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Comparisons of the Association of Family and Social Factors With Functional Limitations Across the United States, Mexico, and South Korea: Findings From the HRS Family of Surveys

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Abstract

Objective: The association of family and social factors with the level of functional limitations was examined across the United States, Mexico, and Korea.

Method: Participants included adults from the 2012 Health and Retirement Study ($n = 10,017$), Mexican Health and Aging Study ($n = 6,367$), and Korean Longitudinal Study of Aging ($n = 4,134$). A common functional limitation scale was created based on Rasch analysis with a higher score indicating better physical function.

Results: The American older adults (3.65 logits) had better physical function compared with Mexican (2.81 logits) and Korean older adults (1.92 logits). There were different associations of family and social factors with functional limitations across the three countries.

Discussion: The American older adults demonstrated less functional limitation compared with Mexican and Korean older adults at the population level. The findings indicate the need to interpret carefully the individual family and social factors associated with functional limitations within the unique context of each country.

Keywords

family structure; social environment; older adults; functional limitations

Introduction

Cross-national comparisons of population aging patterns have emerged as comparable national micro-data have become available. For instance, the United States launched a longitudinal national aging survey in the 1990s, the Health and Retirement Study (HRS;

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Declaration of Conflicting Interests

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Supplemental Material

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Sonnega et al., 2014). Similarly, European and Asian countries as well as Mexico have also implemented national aging surveys to obtain better understanding of aging and establish social and health policies. Examples are the Survey of Health, Aging and Retirement in Europe (SHARE; Börsch-Supan et al., 2013), the Korean Longitudinal Study of Aging (KLoSA; Boo & Chang, 2006), and the Mexican Health and Aging Study (MHAS, 2012; Wong, Michaels-Obregon, & Palloni, 2015).

Recently, the U.S. National Institute of Aging (NIA) and SAGE-plus, which are part of the World Health Organization's Study on Global Ageing and Adult Health (SAGE), have made efforts to harmonize comprehensive domains of national aging surveys, including basic demographics, physical and cognitive health status, financial status, as well as family and social environments/relationships (Kowal et al., 2012; Minicuci, Naidoo, Chatterji, & Kowal, 2016). For instance, the harmonized aging surveys have collected comparable information through similar sets of survey items with standardized sampling and quality control. (Data harmonization procedures can be found on the Gateway to Global Aging Data website at <https://g2aging.org/>.) The harmonized HRS family of surveys provides researchers and policy makers remarkable opportunities for cross-national examinations. For instance, cross-national studies allow researchers to examine differences and disparities in health care across countries and inform policy makers and clinicians of ways to improve healthy aging for older adults (Hong, Reistetter, Díaz-Venegas, Michaels-Obregon, & Wong, 2018b). In particular, since family and social relationships play a significant role in healthy aging (e.g., physical or financial support), it is critical to understand how family and social factors are associated with health and well-being among older adults. Moreover, harmonized national aging studies allow researchers to examine whether family and social factors are similarly or differently associated with healthy aging by comparing health patterns across national populations with varied experiences with population aging and family change.

Traditionally, a major challenge for international health comparisons is the incompatibility of outcome measures across countries. Previous studies of national health comparisons relied on estimations for the percentage and likelihood of having difficulty performing daily activities (Diaz-Venegas, Reistetter, Wang, & Wong, 2016; Gerst-Emerson, Wong, Michaels-Obregon, & Palloni, 2015). While this approach provides an indication of differences between populations, these comparisons have been criticized due to differing measurement scales (Hong, Simpson, Simpson, Brotherton, & Velozo, 2018c). Recently, item response theory 1-parameter Rasch models have been utilized to calibrate national aging studies to accurately compare functional limitations using the same linear interval scale across countries (Buz & Cortés-Rodríguez, 2016; Cieza et al., 2015; Hong, Kim, Sonnenfeld, Grattan, & Reistetter, 2018a; Hong et al., 2018b).

