



MACQUARIE
University

Macquarie University PURE Research Management System

This is the author version of an article published as:

Bowker, J. C., Sette, S., Ooi, L. L., Bayram-Ozdemir, S., Braathu, N., Bølstad, E., Castillo, K. N., Dogan, A., Greco, C., Kamble, S., Kim, H. K., Kim, Y., Liu, J., Oh, W., Rapee, R. M., Wong, Q. J. J., Xiao, B., Zuffianò, A., & Coplan, R. J. (2023). Cross-cultural measurement of social withdrawal motivations across 10 countries using multiple-group factor analysis alignment. *International Journal of Behavioral Development*, 47(2), 190–198.

Access to the published version:

<https://doi.org/10.1177/01650254221132774>

Copyright The Author(s) 2022. Version archived for private and non-commercial, non-derivative use with the permission of the author/s. For further rights please contact the author/s or copyright owner.

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

**Bowker, J. C., Sette, S., Ooi, L. L., Bayram-Ozdemir, S., Braathu, N., Bølstad, E.,
Castillo, K. N., Dogan, A., Greco, C., Kamble, S., Kim, H. K., Kim, Y., Liu, J., Oh, W.,
Rapee, R. M., Wong, Q. J. J., Xiao, B., Zuffianò, A., & Coplan, R. J. (2022).**

International Journal of Behavioral Development

Abstract

The goal of this study was to evaluate the measurement invariance of an adapted assessment of motivations for social withdrawal (*Social Preference Scale-Revised*; SPS-R) across cultural contexts and explore associations with loneliness. Participants were a large sample of university students ($N = 4,397$; $M_{\text{age}} = 20.08$ 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 groups. Additional analyses indicated that overall, shyness, avoidance, and unsociability are three related, but distinct factors, with some notable country differences evident (e.g., in China, India, and Turkey). Shyness and avoidance were related positively to loneliness in all countries, but the strength of the association between shyness and loneliness differed in Italy and India relative to the other countries. Results also indicated that unsociability was related positively to loneliness in the USA only. Theoretical and assessment implications are discussed.

Keywords: 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. To account for this heterogeneity, social withdrawal research has focused on varying *motivations* (or reasons) for social withdrawal (Coplan & Bowker, 2021). Informed by approach and avoidance models (Asendorpf, 1993), *shyness* is posited to be rooted in psychological 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) and 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).

The most frequently used measures of withdrawal motivations are the parent-rated *Child Social Preference Scale* (CSPS; Coplan et al., 2004) for younger children, and its two revisions, the CSPS-R for adolescents (Bowker & Raja, 2011) and emerging adults (Bowker et al., 2017), which were adapted to be developmentally appropriate self-report measures (for other studies that utilized the CSPS-R with emerging adults, see Braathu et al., 2022; White et al., 2022). Unlike the CSPS, both versions of the CSPS-R also included new items to assess avoidant motivations and peer isolation, with the latter not considered a motivation for withdrawal, but

instead time alone due to external causes such as ostracism. Initial psychometric work with the CSPS-R provided some evidence that the three motivations were distinct from 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). There is little psychometric work with the emerging adult version, although Bowker et al. (2017) provided some evidence of its validity, with results uniquely linking shyness and avoidance (but not unsociability) to loneliness and depressive symptoms. This study however also revealed strong correlations among the motivation factors as well as poor internal consistencies for the motivation factors and only involved emerging adults from the USA.

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. For example, it has been suggested that unsociability is viewed more positively in Western cultures because of the positive emphasis on individualism and personal choice. In contrast, in China, where group-orientation and collectivism are core facets of the society, choosing to remove oneself from the group is more likely to be perceived as selfish and deviant (Chen, 2019). In support of these notions, unlike the research conducted in the USA and Canada, unsociability is consistently found to be related to negative psychosocial outcomes in China (e.g., Liu et al., 2015). Such findings underscore the importance of cross-cultural studies of withdrawal motivations (Chen, 2019). We contend, however, that to better understand which withdrawn individuals, within and across cultures, are most at risk for negative psychological outcomes, and 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 USA, 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 either version of the CSPS-R across cultures. Consequently, we argue that researchers should not make assertions about the explanatory power of 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 below) may in turn influence the ways in which varying withdrawal motivations develop, are expressed, and received by others.

