.004	.002	.025	**.295**	.003	.006	.000	.039	.002	.007	.005	.004	.008	.028
Bosnia H.	.001	.001	.009	.000	.006	.030	.004	.015	.000	.003	.001	.002	.001	.001	.001	.004	.014	**.058**
Catalonia	.031	.023	.022	.027	.011	.002	.036	**.180**	.002	.005	.006	.000	.005	.022	.010	.004	.013	.053
Chile	.043	.007	.012	**.072**	.049	.003	.000	.025	.000	.002	.001	.006	.014	.010	**.107**	.018	**.071**	.026
China	.001	.001	.004	.007	.000	.002	.014	**.105**	.002	.001	.006	.001	.004	.004	.006	.000	.001	.019
Germany	.051	.000	.001	.017	.001	.007	.038	**.230**	.002	.010	.006	.007	.017	.015	.040	.000	.013	**.122**
Hungary	.099	.001	.026	.015	.004	.000	.035	**.174**	.001	.001	.001	.000	.011	.007	.045	.002	.045	.019
Israel	.023	.001	.001	.040	.006	.010	.018	**.192**	.000	.001	.001	.007	.038	**.083**	.019	.001	.053	.010
Italy	.043	.011	.000	.010	.000	.000	**.064**	**.135**	.006	.006	.010	.007	.002	.017	.027	.004	.047	**.063**
Poland	.011	.003	.001	.005	.001	.010	.049	**.224**	.003	.004	.004	.000	.006	.003	.002	.000	.006	.030
Qatar	.034	.005	.000	.010	.002	.002	.000	.053	.010	.004	.001	.001	.002	.018	.003	.006	.036	**.075**
Senegal	.000	.000	.000	.000	.001	.008	.003	.056	.003	.017	.012	.008	.002	.005	.003	.000	.003	.002
Spain	.032	.006	.001	.009	.001	.004	.045	**.164**	.003	.004	.000	.000	.025	.012	.023	.001	.007	**.072**
Switz. (F)	.047	.006	.021	.047	.002	.005	**.058**	**.225**	.003	.000	.032	.000	.023	.041	.035	.003	.003	**.073**
Switz. (G)	.011	.000	.000	.003	.018	.000	.050	**.187**	.001	.004	.000	.015	.010	.012	.025	.000	.015	.029
Togo	.005	.001	.006	.000	.008	.055	.009	**.110**	**.091**	.018	.019	**.063**	.000	**.079**	.001	.009	.033	.002
Tunisia	.012	.005	.001	.003	.002	.002	.005	**.183**	.009	.001	.001	.000	.013	.001	.001	.003	.005	.051
USA	**.140**	.007	.027	.024	.033	.014	**.074**	**.115**	.002	.004	.021	.002	.002	.041	.035	.003	.002	.027

Note: Partial eta squared η^2 equal or above .058 are given in boldface type. $\eta^2 < .0099$ = negligible; $\eta^2 > .01$: small; $\eta^2 \geq .0588$ medium; $\eta^2 \geq .1379$: large effect size (Cohen, 1988).



	Honesty-Humility	Emotionality	Extraversion	Agreeableness	Conscientiousness	Openness to Experience
Belgium	.29	-.25	.00	-.17	**.43**	-.16
Bosnia	.28	-.1	-.26	-.04	-.03	.20
Catalonia	.03	.13	.07	.02	.29	**-.33**
Chile	.25	**-.31**	.17	-.05	.19	-.05
China	-.25	.02	**-.31**	.04	**-.55**	-.08
Germany	.19	-.13	.17	.04	.19	.06
Hungary	.25	-.08	**.36**	-.02	.28	**.42**
Israel	.03	-.10	.19	-.11	.29	-.22
Italy	.14	-.11	-.16	-.18	.10	.02
Poland	-.13	-.3	-.12	.02	.05	-.08
Qatar	-.13	.21	.02	-.09	-.28	**-.56**
Senegal	-.03	.05	.12	.07	-.17	-.08
Spain	.30	.26	.02	.25	.26	.01
Switz (F)	**.42**	-.18	.16	.03	.24	.06
Switz (G)	.20	**-.36**	.28	.07	.05	**.34**
Togo	.12	-.13	.16	**.36**	.27	.05
Tunisia	-.11	.15	.05	-.02	-.14	-.30
USA	-.03	-.25	**-.41**	.21	**.41**	**.33**

FIGURE 2 Standardized *z*-scores of HEXACO personality dimensions by country controlling for age, gender, and SPI. Values exceeding ±.30 are in boldface. Positive and negative signs are marked in different colors [Color figure can be viewed at wileyonlinelibrary.com]

personality instruments has achieved strict scalar invariance (Dong & Dumas, 2020). Other authors argue that scalar invariance does not necessarily prevent meaningful mean-level comparison, and that measuring lack of invariance itself might be a phenomenon of substantive interest (Davidov et al., 2014; McCrae, 2015). Thus, criteria of strict invariance are likely to be too strict to establish or be considered essential for measurement invariance studies. Considering this line of argument, together with the acceptable fit of scalar invariance models in the present study, it is suggested that HEXACO-60 might be more appropriate to conduct mean group comparisons. As a result, comparisons of different sociodemographic group means are sustained on the grounds of cross-national stability of structure.