Most of the harmonized aging studies include physical function items, such as basic and instrumental activities of daily living (ADL and IADL) and mobility survey items (Buz & Cortés-Rodríguez, 2016; Cieza et al., 2015; Hong et al., 2018a; Hong et al., 2018b). For instance, both HRS and MHAS include 22 physical function-related items; the KLoSA also includes 10 ADL and IADL items. These physical function-related items have played a critical role in the U.S. health care system research, such as to create a functional status measure in post-acute care settings (Improving Medicare Post-Acute Transformation Act of

2014, 2014), estimate service needs (Spector & Fleishman, 1998), and measure the quality of care in inpatient rehabilitation facilities (Fielder, 1998). For these reasons, functional status as measured by physical function items, specifically ADLs and IADLs, is considered a standard variable in rehabilitation research, similar to demographics and social-behavioral variables (Wiener, Hanley, Clark, & Van Nostrand, 1990). In addition, various international organizations utilize ADL questions from national surveys to estimate functional limitations at the population level (Jacobzone, Cambois, Chaplain, & Robine, 1999).

Therefore, the purpose of this study is to (a) create a common functional limitation scale using harmonized ADLs and IADLs as well as mobility survey items based on a Rasch model and (b) compare the association of family and social factors with the level of functional limitations among older adults across the United States, Mexico, and Korea. We speculated that unique social and cultural context across countries are associated with functional limitations (e.g., the Korean War and sex differences in social role). We hypothesized that American older adults will demonstrate less functional limitation compared with Mexican and Korean older adults at the population level.

Method

Subjects

We obtained de-identified study data from the 2012 HRS, 2012 MHAS, and 2012 KLoSA (Boo & Chang, 2006; Chien et al., 2013; MHAS, 2012). Our study sample included adults who were above the age of 65 years and living in community settings at the time of the surveys. We retrieved representative samples of 10,017 American older adults from the HRS, 6,367 Mexican older adults from the MHAS, and 4,134 Korean older adults from the KLoSA. This study was approved by the Institutional Review Board of the University of Texas Medical Branch.

Outcome Measure

ADL, IADL, and mobility/physical function questions were used to construct an outcome measure to assess the level of functional limitations. The same set of 5 ADL (*dressing, bathing, eating, getting in/out of bed, and toileting*), 4 IADL (*preparing meals, shopping, taking medications, and managing money*), and 13 mobility/physical function (*jogging 1 mile/1 km, walking across a room, walking 1 block, walking blocks, sitting for 2 hours, getting up from a chair, climbing several flights of stairs, climbing one flight of stairs, stooping, reaching arms, pulling/pushing large objects, lifting weights of 10 lb/5 kg, picking up a dime*) questions were retrieved from the HRS and MHAS. Similarly, 8 ADL (*dressing, grooming, washing the face, bathing, eating, getting out of bed, toileting, and bladder/bowel management*) and 9 IADL (*housekeeping, preparing meals, laundering, going out, using public transportation, shopping, money management, phone use, and medication management*) questions were retrieved from the KLoSA. The three surveys ask participants whether they have any difficulty in performing each of these items (0 = *having no difficulty* and 1 = *having difficulty*). The response categories of ADL, IADL, and mobility/physical function questions were re-categorized into 1 (*having no difficulty*) and 0 (*having*

difficulties). The range of the score was 0–8 for ADLs and 0–9 for IADLs. A higher score indicated greater functional capacity (Chien et al., 2013; Hong et al., 2018b; MHAS, 2012).

Covariates

The harmonized HRS, MHAS, and KLoSA contain comparable socioeconomic and health covariates (Chien et al., 2013; Hong et al., 2018b; MHAS, 2012). Demographic and clinical variables were utilized as functional limitation covariates, including sex and chronic conditions (stroke, arthritis, and diabetes) with a dichotomized category (1 = *yes* or 0 = *no*). Age and body mass index (BMI, kg/m²) remained continuous. The self-rated health question consists of a 5-point rating (Table 1).

Family and Social Factors

Family and social variables were selected by the researchers from the limited number of survey items in the three studies that potentially associate with the level of functional limitations among older adults. For instance, poor social and/or financial support from children could be associated with a higher level of functional limitations (Thoits, 2011). We considered living arrangement (living alone) and employment status (currently working) as family and social factors, based on previous research indicating strong associations between both these factors and functional limitations (Beltrán-Sánchez, Pebley, & Goldman, 2017; Møller et al., 2015; Waite & Hughes, 1999; Wang, Chen, Pan, Jing, & Liu, 2013). We utilized family and social factors as primary independent variables because our study purpose was to examine whether there is a significant association between family/social factors and functional limitations.

