

**Cross-Cultural Measurement of Social Withdrawal Motivations Across Ten Countries
Using Multiple-Group Factor Analysis Alignment**

Abstract

The Child Social Preference Scale - Revised (CSPS-R) is a widely used self-report measure of motivations for social withdrawal, but not much is known about its psychometric properties across different cultures. The current study evaluated the measurement invariance of the CSPS-R and associations with loneliness in large samples of university students ($N = 4397$; $M_{age} = 20.08$ years, $SD = 2.96$; 66% females) from 10 countries (Argentina, Australia, Canada, China, India, Italy, South Korea, Norway, Turkey, United States). With this cross-cultural focus, we illustrate the *multiple-group factor analysis alignment method*, an approach developed to assess measurement invariance when there are several groups. Results indicated approximate measurement invariance across the 10 country study groups. Additional analyses indicated that overall, shyness and preference for solitude are two related, but distinct factors, with some notable differences evident in the samples from Canada, China, and the USA. Results of multivariate multigroup regression analyses further revealed that shyness and preference for solitude were both related positively to loneliness in all countries, but the strength of these associations differed in Italy and India relative to the other countries. Theoretical and assessment implications are discussed.

Keywords: Child Social Preference Scale-R; Multiple-group Factor Analysis Alignment;

Social Withdrawal Motivations; Loneliness; Culture; University Students

Social withdrawal refers to the behavioral tendency to withdraw from and avoid familiar and unfamiliar peers (Rubin et al., 2009). Although its concurrent and predictive psychological risks across the lifespan are now well-established, so too is the heterogeneity in the negative psychological outcomes of social withdrawal (Bowker et al., 2012; Bowker & White, 2021). Put simply, not all individuals who regularly withdraw from their peers suffer significantly or severely. To account for this heterogeneity, research on social withdrawal has focused on varying *motivations* (or reasons) for social withdrawal (Coplan & Bowker, 2021). Informed by approach and avoidance models of social withdrawal (Asendorpf, 1993), *shyness* is posited to be rooted in distress. Shy individuals desire to approach and interact with peers, but they ultimately withdraw due to overwhelming fears and anxieties. In contrast, *unsociability* is posited to involve non-fearful preferences for solitude (and also weak approach and avoidant motivations), and *avoidance* is believed to be rooted in strong dislike for social interactions (or avoidant motivations) as well as weak approach motivations. Significantly, numerous studies show that shy and avoidant motivations are more strongly associated with indicators of psychological distress, such as loneliness, relative to unsociability, suggesting that the underlying motivation *matters* when understanding the risks associated with social withdrawal (Coplan et al., 2021; Zhang & Wilkens-Eggum, 2018).

Social withdrawal motivations are typically assessed with parent- (with younger children) or self-report assessments (with adolescents and young adults), with the most frequently used measure being the Child Social Preference Scale (CSPS; Coplan et al., 2004) and one of its revisions, the CSPS-R (Bowker & Raja, 2011; Bowker et al., 2017). The CSPS-R adapted the CSPS to be a self-report measure (from a parent-report measure) developmentally appropriate for adolescents (Bowker & Raja, 2011) and later young adults (Bowker et al., 2017). These versions

also included new items to assess avoidant motivations and peer isolation, with the latter not considered a motivation for social withdrawal, but instead time alone due to external causes such as ostracism. Initial psychometric work with the CSPA-R provided some evidence that the three motivations were distinct from peer isolation – and also from each other during adolescence (e.g., based on exploratory factor analyses, with low to moderate inter-factor correlations; Bowker & Raja, 2011). Bowker and Raja (2011) and Bowker et al. (2017) also provided some evidence of validity for the measure, with results uniquely linking shyness and avoidance (but not unsociability) to loneliness and depressive symptoms. However, the initial work was conducted with a sample of young adolescents (10-14 years) from one specific urban area of India. Subsequent research with samples of emerging adults in the US revealed some evidence of its utility with an older age group, but also stronger correlations among the motivation factors as well as poor internal consistencies for the motivation factors (e.g., Bowker et al., 2017).