The current study demonstrates that the HEXACO-60 is a suitable instrument to assess personality dispositions in different countries and languages simultaneously. One limitation of using this short version is that facet-level scales are too short to get a reliable measure (Ashton & Lee, 2009), but this limitation is almost inherent to short versions, the ZKA-PQ/SF (Aluja et al., 2018) being one of the rare exceptions.

4.2 | Gender and age

Lee and Ashton (2020) analyzed the gender differences in the HEXACO-PI-R across 48 countries. They reported a large difference in Emotionality and a medium effect size

for Honesty-Humility. In both traits, women scored higher. However, the fact that they applied the English version of the HEXACO-PI-R in all countries casts some doubts on their results. The present study replicates this pattern of gender differences using the mother-tongue version of the HEXACO-PI-R in every country. As a result, we can firmly establish that women score higher than men in Emotionality and, to a lesser extent, in Honesty-Humility across countries, with no remarkable differences between genders in the remaining traits. It is important to note that, in the other four factors, some gender differences have been observed at the facet-level. Costa et al. (2001) and Lee and Ashton (2020) reported differences in some specific facets that eventually balanced out to produce no difference at the trait level. For instance, this pattern has been observed with the Extraversion trait. Women score higher on warmth and similar facets, and men higher on Sensation Seeking.

By comparing 18 countries from four continents, we were able to test the Gender-Equality-Personality Paradox. As expected, we observed that gender differences were larger in European countries and the USA. In fact, when only European countries and USA were considered, the average effect size (partial η^2) for Emotionality increased from .18 to .22. Lee and Ashton (2020) suggested that a possible explanation is the presence of national differences in reliability coefficients. The fact that only small differences are observed between women and men in the reliability coefficients in the Non-European countries would appear to undermine this alternative.

More interestingly, Lee and Ashton (2020) suggested that societal characteristics play the most relevant role in accounting for observed gender differences, meaning that the Gender-Equality-Personality Paradox could be due to cultural factors. This conclusion emerges from the comparison of different ethnic groups within countries, as well as the fact that large gender differences are observed only for the Emotionality trait (traditionally viewed as more feminine within countries) and not for the other five factors. No information about ethnic origin was gathered in the present study within countries, so we cannot test the first argument. However, the present study closely replicates the lack of gender differences on the other five factors, so the pattern of results is congruent with the arguments raised by Lee and Ashton (2020).

Comparing the results reported for HEXACO and the pattern of gender differences at the dimension level for FFM, we can draw some interesting conclusions. In both models, Neuroticism/Emotionality presents the largest gender difference. Since HEXACO emotionality and FFM neuroticism share mainly a common association with anxiety, providing some similarity between the two dimensions, it is supported that the Anxiety component is the main candidate to account for the gender differences on Neuroticism/Emotionality. On the other hand, the present study also replicates the lack of gender differences on the Agreeableness factor of HEXACO (Lee & Ashton, 2020). This pattern could shed some more light on the factors behind gender differences by comparing this lack of differences with the well-established gender differences on the Agreeableness factor in the FFM framework (Costa et al., 2001). The location of the Agreeableness factor is not the same in the sixth factor space as in the FFM. In fact, some authors found that the Agreeableness dimension of the FFM is more related to HEXACO Emotionality than to HEXACO Agreeableness (Ludeke et al., 2019). This difference is better observed at the facet-level. Agreeableness in the HEXACO model includes anger (which is a facet of Neuroticism in the NEO-PI-R) and excludes sentimentality (which is defined as empathic concern and emotional attachment, and is located in Emotionality in the HEXACO-PI-R; Ashton & Lee, 2007). By comparing patterns of gender differences in the HEXACO and FFM, it can be suggested that the main personality differences between genders on Agreeableness may be due to empathic altruism (Emotionality), and reciprocal altruism (considering the medium effect size of the Honesty-Humility factor).

With regard to age, the present study replicates in different countries the upward age trend in Honesty-Humility (Ashton & Lee, 2016), which lends support to the notion that tendency for gains from exploiting others (relative to cooperating with others) is potentially higher at the beginning of adulthood—a period when competition for mates, status, and resources is especially intense—as compared with later adulthood. It should be remarked that a negligible relationship between age and the other five traits is observed. Note that this negligible effect is reproduced across most of the 18 different countries, and in spite of the large variability in age in almost every country. In fact, the procedure to collect participants explicitly aimed to assess a wide age range. There are two alternative explanations for this lack of relationships with age. The first one is that no facet was analyzed in the present study and some age trends are best observed at facet-level (Ashton & Lee, 2016; Soto et al., 2011); the second one is that Roberts and Mroczek (2008) reported the largest change in the 20–40 age interval, and most of the samples analyzed in the present study presented an age mean higher than 40 years. Two exceptions, namely China and Togo, are relevant, but the low standard deviation of the age observed in these countries could preclude finding an association between age and personality traits.