The three national surveys contain harmonized family and social variables, including arrangement (living alone), employment status (currently working), six family variables (number of people in house, number of parents, number of children, number of siblings, number of grandchildren, and number of co-resident children), and five dichotomized variables (1 = *yes* or 0 = *no*) related to the level of physical (children living in the same city and weekly contact with children) and financial support from/to family members and weekly religious participation. The variables of financial transfer from children and financial support to children were sub-categorized as financial support, because physical support and financial support among family members differ conceptually. All family and social factors were measured as current status in 2012.

Data Analysis

Scale development.—Statistical approaches consisted of two phases: (a) testing and creating a common functional limitation measure across the three surveys and (b) comparing the influence of family and social factors on the level of functional limitations across samples by using the common functional limitation measure (ruler) from the first phase (Hong et al., 2018b; Hong et al., 2018c). Figure 1 presents the study diagram and analysis procedures. In the first phase, the Rasch model was utilized to develop the common functional limitation measure and test its psychometric properties (unidimensionality, internal consistency, and item fit statistics). In this phase, 450 randomly selected subjects were included ($n = 150$ each survey) to prevent inflated high fit statistic results from the full

sample ($n = 20,518$) (Hong et al., 2018c; Velozo, Byers, Wang, & Joseph, 2007; Wang, Byers, & Velozo, 2008). We examined the unidimensionality assumption for the functional status-related questions in each survey (HRS and MHAS: 5 ADL, 4 IADL, 13 mobility/physical function; KLoSA: 8 ADL, 9 IADL) using a one-factor confirmatory factor analysis (CFA) model. The unidimensionality assumption of those survey questions was determined by factor loadings and the goodness-of-fit statistics, including comparative fit index ($CFI > 0.95$), Tucker–Lewis Index ($TLI > 0.95$), and root mean square error of approximation ($RMSEA < 0.06$) (Brown, 2006). Once each survey had a unidimensional item pool, the Rasch common-item equating method was used to create a common functional limitation scale using the nine common items (*dressing, bathing, eating, getting out of bed, toileting, shopping, meal preparation, money management, and take medications*) from the surveys (Hong et al., 2018c; Wright & Stone, 1979). In addition, the psychometric properties of the common functional limitation measure were tested across the three surveys, including unidimensionality, internal consistency ($r > .8$), item fit statistics ($0.6 < MnSq$, mean square residual < 1.4 and $-2.0 < ZSTD$, standardized $Z < 2.0$), and floor/ceiling effects ($< 15\%$) (Bond & Fox, 2001; Fisher, 2007; McHorney & Tarlov, 1995). In short, Phase I tested the unidimensionality assumption for the nine common items in each survey and conducted Rasch common-item equating to create a common functional status scale. In addition, we examined the psychometric properties of the common scale and revised the functional status scales to accurately and precisely estimate functional status for the three older adult populations.

Next, the full sample was anchored onto the co-calibrated item measure (ruler) using a Rasch common-item equating method to generate person measures from each sample for the second statistical phase. The estimated person measure was calibrated in a linear interval scale (logits) on the same functional limitation measure (ruler), which allowed us to utilize linear regression models to compare the influence of family and social factors using the magnitude of the beta parameter of each variable across the samples. The process for creating a comparable outcome measure for cross-national comparisons is well documented elsewhere (Hong et al., 2018b; Hong et al., 2018c). Winsteps® Rasch Measurement, Version 3.93.2, was used to conduct the Rasch common-item equating analysis and estimate person measure (Linacre, 2017).