It is not known whether there are *mean* differences across cultures in shy, unsociable, and avoidant withdrawal motivations. We do know, however, that although there are numerous similarities in the psychological concomitants of the varying withdrawal motivations across cultures, there is also some cultural variability (Chen, 2019). For instance, unlike the research conducted in the US and Canada, unsociability is consistently found to be related to negative psychosocial outcomes in mainland China (Liu et al., 2015; Liu et al., 2014). Such findings underscore the importance of cross-cultural studies of social withdrawal motivations (Chen, 2019). We contend, however, that to better understand *which* socially withdrawn individuals, within and across cultures, are most at risk for negative psychological outcomes, and the most in need of clinical intervention, we need measures of withdrawal *motivations* that are reliable across cultural barriers. Although the three-motivation model (shyness, unsociability, avoidance) and

assessment developed by Coplan, Bowker, Nelson, and others has received both theoretical and some empirical support (e.g., Bowker & Raja, 2011; Coplan et al., 2018; Nelson, 2013), the reliability evidence remains mostly limited to the US, Canadian, and Chinese cultural contexts. In addition, the mean differences in, and cross-cultural implications of the model and the CSPS-R, have not been thoroughly considered. In fact, we were not able to locate a single study that evaluated measurement invariance of the CSPS-R across cultures. Consequently, we argue that researchers should not make assertions about the explanatory power of social withdrawal motivations across cultures before measurement invariance of the CSPS-R is established. Cultures differ in the extent to which they value and actively socialize their children to engage or approach, rather than avoid, others (Chen, 2019). These cultural differences and others (discussed more below) may in turn influence the ways in which varying withdrawal motivations develop, are expressed, and received by others.

The Current Study

The overarching goal of the current study is to test for measurement invariance in the CSPS-R, and pending these results, evaluate mean differences in the CSPS-R factors and how they are related to one of the most commonly studied outcomes of socially withdrawn behavior and motivations, *loneliness* (i.e., social dissatisfaction or perceived social inadequacies; Asher et al., 1984). Loneliness is also one of the strongest predictors of later internalizing symptomology, including social anxiety and depressive symptoms (Lim et al., 2016), which highlights the importance of understanding its predictors. Establishing measurement invariance for the CSPS-R is a timely and necessary next step in the ever-growing social withdrawal motivation area of research. This would, in turn, allow not only cross-cultural comparisons in motivations but also

cross-cultural comparisons in the associations between the motivations and psychological outcomes.

Ten countries are included in this study, including the two Western countries (the United States, Canada) and one non-Western country (China) where the majority of recent research in this area has been conducted. To provide additional informative cultural contrasts, we also included samples from Argentina, Australia, India, Italy, Korea, Norway and Turkey. Many of these countries are relatively new to the social withdrawal research area (which prevents us from developing strong a priori hypotheses) and vary not only in the extent to which they socialize and prioritize social interactions and initiations, but also in the degree to which they are, broadly, considered independent (like the US and Canada, but also Australia, Italy, and Norway) and interdependent (similar to China, and also Korea, Turkey, Argentina, and India) in their cultural norms and values (e.g., Triandis, 1995).

We evaluate self-reports of social withdrawal motivations and loneliness in large samples of university students in these countries. The focus on university students allows us to examine the psychometric properties of the CSPS-R (as it was revised for emerging adults; Bowker et al., 2017) among individuals who are often experiencing new freedom to decide how to spend their free time, including whether, and when, to engage with peers or to withdraw (Nelson et al., 2020). Evaluating and establishing exact measurement invariance using more traditional strategies such as Multigroup Confirmatory Factor Analysis (MG-CFA) is often difficult to achieve when there are many groups (Kim et al., 2017), such as is the case in our study of 10 countries. As such, we used a newer method to evaluate for *approximate* measurement invariance, referred to as a *Multiple-Group Factor Analysis Alignment*, which addresses the limitations of the more restrictive MG-CFA with its focus on the configural model (Asparaouhov

& Muthén, 2014; Kong et al., 2021; Muthén & Asparaouhov, 2014). This approach has been used with increasing frequency in other areas of research (e.g., political science; Coromina & Peral, 2020), but continues to be rarely used in developmental research.