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 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), with some of the strongest links during emerging adulthood, highlighting the importance of understanding its predictors during this developmental period. Establishing measurement invariance for the CSPS-R is a timely and necessary next step in the ever-growing 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 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) 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 withdraw (Nelson et al., 2020). Emerging adulthood is also when withdrawn behavior may interfere with the completion of numerous tasks (e.g., occupation obtainment), which in turn, may have negative cascading consequences.

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 (Asparouhov & Muthén, 2014; Kong et al., 2021; Muthén & Asparouhov, 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 several questionnaires, including some 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* for emerging adults (CSPS-R; Bowker et al., 2017), which is a self-report developmentally appropriate adaption of the CSPS (Coplan et al., 2004) that assesses varying motivations leading emerging adults to withdraw from their peers. 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 was 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 section.

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 been demonstrated previously 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-items across the cultural groups in our study (see supplemental materials) and found good reliability values in the total sample ($\omega = .85$) and in each cultural group (ω s = .89, .89, .85, .81, .74, .83, .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).

Data Analytic Approach

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

To examine the invariance of the CSPPS-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 (Asparouhov & Muthén, 2014; Muthén & Asparouhov, 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. 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 Configural invariance (i.e., the same pattern of fixed and free-factor loadings are estimated across groups), Metric invariance (i.e., the factor loadings for items are constrained to be equal across groups), and Scalar invariance (i.e., the intercepts are constrained to be equal across groups; the scalar invariance allows to test differences in mean values across groups). For model comparison, we considered the difference in Comparative-Fit-Index (CFI) with a critical level of $-.01$ (Cheung & Rensvold, 2002) (see supplemental materials). The models were evaluated based on previously

established criteria for acceptable model fit indices including CFI, 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 CSPS-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 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. Missing data, ranging from 0% to 3% across countries, were handled using the Full-information maximum-likelihood estimation of the parameters.

Results

Factor Structure of the CSPS-R in the USA Sample

The 3-factor solution showed the best fit indices (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. This adapted scale was renamed the *Social Preference Scale-Revised* (SPS-R). The first factor, labeled *shyness*, was defined by four items (primary factor loadings ranged from .76 to

.84), the second factor, labeled *avoidance*, comprised four items (primary factor loadings ranged from .52 to .95), and the third factor, labeled *unsociability*, was defined by two items (primary factor loadings ranged from .63 to .70).

The CFA conducted with the final three-factor EFA solution displayed a good model fit, $\chi^2(32) = 92.333, p < .001$, CFI = .973, TLI = .962, RMSEA = .053 [90% CI: .041, .066], SRMR = .039. Factor loadings ranged from 0.73 to 0.85, .68 to .82, and .60 to .70 for the shyness, avoidance, and unsociability factors, respectively. At the latent level, the three factors were correlated positively (shyness with avoidance $r = 0.58, p < .001$, shyness with unsociability $r = 0.11, p = .046$, avoidance with unsociability $r = 0.54, p < .001$).

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

The configural CFA model had an acceptable fit², $\chi^2(383) = 1093.151, p < .001$, CFI = .945, TLI = .936, RMSEA = .065 [90% CI: .061, .070], SRMR = .064. 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 avoidance factor), India (item 7 of the avoidance factor), and China (item 15R of the unsociability 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 12 and 14), China (items 15R and 21), and Norway (item 19). Overall, 7% of the estimated parameters were not invariant, suggesting an approximate measurement invariance of the SPS-R measure across the 10 country groups. The reliability of the three factors was good for most

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

groups (ω values ranged from .78 to .87 for the shyness factor, from .64 to .85 for the avoidance factor, and from .64 to .81 for the unsociability factor)³.

Table 4 reports the means for the three factors as estimated by the alignment method. For shyness, participants from Korea and China reported the highest mean levels, and those from Argentina, Turkey, and Italy reported the lowest levels. For avoidance, Indian and Korean participants reported the highest mean levels, and those from Argentina, Italy, and Norway reported the lowest levels. Finally, for unsociability, participants from Turkey and China reported the highest mean levels, whereas participants from Italy, India, and Argentina reported the lowest mean levels.