Comparison of family and social factors.—Multiple linear regression models were built to compare the level of functional limitations and the influence of family and social factors on functional limitation across the American, Mexican, and Korean older adults. In the regression models, the dependent variable was the person measure estimated in a linear interval scale (logits) from the HRS, MHAS, and KLoSA sample with the independent variable country (the United States vs. Mexico vs. Korea). To compare the overall functional limitation across the three countries, we adjusted for demographic, clinical, and family/social variables, including age, sex, living arrangement, employment status, self-rated health, BMI, chronic conditions (stroke, arthritis, and diabetes), number of people in the house, number of family members (parents, children, siblings, and grandchildren), children co-residence, children living in the same city, weekly contact with children, weekly religious participation, and financial transfers from/to children. Finally, multiple linear regression

analyses were conducted for each country using the same measurement scale. In this study, we used hierarchical linear regression models (a) to examine whether the step-wise induction of the family and social factors explained a statistically significant amount of variance and (b) to check whether the significance level of each variable changed across the four models. In addition, the regression coefficients (β) on the study variables in each regression model were examined to compare the effects of family and social factors on functional limitation across countries. SAS version 9.4 was used to manage the study data and conduct multiple linear regression models (SAS Institute Inc., 2014).

Results

Table 1 presents the demographic characteristics of the older adults studied. The mean age across the three samples was 74.7 ($SD = 6.9$) years. The majority of the sample was female (56.9%), unemployed/retired (79.3%), lived with somebody (58.8%), and had chronic arthritis (52.0%). The CFA one-factor model revealed a unidimensional factor structure in the HRS (CFI = 0.962, TLI = 0.958, RMSEA = 0.052), MHAS (CFI = 0.963, TLI = 0.959, RMSEA = 0.056), and KLoSA (CFI = 0.999, TLI = 0.999, RMSEA = 0.030) which allowed us to apply the Rasch model to create a common measure across countries. We also tested the unidimensionality assumption for the nine common items using various random samples ($N = 250, 350, 450$). The nine common items met the unidimensionality assumption with good model fit and high factor loading, regardless of the size of the various random samples (Supplementary Table 1). Using the nine common items across the three surveys, we conducted Rasch common-item equating analysis to create a common functional limitation measure. The nine common measurement scale met the core unidimensionality assumption of the Rasch model in the CFA one-factor model (CFI = 0.982, TLI = 0.976, RMSEA = 0.046) with high factor loadings ($\lambda = 0.784\text{--}0.920$).

Next, the ADL, IADL, and mobility/physical function items were co-calibrated from the three surveys and examined for psychometric properties. The co-calibrated item pool revealed a high internal consistency value (person separation = 3.01 and person reliability = .90), meaning that it produced a precise functional limitation measure. Supplementary Table 2 presents the item difficulty of each item and the fit statistics results of the common functional limitation measure across the HRS, MHAS, and KLoSA. Only four items were misfit to the Rasch model: HRS_Sit 2 Hours (Infit MnSq = 1.54, ZSTD = 3.00), HRS_Pick Up Dime (Infit MnSq = 1.60, ZSTD = 2.60), HRS_Reach Arm (Infit MnSq = 1.61, ZSTD = 3.50), and MHAS_Reach Arm (Infit MnSq = 1.56, ZSTD = 3.00); these were removed from future analyses (Supplementary Table 2). Finally, there were no floor (5.6%) or ceiling effects (7.3%) in the common functional limitation measure.

Figure 2 presents the person measure distributions across the three surveys using the same measurement scale (left = HRS, middle = MHAS, right = KLoSA). The unadjusted person measure means were HRS = 3.65 ($SD = 3.20$) logits, MHAS = 2.81 ($SD = 2.80$) logits, and KLoSA = 1.92 ($SD = 2.33$) logits, meaning the American older adults have higher functional status compared with Mexican and Korean older adults. Table 2 presents the hierarchical linear regression models that additionally account for demographics (Model I), clinical/behavioral factors (Model II), family and environmental factors (Model III), and financial

support (Model IV). The multiple linear regression model accounting for all covariates (Model IV, Table 2) revealed that the Korean adults had significantly more functional limitation compared with older adults in Mexico ($\beta = 0.81$, $p < .0001$) or the United States ($\beta = 1.18$, $p < .0001$). The following variables were also found to be significantly related (all $ps < .05$) to functional status: age ($\beta = -0.09$), female sex ($\beta = -0.48$), being single ($\beta = -0.13$), high BMI ($\beta = -0.07$), self-rated health ($\beta = -1.11$), stroke ($\beta = -1.23$), arthritis ($\beta = -0.74$), diabetes ($\beta = -0.29$), number of people in their house ($\beta = -0.04$), any children co-residing ($\beta = -0.11$), and any children living in the same city ($\beta = -0.14$).