4.3 | Social position

The results of the present study suggest that personality traits are relevant to understand individual differences on social position. Although the effect sizes observed are small, the tendency is clear for five out of six factors.

Furthermore, the tendency is generally replicated across genders. A profile of high scores on Honesty-Humility, Extraversion, Conscientiousness, Openness to Experience, and low scores on Emotionality increases the likelihood of achieving a higher social position. The role of Conscientiousness and Openness is not strange given the relationship of both traits with educational achievement (e.g., Moshagen et al., 2019), and Conscientiousness with work achievement (Schmidt et al., 2016). Note that the relationships between the FFM and social position are replicated (Bucciol et al., 2015).

Extraversion and Neuroticism have been demonstrated to play a role in the occupational status and career success achieved (Judge et al., 2002). This role may be related to leadership qualities, which can be accounted for in part by individual differences on Extraversion and Neuroticism (Judge et al., 2002). Another explanation for the lack of direct relationship between academic and job outcomes, but the existence of a possible association between both traits and Social Position, is the presence of a non-linear relationship or the need to consider the interaction between both traits (Judge & Erez, 2007).

Unexpectedly, higher scores on Honesty-Humility are associated with high social position, rather than low social position. People who score high on Honesty-Humility generally shun social hierarchies and put themselves after others, but also tend to gain better social position according to the present results. This trend is significantly greater in men, which might suggest that the effect size could be higher if only men were considered. A possible reason to account for this piece of data is related to work conditions, as concern for others could be more valued in the current context, which favors teamwork in job settings.

On the other hand, a null relationship between Agreeableness and social position is reported. Considering that Honesty-Humility accounts for some significant variance on social status, it could be surmised that the usual lack of association between Agreeableness and economic outcomes is due to personality dispositions to concern about others related with social status and economic variables being better covered by Honesty-Humility than by Agreeableness. Hence, Sincerity, Fairness, Greed-Avoidance and Modesty seem to be more important to achieve social status than Forgiveness, Gentleness, Flexibility and Patience (Ashton & Lee, 2007).

A final remark should be made about the future potential of the Honesty-Humility trait. Since higher scores on this trait are associated with a disposition to positive concern about others, higher social position and liberal values (promotion of both individualism and equality; Kajonius & Dåderman, 2014), people with high scores on this trait are in a good position to positively influence the well-being of individuals and society.

4.4 | Country differences

Allik et al. (2017) analyzed the mean profiles of the NEO-PI-R across 62 different countries and observed that differences across countries on personality disposition are very small. The present study is in agreement with this conclusion. Only 13 out of 108 possible comparisons were higher than a 0.3 standard deviation. The present results therefore suggest no sharp differences in personality across countries in the HEXACO personality factor space. However, and contrary to other studies (Allik & McCrae, 2004), no pattern of similarity based on geographical proximity is observed. It is important to note that the lack of association between country and personality has been observed after controlling the role of age, gender, and SPI. Thus, the present paper emphasizes the need to control for these variables when comparing mean profiles of countries.

It should be stated that the lack of relevant differences seems to contradict Structural Equation Modeling analysis (SEM). However, note that SEM is based on the fit of 18 countries simultaneously. As has been commented above, it is quite unrealistic to expect similar fit at the mean-levels. On the other hand, those 13 mean-differences (and other trait comparisons close to the cut-off point of .30) could explain the unacceptable fit of the scalar models quite well. Congruent with this interpretation, the trait with most different means is the trait with the worst fit of the scalar model (Openness to Experience). Standardized comparisons point more to a lack of differences across countries and, therefore, support the notion that requirements for scalar invariance are quite restrictive and not very informative (Davidov et al., 2014; McCrae, 2015). As the present results show, only a few differences across countries produce an unacceptable fit on those models.

The results of the present study support the Similarities Hypothesis (Kajonius & MacGiolla, 2017) concluding that the relationship between a country and an individual's personality traits is small. One challenge to this kind of research is that the way the instrument was translated may make it difficult to separate the effect of the country from any language effects. Kajonius and MacGiolla (2017) reported that personality models replicated across countries, thus allowing for comparison of traits across countries. The present study replicates this pattern since the HEXACO-60 structure is largely invariant across countries. Similarly to Kajonius and MacGiolla (2017), the present study also found that within-country sex differences for the six personality traits showed similar patterns across countries and finally, interindividual differences are much larger than the cultural differences, which appear to be very small or even negligible and difficult to predict, being different according to the inventory used (Rossier et al., 2016). This lack of cultural differences is also congruent with previous studies revealing that genetic

influences remain invariant across diverse nations (Yamagata et al., 2006), and with the fact that HEXACO shows the same pattern as other personality models in genetic studies: Equal relevance of genetic and non-shared components, and negligible estimation of the relevance of shared environment across the six factors (Kandler et al., 2019).