Method

Participants

Participants were $N = 4397$ undergraduate students ($n = 2891$; 66% female) enrolled in introductory psychology courses ($M_{\text{age}} = 20.08$, $SD = 2.96$). Participants were from urban regions in 10 countries: Argentina, Australia, Canada, China, India, Italy, Korea, Norway, Turkey, and USA (for more information about sociodemographic characteristics of each country group, see Table 1). The total sample included university students from different ethnic groups, with approximately 30% ($n = 1342$) self-reporting as Caucasian, 42% ($n = 1834$) as Asian, 2% ($n = 103$) as Black, 7% ($n = 313$) as Hispanic/Latinx, 2% ($n = 65$) as Arabic, and 4% ($n = 161$) as “Other” (missing data was reported for 13% of participants, $n = 579$).

Procedures

All participants completed a series of questionnaires, including several that were not of interest in this study, as part of a larger cross-cultural study on solitary experiences among university students. Participants either completed paper-and-pencil measures or completed the measures online (through Qualtrics, SurveyMonkey, Limesurvey, Nettskjema, or FluidSurveys), and many received course credit for their study participation. In countries in which English was not the primary language, measures were translated into their respective native language and then back-translated into English, with any discrepancies resolved by an expert panel.

Measures

Social withdrawal motivations. Participants completed the 21-item revised version of the Child Social Preference Scale-Revised (CSPS-R; Bowker et al., 2017; Bowker & Raja, 2011), which is a self-report adaption of the CSPS (Coplan et al., 2004) that assesses varying motivations leading emerging adults to withdraw from their peers. Bowker and Raja (2011) developed the CSPS-R to be appropriate for young adolescents, but study participants completed a longer version of the measure that was further modified to be appropriate for emerging adults (e.g., words like “play” were replaced with words like “hang out”; see Bowker et al., 2017). The measure includes items descriptive of *shy* (e.g., “Feeling shy to hang out with others”), *unsociable* (e.g., “Do not mind spending time alone”), and *avoidant* motivations (“I try to avoid spending time with others”) as well as *peer isolation*, which were not of interest and thus excluded in analyses. Participants reported how much they were like each item on a 5-point scale (1 = *not at all*, 5 = *a lot*). Psychometric properties are reported in the Results.

Loneliness. Participants completed the 20-item version of the UCLA Loneliness Scale (Russell et al., 1978), indicating how often each of the statements was descriptive of them on a 4-point scale (0 = *never*, 3 = *often*). For the present study, we used 5 items that have previously been demonstrated to be appropriate for cross-cultural comparisons (Hudiyana et al., 2021; e.g., “I feel left out”; “I feel isolated from others”). We confirmed the cross-culturally equivalence of the 5-item across the cultural groups in our study (see the supplemental materials) and revealed good reliability values in the total sample ($\alpha = .85$) and in each cultural group (α s = .89, .89, .84, .81, .72, .82, .83 in Canada, USA, Italy, China, India, Turkey, Korea, respectively¹). This loneliness measure has been widely used in different countries (e.g., Auné et al., 2020; Boffo et al., 2012; Lasgaard, 2007).

¹The UCLA Loneliness Scale was not administered in Argentina, Australia, and Norway.

Data Analytic Approach

To examine the invariance of the CSPS-R across the 10 country groups, we first ran a series of exploratory factor analyses (EFAs) using Geomin as the oblique method of rotation in the USA sample (i.e., the calibration sample). The USA was chosen as the calibration sample since the scale was developed and revised by one of the study authors in this country (Bowker & Raja, 2011; Bowker et al., 2017). Initial EFAs were conducted to ascertain the goodness of different factor solutions (from one-factor solution to four-factor solution) and to individuate the items that displayed the best psychometric properties (e.g., primary factor loadings above .30, no cross-loadings; Costello & Osborne, 2005). Using the most acceptable EFA solution, we also ran a Confirmatory Factor Analysis (CFA) in the USA sample to evaluate its model fit.

