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Adolescent self-construal across cultures: Measurement invariance of the Aspects of Identity Questionnaire-IV in 30 countries

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Abstract

Despite the critical role of culture in understanding adolescent self and identity, there is a lack of cross-culturally validated measures of adolescent self-construal. The present study evaluated cross-national measurement invariance of the Aspects of Identity Questionnaire-IV (AIQ-IV), assessing four dimensions of self-construal: personal, relational, public, and collective. The sample included 16,795 adolescents aged 14–19 years from 30 countries across four continents. The four-factor structure of the AIQ-IV obtained using exploratory structural equation modeling (ESEM) was supported in the vast majority of countries. Exact invariance testing using multi-group ESEM supported configural invariance, indicating that the overall structure of the AIQ-IV was similar

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across countries. Full scalar invariance was supported only on a subset of countries (i.e., when tests were conducted using European countries grouped by UN geographical regions). An alignment approach provided evidence for the approximate invariance of the ESEM model, with 15.6% of parameters showing noninvariance and allowing for comparison of latent means. The largest number of noninvariant parameters was evident in Asian countries, with items assessing collective-interdependent aspects of identity showing the most variation across countries. A comparison of mean levels of identity orientations across countries revealed that culture-level dimensions of collectivism–individualism do not translate simply into individual-level dimensions of self-construal.

KEYWORDS
adolescence, culture, identity, measurement invariance, self, self-construal

INTRODUCTION

Over the past several decades, research on adolescent identity has predominantly focused on identity processes, aiming to elucidate the dynamics of identity development in adolescence (e.g., Branje et al., 2021). This line of research has been enormously fruitful and has resulted in several influential identity formation models validated in different cultural contexts (e.g., Crocetti, 2017). In contrast, there has been a dearth of studies, especially cross-national ones, in the field of identity content (what identity is; that is, which self-attributes are used to define identity) (McLean et al., 2016). This process/content imbalance and a lack of cross-national studies of identity content hinder a more comprehensive understanding of adolescent identity for at least two reasons. First, both processes and content are key to identity formation—an essential developmental task in adolescence. As argued by Galliher et al. (2017), investigating identity processes without knowing *what* is developing leads to a fragmented understanding of identity because it ignores the role of cultural, historical, and contextual factors in identity development. Furthermore, Galliher and colleagues call for a developmental approach to identity content as the value placed on different aspects of identity changes across the lifespan. For example, the transition into adolescence is marked by the increasing importance of peer context for the relational self, with self-descriptions becoming more differentiated as adolescents experience an increasing range of social contexts and develop the capacity for abstract thinking (Van der Aar et al., 2018). Second, identity content, no matter how conceptualized—via broader dimensions of self-construal or specific domains such as gender roles, ethnicity, religion, friendships, and romance—is culturally grounded (Galliher et al., 2017). Despite this recognition, a cross-national perspective on identity content in adolescence remains understudied. The present study, incorporating 30 countries, aims to contribute to the cross-national understanding of identity content in adolescence by evaluating the cross-national validity of the Aspects of Identity Questionnaire-IV (AIQ-IV), a measure of self-construal developed within the tetrapartite model of the self (Cheek & Cheek, 2018).

The tetrapartite model of the self

The tetrapartite model of the self (Cheek & Cheek, 2018) is one of few models in the field of identity that focuses on the content. Within the tetrapartite model of the self, the conceptions of self and identity content are studied through identity orientations, which refer to "the relative importance or value that individuals place on various identity attributes when constructing their self-definition" (Cheek & Cheek, 2018, p. 467).

The model distinguishes between four broad identity orientations or selves: personal (individual), relational, public (social), and collective. *Personal identity orientation* captures attributes that make a person feel unique and distinct from others, such as personal values and goals, emotions, and feelings. This identity orientation refers to the relative importance of the inner sense of self, resembling independent self-construal (Cheek & Cheek, 2020; Markus & Kitayama, 2010) and individual self (Sedikides et al., 2011). The three remaining identity orientations represent interpersonal or social aspects of the self and reflect interdependent self-construal (Cheek & Cheek, 2020). *Relational identity orientation* refers to the relative importance of close relationships and dyadic attachments (e.g., with a close friend or a romantic partner) when constructing self-definition. In contrast, *collective identity orientation* captures the relative value of collectives, groups, and communal bonds in the process of forming an identity, including religion, language, ethnic background, and community. Relational identity orientation overlaps with constructs of relational self (Sedikides et al., 2011) and relational-interdependent self-construal (Cross et al., 2000), whereas collective identity orientation is similar to collective self (Sedikides et al., 2011) and collective-interdependent self-construal (Cross, 2009). Finally, *public identity orientation* covers attributes that include one's social reputation, popularity, physical appearance, and public image.

The Aspects of Identity Questionnaire-IV (AIQ-IV)

The Aspects of Identity Questionnaire-IV (AIQ-IV; Cheek et al., 2002) is the latest version of the questionnaire

developed within the tetrapartite model of the self to assess four identity orientations (for a historical overview of the AIQ, see Cheek & Cheek, 2018). The AIQ-IV has one key advantage over many other measures of self-construal and the content of identity: it taps all four major aspects of the self—personal, relational, collective, and public—discussed within various models of self (e.g., Kashima et al., 2011). Some measures are narrowly focused on assessing only a single aspect of self-construal, such as close relationships (e.g., the Relational-Interdependent Self-Construal Scale; Cross et al., 2000) or group membership (e.g., the Collective-Interdependent Self-Construal Scale; Gabriel & Gardner, 1999), whereas others do not differentiate between different dimensions of interdependent self-construal (e.g., the Self-Construal Scale, SCS; Singelis, 1994) or omit the public aspect of the self (e.g., the Relational, Individual, and Collective Self-Aspects Scale; Kashima & Hardie, 2000). Another advantage of this questionnaire is its ease of use, making it suitable for use with adolescents. Participants need to rate the importance of various personal attributes (e.g., "My dreams and imagination") and social attributes (e.g., "Being a good friend to those I really care about") to their sense of self. Finally, the use of clear and simple item wording eases the translation of the AIQ-IV to other languages. Its breadth of self-attributes, ease of use, and straightforward item wording make the AIQ-IV a potentially valuable tool for cross-national and adolescent research. However, to our knowledge, the cross-national validity of the AIQ-IV among adolescents has not been investigated to date.

It should be emphasized that the tetrapartite model of the self (and its accompanying questionnaire, the AIQ-IV) is just one possible operationalization of identity content, which has its own limitations compared to other models. The tetrapartite model of the self focuses on the relative importance of a limited set of personal and social attributes when constructing self-definitions, which do not exhaust all possible aspects of identity that might be relevant for individuals living in different sociocultural contexts. In addition, it does not attempt to delineate various subtle dimensions of self-construal (see Hardin et al., 2004; Vignoles et al., 2016) or specific content domains, but instead centers on four relatively broad aspects of the self (Cheek & Cheek, 2018). Broadly defined dimensions of self-construal as posited by the tetrapartite model of the self, despite its limitations, might prove useful for cross-national research. This approach overcomes the limitation of listing numerous specific facets of self-construal that might be difficult to translate into some languages and that would place a burden on participants both in terms of survey length and difficulties in understanding the meaning of items.

The importance of evaluating cross-national invariance of the AIQ-IV

Cross-national studies on adolescent identity content are important for a multitude of reasons. First, the process of self-construal is culturally embedded (Markus & Kitayama, 1991). Therefore, research on attributes that are prioritized when defining one's identity might provide a fruitful approach to describe and analyze cultural differences (Smith, 2011). The AIQ-IV is a potentially useful tool for describing these differences, as it covers a broad range of personal and social attributes that might be relevant in various cultural contexts (although in no case exhaustive, as stressed above). Second, many existing measures of self-construal fail to contribute to the theoretical explanations of cultural differences in behavior, hindering our understanding of the role of self-construal in motivation, emotion, and cognition (Cross et al., 2011). Finally, during the process of identity formation—a critical developmental task in adolescence—adolescents from different cultural contexts can be expected to ascribe different importance to various personal and social attributes when construing the self (Essau et al., 2011; Marbell-Pierre et al., 2019). Although cross-cultural differences in adolescent self-construal have been consistently reported, most of these studies sampled adolescents from only two countries and used measures with questionable cross-cultural validity, warranting further multinational research.