Multigroup Analysis for Shyness, Avoidance, and Unsociability

Table 5 reports the means and standard deviations of the study variables. To test possible differences in the associations between shyness, avoidance, and unsociability across the 10 country groups, we ran a multigroup analysis⁴. The unconstrained model showed a good fit, $\chi^2(27) = 32.162, p = .23, CFI = .997, TLI = .994, RMSEA = .021, 90\% CI [.001, .045], SRMR = .027$, but it was statistically different, $\Delta\chi^2(27) = 189.047, p < .001$, from the constrained model, $\chi^2(54) = 221.209, p < .001, CFI = .913, TLI = .904, RMSEA = .084, 90\% CI [.073, .096], SRMR = .120$, suggesting cultural differences in the parameters estimated. Based on the modification indexes and the chi-square contribution, we relaxed the correlation between avoidance and unsociability in Turkey, China, Australia, and India. We also relaxed the

³Results revealed lower reliability values for the shyness factor in India ($\omega = .54$) and the unsociability factor for Argentina ($\omega = .44$), China ($\omega = .44$), and India ($\omega = .40$). Given the poor reliability, results for shyness and unsociability with these groups should be interpreted with caution.

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

correlation between unsociability and shyness in China and the correlation between shyness and avoidance in Canada, USA, Australia, and Norway. The partially constrained model, $\chi^2(45) = 58.236, p = .09, CFI = .993, TLI = .991, RMSEA = .026, 90\% CI [.001, .044], SRMR = .051$, did not differ from the unconstrained model, as indicated by the non-significant chi-square difference test, $\Delta\chi^2(18) = 26.074, p = .09$. Results of the partially constrained path model revealed that shyness, avoidance, and unsociability were correlated positively in nearly all country groups. However, the association between avoidance and unsociability was stronger in Australia and Turkey and weaker in China and India compared to the other countries. Also, the association between unsociability and shyness was *negative* in China, and the relation between shyness and avoidance was stronger in USA, Canada, Australia, and Norway compared to the other countries (Table 6).

Multivariate Multigroup Regression Analysis

The unconstrained model showed a good fit, $\chi^2(12) = 13.316, p = .35, CFI = .998, TLI = .995, RMSEA = .015, 90\% CI [.001, .050]$, but it was statistically different, $\Delta\chi^2(18) = 40.972, p < .001$, from the constrained model, $\chi^2(30) = 54.288, p = .01, CFI = .970, TLI = .965, RMSEA = .041, 90\% CI [.023, .058]$, suggesting cultural differences in the parameters estimated⁵. Based on the modification indexes and the chi-square contribution, we relaxed some parameters in India, Italy, and the USA. The partially constrained model, $\chi^2(27) = 33.885, p = .17, CFI = .991, TLI = .989, RMSEA = .023, 90\% CI [.001, .044]$, did not differ from the unconstrained model, as indicated by the non-significant chi-square difference test, $\Delta\chi^2(15) = 20.569, p = .15$. Results of the partially constrained model revealed that shyness and avoidance were associated positively

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.

with loneliness in all country groups (representing 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. In addition, the association between unsociability and loneliness was significant and positive in the USA but not in the other groups (Table 7).

Discussion

The current study investigated whether the newly adapted SPS-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* (Asparouhov & Muthen, 2014; Muthen & Asparouhov, 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 SPS-R across the 10 country groups. These findings are significant as they are the first to suggest that the SPS-R may be used to meaningfully compare levels of social withdrawal motivations across different countries. Measurement invariance was evinced for a *three*-factor model of shyness, avoidance, and unsociability, consistent with the commonly analyzed three C-SPS-R factors. 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). Thus, it is noteworthy that the findings herein confirm, for the first time, that across *cultures*, it appears accurate, at least when using the SPS-R, to distinguish between motivations for withdrawal rooted in *strong* approach and avoidance motivations (shyness), *weak* approach and avoidance motivations (unsociability), and *weak* approach and *strong* avoidance motivations (avoidance).

Also noteworthy were findings showing several mean country group differences. For example, Korean and Chinese university students reported the highest means on shyness,

avoidance, and unsociability, perhaps due to social and cultural norms and values in each country which emphasize modesty and humility (Korea) and reflection and solitude (China) (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 China, which are diverse in many ways, including in their prevailing cultural norms and values.