Then, using the CFA model tested in the USA sample, we performed the multigroup factor analysis alignment method to check the invariance of the scale across the 10 country groups (Asparaouhov & Muthén, 2014; Muthén & Asparaouhov, 2014). As noted previously, the alignment method is appropriate when there are many groups involved, providing approximate (rather than exact) factor loadings and intercepts invariance. The approximate measurement invariance is obtained when less than 25% of the estimated parameters are non-invariant. As a set of exploratory analyses, we also ran the traditional MG-CFA to analyze the gender invariance of the scale across two groups (males vs. females) in the overall sample, testing the Configural, Metric, and Scalar invariances (see supplemental materials). The models were evaluated based on previously established criteria for acceptable model fit indices including comparative-fit-index (CFI) and Tucker-Lewis-Index (TLI) ($> .90$), and standardized root-mean-square residual (SRMR; $< .08$) (Hu & Bentler, 1999). Because root-mean-square-error-of-approximation

(RMSEA) values tend to increase when multiple groups are involved, a more liberal cut-off of .10 was used to evaluate model fit (Rutkowski & Svetina, 2014).

We then performed a multigroup analysis to evaluate the association between the individuated factors of the CSPA-R across the cultural groups. Finally, multivariate multigroup regression analysis was run to evaluate the links between the individuated factors to self-reports of loneliness. In both of these models, the fit of the *unconstrained* model (i.e., all paths were freely estimated across the groups) was compared to the fit of the *constrained* model (i.e., all paths were constrained to be equal across the groups) through the chi-square difference test for nested models ($\Delta\chi^2$) to evaluate possible differences in the paths across the country/cultural groups.

All the analyses were run in *Mplus 8* (Muthén & Muthén, 1998-2017) with the maximum likelihood estimator with robust standard errors to non-normality (MLR). Missing data, ranging from 0% to 3% across countries, were handled using the Full-information maximum-likelihood (FIML) estimation of the parameters.

Results

Factor Structure of the CSPA-R in the USA sample

The 3-factor solution showed the best fit indices (Table 2). However, the third factor of the 3-factor solution only comprised two items, and as such, was considered an unstable factor (cf. minimum 3 items required for a stable factor; Brown, 2006). Therefore, the 2-factor solution was selected as the optimal model (Table 2). However, 11 items were removed because they showed poor psychometric properties (i.e., low factor loadings on the intended factor and/or cross-loading items). The results of the final EFA solution are displayed in Table 3. The first factor, labeled *shyness*, was defined by four items (primary factor loadings ranged from .70 to

.85, secondary factor loadings ranged from -.04 to .05), whereas the second factor, labeled *preference for solitude* (PFS), comprised six items descriptive of both unsociability and avoidance (primary factor loadings ranged from .51 to .83, secondary factor loadings ranged from -.22 to .27).

The CFA conducted with the final two-factor EFA solution displayed a good model fit, $\chi^2(33) = 113.157, p < .001$, CFI = .964, TLI = .951, RMSEA = .060 [90% CI: .048, .073], SRMR = .052, with a residual covariance between errors of the two reversed items (6 and 15). Factor loadings ranged from 0.74 to 0.84 and from .35 to .82 for the shyness and PFS factors, respectively. At the latent level, the two factors were positively correlated ($r = 0.57, p < 0.001$).

Cross-Cultural Measurement Invariance of the CSPS-R across the 10 Countries

The configural CFA model had an acceptable fit², $\chi^2(330) = 1024.286, p < .001$, CFI = .947, TLI = .927, RMSEA = .069 [90% CI: .064, .074], SRMR = .060. Results from the multiple-group factor analysis alignment method revealed that at the factor-loading level, there were non-invariant factor loadings in the USA (item 2 for the shyness factor), Turkey (item 16 of the PFS factor), and China and India (in both countries, item 15 of the PFS factor). At the intercept level, results showed that there were non-invariant intercepts in Turkey (items 2, 16, and 20), Canada (item 14), Australia (item 14), Korea (items 14, 21, and 6), Italy (items 6 and 16), China (items 15 and 19), Norway (item 19), and India (item 6). Overall, 9% of the estimated parameters were not invariant, suggesting an approximate measurement invariance of the CSPS-R measure across the 10 country groups. The reliability of the two factors was good for most of

² When using the alignment method, the model fit is the one obtained from the configural model (Muthén & Asparouhov, 2018).

the groups (Cronbach's α s ranged from .77 to .87 for the shyness factor and from .71 to .85 for the PFS factor)³.