To better understand cultural differences in adolescent self-construal and their relations with different outcomes, cross-culturally validated measures of identity content are deemed crucial. Most researchers agree that cross-cultural comparisons and inferences on cultural variability are meaningful and valid only if measures show evidence of measurement invariance (e.g., Meuleman et al., 2023). The issue of measurement invariance addresses the question of whether the measurement parameters, such as factor loadings and item intercepts/thresholds, are the same across different groups (i.e., whether the same concept is being measured in the same way across different groups or contexts; Leitgöb et al., 2023). Hence, evidence of measurement invariance of a tool implemented across groups suggests that the construct assessed using this tool has the same meaning across those groups.

In cross-cultural studies, three levels of measurement invariance are typically tested using a conventional multigroup approach (e.g., Boer et al., 2018): configural, metric, and scalar. Configural invariance indicates that the factor structure is the same across groups. Metric invariance implies that factor loadings are equal across groups, and this level of invariance allows for the comparison of unstandardized associations across groups. Scalar invariance implies that both factor loadings and item intercepts (or thresholds for categorical data) are equal across groups. Support for scalar invariance provides a justification for the comparison of latent means across groups. However, in studies that include many groups and use a questionnaire with many items and several factors (such as the AIQ-IV), evidence of full scalar invariance is rarely obtained (e.g., Marsh et al., 2018). The standard multi-group approach is too restrictive for many groups and increases the likelihood of Type I error (i.e., wrongly identifying noninvariant parameters; Widaman & Olivera-Aguilar, 2023). Several

alternative approaches to testing measurement invariance across groups have been developed to overcome these limitations of the multi-group analysis (e.g., Kim et al., 2017). One of these novel methods is alignment optimization (Asparouhov & Muthén, 2014), which will be used in the present research and is described below.

The present study

Cross-national research on identity content in adolescence has been hindered by a lack of valid measures established across a large number of culturally diverse samples. Thus, not much is known about cross-national variation in adolescent self-construal and identity content. The present study aims to contribute to the field of identity and adolescent research by evaluating the measurement invariance of the AIQ-IV in adolescent samples recruited across 30 countries. These countries cover a range of world regions and differ substantially in various sociocultural dimensions and both objective and subjective indicators of quality of life (see Table S1). Cultural bias in psychological research, including developmental psychology, has been widely documented (e.g., Nielsen et al., 2017), and the vast majority of studies in psychology rely on samples from WEIRD (Western, Educated, Industrialized, Rich, and Democratic) countries, limiting the generalizability of findings (Thalmayer et al., 2021). Here, by including a large number of countries and understudied world regions such as Eastern Europe and Latin America, we aim to contribute to a more global understanding of self-construal beyond the WEIRD–Confucian comparisons dominant in psychological science (Krys et al., 2025). We are fully aware that culture and country are not synonymous (Taras et al., 2016). Thus, we do not equate entire countries with single cultures and prefer the term "cross-national" throughout the paper.

To our knowledge, no study has yet examined the cross-national invariance of the AIQ-IV in high-school adolescents. Del Prado et al. (2007) used the AIQ-IV in samples of college students from four countries (the USA, Australia, Mexico, and the Philippines). They found evidence of metric invariance across cultures but also reported substantially lower correlations between the four identity orientations in two individualistic countries (the USA and Australia) than in the two collectivistic countries (Mexico and the Philippines). However, del Prado et al.'s study (2007) has some limitations regarding the measurement invariance testing: first, the Australian sample was small ($N = 112$); second, the authors did not test alternative structural models of the AIQ-IV, but only the original four-factor confirmatory factor analysis (CFA) model; third, scalar invariance was not tested, leaving an open question about whether the latent means comparison across countries is justified; and fourth, the standard conventions for testing measurement invariance and reporting the results were not followed (e.g., Putnick & Bornstein, 2016).

Therefore, the main goal of our study was to test the cross-national invariance of the AIQ-IV in adolescent samples as a way to evaluate whether the use of this scale in cross-national research is justified. Without evidence of cross-national invariance, conclusions about group differences are likely to be invalid (Maassen et al., 2023); invariance testing of a scale is thus an essential step before being used in cross-national comparisons. We expected that the original four-factor model of the AIQ-IV would provide a good fit to the data in most countries. In addition to a standard four-factor CFA model, we also tested the four-factor exploratory structural equation model (ESEM; Asparouhov & Muthén, 2009), which was supported in previous studies (Jovanović et al., 2025). The ESEM model allows for the incorporation of cross-loadings, which are to be expected in the case of multidimensional instruments, such as the AIQ-IV, which include conceptually-related subscales (Morin, 2023). It can be expected that AIQ-IV items measuring different dimensions of self-construal will be associated with more than one factor because different aspects of the self and identity are not independent but instead interact with each other and coexist (Vignoles et al., 2011). For example, AIQ-IV item 3, "Being a part of the many generations of my family," was designed to measure collective identity orientation, but this item is also likely to show associations with the three remaining identity orientations because family includes close interpersonal relationships (relational), makes people feel unique (personal), and affects social reputation (public). These theoretically meaningful cross-loadings are ignored in a standard CFA model, making the ESEM a more flexible and potentially more appropriate approach for investigating the AIQ-IV structure, as it might provide a more accurate representation of the factor structure and result in less biased estimates than CFA (e.g., Morin et al., 2020). Consequently, more valid results in subsequent analyses, such as measurement invariance testing, are to be expected. Finally, we also tested latent mean differences in the four dimensions of self-construal to examine whether adolescents across the 30 countries differ in their endorsement of personal, relational, public, and collective aspects of the self.

METHODS

Sample and procedure

Data for this study come from an international research collaboration, which is a part of the larger project titled "Identity orientations and mental health in adolescence: Examining the roles of basic psychological needs and culture (IDIOMATIC)". In total, 16,795 adolescents aged 14–19 years from 30 countries participated in this study. The countries included were obtained after contacting potential collaborators from all world regions and more than 50 countries. The initial set of countries was selected to include those differing in cultural values and both subjective and objective indicators of quality of life, as well as to overcome the

common WEIRD issue in psychological research (Henrich et al., 2010) and to address the underrepresentation of non-WEIRD countries in large-scale studies on adolescent samples. Sample sizes ranged from 305 in the Netherlands to 1150 in Hungary ($M = 560$; $Mdn = 512$). The data were collected from April 2023 to June 2024 (for more details about the procedure, please see Section A in the Appendix S1). Sample size, language, administration mode (paper-and-pencil or online), age, and gender of participants in each country are presented in Table 1. Additional sociodemographic characteristics, including parental education level, parental employment status, and self-rated family's financial situation, are shown in Tables S2 and S3. In most countries, participants were recruited from secondary schools using convenience sampling. Institutional review board or ethical committee approval was obtained prior to data collection in each country. Only participants who provided informed consent were included in the study.

Instruments

The Aspects of Identity Questionnaire-IV (AIQ-IV; see Cheek & Cheek, 2018) contains 35 items in which participants are presented with a particular attribute (i.e., different aspects of identity) and asked to rate the importance of that attribute to their sense of who they are. The AIQ-IV assesses four identity orientations: Personal (10 items; e.g., *My emotions and feelings*), Relational (10 items; e.g., *Being a good friend to those I really care about*), Public (7 items; e.g., *My physical appearance: my height, my weight, and the shape of my body*), and Collective (8 items; e.g., *Being a part of the many generations of my family*). Each item is rated on a 5-point scale ranging from 1 (*Not important to my sense of who I am*) to 5 (*Extremely important to my sense of who I am*). Three items from the original AIQ-IV were slightly reworded to be more suitable for participants' age and different cultural contexts: (a) "My race or ethnic background" was

TABLE 1 Sample characteristics broken down by country.