Table 3 presents the regression coefficients from the three individual regression models in each country by accounting for demographics and clinical factors. Most family and social factors revealed significant multiplicative interaction terms across countries with functional limitation ($p < .05$), except for any weekly religious group participation ($p = .74$), any children living in the same city ($p = .60$), any weekly contact with children ($p = .36$), and financial transfer to children ($p = .20$). These four non-significant factors were excluded in the stratified analysis by country.

Current employment status ($\beta = 0.30$ – 0.74 , $p < .05$) was associated with lower functional limitation across three countries. While being female was associated with lower functional limitation in Korea ($\beta = 0.16$, $p < .05$), it was associated with higher functional limitation in the United States ($\beta = -0.80$, $p < .05$) and Mexico ($\beta = -0.66$, $p < .05$). Interestingly, being single was associated with higher functional limitation in the United States ($\beta = -0.30$, $p < .05$); however, there was no such association in either Korea or Mexico ($p > .05$). In addition, financial transfer from children was associated with lower functional limitation in Korea ($\beta = 0.19$, $p < .05$) but it was associated with higher functional limitation in the United States ($\beta = -0.46$, $p < .05$). Finally, any children co-residing was associated with higher functional limitation in Mexico ($\beta = -0.18$, $p < .05$).

Discussion

This study developed a common functional limitation measure and compared the level of functional status in older adults across the United States, Mexico, and Korea. The influence of family and social factors on the level of functional status was compared using a common functional limitation measure (ruler) that demonstrated good psychometric properties (reliability and validity). The study findings indicate that American older adults have lower functional limitation compared with Mexican and Korean older adults, and Mexican older adults have lower functional limitation than Korean older adults.

The three countries had different effects of family and social factors on functional limitation among the older adults. The findings indicate the need to carefully interpret the association between family and social factors and functional limitation within the unique social and cultural context of each country. For instance, Korean adults had a significantly higher level of functional limitation compared with the United States and Mexico, which might be explained by the experience of the Korean War (1950–1953). The average age of the Korean sample was 74.4 years, meaning their adolescent and young adults years would have been characterized by the trauma and privation of war, as well as the intense physical labor

needed to rebuild the country; these experiences may have led to higher levels of functional limitation in old age. However, while being female had an inverse relationship with a higher functional limitation in Korea, it was positively associated with the level of functional limitation in the United States and Mexico, meaning that American and Mexican females may have been exposed to similar occupation and lifestyle demands. Thus, in aggregate, our results underscore the need to incorporate aspects of the life course of the study cohorts to better explain the cross-national findings.

Family and social factors are critical in managing and preventing functional limitation, because family members can provide monetary support and assistance in dealing with ADLs and IADLs (Altman & Blackwell, 2016). Altman and Blackwell (2016) reported that, among single older adults in the United States, 31.5% and 47.0% had disability in personal care and routine needs, respectively. Our findings are similar to previous studies in that being single was significantly related to functional limitation in the United States ($\beta = -0.30, p < .05$). However, the same was not true in either Korea or Mexico. More American older adults (44.7%) were single compared with those in Mexico (40.6%) or Korea (33.7%). In addition, only 4.9% of American older adults had financial support from their children, compared with much larger numbers for Mexican (44.0%) and Korean older adults (84.6%). In other words, being a single older adult in the United States indicates more vulnerability to functional limitation and less likelihood of having financial support compared with the other two countries.