Table 4 reports the means for the two factors as estimated by the alignment method. Results revealed that participants from Korea reported the highest mean level of shyness, whereas participants from Argentina and Turkey reported the lowest levels of shyness. For PFS, Indian participants reported the highest levels, whereas Argentina and Italy reported the lowest levels.

Multigroup Analysis for Shyness and Preference for Solitude

Table 5 reports the means and standard deviations of the study variables. To test possible differences in the association between shyness and PFS across the 10 country groups, we ran a multigroup analysis⁴. The unconstrained model showed a good fit, $\chi^2(18) = 20.613$, $p = .30$, CFI = .996, TLI = .994, RMSEA = .018, 90% CI [.001, .048], SRMR = .026, but it was statistically different, $\Delta\chi^2(9) = 72.1854$, $p < .001$, from the constrained model, $\chi^2(27) = 94.857$, $p < .001$, CFI = .902, TLI = .891, RMSEA = .076, 90% CI [.060, .093], SRMR = .092, suggesting cultural differences in the parameters estimated. Based on the modification indexes and the chi-square contribution, we relaxed the correlation between shyness and PFS in China, Canada, and USA. The partially constrained model, $\chi^2(24) = 36.684$, $p = .05$, CFI = .982, TLI = .977, RMSEA = .035, 90% CI [.004, .056], SRMR = .049, differed from the unconstrained model, as evident with the chi-square difference test with a $p < .05$, $\Delta\chi^2(6) = 15.4454$, $p = .017$. Results of the partially

³Results revealed lower reliability values for shyness and PFS factors in India ($\alpha = .53$ for shyness, $\alpha = .54$ for PFS). Given the poor reliability of the two factors for the India group, results with this group should be interpreted with caution.

⁴Since age was not collected in Norway, the models were only controlled for participant gender. The effects of gender on both shyness and PFS were constrained to be equal across the 10 country groups.

constrained path model revealed that shyness and PFS were positively correlated in all country groups. However, the association was stronger in Canada and USA and weaker in China compared to the other countries (Table 6).

Multivariate Multigroup Regression Analysis

The unconstrained model showed a good fit, $\chi^2(12) = 12.725, p = .39, CFI = .999, TLI = .998, RMSEA = .011, 90\% CI [.001, .048]$, but it was statistically different, $\Delta\chi^2(12) = 33.8915, p < .001$, from the constrained model, $\chi^2(24) = 46.688, p = .01, CFI = .972, TLI = .967, RMSEA = .044, 90\% CI [.025, .062]$, suggesting cultural differences in the parameters estimated⁵.

Therefore, based on the modification indexes and the chi-square contribution, we relaxed some parameters in Italy and India. The partially constrained model, $\chi^2(22) = 31.357, p = .09, CFI = .988, TLI = .985, RMSEA = .029, 90\% CI [.001, .053]$, differed from the unconstrained model, as evident with the chi-square difference test with a $p < .05, \Delta\chi^2(10) = 18.5849, p = .04$. Results of the partially constrained model revealed that shyness and PFS were positively associated with loneliness in all country groups (initial evidence of concurrent validity), but the magnitude of the association between shyness and loneliness was different in Italy (stronger) and India (weaker) compared to the other groups (Table 7).

Discussion

The current study investigated whether the CSPS-R measure is appropriate for the assessment of social withdrawal motivations during emerging adulthood in different cultures. To do so, we utilized the *multiple-group factor analysis alignment* (Asparaouhov & Muthen, 2014; Muthen &

⁵The models controlled for participant gender and age. The associations of gender and age on loneliness were constrained to be equal across country groups. The analyses did not include participants from Argentina, Australia, and Norway as loneliness data were not collected in these countries.