Country	*N*	% Female	Mean age	Age range	Language	Administration mode
Bangladesh	500	50.2	16.85	14–19	Bangla	Paper-and-Pencil
Bosnia and Herzegovina	500	64.6	17.09	14–19	Bosnian	Paper-and-Pencil
Canada	514	72.2	17.36	15–18	English	Online
Chile	503	49.9	17.81	16–19	Spanish	Online
Colombia	504	56	16.30	15–19	Spanish	Paper-and-Pencil
Croatia	537	78.4	17.28	14–19	Croatian	Online
Cuba	801	65.4	16.41	14–18	Spanish	Online
Estonia	514	56.8	16.54	15–18	Estonian	Online
France	410	63.9	15.99	15–18	French	Online
Germany	487	74.3	17.21	15–18	German	Online
Hungary	1150	53.4	16.39	14–19	Hungarian	Online
India	554	57.6	16.74	14–19	Hindi	Online
Indonesia	506	56.9	16.51	14–19	Indonesian	Online
Iran	500	56.6	16.00	15–18	Farsi	Paper-and-Pencil, Online
Italy	387	56.6	16.59	14–19	Italian	Online
Japan	500	50	16.54	15–18	Japanese	Online
Lithuania	507	54.8	16.13	14–19	Lithuanian	Online
Macau	530	46	16.33	15–18	Chinese	Online
Mexico	606	58.3	16.71	14–19	Spanish	Paper-and-Pencil, Online
Montenegro	559	68.3	16.99	15–18	Montenegrin	Paper-and-Pencil
Netherlands	305	60.7	17.06	16–19	Dutch	Online
North Macedonia	710	60.3	16.80	14–19	Macedonian	Online
Peru	500	48.6	15.68	15–18	Spanish	Paper-and-Pencil
Poland	510	79	17.47	15–18	Polish	Online
Portugal	422	66.5	16.20	14–19	Portuguese	Online
Romania	565	51.7	16.68	14–19	Romanian	Paper-and-Pencil
Serbia	1099	55.7	16.03	15–19	Serbian	Paper-and-Pencil
Slovenia	556	55.4	16.32	15–18	Slovenian	Online
Spain	532	61.8	16.70	14–19	Spanish	Online
Turkey	527	43.8	16.10	14–18	Turkish	Paper-and-Pencil

changed to "My ethnic or national background" because race is an irrelevant concept in many countries; (b) "My religion" was adjusted to "My religion or my views on religion" to be suitable for both religious and nonreligious participants; and (c) "My commitments on political issues or my political activities" was modified to "My opinions on political issues and social problems (such as poverty, unemployment etc.)" to be suitable for politically inactive adolescents.

The English version of the AIQ-IV was used in Canada, whereas in the remaining countries or regions, the scale was translated into the native language of that country or region (see Table 1). Either a standard back-translation procedure or a committee approach was used (see van de Vijver & Leung, 2021).

Data analysis plan

All analyses were conducted in Mplus 8.11 (Muthén & Muthén, 1998–2017). Syntaxes and data are available on the Open Science Framework website: https://osf.io/psx4k/. Missing data were handled using the default algorithms in Mplus for the weighted least squares mean and variance adjusted (WLSMV) estimator.

The analysis was performed as follows. First, we tested the factor structure of the AIQ-IV in each country separately. Two models were evaluated: (1) the four-factor CFA model, with four correlated latent identity orientation factors: Personal, Relational, Public, and Collective; and (2) the four-factor ESEM model, with the same four factors and all cross-loadings freely estimated, but targeted to be as close to zero as possible using the target rotation procedure. In addition to individual samples, we also report the results for the pooled sample. The AIQ-IV's response scale was treated as ordinal, so we used the WLSMV estimator, which is recommended when ordinal categorical data with five response options are used (Brauer et al., 2023). The fit to the data was deemed acceptable and good if the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) values were ≥ 0.90 and ≥ 0.95, respectively, while the upper bound values of the Root Mean Square Error of Approximation (RMSEA) 90% confidence interval (CI) were ≤ 0.05 and 0.10, respectively (Wang & Wang, 2020).

Second, measurement invariance across countries was tested using two procedures: (1) a standard multi-group analysis using a 3-step approach (Bowen & Masa, 2015) for testing exact invariance, and (2) an alignment optimization for testing approximate invariance. The multi-group approach tested only the configural invariance (evaluating whether the same items measure the same constructs across groups) and the scalar invariance (evaluating whether the thresholds and factor loadings are equal across groups). We omitted the metric invariance step because factor loadings and thresholds should be tested in tandem when items are considered ordinal (e.g., Sass et al., 2014).

Because scalar invariance is difficult to achieve in large-scale and cross-cultural studies that include many countries (e.g., Marsh et al., 2018), we also tested exact invariance across a smaller number of groups. More specifically, we examined measurement invariance across 12 UN geographic sub-regions (see Table S1) and across countries and UN sub-regions within continents.

Researchers have offered various recommendations for cutoff values when testing invariance under different conditions, such as the number of groups, sample size, number of factors, and distribution (Svetina et al., 2020). No clear guidelines have been offered for invariance testing of the ESEM models with ordinal data across 30 groups. Therefore, we decided to combine some of the most frequently used criteria (Svetina et al., 2020) and to rely on cutoff values of 0.01 for ΔCFI and 0.05 for ΔRMSEA when comparing scalar and configural models.

Finally, if full exact scalar invariance was not supported in our data, we decided to proceed with the alignment optimization to test for approximate invariance. The alignment method was developed by Asparouhov and Muthén (2014) as an alternative to the multi-group CFA, which has some important limitations when many groups are included in a study. Besides a poor fit of the scalar model, the process of model adjustments based on modification indices becomes tedious, time-consuming, and impractical for many groups due to the countless significant modification indices (Muthén & Asparouhov, 2018). The alignment method is based on the configural model (i.e., on the optimal set of parameters from this model) and does not require exact measurement invariance, such as the standard multi-group CFA. The method estimates factor means and variances for each group but does not require loadings and intercepts (i.e., thresholds for categorical data) to be equal across groups. It allows for cross-group differences in parameters and identifies the optimal invariance pattern with a minimal number of large noninvariant parameters and many approximately invariant parameters (Cieciuch et al., 2018). Alignment has the great advantage of enabling comparison of latent factor means across many groups, even in the absence of support for full scalar invariance (Marsh et al., 2018). Recently, the alignment method has been extended to multi-group ESEM (Asparouhov & Muthén, 2023), and this will be tested in the present study. We used the 25% cutpoint for evaluating the acceptable proportion of noninvariant parameters (Muthén & Asparouhov, 2014).

RESULTS

Factor structure of the AIQ-IV in each country separately and on the pooled sample

The fit indices of the two competing models in 30 countries and on the pooled data are reported in Table 2. The original four-factor CFA model provided a poor fit to the data in most countries, whereas the ESEM model had an acceptable or good fit in all countries. The ESEM solution resulted in well-defined and reliable factors in all countries, with a few

TABLE 2 Factor structure of the AIQ-IV in each country separately and on the pooled data.