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 avoidance 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. Perhaps increased globalization, stronger international communication, and more shared global values in recent years is increasing risks associated with strong *avoidant* motivations (as evident in both shyness and avoidance) to spend time alone across cultures. Consistent with prevailing notions about and earlier findings suggesting that unsociability may be relatively benign, our findings also suggest that those who lack strong desires for interaction, perhaps due to non-fearful preferences for solitude, might not suffer psychologically from the lack of social interaction – *unless* they reside in the USA. This finding was not expected, but may be because unsociability and its lack of social initiation contrasts sharply with ever-growing independent and *assertive* cultural goals in the USA. 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. Of note, in its current form, the SPS-R unsociability scale comprises two reverse-scored items that pertain to enjoyment of, and preference for, social interaction. It would be of interest in the future to consider additional items descriptive of the non-fearful preference for solitude aspect of unsociability (i.e., enjoyment of solitude).

Notwithstanding, 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 useful for developmental scientists around the globe.

References

- Asendorpf, J. B. (1993). Abnormal shyness in children. *Journal of Child Psychology and Psychiatry*, 34(7), 1069–1083. <https://doi.org/10.1111/j.1469-7610.1993.tb01774.x>
- Asher, S. R., Hymel, S., & Renshaw, P. D. (1984). Loneliness in children. *Child Development*, 55(4), 1456–1464. <https://doi.org/10.2307/1130015>
- Asparouhov, T., & Muthén, B. (2014). Multiple-group factor analysis alignment. *Structural Equation Modeling*, 21(4), 495–508. <https://doi.org/10.1080/10705511.2014.919210>
- Auné, S.E., Abal, F.J.P., & Attorresi, H.F. (2020). Modeling of the UCLA Loneliness Scale According to the Multidimensional Item Response Theory. *Current Psychology*. Advance online publication. <https://doi.org/10.1007/s12144-020-00646-y>
- Boffo, M., Mannarini, S., & Munari, C. (2012). Exploratory structure equation modeling of the UCLA loneliness scale: A contribution to the Italian adaptation. *Testing, Psychometrics, Methodology in Applied Psychology*, 19(4), 345-363. <https://doi.org/10.4473/TPM19.4.7>
- Bowker, J. C., Stotsky, M. T., & Etkin, R. G. (2017). How BIS/BAS and psycho-behavioral variables distinguish between social withdrawal subtypes during emerging adulthood. *Personality and Individual Differences*, 119, 283-288. <https://doi.org/10.1016/j.paid.2017.07.043>
- Bowker, J.C., & Raja, R. (2011). Social Withdrawal Subtypes during Early Adolescence in India. *Journal of Abnormal Child Psychology*, 39, 201–212. <https://doi.org/10.1007/s10802-010-9461-7>
- Bowker, J. C., & White, H. I. (2021). Studying peers in research on social withdrawal: Why broader assessments of peers are needed. *Child Development Perspectives*, 15(2), 90–95. <https://doi.org/10.1111/cdep.12404>

- Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York, NY: Guilford Press.
- Chen, X. (2019). Culture and shyness in childhood and adolescence. *New Ideas in Psychology, 53*, 58-66. <https://doi.org/10.1016/j.newideapsych.2018.04.007>
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness of fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 233-255. https://doi.org/10.1207/S15328007SEM0902_5
- Coplan, R.J. & Bowker, J.C. (2021). Looking beyond social motivations: Considering novel perspectives on social withdrawal in childhood and adolescence. *Merrill-Palmer Quarterly, 67*(4), 390-415. <https://doi.org/10.13110/merrpalmquar1982.67.4.0416>
- Coplan, R., Prakash, K., O'Neil, K., & Armer, M. (2004). Do you “want” to play? Distinguishing between conflicted shyness and social disinterest in early childhood. *Developmental Psychology, 40*, 244–258. <https://doi.org/10.1037/0012-1649.40.2.244>
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research and Evaluation, 10*, 173–178. <https://doi.org/10.7275/jyj1-4868>
- Gelfand, M. J., Raver, J. L., Nishii, L., Leslie, L. M., Lun, J., Lim, B. C., & Yamaguchi, S. (2011). Differences between tight and loose cultures: A 33-nation study. *Science, 332*, 1100–1104. <https://doi.org/10.1126/science.1197754>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. <https://doi.org/10.1080/10705519909540118>