4.5 | Limitations and final conclusions

The present study presents a series of limitations. The first one is that most of the countries studied are European. It would be interesting to replicate the present results (especially with regard to scalar structure and social position) in a wider sample of non-western countries. This is strongly recommended since non-western countries may present low reliability coefficients and poorer structure replicability due to difficulties in comprehension or motivation, biased response styles within countries, or low education levels (Laajaj et al., 2019). Secondly, some samples could not be considered to be representative of the corresponding country. In these countries, this study should also be replicated with larger and more representative samples. Nevertheless, the sizes of the samples may be considered appropriate for the aims of the study since only two samples (Israel and Switzerland [French]) do not meet the requirement of at least 150 participants by gender (Lee & Ashton, 2020), and the procedure to gather data assures a balance of gender and age-range distributions. Thirdly, the cross-sectional nature of the data could bias the results and conclusions with regard to the age variable (Roberts & Mroczek, 2008).

We may also assume that the relatively high mean age (about 40 in most countries) makes the social position distribution sufficiently representative. However, it is possible that associations between personality and social position reflect some response styles. For example, perhaps people of lower socioeconomic status tend to give less socially desirable responses or somewhat less coherent responses. In this way, future studies should compare the stability of the HEXACO personality structure across social position distribution (Bizumic, & Monaghan, 2020). Finally, we should bear in mind that since strict scalar invariance was not supported, mean comparisons should be treated with caution.

Summing up, the present study clearly supports the use of the HEXACO-60 across the world in research and applied settings where pressure of time prevents the application of long personality questionnaires. The administration time for the HEXACO-60 is relatively brief since it requires 10 min at most to be completed. It should also be remarked that previous literature suggests that the HEXACO model may be as useful and predictive as the FFM (e.g., Anglim et al., 2020; Ashton & Lee, 2007), or even more predictive in some contexts (e.g., Ashton & Lee, 2008; Muris et al., 2017; Pletzer et al., 2019). Naturally, this greater predictive power of the HEXACO model is retained in the HEXACO-60 since it reliably assesses the Honesty-Humility trait. With regard to sociodemographic variables, previous gender effects are replicated with the HEXACO-60. The main differences observed between genders are for Emotionality and Honesty-Humility, and the Gender-Equality-Personality Paradox is strongly replicated, since the largest differences are observed in European countries. There were no strong effects of age and country on personality differences.

Finally, social position is related with higher scores on Honesty-Humility, Extraversion, Conscientiousness and Openness, and lower scores on Emotionality. Note that this pattern of results is observed across a variety of countries that clearly differ on political and economic systems, welfare and other political, economic and social indices. It confirms that personality may play a small (but relevant) role in the observed differences on economic variables, irrespective of the specific country analyzed. The present paper therefore highlights the need to consider these psychological variables in actions to prevent and change, for instance, poverty and social deprivation.

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ETHICS STATEMENT

The handling of the information was carried out in accordance with Data Protection and Guarantee of Digital Rights, Helsinki Declaration, in the Council of Europe Convention on Human Rights.

AUTHOR CONTRIBUTIONS

Luis F. García: Writing-Original draft preparation and Data-Analysis; Anton Aluja and Jérôme Rossier: Conceptualization, Writing-Original draft preparation, and Data-Analysis; Fritz Ostendorf, Joseph Glicksohn and Adam W. Stivers: Writing-Original draft preparation. All co-authors: Gathering data, edit and review the original draft.

ORCID

Luis F. García https://orcid.org/0000-0001-6330-0535
Jérôme Rossier https://orcid.org/0000-0002-9924-3672
Kokou A. Atitsogbe https://orcid.org/0000-0003-3469-1738

REFERENCES

Allik, J., Church, A. T., Ortiz, F. A., Rossier, J., Hřebíčková, M., de Fruyt, F., Realo, A., & McCrae, R. R. (2017). Mean profiles of the NEO personality inventory. *Journal of Cross-national Psychology*, *48*, 402–420. https://doi.org/10.1177/0022022117692100

Allik, J., & McCrae, R. R. (2004). Toward a geography of personality traits: Patterns of profiles across 36 cultures. *Journal of Cross-national Psychology*, *35*, 13–28. https://doi.org/10.1177/0022022103260382

Aluja, A., García, O., Rossier, J., & García, L. F. (2005). Comparison of the NEO-FFI, the NEO-FFI-R and an alternative short version of the NEO-PI-R (NEO-60) in Swiss and Spanish samples. *Personality and Individual Differences*, *38*, 591–604. https://doi.org/10.1016/j.paid.2004.05.014

Aluja, A., Lucas, I., Blanch, A., García, O., & García, L. F. (2018). The Zuckerman-Kuhlman-Aluja personality questionnaire shortened form (ZKA-PQ/SF). *Personality and Individual Differences*, *134*, 174–181. https://doi.org/10.1016/j.paid.2018.06.015