	Four-factor CFA model ($df = 554$)				Four-factor ESEM model ($df = 461$)			
Country	χ^2	**CFI**	**TLI**	**RMSEA [90% CI]**	χ^2	**CFI**	**TLI**	**RMSEA [90% CI]**
Bangladesh	1800.05	0.932	0.927	0.067 [0.064, 0.071]	998.50	0.971	0.962	0.048 [0.044, 0.052]
Bosnia and Herzegovina	1978.32	0.831	0.818	0.072 [0.068, 0.075]	953.22	0.942	0.925	0.046 [0.042, 0.050]
Canada	1717.08	0.882	0.873	0.064 [0.060, 0.067]	1073.66	0.938	0.920	0.051 [0.047, 0.055]
Chile	1673.27	0.879	0.870	0.063 [0.060, 0.067]	958.81	0.946	0.930	0.046 [0.042, 0.051]
Colombia	1638.48	0.867	0.857	0.062 [0.059, 0.066]	892.73	0.947	0.932	0.043 [0.039, 0.047]
Croatia	1859.75	0.869	0.859	0.066 [0.063, 0.070]	1014.28	0.944	0.928	0.047 [0.043, 0.051]
Cuba	3210.64	0.832	0.819	0.077 [0.075, 0.080]	1522.56	0.933	0.913	0.054 [0.051, 0.057]
Estonia	2128.68	0.885	0.876	0.074 [0.071, 0.078]	910.41	0.967	0.958	0.044 [0.039, 0.048]
France	1499.27	0.829	0.816	0.065 [0.061, 0.068]	991.82	0.904	0.876	0.053 [0.048, 0.058]
Germany	1973.71	0.875	0.865	0.073 [0.069, 0.076]	984.84	0.954	0.940	0.048 [0.044, 0.052]
Hungary	4533.16	0.809	0.795	0.079 [0.077, 0.081]	1966.59	0.928	0.907	0.053 [0.051, 0.056]
India	1572.72	0.921	0.915	0.058 [0.054, 0.061]	790.82	0.974	0.967	0.036 [0.032, 0.040]
Indonesia	1508.56	0.878	0.869	0.058 [0.055, 0.062]	879.15	0.947	0.931	0.042 [0.038, 0.047]
Iran	1555.82	0.872	0.862	0.060 [0.057, 0.064]	981.39	0.933	0.914	0.048 [0.043, 0.052]
Italy	1612.01	0.915	0.909	0.070 [0.066, 0.074]	878.66	0.967	0.957	0.048 [0.044, 0.053]
Japan	2206.36	0.899	0.892	0.077 [0.074, 0.081]	1133.84	0.959	0.947	0.054 [0.050, 0.058]
Lithuania	1686.10	0.959	0.957	0.063 [0.060, 0.067]	1104.74	0.977	0.970	0.052 [0.049, 0.056]
Macau	2005.85	0.774	0.757	0.070 [0.067, 0.074]	919.36	0.929	0.908	0.043 [0.039, 0.047]
Mexico	2035.71	0.893	0.886	0.066 [0.063, 0.070]	986.27	0.962	0.951	0.043 [0.040, 0.047]
Montenegro	1611.98	0.847	0.836	0.058 [0.055, 0.062]	1056.24	0.914	0.889	0.048 [0.044, 0.052]
Netherlands	1271.84	0.831	0.818	0.065 [0.060, 0.070]	825.15	0.914	0.889	0.051 [0.045, 0.056]
North Macedonia	2235.62	0.874	0.865	0.065 [0.063, 0.068]	1259.43	0.940	0.923	0.049 [0.046, 0.053]
Peru	1486.91	0.902	0.895	0.058 [0.054, 0.062]	874.22	0.957	0.944	0.042 [0.038, 0.047]
Poland	2436.89	0.847	0.835	0.082 [0.078, 0.085]	1099.33	0.948	0.933	0.052 [0.048, 0.056]
Portugal	1680.91	0.887	0.878	0.069 [0.066, 0.073]	931.49	0.953	0.939	0.049 [0.045, 0.054]
Romania	2125.53	0.848	0.837	0.071 [0.068, 0.075]	1001.46	0.949	0.934	0.046 [0.042, 0.049]
Serbia	3554.09	0.858	0.847	0.070 [0.068, 0.072]	1796.54	0.937	0.918	0.051 [0.049, 0.059]
Slovenia	2742.00	0.816	0.803	0.084 [0.081, 0.087]	1121.63	0.944	0.928	0.051 [0.047, 0.055]
Spain	1950.36	0.848	0.837	0.069 [0.066, 0.072]	1051.71	0.936	0.917	0.049 [0.045, 0.053]
Turkey	806.99	0.909	0.902	0.029 [0.025, 0.034]	559.15	0.965	0.954	0.020 [0.013, 0.026]
Pooled data	43,593.69	0.861	0.851	0.068 [0.067, 0.069]	15,525.32	0.951	0.937	0.044 [0.044, 0.045]

Abbreviations: CFA, Confirmatory Factor Analysis; CFI, Comparative Fit Index; CI, confidence interval; ESEM, Exploratory Structural Equation Modeling; RMSEA, Root Mean Square Error of Approximation; TLI, Tucker-Lewis Index.

exceptions (see Tables S4–S13 for standardized factor loadings and Table 3 for omega coefficients and mean loadings for each factor in each country). In the four following countries, only one factor was relatively poorly defined (mean $\lambda < 0.40$) and had below acceptable reliability ($\omega < 0.70$): Bangladesh (Collective Identity Orientation), India (Public Identity Orientation), Indonesia (Personal Identity Orientation), and Iran (Public Identity Orientation). In Macau and Turkey, all factors except Collective Identity Orientation (Macau) and Relational Identity Orientation (Turkey) were relatively poorly defined.

Some items were found to be weak indicators of their target factor in several countries. For example, Personal Identity Orientation item 21 ("Knowing that I continue to be essentially the same inside even though life involves many external changes") had weak loadings (<0.30) on its theoretical factor in 13 countries. Similarly, Public Identity Orientation item 17 ("My social behavior, such as the way I act when meeting people") and Collective Identity Orientation item 31 ("My opinions on political issues and social problems (such as poverty, unemployment, etc.)") had low loadings on their target factors in a number of countries (see Tables S4–S13 for details).

A number of statistically significant cross-loadings were detected, but most were low in magnitude. However, some items had substantial cross-loadings in a number of countries. For example, Relational Identity Orientation items 19 ("My relationships with the people I feel close to") and 22 ("Being a good friend to those I really care about") had

TABLE 3 Mean loadings and omegas.

	Personal		Relational		Public		Collective	
Country	**Mean λ**	**ω**	**Mean λ**	**ω**	**Mean λ**	**ω**	**Mean λ**	**ω**
Bangladesh	0.404	0.80	0.494	0.84	0.481	0.76	0.351	0.68
Bosnia and Herzegovina	0.483	0.79	0.574	0.86	0.535	0.77	0.602	0.84
Canada	0.480	0.79	0.702	0.92	0.606	0.83	0.594	0.84
Chile	0.543	0.84	0.646	0.89	0.619	0.83	0.507	0.76
Colombia	0.531	0.82	0.569	0.85	0.527	0.77	0.533	0.79
Croatia	0.559	0.84	0.653	0.90	0.629	0.84	0.616	0.86
Cuba	0.583	0.87	0.639	0.90	0.654	0.86	0.565	0.81
Estonia	0.568	0.86	0.703	0.93	0.659	0.87	0.628	0.87
France	0.461	0.76	0.659	0.90	0.605	0.82	0.538	0.78
Germany	0.545	0.84	0.623	0.89	0.617	0.83	0.476	0.74
Hungary	0.490	0.80	0.646	0.90	0.622	0.84	0.455	0.71
India	0.542	0.87	0.463	0.82	0.378	0.65	0.487	0.79
Indonesia	0.295	0.58	0.672	0.90	0.552	0.80	0.439	0.70
Iran	0.451	0.78	0.527	0.83	0.333	0.54	0.449	0.71
Italy	0.606	0.90	0.658	0.92	0.688	0.88	0.594	0.83
Japan	0.527	0.86	0.596	0.91	0.538	0.84	0.608	0.87
Lithuania	0.596	0.89	0.708	0.93	0.646	0.88	0.596	0.86
Macau	0.353	0.64	0.329	0.62	0.286	0.44	0.485	0.75
Mexico	0.552	0.85	0.657	0.90	0.588	0.82	0.558	0.81
Montenegro	0.572	0.84	0.598	0.86	0.529	0.76	0.533	0.78
Netherlands	0.534	0.82	0.674	0.90	0.600	0.82	0.499	0.75
North Macedonia	0.609	0.87	0.566	0.86	0.557	0.79	0.562	0.81
Peru	0.562	0.85	0.621	0.88	0.599	0.82	0.466	0.72
Poland	0.516	0.81	0.569	0.88	0.636	0.84	0.466	0.75
Portugal	0.590	0.88	0.666	0.91	0.681	0.88	0.539	0.82
Romania	0.468	0.78	0.581	0.86	0.529	0.78	0.532	0.77
Serbia	0.567	0.85	0.687	0.91	0.636	0.84	0.598	0.84
Slovenia	0.557	0.84	0.701	0.92	0.645	0.86	0.560	0.81
Spain	0.575	0.84	0.680	0.90	0.638	0.85	0.539	0.78
Turkey	0.368	0.64	0.413	0.70	0.299	0.43	0.246	0.36

Note: λ = standardized factor loading; ω = Omega coefficient of reliability.

cross-loadings greater than 0.30 on the Personal Identity Orientation factor in eight and 12 countries, respectively. Similarly, Public Identity Orientation item 17 ("My social behavior, such as the way I act when meeting people") had cross-loadings above 0.30 on the Personal Identity Orientation factor in 20 countries.