- Inglehart, R., & Welzel, C. (2005). *Modernization, cultural change and democracy: The human development sequence*. New York, NY: Cambridge University Press.
- Kim, E. S., Cao, C., Wng, Y., & Nguyen, D. T. (2017). Measurement invariance testing with many groups: A comparison of five approaches. *Structural Equation Modelling: A multidisciplinary Journal*, 24, 524-544. <https://doi.org/10.1080/10705511.2017.1304822>
- Kim, J., Rapee, R. M., Oh, K. J., & Moon, H. S. (2008). Retrospective report of social withdrawal during adolescence and current maladjustment in young adulthood: Cross-cultural comparisons between Australian and South Korean students. *Journal of Adolescence*, 31(5), 543-563. <https://doi.org/10.1016/j.adolescence.2007.10.011>
- Lim, M. H., Rodebaugh, T. L., Zyphur, M. J., & Gleeson, J. F. M. (2016). Loneliness over time: The crucial role of social anxiety. *Journal of Abnormal Psychology*, 125(5), 620–630. <https://doi.org/10.1037/abn0000162>
- Liu, J., Chen, X., Coplan, R. J., Ding, X., Zarbatany, L., & Ellis, W. (2015). Shyness and unsociability and their relations with adjustment in Chinese and Canadian children. *Journal of Cross-Cultural Psychology*, 46(3), 371-386. <https://doi.org/10.1177/0022022114567537>
- Muthén, B., & Asparouhov, T. (2014). IRT studies of many groups: The alignment method. *Frontiers in Psychology*, 5, 978. <https://doi.org/10.3389/fpsyg.2014.00978>
- Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide*. Los Angeles: Muthén & Muthén.
- Rubin, K. H., Coplan, R. J., & Bowker, J. C. (2009). Social withdrawal in childhood. *Annual Review of Psychology*, 60(1), 141–171. <https://doi.org/10.1146/annurev.psych.60.110707.163642>

Russell, D., Peplau, L. A., & Ferguson, M. L. (1978). Developing a measure of loneliness. *Journal of Personality Assessment*, 42(3), 290–294. https://doi.org/10.1207/s15327752jpa4203_11

Rutkowski, L., & Svetina, D. (2014). Assessing the hypothesis of measurement invariance in the context of large-scale international surveys. *Educational and Psychological Measurement*, 74(1), 31-57. <https://doi.org/10.1177/00131644134982>

Triandis, H. C. (1995). *Individualism and collectivism*. Boulder, CO: Westview Press.

Table 1

Sample Sociodemographic Characteristics by Country

	<i>n (%)</i>	<i>n female</i>	<i>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 (<i>df</i>)	<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. 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 3-factor EFA solution in the USA Sample

<i>Item no. and abbreviated content</i>	<i>Shyness</i>	<i>Avoidance</i>	<i>Unsociability</i>
<i>Shyness</i>			
2. Nervous to hang out with others despite the desire to do so.	0.84	-0.11	0.01
19. Feel nervous to interact with others despite the desire to do so.	0.83	0.04	-0.14
14. Often afraid to hang out with others despite the desire to do so.	0.78	-0.01	-0.14
7. Feel too shy to hang out with others.	0.76	-0.04	0.01
<i>Avoidance</i>			
21. Spend time alone due to dislike of others.	-0.16	0.95	-0.01
16. Avoid spending time with others.	0.06	0.74	-0.01
12. Choose to spend time alone due to dislike of others.	0.01	0.73	0.13
20. Do not mind spending time alone.	0.22	0.52	0.02
<i>Unsociability</i>			
6R. Happy to hang out with others.	0.07	0.01	0.70
15R. Preferring to hang out with others than to spend time alone.	-0.01	0.08	0.63

Note. R denotes a reverse-scored item.