Aluja, A., Rossier, J., Oumar, B., García, L. F., Bellaj, T., Ostendorf, F., Ruch, W., Wang, W., Kövi, Z., Ścigała, D., Čekrlija, Đ., Stivers, A. W., Di Blas, L., Valdivia, M., Ben Jemaa, S., Atitsogbe, K. A., Hansenne, M., & Glicksohn, J. (2020). Multicultural validation of the Zuckerman–Kuhlman–Aluja personality questionnaire shortened form (ZKA-PQ/SF) across 18 countries. *Assessment*, *27*(4), 728–748. https://doi.org/10.1177/1073191119831770

Aluja, A., Sayans-Jiménez, P., García, L. F., & Gutierrez, F. (2020, October 15). Location of international classification of diseases—11th revision and diagnostic and statistical manual of mental disorders, fifth edition, dimensional trait models in the alternative five-factor personality space. *Personality Disorders: Theory, Research, and Treatment*, *12*, 127–139. https://doi.org/10.1037/per0000460

Anglim, J., Horwood, S., Smillie, L. D., Marrero, R. J., & Wood, J. K. (2020). Predicting psychological and subjective well-being from personality: A meta-analysis. *Psychological Bulletin*, *146*, 279–323. https://doi.org/10.1037/bul0000226

Ashton, M. C., & Lee, K. (2001). A theoretical basis for the major dimensions of personality. *European Journal of Personality*, *15*, 327–353. https://doi.org/10.1002/per.417

Ashton, M. C., & Lee, K. (2005). Honesty-humility, the Big Five and the five-factor model. *Journal of Personality*, *73*, 1321–1353. https://doi.org/10.1111/j.1467-6494.2005.00351.x

Ashton, M. C., & Lee, K. (2007). Empirical, theoretical, and practical advantages of the HEXACO model of personality structure. *Personality and Social Psychology Review*, *11*, 150–166. https://doi.org/10.1177/1088868306294907

Ashton, M. C., & Lee, K. (2008). The prediction of honesty-humility-related criteria by the HEXACO and five-factor models of personality. *Journal of Research in Personality*, *42*, 1216–1228. https://doi.org/10.1016/j.jrp.2008.03.006

Ashton, M. C., & Lee, K. (2009). The HEXACO-60: A short measure of the major dimensions of personality. *Journal of Personality Assessment*, *91*, 340–345. https://doi.org/10.1080/00223890902935878

Ashton, M. C., & Lee, K. (2016). Age trends in HEXACO-PI-R self-reports. *Journal of Research in Personality*, *64*, 102–111. https://doi.org/10.1016/j.jrp.2016.08.008

Ashton, M. C., & Lee, K. (2020). Objections to the HEXACO model of personality structure—And why those objections fail. *European Journal of Personality*, *34*(4), 492–510. https://doi.org/10.1002/per.2242

Ashton, M. C., Lee, K., De Vries, R. E., Hendrickse, J., & Born, M. P. (2012). The maladaptive personality traits of the personality inventory for DSM-5 (PID-5) in relation to the HEXACO personality factors and schizotypy/dissociation. *Journal of Personality Disorders*, *26*, 641–659. https://doi.org/10.1521/pedi.2012.26.5.641

Ashton, M. C., Lee, K., Perugini, M., Szarota, P., de Vries, R. E., Di Blas, L., Boies, K., & De Raad, B. (2004). A six-factor structure of personality-descriptive adjectives: Solutions from psycholexical studies in seven languages. *Journal of Personality and Social Psychology*, *86*(2), 356–366. https://doi.org/10.1037/0022-3514.86.2.356

Ashton, M. C., Lee, K., & Son, C. (2000). Honesty as the sixth factor of personality: Correlations with Machiavellianism, primary psychopathy, and social adroitness. *European Journal of Personality*, *14*, 359–369. https://doi.org/10.1002/1099-0984(200007/08)14:4<359::AID-PER382>3.0.CO;2-Y

Bizumic, B., & Monaghan, C. (2020). The HEXACO model: Clinical extensions and universality. *European Journal of Personality*, *34*(4), 511–512. https://doi.org/10.1002/per.2284

Blanch, A., & Aluja, A. (2016). Text mining a self-report back-translation. *Psychological Assessment*, *28*(6), 750–764. https://doi.org/10.1037/pas0000213

Booth, T., & Hughes, D. J. (2014). Exploratory structural equation modeling of personality data. *Assessment*, *21*(3), 260–271. https://doi.org/10.1177/1073191114528029

Bucciol, A., Cavasso, B., & Zarri, L. (2015). Social status and personality traits. *Journal of Economic Psychology*, *51*, 245–260. https://doi.org/10.1016/j.joep.2015.10.002

Byrne, B. M., & van de Vijver, F. J. (2010). Testing for measurement and structural equivalence in large-scale cross-national studies: Addressing the issue of nonequivalence. *International Journal of Testing*, *10*, 107–132. https://doi.org/10.1080/15305051003637306

Church, A. T., Alvarez, J. M., Mai, N. T. Q., French, B. F., Katigbak, M. S., & Ortiz, F. A. (2011). Are cross-national comparisons of personality profiles meaningful? Differential item and facet functioning in the revised NEO personality inventory. *Journal of Personality and Social Psychology*, *101*, 1068–1089. https://doi.org/10.1037/a0025290

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Academic Press.