Finally, interfactor correlations in the ESEM solutions varied considerably across countries (see Table 4 for details). For example, the latent correlation between Public and Personal Identity Orientations ranged from 0.06 (Bosnia and Herzegovina) to 0.66 (Japan), while that between Collective and Personal Identity Orientation ranged from 0.06 (Romania) to 0.68 (India).

In sum, the ESEM solution of the AIQ-IV was supported in the vast majority of countries, so this model was retained for the measurement invariance analyses.

Exact invariance testing across countries and UN geographical sub-regions

The fit indices of measurement invariance models are presented in Tables 5 and S14. Configural invariance models showed an acceptable or good fit to the data in all analyses across countries, UN sub-regions, and within continents. The scalar model resulted in a substantial deterioration in model fit compared to the configural model when analyses were performed including all 30 countries, the 12 UN sub-regions, UN sub-regions within the Americas and Asia, and countries within continents (for example, across seven Asian countries). Scalar invariance was supported only when tests were conducted using European countries grouped by UN geographical regions (i.e., Southern, Northern, Eastern, and Western Europe). Given the large number of groups and

TABLE 4 Correlations between ESEM factors across countries.

Country	Relational-personal	Public-personal	Public-relational	Collective-personal	Collective-relational	Collective-public	Mean
Bangladesh	0.52	0.41	0.54	0.59	0.46	0.46	0.50
Bosnia and Herzegovina	0.46	0.06	0.25	0.39	0.41	0.09	0.28
Canada	0.60	0.30	0.37	0.39	0.36	0.29	0.39
Chile	0.59	0.19	0.41	0.35	0.36	0.37	0.38
Colombia	0.49	0.16	0.31	0.30	0.38	0.37	0.33
Croatia	0.58	0.17	0.28	0.45	0.37	0.15	0.33
Cuba	0.58	0.15	0.28	0.26	0.43	0.31	0.34
Estonia	0.64	0.39	0.41	0.42	0.23	0.43	0.42
France	0.45	0.14	0.26	0.30	0.16	0.08	0.23
Germany	0.61	0.30	0.43	0.21	0.20	0.35	0.35
Hungary	0.54	0.29	0.42	0.31	0.24	0.16	0.33
India	0.57	0.33	0.48	0.68	0.55	0.40	0.50
Indonesia	0.48	0.27	0.50	0.29	0.30	0.26	0.35
Iran	0.48	0.15	0.12	0.42	0.49	0.21	0.31
Italy	0.66	0.41	0.44	0.25	0.26	0.28	0.38
Japan	0.67	0.66	0.51	0.51	0.44	0.46	0.54
Lithuania	0.80	0.54	0.62	0.60	0.59	0.58	0.62
Macau	0.39	0.33	0.24	0.15	0.42	0.08	0.27
Mexico	0.60	0.30	0.50	0.26	0.38	0.49	0.42
Montenegro	0.44	0.12	0.20	0.30	0.27	0.18	0.25
Netherlands	0.42	0.26	0.49	0.25	0.10	0.23	0.29
North Macedonia	0.60	0.34	0.33	0.55	0.46	0.28	0.43
Peru	0.49	0.21	0.49	0.37	0.38	0.46	0.40
Poland	0.37	0.38	0.40	0.35	0.37	0.32	0.36
Portugal	0.69	0.30	0.44	0.43	0.46	0.44	0.46
Romania	0.53	0.08	0.32	0.06	0.21	0.13	0.22
Serbia	0.53	0.18	0.37	0.34	0.35	0.09	0.31
Slovenia	0.54	0.21	0.35	0.27	0.22	0.11	0.28
Spain	0.59	0.07	0.20	0.27	0.22	0.21	0.26
Turkey	0.45	0.23	0.29	0.31	0.35	0.23	0.31
Range	0.37–0.80	0.06–0.66	0.12–0.62	0.06–0.68	0.10–0.59	0.08–0.58	0.22–0.62
Mean	0.55	0.26	0.37	0.35	0.35	0.28	/

TABLE 5 Exact measurement invariance testing.

Model	χ^2	df	CFI	ΔCFI	RMSEA [90% CI]	ΔRMSEA
Across 30 countries						
Configural	37,586.62	16,759	0.941	–	0.047 [0.046, 0.048]	–
Scalar	59,104.24	20,356	0.891	−0.050	0.058 [0.058, 0.059]	0.011
Across 12 UN sub-regions						
Configural	20,865.41	5532	0.951	–	0.045 [0.044, 0.045]	–
Scalar	33,316.98	8007	0.920	−0.031	0.048 [0.047, 0.048]	0.003

Note: The residual variance of item 14 was fixed at 0 in Poland for the scalar model across 30 countries.

Abbreviations: CFI, Comparative Fit Index; CI, confidence interval; RMSEA, Root Mean Square Error of Approximation; Δ = change.

items, we chose not to test the partial scalar invariance (e.g., by examining the parameter estimates from the configural model or the modification indices from the scalar model) but to proceed with approximate invariance testing with an alignment approach instead.

Approximate invariance testing with alignment

The results of the alignment optimization using the free approach are shown in Table S15. A total of 8400 parameters were estimated, as there were 30 groups, 140 loadings, and 140 thresholds. The results showed that 15.6% of parameters (1310 of a total of 8400) were noninvariant (682 thresholds, 16.23%; 628 loadings, 14.95%). These results were below the 25% cutpoint proposed by Muthén and Asparouhov (2014), thus supporting an approximate invariance. Countries with the largest number of noninvariant parameters were Macau (123), India (112), Bangladesh (97), Iran (86), and Japan (80), whereas countries with the smallest number of noninvariant parameters were Chile (11), Croatia (13), Portugal (18), Spain (18), Canada (19), Mexico (19), and Peru (20) (see Table S16 for details).

Item loadings of the Collective Identity Orientation factor demonstrated the largest level of noninvariance (range = 2–12 countries; *Mdn* = 8), followed by Public Identity Orientation (range = 2–13 countries; *Mdn* = 6). Loadings of the Relational (range = 1–12 countries; *Mdn* = 3.5) and Personal Identity Orientations (range = 1–6 countries; *Mdn* = 4) exhibited lower levels of noninvariance. The most noninvariant was threshold 4 (for 35 items, it was noninvariant on average in about seven countries; *Mdn* = 7), whereas the remaining three thresholds showed similar levels of noninvariance ($Mdn_{\text{threshold1}} = 4$; $Mdn_{\text{threshold2}} = 3$; $Mdn_{\text{threshold3}} = 3$).