Table 4

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

Ranking	Group	Value	Group With Significantly Smaller Factor Mean
<i>Shyness</i>			
1	KOR	0.636	CHN, IND, NOR, CAN, AUS, USA, ITA, TUR, ARG
2	CHN	0.381	CAN, AUS, USA, ITA, TUR, ARG
3	IND	0.251	AUS, USA, ITA, TUR, ARG
4	NOR	0.224	USA, ITA, TUR, ARG
5	CAN	0.135	USA, ITA, TUR, ARG
6	AUS	0.010	ITA, TUR, ARG
7	USA	0.000	ITA, TUR, ARG
8	ITA	-0.324	ARG
9	TUR	-0.452	ARG
10	ARG	-0.616	
<i>Avoidance</i>			
1	IND	0.505	CHN, TUR, CAN, AUS, USA, NOR, TUR, ARG
2	KOR	0.462	CHN, TUR, CAN, AUS, USA, NOR, TUR, ARG
3	CHN	0.186	USA, NOR, TUR, ARG
4	TUR	0.177	USA, NOR, TUR, ARG
5	CAN	0.135	USA, NOR, TUR, ARG
6	AUS	0.085	NOR, TUR, ARG
7	USA	0.000	NOR, TUR, ARG
8	NOR	-0.275	
9	ITA	-0.341	
10	ARG	-0.400	
<i>Unsociability</i>			
1	TUR	0.185	USA, NOR, KOR, ITA, IND, ARG
2	CHN	0.142	KOR, ITA, IND, ARG
3	AUS	0.038	ITA, IND, ARG
4	CAN	0.005	ITA, IND, ARG

5	USA	0.000	ITA, IND, ARG
6	NOR	-0.035	ITA, IND, ARG
7	KOR	-0.092	ITA, IND, ARG
8	ITA	-0.492	
9	IND	-0.536	
10	ARG	-0.681	

Note. Data collection groups: CAN = Canada, USA = United States of America, ARG = Argentina, ITA = Italy, CHN = China, AUS = Australia, IND = India, TUR = Turkey, KOR = Korea, NOR = Norway. The means, ordered from high to low, are shown for the groups that have factor means significantly different at the 5% level. Average Invariance Index = 0.716; 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 Shyness, Avoidance, Unsociability, and Loneliness by Country

	Shyness	Avoidance	Unsociability	Loneliness
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Canada	2.47(1.11)	2.14(0.87)	2.69(0.92)	1.01(0.82)
USA	2.35(1.06)	2.03(0.84)	2.65(0.90)	0.90(0.77)
Argentina	1.70(0.81)	1.62(0.70)	2.23(0.84)	---
Italy	2.02(1.01)	1.75(0.72)	2.36(0.91)	0.88(0.70)
China	2.64(0.88)	2.17(0.80)	2.94(0.83)	1.10(0.67)
Australia	2.36(1.07)	2.09(0.88)	2.73(0.99)	---
India	2.57(0.83)	2.43(0.87)	2.46(1.03)	1.14(0.80)
Turkey	1.98(0.83)	2.17(0.87)	2.80(0.95)	0.54(0.60)
Korea	2.93(0.84)	2.35(0.68)	2.65(0.72)	0.54(0.58)
Norway	2.50(1.17)	1.82(0.73)	2.64(1.00)	---
Overall sample	2.37(1.01)	2.08(0.84)	2.67(0.93)	0.90(0.75)

Note. The loneliness measure was not administered in Argentina, Australia, and Norway.

Table 6

Associations between Shyness, Avoidance, and Unsociability in the Final Multigroup Analysis

Country	Shyness ↔ Unsociability			Shyness ↔ Avoidance			Avoidance ↔ Unsociability		
	<i>r</i> (cov)	SE	<i>p</i> -	<i>r</i> (cov)	SE	<i>p</i> -	<i>r</i> (cov)	SE	<i>p</i> -
	value			value			value		
USA	.14(.13)	.02	<.001	.55(.50)	.03	<.001	.41(.32)	.02	<.001
Canada	.13(.13)	.02	<.001	.55(.51)	.03	<.001	.41(.32)	.02	<.001
Argentina	.19(.13)	.02	<.001	.51(.29)	.03	<.001	.52(.32)	.02	<.001
Italy	.16(.13)	.02	<.001	.47(.29)	.03	<.001	.54(.32)	.02	<.001
China	-.12(-.09)	.04	<.01	.40(.29)	.02	<.001	.19(.13)	.04	<.001
Australia	.13(.13)	.01	<.001	.50(.47)	.04	<.001	.49(.42)	.05	<.001
India	.15(.13)	.02	<.001	.39(.29)	.02	<.001	.17(.16)	.05	<.001
Turkey	.17(.13)	.02	<.001	.41(.29)	.02	<.001	.60(.49)	.03	<.001
Korea	.21(.13)	.02	<.001	.47(.29)	.02	<.001	.61(.32)	.02	<.001
Norway	.12(.13)	.01	<.001	.50(.42)	.05	<.001	.47(.32)	.03	<.001