Connolly, F. F., Goossen, M., & Hjerm, M. (2020). Does gender equality cause gender differences in values? Reassessing the gender-equality-personality paradox. *Sex Roles: A Journal of Research*, *83*(1–2), 101–113. https://doi.org/10.1007/s11199-019-01097-x

Costa, P. T., Terracciano, A., & McCrae, R. R. (2001). Gender differences in personality traits across cultures: Robust and surprising findings. *Journal of Personality and Social Psychology*, *81*, 322–331. https://doi.org/10.1037/0022-3514.81.2.322

Davidov, E., Meuleman, B., Cieciuch, J., Schmidt, P., & Billiet, J. (2014). Measurement equivalence in cross-national research. *Annual Review of Sociology*, *40*, 55–75. https://doi.org/10.1146/annurev-soc-071913-043137

De Raad, B., Barelds, D. P. H., Levert, E., Ostendorf, F., Mlačić, B., Blas, L. D., Hřebíčková, M., Szirmák, Z., Szarota, P., Perugini, M., Church, A. T., & Katigbak, M. S. (2010). Only three factors of personality description are fully replicable across languages: A comparison of 14 trait taxonomies. *Journal of Personality and Social Psychology*, *98*, 160–173. https://doi.org/10.1037/a0017184

De Vries, A., De Vries, R. E., & Born, M. P. (2011). Broad versus narrow traits: Conscientiousness and Honesty-Humility as predictors of academic criteria. *European Journal of Personality*, *25*, 336–348. https://doi.org/10.1002/per.795

Dong, Y., & Dumas, D. (2020). Are personality measures valid for different populations? A systematic review of measurement invariance across cultures, gender, and age. *Personality and Individual Differences*, *160*(1), 1–23. https://doi.org/10.1016/j.paid.2020.109956

Egan, V., Deary, I., & Austin, E. (2000). The NEO-FFI: Emerging British norms and an item-level analysis suggest N, A and C are more reliable than O and E. *Personality and Individual Differences*, *29*, 907–920. https://doi.org/10.1016/S0191-8869(99)00242-1

Gaughan, E. T., Miller, J. D., & Lynam, D. R. (2012). Examining the utility of general models of personality in the study of psychopathy: A comparison of the HEXACO-PI-R and NEO PI-R. *Journal of Personality Disorders*, *26*, 513–523. https://doi.org/10.1521/pedi.2012.26.4.513

Haslbeck, J. M., & Waldorp, L. J. (2020). mgm: Structure estimation for time-varying mixed graphical models in high-dimensional data. *Journal of Statistical Software*, *93*, 1–46. https://doi.org/10.18637/jss.v093.i08

Hollingshead, A. B. (1957). *Two factor index of social position*. Privately printed.

Hollingshead, A. B., & Redlich, F. C. (1958). *Social class and mental illness: A community study*. John Wiley & Sons.

Ion, A., Iliescu, D., Aldhafri, S., Rana, N., Ratanadilok, K., Widyanti, A., & Nedelcea, C. (2017). A cross-national analysis of personality structure through the lens of the HEXACO model. *Journal of Personality Assessment*, *99*, 25–34. https://doi.org/10.1080/00223891.2016.1187155

Johnson, M. K., Rowatt, W. C., & Perrini, L. (2011). A new trait on the market: Honesty Humility as a unique predictor of job performance ratings. *Personality and Individual Differences*, *50*, 857–862. https://doi.org/10.1016/j.paid.2011.01.011

Jones, D. N., & Paulhus, D. L. (2014). Introducing the short dark triad (SD3): A brief measure of dark personality traits. *Assessment*, *21*, 28–41. https://doi.org/10.1177/1073191113514105

Judge, T. A., Bono, J. E., Ilies, R., & Gerhardt, M. W. (2002). Personality and leadership: A qualitative and quantitative review. *Journal of Applied Psychology*, *87*(4), 765–780. https://doi.org/10.1037/0021-9010.87.4.765

Judge, T. A., & Erez, A. (2007). Interaction and intersection: The constellation of emotional stability and extraversion in predicting performance. *Personnel Psychology*, *60*, 573–596. https://doi.org/10.1111/j.1744-6570.2007.00084.x

Kajonius, P. J., & Dåderman, A. M. (2014). Exploring the relationship between honesty-humility, the Big Five, and liberal values in Swedish students. *Europe's Journal of Psychology*, *10*(1), 104–117. https://doi.org/10.5964/ejop.v10i1.672