Asoaraouhov, 2014), which is particularly suitable for evaluating *approximate* measurement invariance across a large number of groups. In a sample of more than 4,000 university students, results showed evidence of measurement invariance for the CSPS-R across the 10 country groups. These findings are significant as they are the first to suggest that the CSPS-R may be used to meaningfully compare levels of social withdrawal motivations across different countries. However, measurement invariance was evinced for a *two*-factor model of shyness and PFS (which included both unsociability and avoidance items), rather than the more commonly analyzed three CSPS-R factors of shyness, unsociability, and avoidance. Leading theory in this area of research also typically distinguishes between shyness, unsociability, and avoidance (although there have been some exceptions, such as Wang et al., 2017). Yet, the findings herein suggest that across cultures, it may be most accurate, at least when using the CSPS-R, to distinguish between motivations for social withdrawal rooted in *strong* approach and avoidance motivations (as is the case with shyness) and those motivations rooted in *weak* approach motivations (as is the case with both unsociability and avoidance). Although all socially withdrawn behaviors involve the active avoidance of others, varying desires to *approach*, and how such desires translate into social initiations and interactions (or lack thereof), may be the distinguishing features of different reasons for social withdrawal.

Also noteworthy were findings showing several country group differences in shyness and PFS. For example, Korean and Indian university students reported the highest means on shyness and PFS, respectively, perhaps due to social and cultural norms and values in each country which emphasize modesty and humility (Korea) and reflection and solitude (India) (Gelfand et al., 2011; Inglehart & Welzel, 2005). Of course, it is difficult to generalize across entire countries (and the lack of a direct assessment of culture was a significant limitation of our study), such as

Korea and India, which are diverse in many ways, including in their prevailing cultural norms and values. However, the mean differences involving India (relative to the other country groups) were consistent with the results showing that shyness was less strongly related to loneliness in India, perhaps because of greater acceptance in the culture of spending time alone – for any reason.

Another notable country difference emerged: shyness was found to be more strongly related to loneliness in Italy relative to the other country groups, perhaps due to the unique expectations for social assertion and connectedness in many regions of Italy. Regardless, we think it is important to emphasize that for the first time, with factors found to be invariant across cultures, we found that both shyness and PFS were related uniquely and positively to reports of loneliness, which underscores the importance of considering *both* social withdrawal motivations in studies of social withdrawal and its negative psychosocial concomitants across cultures. In contrast to prevailing notions about and earlier findings suggesting that PFS may be relatively benign, especially in non-Western societies (e.g., Kim et al., 2008), our findings also suggest that those with strong desires to withdraw, for whatever reason, might suffer psychologically from the lack of social interaction. Perhaps increased globalization, stronger international communication, and more shared global values in recent years is changing these earlier detected cultural differences and increasing risks associated with any motivation to spend time alone. Of course, future research will be needed to replicate our study findings and longitudinal data should be utilized to evaluate the stability of the factors over time as well as the direction of effects. However, we hope that this study will set the stage for future cross-cultural work on social withdrawal motivations and that the multiple-group factor analysis alignment method will be of use to developmental scientists around the globe.

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Table 1

Sample sociodemographic characteristics by country

	<i>n (%)</i>	<i>n female</i>	<i>M_{age} (SD)</i>
Canada	582 (13)	351	19.93 (2.86)
USA	666 (15)	366	19.91 (1.98)
Argentina	257 (6)	201	19.79 (4.22)
Italy	348 (8)	312	21.85 (3.84)
China	850 (19)	438	18.83 (0.92)
Australia	318 (7)	262	20.62 (6.02)
India	299 (7)	212	22.28 (1.60)
Turkey	574 (13)	410	19.95 (1.77)
Korea	259 (6)	147	19.91 (0.91)
Norway	244 (6)	192	---
Overall sample	4397 (100)	2891	20.08 (2.96)