Note. Correlation coefficients (*r*) with their respective covariances in parenthesis (↔) and their standard errors (SE) are reported. Gender was constrained to be equal across countries. In bold are paths that were not constrained to be equivalent to the other countries.

Table 7

Links between Shyness, Avoidance, Unsociability, and Loneliness in the Final Multigroup

Regression Analysis

Country	Shyness → Loneliness			Avoidance → Loneliness			Unsociability → Loneliness		
	β (b)	SE	<i>p</i> -value	β (b)	SE	<i>p</i> -value	β (b)	SE	<i>p</i> -value
USA	.37(.27)	.02	<.001	.14(.13)	.02	<.001	.12(.10)	.04	<.01
Canada	.38 (.27)	.02	<.001	.14 (.13)	.02	<.001	.03 (.03)	.02	.053
Italy	.54(.38)	.04	<.001	.13(.13)	.02	<.001	.03(.03)	.02	.053
China	.35(.27)	.02	<.001	.15(.13)	.02	<.001	.03(.03)	.02	.052
India	.15(.14)	.06	<.05	.15(.13)	.02	<.001	.04(.03)	.02	.053
Turkey	.39(.27)	.02	<.001	.19(.13)	.03	<.001	.04(.03)	.02	.050
Korea	.41(.27)	.03	<.001	.16(.13)	.02	<.001	.03(.03)	.02	.051

Note. Standardized regression coefficients (β), their non-standardized coefficients in parentheses, and their standard errors (SE) are reported. Gender and age were constrained to be equal across countries. In bold are paths that were not constrained to be equivalent to the other countries.

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

Supplementary Materials

Cross-Cultural Measurement Invariance of the UCLA Loneliness Scale

Before testing the relations among the individualized factors of the SPS-R and loneliness, we checked the invariance of the loneliness measure across the 7 cultural sites using the multiple-group factor analysis alignment method (Asparouhov & Muthén, 2014; Muthén & Asparouhov, 2014).

The configural CFA model had an acceptable fit⁶, $\chi^2(35) = 91.960$, $p < .001$, CFI = .987, TLI = .973, RMSEA = .057 [90% CI: .043, .071], SRMR = .022. Results from the multiple-group factor analysis alignment method revealed that at the factor-loading level, all the factor loadings were invariant across the cultural groups. At the intercept level, results showed that there were non-invariant intercepts in Turkey (the intercepts of the items 4 and 16), Canada (the intercept of item 10), USA (the intercept of item 10), Italy (the intercept of the items 10), and China (the intercept of item 16). Overall, the alignment method indicated that the 8.6% of the estimated parameters were not invariant, revealing an approximate measurement invariance of the loneliness measure in our cross-cultural study.

Table S1 reports the means for the loneliness factor as estimated by the alignment method. Results revealed that participants from India and China reported the highest mean level of loneliness, whereas participants from Korea and Turkey reported the lowest levels of loneliness.

⁶In the alignment method, the model fit is the one obtained from the configural model (Muthén & Asparouhov, 2018).

Table S1

Loneliness Items: Factor Mean Comparisons of the 7 Countries

Ranking	Group	Value	Group With Significantly Smaller Factor Mean
<i>Loneliness</i>			
1	IND	0.382	CAN, USA, ITA, TUR, KOR
2	CHN	0.358	CAN, USA, ITA, TUR, KOR
3	CAN	0.155	USA, ITA, TUR, KOR
4	USA	0.000	TUR, KOR
5	ITA	-0.055	TUR, KOR
6	TUR	-0.334	KOR
7	KOR	-0.478	

Note. Data collection groups: CAN = Canada, USA = United States of America, ITA = Italy, CHN = China, IND = India, TUR = Turkey, KOR = Korea. The analyses did not include participants from Argentina, Australia, and Norway as loneliness data were not collected in these countries. 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 = 0.726; 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).