Kajonius, P., & MacGiolla, E. (2017). Personality traits across countries: Support for similarities rather than differences. *PLoS ONE*, *12*, e0179646. https://doi.org/10.1371/journal.pone.0179646

Kandler, C., Richter, J., & Zapko-Willmes, A. (2019). The nature and nurture of HEXACO personality trait differences: An extended twin family study. *Zeitschrift für Psychologie*, *227*, 195–206. https://doi.org/10.1027/2151-2604/a000378

Kawamoto, T. (2016). Cross-sectional age differences in the HEXACO personality: Results from a Japanese sample. *Journal of Research in Personality*, *62*, 1–5. https://doi.org/10.1016/j.jrp.2016.03.001

Laajaj, R., Macours, K., Hernandez, D. A., Arias, O., Gosling, S. D., Potter, J., Rubio-Codina, M., & Vakis, R. (2019). Challenges to capture the Big Five personality traits in non-WEIRD populations. *Science Advances*, *5*, eaaw5226. https://doi.org/10.1126/sciadv.aaw5226

Lee, K., & Ashton, M. C. (2004). Psychometric properties of the HEXACO personality inventory. *Multivariate Behavioral Research*, *39*(2), 329–358. https://doi.org/10.1207/s15327906mbr3902_8

Lee, K., & Ashton, M. C. (2006). Further assessment of the HEXACO personality inventory: Two new facet scales and an observer report form. *Psychological Assessment*, *18*, 182–191. https://doi.org/10.1037/1040-3590.18.2.182

Lee, K., & Ashton, M. C. (2020). Sex differences in HEXACO personality characteristics across countries and ethnicities. *Journal of Personality*, *88*, 1075–1090. https://doi.org/10.1111/jopy.12551

Lorenzo-Seva, U., & Ferrando, P. J. (2013). FACTOR 9.2 a comprehensive program for fitting exploratory and semiconfirmatory factor analysis and IRT models. *Applied Psychological Measurement*, *37*, 497–498. https://doi.org/10.1177/0146621613487794

Lorenzo-Seva, U., & ten Berge, J. M. F. (2006). Tucker's congruence coefficient as a meaningful index of factor similarity. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences*, *2*(2), 57–64. https://doi.org/10.1027/1614-2241.2.2.57

Ludeke, S. G., Bainbridge, T. F., Liu, J., Zhao, K., Smillie, L. D., & Zettler, I. (2019). Using the big five aspect scales to translate between the HEXACO and Big Five personality models. *Journal of Personality*, *87*(5), 1025–1038. https://doi.org/10.1111/jopy.12453

MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods*, *4*, 84–99. https://doi.org/10.1037/1082-989X.4.1.84

Marsh, H. W. (2007). Application of confirmatory factor analysis and structural equation modeling in sport and exercise psychology. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of sport psychology* (pp. 774–798). John Wiley & Sons Inc.

Matthews, G., Deary, I. J., & Whiteman, M. C. (2009). *Personality traits* (3rd ed.). Cambridge University Press.

McCrae, R. R. (2015). A more nuanced view of reliability: Specificity in the trait hierarchy. *Personality and Social Psychology Review*, *19*(2), 97–112. https://doi.org/10.1177/1088868314541857

McGrath, D. S., Neilson, T., Lee, K., Rash, C. L., & Rad, M. (2018). Associations between the HEXACO model of personality and gambling involvement, motivations to gamble, and gambling severity in young adult gamblers. *Journal of Behavioral Addictions*, *7*, 392–400. https://doi.org/10.1556/2006.7.2018.29

Moshagen, M., Thielmann, I., Hilbig, B. E., & Zettler, I. (2019). Meta-analytic investigations of the HEXACO Personality Inventory (-Revised): Reliability generalization, self–observer agreement, intercorrelations, and relations to demographic variables. *Zeitschrift für Psychologie*, *227*(3), 186–194. https://doi.org/10.1027/2151-2604/a000377

Muris, P., Merckelbach, H., Otgaar, H., & Meijer, E. (2017). The malevolent side of human nature: A meta-analysis and critical review of the literature on the dark triad (narcissism, Machiavellianism, and psychopathy). *Perspectives on Psychological Science*, *12*, 183–204. https://doi.org/10.1177/1745691616666070

Pletzer, J. L., Bentvelzen, M., Oostrom, J. K., & de Vries, R. E. (2019). A meta-analysis of the relations between personality and workplace deviance: Big Five versus HEXACO. *Journal of Vocational Behavior*, *112*, 369–383. https://doi.org/10.1016/j.jvb.2019.04.004

Roberts, B. W., & Mroczek, D. (2008). Personality trait change in adulthood. *Current Directions in Psychological Science*, *17*(1), 31–35. https://doi.org/10.1111/j.1467-8721.2008.00543.x