Table 2

EFA Factor Solutions for the USA Sample

<i>Factor Solutions</i>	<i>Model fit</i>					
	χ^2 (df)	<i>P</i>	CFI	TLI	RMSEA [90% CI]	SRMR
1-factor solution	894.296 (35)	<.001	.614	.503	.192 [.181, .203]	.112
2-factor solution	124.076 (26)	<.001	.956	.924	.075 [.062, .089]	.039
3-factor solution	30.479 (18)	.033	.994	.986	.032 [.009, .051]	.012
4-factor solution	788.244 (11)	.025	.651	-.430	.326 [.307, .345]	.009

Note. Although the 3-factor solution displayed a good model fit, the third factor only comprised two items (Costello & Osborne, 2005). EFA = Exploratory Factor Analysis. CFI = Comparative-Fit-Index; TLI = Tucker-Lewis-Index; RMSEA = Root-Mean-Square-Error-of-Approximation; SRMR = Standardized Root-Mean-square Residual.

Table 3

Item Loadings for the Final 2-factor EFA solution in the USA Sample

<i>Item no. and abbreviated content</i>	<i>Shyness</i>	<i>PFS</i>
<i>Shyness</i>		
19. Feeling nervous to interact with others despite the desire to do so.	0.85	0.01
14. Feeling often afraid to hang out with others despite the desire to do so.	0.79	-0.04
2. Being sometimes nervous to hang out with others despite the desire to do so.	0.77	0.01
7. Feeling shy to hang out with others.	0.70	0.05
<i>Preference for Solitude</i>		
21. Spending time alone for the dislike staying with others.	-0.01	0.83
12. Choosing to spend time alone for the dislike to stay with others.	0.04	0.80
16. Avoiding spend time with others.	0.16	0.68
15R. Preferring to hang out with others than to spend time alone.	-0.22	0.54
20. Do not mind spending time alone.	0.27	0.52
6R. Being happy to hang out with others.	-0.18	0.51

Note. EFA = Exploratory Factor Analysis. PFS = Preference for Solitude. For each factor, items were reported from the higher to lower factor loadings. R denotes a reverse-scored item.

Table 4

CSPS-R Items: Factor Mean Comparisons of the 10 Countries

Ranking	Group	Value	Group With Significantly Smaller Factor Mean
<i>Shyness</i>			
1	9	0.636	5 7 10 1 6 2 4 8 3
2	5	0.384	1 6 2 4 8 3
3	7	0.251	6 2 4 8 3
4	10	0.227	2 4 8 3
5	1	0.135	2 4 8 3
6	6	0.010	4 8 3
7	2	0.000	4 8 3
8	4	-0.324	3
9	8	-0.452	
10	3	-0.613	
<i>Preference for Solitude</i>			
1	7	0.483	8 5 1 6 2 10 4 3
2	9	0.227	10 4 3
3	8	0.208	2 10 4 3
4	5	0.193	2 10 4 3
5	1	0.136	2 10 4 3
6	6	0.103	10 4 3
7	2	0.000	10 4 3
8	10	-0.196	3
9	4	-0.362	
10	3	-0.552	

Note. Data collection groups: 1 = Canada, 2 = USA, 3 = Argentina, 4 = Italy, 5 = China, 6 = Australia, 7 = India, 8 = Turkey, 9 = Korea, 10 = Norway. The means, ordered from high to low, are shown for the groups that have factor means significantly different on the 5% level. Average Invariance Index = 0.616; this index represents the degree of confidence for mean comparisons across the groups, with values ranging from 0 (full non-invariance) to 1 (perfect scalar invariance).