Factor Invariance Across Gender for the SPS-R

The multigroup CFAs confirmed the strong factor consistency of the SPS-R for males and females. Results revealed a good model fit for the configural invariance model, $\chi^2(66) = 386.601, p < .001, CFI = .972, TLI = .960, RMSEA = .048$ [90% CI: .044, .053], SRMR = .033. As suggested by the difference in CFI test, with a critical level of -.01 (Cheung & Rensvold,

2002), we found evidence for scalar invariance of the SPS-R across genders. Specifically, we found negligible changes in CFI for the comparison between the configural and metric models, $\Delta\text{CFI} = -.001$, $\chi^2(71) = 407.530$, $p < .001$, $\text{CFI} = .971$, $\text{TLI} = .963$, $\text{RMSEA} = .047$ [90% CI: .042, .051], $\text{SRMR} = .034$, and the metric and scalar models, $\Delta\text{CFI} = -.002$, $\chi^2(78) = 432.556$, $p < .001$, $\text{CFI} = .969$, $\text{TLI} = .964$, $\text{RMSEA} = .046$ [90% CI: .042, .050], $\text{SRMR} = .035$. Results revealed that for the three factors, the latent means of shyness and avoidance were lower among females than among males (mean difference for shyness = $-.12$, $p < .001$; mean difference for avoidance = $-.18$, $p < .001$). The effect sizes (Cohen's d) to assess the magnitude of the difference between latent means were .14 for shyness and .22 avoidance. Table S2 reports the means and standard deviations of the study variables for males and females in each site.

Table S2

Means and Standard Deviations for Shyness, Avoidance, Unsociability, and Loneliness by Gender

	Shyness		Avoidance		Unsociability		Loneliness	
	Male	Female	Male	Female	Male	Female	Male	Female
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Canada	2.38(1.12)	2.54(1.10)	2.15(0.87)	2.13(0.86)	2.63(0.91)	2.73(0.93)	0.98(0.82)	1.03(0.82)
USA	2.36(1.03)	2.34(1.08)	2.07(0.84)	1.99(0.82)	2.58(0.87)	2.70(0.92)	1.00(0.81)	0.84(0.73)
Argentina	1.90(0.87)	1.63(0.78)	1.89(0.79)	1.53(0.64)	2.40(0.83)	2.17(0.84)	---	---
Italy	2.10(0.93)	2.01(1.01)	2.01(0.79)	1.72(0.71)	2.37(0.91)	2.35(0.92)	0.84(0.68)	0.88(0.71)
China	2.72(0.89)	2.56(0.88)	2.27(0.83)	2.07(0.77)	2.92(0.84)	2.96(0.83)	1.16(0.70)	1.05(0.65)
Australia	2.28(1.06)	2.38(1.08)	2.19(0.98)	2.07(0.85)	2.69(0.93)	2.74(1.01)	---	---
India	2.58(0.81)	2.57(0.84)	2.52(0.87)	2.40(0.88)	2.40(1.05)	2.47(1.02)	1.21(0.81)	1.11(0.79)
Turkey	1.99(0.82)	1.98(0.84)	2.20(0.87)	2.15(0.88)	2.87(0.96)	2.77(0.95)	0.57(0.61)	0.54(0.61)
Korea	2.90(0.83)	2.95(0.85)	2.43(0.68)	2.30(0.68)	2.63(0.72)	2.66(0.73)	0.55(0.64)	0.53(0.53)
Norway	2.45(1.16)	2.52(1.17)	1.92(0.81)	1.79(0.71)	2.82(0.98)	2.59(1.00)	---	---
Overall sample	2.45(1.00)	2.32(1.02)	2.20(0.85)	2.02(0.83)	2.70(0.90)	2.66(0.94)	0.96(0.77)	0.87(0.73)

Note. The loneliness measure was not administered in Argentina, Australia, and Norway.