Regardless of country, current employment status and social engagement (any weekly religious group participation) were associated with lower functional limitation. Similarly, previous studies have demonstrated that social participation and engagement are positively associated with quality of life, delayed functional decline, and improved health and well-being (Levasseur, Desrosiers, St-Cyr, & Tribble, 2008; Turcotte et al., 2015; Young & Glasgow, 1998). Findings were based on three vastly different aging populations and still support the importance of social engagement as positive for functional status. Larger prospective trials are needed to confirm the study results and to inform functional limitation prevention strategies. While a financial transfer from children was associated with lower functional limitation in Korea, it was associated with higher functional limitation in the United States. In addition, any children co-residing was associated with higher functional limitation in Mexico. Larger prospective trials are needed to confirm the study results and to inform functional limitation prevention strategies.

The study findings indicate that specific age groups might have different levels of functional limitations. For instance, previous studies reported that the American adults were less functional than the Mexican adults aged 50 and older (Gerst-Emerson et al., 2015; Hong et al., 2018b). However, our findings indicate that the American older adults have lower levels of functional limitation compared with the Mexican older adults of 65 years and older. In other words, the health status in the age group of 50 to 64 years old can affect the functional limitation estimations for the overall cross-national comparisons. We speculated that the two countries may have different trajectories and survival rates across age groups which influence functional limitations between the two countries. Future age-specific cross-national comparison studies (e.g., 50–64, 65–74, 75–84, and above 85 years of age) need to

establish age-tailored health policies for different levels of functional limitations across age groups and countries.

Although Rasch analysis can be used for meaningful comparisons even if not all the items are similar across the three countries (i.e., as long as there is a set of common anchoring items), we conducted sensitivity analysis with only the ADL and IADL items by excluding the mobility/physical function items. The sensitivity analysis revealed that the nine common ADL and IADL items were unidimensional and had no misfit to the Rasch model. In addition, the estimated person measures indicated that the American older adults (3.3 logits, $SE = 0.15$) had lower functional limitation compared with those from Mexico (3.1 logits, $SE = 0.15$) and Korea (1.0 logits, $SE = 0.15$). This result is consistent with the person measures estimated by the full set of items in the three surveys. However, when we used only those nine items, the precision significantly deteriorated (person strata = 0.86, person reliability = .42) due to the small number of common items (Wright & Stone, 1979). In addition, there were considerable ceiling effects (52.4%) due to the relatively easy items compared with mobility/physical function items. Based on previous cross-national studies (Buz & Cortés-Rodríguez, 2016; Cieza et al., 2015; Hong et al., 2018b) and the mathematical relationship with the small number of items and poor precision (Wright & Stone, 1979), the mobility/physical function items seem to be indispensable in precisely estimating the level of functional limitations in cross-national comparison studies.

In this study, the research method successfully compared functional limitation levels across three countries. Our research method is critical in cross-national comparison studies because it can be applied to other similar population-based longitudinal aging studies. In addition, the estimated functional limitation levels will inform and contribute to future research on global aging for both healthy and disabled community-dwelling older adults. Based on the findings, policy makers and clinicians should further investigate the drivers of functional limitations in Korea, Mexico, and the United States. Future research will also need to benchmark and implement appropriate health policies to address identified relationships between family/social factors and functional limitations.

Finally, we primarily focused on creating a common functional status measure to compare the association of family and social factors with the level of functional limitations among older adults in three countries. While the demonstration of the study methodologies can be applied to other national aging surveys to allow multiple cross-national comparison studies, conceptually, the reported item difficulty in the ADL, IADL, mobility, and physical function items could be culture-dependent. Future studies will need to test how the understanding of functional limitation in different cultures may potentially influence the item calibration of these physical function items, to accurately and precisely estimate the latent trait of functional limitations.

Limitations

While the current study compared the level of functional limitations using a common measurement scale and the same age groups, the study cohorts have few common family and social variables (e.g., cultural perspectives), which represents a challenge in interpreting the