Mean level of identity orientation across countries

The results of the aligned means comparisons between 30 countries are shown in Table S17 and graphically depicted in Figure 1. The highest levels of Personal Identity Orientation were found in several countries of the former Yugoslavia (Montenegro, Croatia, Serbia, and Bosnia and Herzegovina), Portugal, Colombia, and Spain, whereas the lowest levels were in several Asian countries (Macau, Bangladesh, Japan, Turkey, and India) (see Figure 1). Countries with the highest levels of Relational Identity Orientation were also the four abovementioned countries of the former Yugoslavia, as well as Estonia, Spain, and Portugal, whereas the lowest levels were among Asian countries (Bangladesh, India, Japan, and Iran) and a few Latin American countries (Peru, Colombia). Public Identity Orientation was highest in Indonesia and several European countries (Estonia, Germany, and Croatia) and lowest in Latin American countries (Colombia, Cuba, Peru, and Chile), Bangladesh, and Montenegro. Finally, countries with the highest levels of Collective Identity Orientation were the former Yugoslav republics (excluding Slovenia) and several Asian countries (Macau, Iran, Turkey, India, and Indonesia), whereas the lowest levels were found in several European (Poland, Italy, Hungary, France, and the Netherlands) and Latin American countries (Cuba, Colombia, and Chile).

DISCUSSION

Self-construal is a crucial process in adolescence. It is socioculturally rooted and has significant consequences for psychological functioning (Markus & Kitayama, 2010). However, cross-national differences in adolescent self-construal are still poorly understood. The present study aimed to contribute to the cross-cultural literature on adolescent self-construal by evaluating the cross-national measurement invariance of the AIQ-IV and testing mean differences in the four dimensions of self (personal, relational, public, collective) among adolescents across 30 countries.

Several key findings of the present study should be emphasized. First, we found that the original four-factor CFA model of the AIQ-IV provided a poor fit to the data in all but six countries (Bangladesh, India, Italy, Lithuania, Peru, and Turkey), whereas the four-factor ESEM model yielded an acceptable or good fit to the data in all 30 countries. Moreover, with a few exceptions (Macau and Turkey), the ESEM approach resulted in well-defined and reliable factors. These findings confirm that the investigation of the structure of complex, multidimensional questionnaires benefits from allowing cross-loadings to be incorporated into the model (Xiao et al., 2019) and that the ESEM is superior to CFA when examining the structure of the AIQ-IV, replicating previous findings (Jovanović et al., 2025). Furthermore, our results are consistent with recent ideas that the assessment of self-construal should extend beyond a simple *independent-interdependent* dichotomy (e.g., Vignoles et al., 2016) and that a distinction should be made between relational interdependence (defining oneself primarily in terms of close relationships) and collective interdependence (defining oneself primarily in terms of group memberships) (e.g., Cross et al., 2009). We also found support for Public Identity Orientation as a separate dimension of self-construal (Cheek & Cheek, 2018).

It has been widely recognized that a dichotomous conceptualization of self does not do justice to the complexity of self-construal (e.g., Kagitcibasi, 2005). The tetrapartite model of the self is just one approach accounting for this complexity by making a distinction between three broad dimensions of the interdependent self. However, some models differentiate other forms of independence and interdependence, which are not covered by the tetrapartite model of the self. For example, Kitayama et al. (2022) distinguish between four forms of interdependence: *self-effacing* (prevalent in East Asia), *self-assertive* (Arab regions), *expressive* (Latin America), and *argumentative* (South Asia).

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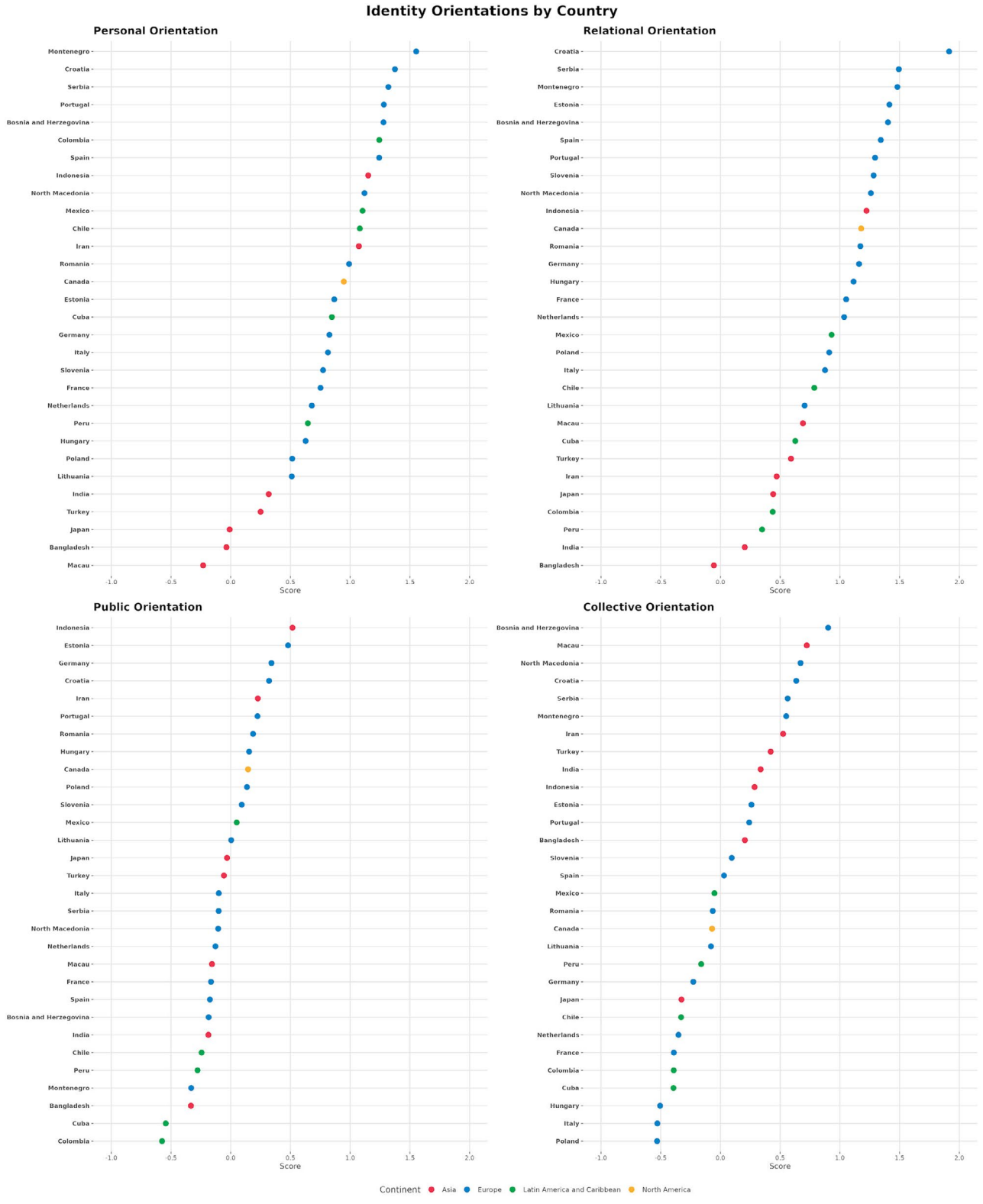

FIGURE 1 Aligned means across countries.