Table 5

Means and Standard Deviations for the Shyness, Preference for Solitude, and Loneliness by Country

	Shyness			PFS			Loneliness		
	Total sample <i>M (SD)</i>	Male <i>M (SD)</i>	Female <i>M (SD)</i>	Total sample <i>M (SD)</i>	Male <i>M (SD)</i>	Female <i>M (SD)</i>	Total sample <i>M (SD)</i>	Male <i>M (SD)</i>	Female <i>M (SD)</i>
Canada	2.48(1.11)	2.38(1.12)	2.54(1.10)	2.32(0.77)	2.31(0.75)	2.33(0.78)	1.01(0.82)	0.98(0.82)	1.03(0.82)
USA	2.35(1.06)	2.36(1.03)	2.34(1.08)	2.23(0.73)	2.24(0.73)	2.22(0.71)	0.90(0.77)	1.00(0.81)	0.84(0.73)
Argentina	1.69(0.81)	1.90(0.87)	1.63(0.78)	1.82(0.64)	2.06(0.71)	1.75(0.60)	---	---	---
Italy	2.02(1.01)	2.10(0.93)	2.01(1.01)	1.95(0.70)	2.13(0.73)	1.93(0.69)	0.88(0.70)	0.84(0.68)	0.88(0.71)
China	2.64(0.88)	2.72(0.89)	2.56(0.88)	2.42(0.65)	2.49(0.66)	2.37(0.64)	1.10(0.67)	1.16(0.70)	1.05(0.65)
Australia	2.36(1.07)	2.28(1.06)	2.38(1.08)	2.31(0.80)	2.35(0.84)	2.30(0.79)	---	---	---
India	2.57(0.83)	2.58(0.81)	2.57(0.84)	2.44(0.71)	2.48(0.67)	2.42(0.73)	1.14(0.80)	1.21(0.81)	1.11(0.79)
Turkey	1.98(0.83)	1.99(0.82)	1.98(0.84)	2.38(0.81)	2.43(0.79)	2.36(0.82)	0.54(0.60)	0.57(0.61)	0.54(0.61)
Korea	2.93(0.84)	2.90(0.83)	2.95(0.85)	2.45(0.63)	2.50(0.63)	2.42(0.63)	0.54(0.58)	0.55(0.64)	0.53(0.53)
Norway	2.50(1.17)	2.45(1.16)	2.52(1.17)	2.09(0.72)	2.22(0.71)	2.06(0.72)	---	---	---
Overall sample	2.37(1.01)	2.45(1.00)	2.32(1.02)	2.28(0.74)	2.37(0.72)	2.23(0.75)	0.90(0.75)	0.96(0.77)	0.87(0.73)

Note. Shyness and PFS range from 1 (*not at all*) to 5 (*a lot*). Loneliness range from 0 (*never*) to 3 (*often*). The UCLA Loneliness Scale was not administered in Argentina, Australia, and Norway.

Table 6

Associations between Shyness and Preference for Solitude in the Final Multigroup Analysis

Shyness ↔ Preference for Solitude			
Country	<i>r</i>	SE	<i>p</i> -value
USA	.451	.034	<.001
Canada	.503	.033	<.001
Argentina	.484	.032	<.001
Italy	.415	.029	<.001
China	.242	.035	<.01
Australia	.331	.026	<.001
India	.413	.024	<.001
Turkey	.388	.024	<.001
Korea	.464	.028	<.001
Norway	.333	.029	<.001

Note. Correlation coefficients (*r*) (↔) with their standard errors (SE) are reported. The model controlled for gender with gender being constrained to be equal across the countries. In bold are paths that were not constrained to be equivalent to the other countries.

Table 7

Links between Shyness, Preference for Solitude, and Loneliness in the Final Multigroup Regression Analysis

Country	Shyness → Loneliness			Preference for Solitude → Loneliness		
	β	SE	<i>p</i> -value	β	SE	<i>p</i> -value
USA	.38	.02	<.001	.16	.02	<.001
Canada	.39	.02	<.001	.16	.02	<.001
Italy	.54	.04	<.001	.17	.02	<.001
China	.36	.02	<.001	.16	.02	<.001
India	.16	.06	<.01	.16	.02	<.001
Turkey	.39	.02	<.001	.23	.02	<.001
Korea	.41	.03	<.001	.19	.02	<.001

Note. Standardized regression coefficients (β) with their standard errors (SE) are reported. Gender and age were controlled such that they were constrained to be equal across the countries. In bold, however, are paths that were not constrained to be equivalent to the other countries.