study findings. Since various HRS family studies have been harmonized, it would be clearer to interpret cross-national functional limitation findings across adjacent countries or similar race/ethnicity groups (e.g., East Asian countries, or Hispanic groups across countries). Second, various individual and environmental factors were not controlled for in the regression model, including educational attainment, household income, depression, cognitive deficit, and health insurance, due to the different survey content across the three surveys. Future studies will need to harmonize the different family and social factors as well as account for uncontrolled factors when comparing functional limitation among older adults across the three countries. While the harmonized HRS, MHAS, and KLoSA demonstrated few missing observations, several covariates had more than 5% missing observations, including BMI ($n = 1,291$, 6.5%), financial transfer to children ($n = 1,087$, 5.3%), and financial transfer from children ($n = 1,058$, 5.2%). However, the missing observations did not affect the study results because the direction of regression coefficients (β) and the significance of each covariate did not change across the four regression models. Finally, this study is a cross-sectional design which only reveals the associations between family/social factors and functional limitations. For instance, the association with employment status and being single might indicate a reverse causation. A longitudinal data analysis or structural equation modeling would be needed to validate the relationships between family/social factors and functional limitations.

Conclusion

The Rasch model indicates that American older adults have lower levels of functional limitation compared with Mexican and Korean older adults. In addition, the effects of family and social factors on functional limitation were different across the three countries. It is speculated that the majority of differences across the three countries may be due to the different life courses experienced by these cohorts of elderly, cultural differences in reporting, or exposure to different health care systems. Thus, our study findings should be interpreted within the unique social and cultural context of each country.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Study diagram and analysis procedures.

Figure 2.

Person measure distributions of the older adults in the HRS, MHAS, and KLoSA on the same measurement scale (logits). The numbers on the left side indicate the measures of person ability and item difficulty in logits. The questions are located on the right side of the map. On the map, the people located on the top indicate high person ability (healthy) and those located at the bottom indicate low person ability (less healthy). “Ss” indicates 1 standard deviation and “Ts” indicates 2 standard deviations for item difficulty and person ability, respectively. Arrows between the dashed lines indicate the differences among the means of person measure across the three countries. HRS = Health and Retirement Study; MHAS = Mexican Health and Aging Study; KLoSA = Korean Longitudinal Study of Aging.

Table 1.

Demographic Characteristics of the Older Adults in the 2012 HRS, MHAS, and KLoSA, n (%).

Variables	Total ($n = 20,518$)	HRS ($n = 10,017$)	MHAS ($n = 6,367$)	KLoSA ($n = 4,134$)
Age, $M(SD)$	74.7 (6.9)	75.8 (7.1)	73.1 (6.6)	74.4 (6.6)
Sex (female)	11,681 (56.9)	5,870 (58.6)	3,431 (53.8)	2,380 (57.5)
Living arrangement (single)	8,462 (41.2)	4,484 (44.7)	2,585 (40.6)	1,393 (33.7)
Currently employed	4,247 (20.7)	1,857 (18.5)	1,469 (23.0)	921 (22.2)
Chronic conditions				
Stroke	1,578 (7.7)	972 (9.7)	291 (4.5)	315 (7.6)
Arthritis	10,579 (52.0)	7,064 (71.8)	2,155 (33.8)	1,360 (32.9)
Diabetes	5,167 (25.3)	2,649 (26.7)	1,647 (25.9)	871 (21.0)
Body mass index (kg/m^2), $M(SD)$	26.5 (5.3)	27.7 (5.6)	26.7 (4.7)	22.9 (2.9)
Self-rated health, $M(SD)$	3.4 (1.0)	2.9 (1.0)	3.7 (0.8)	4.0 (0.8)
No. of living people in house, $M(SD)$	2.4 (1.7)	2.0 (1.0)	3.1 (2.4)	2.2 (1.1)
No. of living children, $M(SD)$	4.1 (2.6)	3.3 (2.1)	5.6 (3.1)	3.5 (1.5)
No. of grandchildren, $M(SD)$	5.0 (7.5)	0.1 (0.5)	11.5 (9.5)	6.1 (3.7)
No. of living parents, $M(SD)$	0.1 (0.3)	0.06 (0.2)	0.25 (0.5)	0.06 (0.2)
No. of living siblings, $M(SD)$	2.9 (2.5)	2.5 (2.3)	4.0 (2.9)	2.4 (2.0)
Any children co-residing	7,613 (38.2)	1,807 (19.0)	4,476 (70.3)	1,330 (32.8)
Any children living in the same city	13,295 (67.7)	5,249 (56.9)	5,736 (90.0)	2,310 (56.9)
Any weekly contact with children	17,388 (88.6)	8,340 (90.6)	5,766 (90.5)	3,282 (81.0)
Any weekly religious group participation	7,624 (37.2)	4,504 (45.2)	2,439 (38.3)	681 (16.4)
Financial transfer from children	6,559 (33.7)	463 (4.9)	2,662 (44.0)	3,434 (84.6)
Financial transfer to children	3,708 (19.0)	2,635 (28.2)	862 (14.2)	211 (5.2)