Vignoles et al. (2016) make a distinction between seven bipolar dimensions of self-construal (i.e., *difference* vs. *similarity*; *self-containment* vs. *connection to others*; *self-direction* vs. *receptiveness to influence*; *self-reliance* vs. *dependence on others*; *self-expression* vs. *harmony*; *self-interest* vs. *commitment to others*; and *consistency* vs. *variability*). To provide a final example, Hardin et al. (2004) identified four dimensions of independence (*autonomy/assertiveness*, *individualism*, *behavioral consistency*, and *primacy of self*) and two dimensions of interdependence (*esteem for group*

and *relational interdependence*) within the 30-item SCS. Hence, it is important to note that AIQ-IV does not allow for a nuanced assessment of various facets of independent self-construal. Researchers interested in a detailed assessment of personal aspects of the self should complement AIQ-IV with measures of self-construal such as the scale developed by Vignoles et al. (2016). Items used in the original Vignoles et al. (2016) scale or an updated version that includes another dimension named *decontextualized* vs. *contextualized self* (Krys et al., 2021) could easily be adapted to the AIQ-IV's response scale ranging from "Not important to my sense of who I am" to "Extremely important to my sense of who I am." An important avenue for future research on the AIQ-IV is the differentiation between the facets of personal identity orientation by including novel dimensions such as those discussed by Vignoles and colleagues. Furthermore, as the AIQ-IV was developed within a single country (i.e., the USA), covering only a limited set of personal and social attributes, the relevance of these attributes for adolescents living in different communities and sociocultural contexts should be explored in depth using cultural and indigenous approaches and qualitative research methods (Kim et al., 2006). Cross-cultural qualitative research that combines emic and etic perspectives (e.g., Cheung et al., 2011) could be used to identify new self-attributes that might be incorporated in the AIQ-IV, as well as to examine culture-specific cognitive representations of others and reference groups involved in responding to scale items. For example, the long history of collectivist values in countries such as Serbia and Bosnia and Herzegovina has probably resulted in adolescents having different cognitive representations of others and using different social groups as a reference when thinking about "other people" and "personal relationships" compared to adolescents living in countries with a long history of individualistic values.

Our findings that several items were poor indicators of theoretically expected factors in a number of countries further highlight the importance of refining the AIQ-IV and call for a detailed examination of its cultural relevance using both quantitative and qualitative methods. We believe it is still premature to suggest the exclusion of some items from the AIQ-IV because more research is needed to replicate our findings. In addition, as self-construal is a dynamic process, changes in social, economic, and political conditions can be expected to be accompanied by changes in personal and social attributes that have a central role in self-definitions. For example, weak factor loadings of item 31, "My opinions on political issues and social problems (such as poverty, unemployment, etc.)" in many countries indicate that political involvement is not a very important aspect of collective identity for many adolescents, aligning with findings on political disengagement among youth (Kitanova, 2020). Although this item was a poor indicator of collective identity orientation in Serbian adolescent samples recruited in 2023 (Jovanović et al., 2025), it could be expected to be an important facet of self-construal among Serbian adolescents at the end of 2024 and the beginning of 2025, evidencing a resurgence of youth activism, marked by the largest student protests in Serbia since 1968, which have spread to the secondary education sector.

Second, the associations between the four dimensions of self-construal varied considerably between countries, but some interesting patterns could be recognized. The Personal and Relational Identity Orientations were the most closely associated, supporting the inextricable link between individual and relational aspects of the self and identity (Vignoles, 2019) and the view of identity as rooted in close relationships (Kerpelman & Pittman, 2018). The weakest associations, in general, were observed between Public Identity Orientation and Personal and Collective Identity Orientations, further supporting the distinctiveness of these dimensions among adolescents. Collective and Relational Identity Orientations had the weakest correlations among the countries of Western Europe (France, Germany, and the Netherlands), indicating greater independence between these two aspects of interdependent self-construal in Western, individualistic countries. These results are consistent with the findings of del Prado et al. (2007), who found that identity orientations were more closely associated in Mexico and the Philippines than in Australia and the USA. Given the potential coexistence of independent and interdependent dimensions of self-construal in adolescents at the individual level (e.g., Kagitcibasi, 2013), a person-centered approach might provide a more detailed depiction of the interplay between different self-construal dimensions.

Third, cross-national measurement invariance testing produced a complex pattern of results. Multi-group testing for exact cross-national measurement invariance revealed that the configural invariance of the ESEM model was supported, indicating that the pattern of AIQ-IV item loadings on the latent factors is similar across countries (e.g., Putnick & Bornstein, 2016). However, scalar invariance was not achieved across 30 countries, as evidenced by a large drop in model fit compared to the configural model. This finding indicates that factor loadings and item thresholds varied substantially across countries, which precludes us from examining latent mean differences in the four identity orientations across countries using the exact invariance approach (Leitgöb et al., 2023). These results align with the majority of previous studies examining cross-national invariance of multidimensional questionnaires across many groups, which also typically fail to achieve scalar invariance (e.g., Iurino & Saucier, 2020; Jonason et al., 2020). Scalar invariance was also untenable when exact invariance testing was applied to a smaller subset of countries (i.e., within continents) and UN sub-regions, except for 17 European countries grouped by four UN sub-regions. The difficulty in achieving full scalar invariance even when a smaller number of groups was included suggests that countries grouped by UN sub-regions are heterogeneous with regard to sociocultural factors, such as models of selfhood. Our findings indicate that these differences might be less evident between European countries grouped by UN sub-regions, which corroborate findings that many European countries, despite considerable

cultural differences, share some core features, including a conceptualization of the self as unique and decontextualized (Vignoles et al., 2018).

The evaluation of approximate invariance using alignment optimization yielded promising results, highlighting the value of applying this procedure in adolescent cross-national research (Han, 2024). The alignment procedure identified around 16% of noninvariant parameters, providing evidence for the approximate measurement invariance of the ESEM model of the AIQ-IV (Asparouhov & Muthén, 2023). Notably, countries in Asia (specifically Macau, India, Bangladesh, Iran, and Japan) exhibited the highest number of noninvariant parameters, indicating a potential divergence in the interpretation of AIQ-IV items in these nations compared to others in the study. It is important to note that the AIQ-IV was developed based on the tetrapartite model, which is grounded in Western conceptions of the self and may have limited relevance to nonWestern perspectives and lay theories of the self. Previous studies have clearly indicated substantial cross-cultural differences in the content and structure of the self-concept and lay beliefs about the nature of the self. For example, research on the dialectical self has underscored the contradictory, changeable, and holistic nature of the self-concept in East Asian countries (Spencer-Rodgers et al., 2009), presenting a sharp contrast to the Western view of the self as consistent, stable, separate, and unitary (e.g., Suh, 2002). The Western bias of the AIQ-IV, stemming from the Western-centric conceptualization of the self within the tetrapartite model, might also partly explain why scalar invariance was supported only when European countries (but not Asian or Latin American) were grouped by UN sub-regions.

The loadings of several items showed the greatest variation across countries (item $6_{\text{Collective}}$: *My ethnic or national background*; item $20_{\text{Collective}}$: *My feeling of belonging to my community*; item $25_{\text{Collective}}$: *My feeling of pride in my country, being proud to be a citizen*; item 15_{Public}: *My gestures and mannerisms, the impression I make on others*; item $29_{\text{Relational}}$: *Connecting on an intimate level with another person*), with the greatest noninvariance found for loadings of the Collective Identity Orientation factor. These findings are in line with the argument that social identity (often referred to as collective identity) is expected to have different meanings and to be experienced differently across cultures (Feitosa et al., 2012). In addition, the fourth threshold of AIQ-IV items, marking the transition from response options "Very important to my sense of who I am" to "Extremely important to my sense of who I am," showed the greatest level of noninvariance among the thresholds. These findings point to well-known cross-cultural differences in response styles (e.g., Johnson et al., 2011), such as acquiescent and extreme responding (e.g., Kemmelmeier, 2016).