Rollock, D., & Lui, P. P. (2016). Measurement invariance and the five-factor model of personality: Asian international and euro American cultural groups. *Assessment*, *23*, 571–587. https://doi.org/10.1177/1073191115590854

Roncero, M., Fornés, G., García-Soriano, G., & Belloch, A. (2014). Modelo de personalidad HEXACO: Relaciones con psicopatología emocional en una muestra española [HEXACO personality model: Relationships with emotional psychopathology in a Spanish sample]. *Revista de Psicopatología y Psicología Clínica*, *19*(1), 1. https://doi.org/10.5944/rppc.vol.19.num.1.2014.12929

Rossier, J., Aluja, A., Blanch, A., Barry, O., Hansenne, M., Carvalho, A. F., Valdivia, M., Wang, W., Desrichard, O., Hyphantis, T., Suranyi, Z., Glicksohn, J., De Pascalis, V., León–Mayer, E., Piskunov, A., Stivers, A., Morizot, J., Ostendorf, F., Čekrlija, Đ., … Karagonlar, G. (2016). Cross-cultural generalizability of the alternative five-factor model using the Zuckerman–Kuhlman–Aluja personality questionnaire. *European Journal of Personality*, *30*, 139–157. https://doi.org/10.1002/per.2045

Rossier, J., & Duarte, M. E. (2019). Testing and assessment in an international context: Cross-and multi-cultural issues. In J. Athanasou & H. Perera (Eds.), *International handbook of career guidance* (2nd ed., pp. 613–637). Springer. https://doi.org/10.1007/978-3-030-25153-6_28

Schmidt, F. L., Oh, I. & Shaffer, J. A. (2016). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 100 years of research findings. Fox School of Business Research Paper.

Schmitt, D. P., Realo, A., Voracek, M., & Allik, J. (2008). Why can't a man be more like a woman? Sex differences in Big Five personality traits across 55 cultures. *Journal of Personality and Social Psychology*, *94*, 168–182. https://doi.org/10.1037/0022-3514.94.1.168

Soto, C. J., John, O. P., Gosling, S. D., & Potter, J. (2011). Age differences in personality traits from 10 to 65: Big Five dimensions and facets in a large cross-sectional sample. *Journal of Personality and Social Psychology*, *100*, 330–348. https://doi.org/10.1037/a0021717

Steinmetz, H. (2013). Analyzing observed composite differences across groups: Is partial measurement invariance enough? *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences*, *9*, 1–12. https://doi.org/10.1027/1614-2241/a000049

Thalmayer, A. G., Saucier, G., & Eigenhuis, A. (2011). Comparative validity of brief to medium-length Big Five and big six personality questionnaires. *Psychological Assessment*, *23*, 995–1009. https://doi.org/10.1037/a0024165

Thielmann, I., Akrami, N., Babarović, T., Belloch, A., Bergh, R., Chirumbolo, A., Čolović, P., de Vries, R. E., Dostál, D., Egorova, M., Gnisci, A., Heydasch, T., Hilbig, B. E., Hsu, K.-Y., Izdebski, P., Leone, L., Marcus, B., Međedović, J., Nagy, J., … Lee, K. (2019). The HEXACO-100 across 16 languages: A large-scale test of measurement invariance. *Journal of Personality Assessment*, *102*, 714–726. https://doi.org/10.1080/00223891.2019.1614011

Thielmann, I., Spadaro, G., & Balliet, D. (2020). Personality and prosocial behavior: A theoretical framework and meta-analysis. *Psychological Bulletin*, *146*(1), 30–90. https://doi.org/10.1037/bul0000217

Yamagata, S., Suzuki, A., Ando, J., Ono, Y., Kijima, N., Yoshimura, K., Ostendorf, F., Angleitner, A., Riemann, R., Spinath, F. M., Livesley, W. J., & Jang, K. L. (2006). Is the genetic structure of human personality universal? A cross-national twin study from North America, Europe, and Asia. *Journal of Personality and Social Psychology*, *90*, 987–998. https://doi.org/10.1037/0022-3514.90.6.987

Yoo, T. Y., Lee, K., & Ashton, M. C. (2004). Psychometric properties of the Korean version of the HEXACO personality inventory. *Korean Journal of Social and Personality Psychology*, *18*, 61–75. https://doi.org/10.1177/0013164404267277

Zettler, I., Thielmann, I., Hilbig, B. E., & Moshagen, M. (2020). The nomological net of the HEXACO model of personality: A large-scale meta-analytic investigation. *Perspectives on Psychological Science*, *15*(3), 723–760. https://doi.org/10.1177/1745691619895036

Zhao, K., & Smillie, L. D. (2015). The role of interpersonal traits in social decision making: Exploring sources of behavioral heterogeneity in economic games. *Personality and Social Psychology Review*, *19*(3), 277–302. https://doi.org/10.1177/1088868314553709

SUPPORTING INFORMATION

Additional Supporting Information may be found online in the Supporting Information section.

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