Finally, the results regarding the mean levels of four identity orientations across countries clearly suggest the need to reconsider the traditional East–West dichotomy in self-construal. We found that Personal Identity Orientation, closely associated with independent self-construal, is highest among adolescents from three former countries of Yugoslavia (Montenegro, Croatia, and Serbia), which are traditionally considered collectivist societies. Furthermore, adolescents from Latin American and some Asian countries (Iran and Indonesia), which are considered collectivistic societies, endorsed Personal Identity Orientation more than adolescents from the remaining Asian countries (Macau, Bangladesh, Japan, Turkey, and India), who ranked at the bottom of Personal Identity Orientation. These findings are broadly in line with previous cross-cultural studies on self-construal. For example, del Prado et al. (2007) compared mean scores on the AIQ-IV of student samples from four countries (Mexico, the Philippines, Australia, and the USA) and found that participants from the two countries considered individualistic (Australia, the USA) did not report higher levels of Personal Identity Orientation compared to participants from the two countries endorsing collectivist values (Mexico, the Philippines). Contrary to expectations, these authors found that Mexican students had higher Personal Identity Orientation and lower Relational Identity Orientation than students from the three remaining countries. Furthermore, only the Filipino students, but not the Mexican students, reported higher levels of the Public and Collective Identity Orientations than students from the two individualistic cultures. Del Prado et al.'s (2007) findings clearly indicate that culture-level dimensions of collectivism–individualism do not simply translate into individual-level dimensions of self-construal. Similar findings were observed by Krys et al. (2019) in a 12-country study that used 10 items from Singelis's SCS (1994); they found that students from Colombia and Mexico reported the lowest levels of interdependent self-construal and the highest levels of independent self-construal. In their sample, the lowest levels of independent self-construal were found among students from East Asian countries (China, Japan, and South Korea) and the highest level among students from Pakistan. A study that synthesized the results from Krys et al. (2019) and two additional cross-cultural studies using versions of the SCS (Church et al., 2013; Fernández et al., 2005) concluded that there were no substantial differences in interdependent self-construal between participants from Latin America and Confucian (i.e., East Asian) countries, but also that "Samples from Latin American countries rated themselves higher on independence than those from Confucian countries—and samples from countries of Northwestern European heritage occupied an intermediate position" (Krys et al., 2022, p. 1169).

Our findings on the mean levels of Relational Identity Orientation across countries are consistent with the conclusions of Krys et al. (2022). We found that some Asian and Latin American countries (e.g., Japan and Colombia; Cuba and Iran; Macau and Chile) did not differ in Relational Identity Orientation and that almost all countries from these two regions reported lower levels of the relational dimension of self-construal compared to most European countries. However, the results regarding Collective Identity Orientation lead to different conclusions on the

differences in interdependent self-construal. In five countries of the former Yugoslavia and several Asian countries (Macau, Iran, Turkey, India, and Indonesia), this identity orientation was higher than in the majority of European countries (considered individualistic) and Latin American countries (considered collectivistic). This suggests that the conclusions of Krys et al. (2022) regarding the differences between Latin American and Asian countries apply to relational-interdependent self-construal but not to collective-interdependent self-construal. This conclusion is not surprising as Singelis's measure of interdependent self-construal is group-oriented; that is, it focuses on group harmony (sample item: "It is important for me to maintain harmony within my group") and the respect for group authority (sample item: "Even when I strongly disagree with group members, I avoid an argument"), rather than on the importance of close relationships, which is assessed with Relational Identity Orientation items.

LIMITATIONS AND FUTURE DIRECTIONS

The present study is the first to examine cross-national invariance of the AIQ-IV on adolescent samples across 30 countries using both exact and approximate invariance testing approaches. However, it has several limitations. First, although samples in most countries were large ($N > 500$), we used convenience sampling of adolescents with a limited age range. Recruiting adolescent participants in multinational studies is a challenging task, so convenience sampling was used to facilitate data collection and to cover a wide range of countries, which differ considerably in terms of the resources available to researchers. The decision to focus on 14–19-year-olds was made with the goal of increasing the comparability of samples and avoiding age-heterogeneous samples. However, future studies should strive to increase the generalizability of our findings by recruiting representative samples and including early adolescent samples. Achieving this would enable a deeper understanding of cross-cultural differences in self-construal across stages of adolescence. Second, although the present study included countries covering a range of world regions that varied in socioeconomic and cultural characteristics, our results should be interpreted with caution as our sample is still not representative of the human population. Future studies should aim to further extend the spectrum of countries and include participants from world regions such as Africa, which are typically overlooked in psychological science (Muthukrishna et al., 2020) even though they shed light on the complexity of self-construal (Kitayama et al., 2022). Third, our study did not include a broad set of sociodemographics and other variables (e.g., values, beliefs) that could be used as an individual-level assessment proxy for culture and enable a more thorough analysis of the relationship between cultural factors and self-construal. We reiterate here that countries should not be equated with culture, as within-country cultural differences are often larger than between-country differences (e.g., Fischer & Schwartz, 2011). As cultural heterogeneity within countries in our sample is unknown, the findings should not be overgeneralized but instead interpreted with caution. Future studies should aim to include measures that would enable an understanding of within-country cultural variability. Fourth, as the present study focused on the measurement invariance of the AIQ-IV and the cross-national comparison of latent means was not our primary goal, we did not deal with response styles. However, as response style biases are poorly investigated in adolescent samples and might distort the conclusions of cross-national comparisons, future cross-national application of the AIQ-IV among adolescents should carefully evaluate whether the same conclusions are drawn with and without correcting for response styles. Several procedures are available to researchers to deal with response styles (van de Vijver & Leung, 2021), which might be applied to investigate the degree to which cross-national differences in mean levels and correlates of identity orientations are substantive (i.e., reflect valid differences) or due to response styles. Fifth, we did not investigate age and gender differences in self-construal, so the value of the AIQ-IV for examining age and gender-related differences in mean levels, relationships between, and motivational utility of four identity orientations remains unknown. Sixth, the present study focused on the cross-national measurement invariance of the AIQ-IV, whereas we did not examine country-level and individual-level correlates of self-construal nor evidence of AIQ-IV's convergent validity across cultures. Future studies should aim to deepen our understanding of factors that might contribute to explaining cross-cultural differences and similarities in self-construal (e.g., Vignoles et al., 2016) and investigate the congruence between AIQ-IV and other self-report and implicit measures of self-construal (e.g., Uskul et al., 2023). Seventh, although we used a cross-cultural (i.e., etic, culture-comparative) approach, which is one of the three major perspectives for examining relationships between psychological processes and culture, the two remaining approaches (cultural psychology and indigenous psychology) should also be used in future research on adolescent self-construal to provide a deeper, nuanced, and culturally meaningful understanding of this process (see Triandis, 2000). Eighth, the cross-sectional design did not allow investigation of longitudinal invariance and temporal stability of the AIQ-IV, so its effectiveness for examining changes in self-construal across countries remains unknown. Longitudinal studies (both in adolescence and across the lifespan) are warranted due to the dynamic nature of identity and self-construal, which was not addressed in the present study. Finally, it should be emphasized that the AIQ-IV focuses on the *importance of different, relatively broad personal and social attributes* when constructing self-definition, and that the scale was not intended to assess *ways of being* independent

or interdependent as other scales do by covering a range of beliefs, behavioral tendencies, values, and so on. More research on these issues is warranted as it remains unknown which approach to measuring adolescent self-construal is more beneficial in terms of cross-cultural validity and predicting important outcomes.

CONCLUSION

Our study provides several important insights into the assessment of adolescent self-construal from a cross-national perspective. The AIQ-IV demonstrated promise as a tool for cross-cultural researchers, as suggested by the evidence of approximate measurement invariance and the four-dimensional structure of self-construal obtained in all countries. Our findings highlight the superiority of the ESEM approach over a standard CFA when analyzing the structure of complex, multidimensional questionnaires like the AIQ-IV. Additionally, this study underscores the advantages of employing alignment optimization in multinational research to test latent mean differences in psychological constructs. Finally, although our results regarding the mean levels of identity orientations across countries provide strong support for recent initiatives advocating a reevaluation of cultural binary distinctions between East and West or independent and interdependent self-construal (e.g., Krys et al., 2022), they should be interpreted with great caution given the differences between samples across countries.

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CONFLICT OF INTEREST STATEMENT

The authors report there are no competing interests to declare.

DATA AVAILABILITY STATEMENT

All materials, including datasets and analysis syntaxes, can be found at: https://osf.io/psx4k/.

PATIENT CONSENT STATEMENT

The parent/guardian consent was obtained in countries where parental consent was required for a certain age. In other countries, informed consent was obtained and the sample included only adolescents who are free to consent to research participation according to domestic legislation (for example, in the Netherlands and Serbia, adolescents are free to consent to research participation with 16 and 15 years, respectively).

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