Note. Self-rated health: 1 = very good to 5 = very bad. HRS = Health and Retirement Study; MHAS = Mexican Health and Aging Study; KLoSA = Korean Longitudinal Study of Aging.

Table 2.

Hierarchical Linear Regression Models—Functional Status Comparisons Among Older Adults Across the United States, Mexico, and Korea in 2012.

Variables	Regression coefficient (β), 95% confidence intervals [lower, upper]			
	Model I	Model II	Model III	Model IV
Survey				
KLoSA	Reference Group	Reference Group	Reference Group	Reference Group
MHAS	0.73 [0.62, 0.84] [*]	0.69 [0.58, 0.79] [*]	0.81 [0.69, 0.92] [*]	0.81 [0.68, 0.94] [*]
HRS	1.90 [1.80, 2.01] [*]	1.24 [1.13, 1.35] [*]	1.22 [1.10, 1.35] [*]	1.18 [1.03, 1.33] [*]
Age	-0.11 [-0.11, -0.10] [*]	-0.09 [-0.10, -0.08] [*]	-0.09 [-0.09, -0.08] [*]	-0.09 [-0.09, -0.08] [*]
Sex (female)	-0.79 [-0.87, -0.71] [*]	-0.50 [-0.58, -0.43] [*]	-0.48 [-0.56, -0.40] [*]	-0.48 [-0.56, -0.40] [*]
Living arrangement (single)	-0.25 [-0.34, 0.17] [*]	-0.11 [-0.19, -0.04] [*]	-0.13 [-0.21, -0.05] [*]	-0.13 [-0.21, -0.04] [*]
Body mass index, (kg/m ²)		-0.07 [-0.08, -0.06] [*]	-0.07 [-0.08, -0.06] [*]	-0.07 [-0.08, -0.06] [*]
Currently employed		0.54 [0.45, 0.63] [*]	0.52 [0.43, 0.61] [*]	0.53 [0.43, 0.62] [*]
Any weekly religious group participation		0.29 [0.22, 0.36] [*]	0.29 [0.21, 0.36] [*]	0.28 [0.21, 0.36] [*]
Self-rated health		-1.12 [-1.15, -1.08] [*]	-1.11 [-1.15, -1.07] [*]	-1.11 [-1.15, -1.07] [*]
Chronic condition				
Stroke		-1.23 [-1.35, -1.10] [*]	-1.23 [-1.37, -1.10] [*]	-1.23 [-1.37, -1.10] [*]
Arthritis		-0.78 [-0.86, -0.70] [*]	-0.75 [-0.83, -0.67] [*]	-0.74 [-0.82, -0.66] [*]
Diabetes		-0.30 [-0.39, -0.22] [*]	-0.30 [-0.38, -0.21] [*]	-0.29 [-0.38, -0.21] [*]
No. of living people in house			-0.04 [-0.07, -0.02] [*]	-0.04 [-0.07, -0.02] [*]
No. of living parents			-0.04 [-0.07, 0.14]	0.03 [-0.08, 0.13]
No. of living siblings			0.03 [0.01, 0.04] [*]	0.03 [0.01, 0.04] [*]
No. of living children			0.00 [-0.02, 0.02]	0.00 [-0.02, 0.02]
No. of grandchildren			0.00 [-0.01, 0.01]	0.00 [-0.01, 0.01]
Any children co-resides			-0.11 [-0.20, -0.01] [*]	-0.11 [-0.21, -0.01] [*]
Any children living in the same city			-0.14 [-0.23, -0.05] [*]	-0.14 [-0.23, -0.05] [*]
Any weekly contact with children			-0.05 [-0.17, 0.08]	-0.05 [-0.17, 0.08]
Financial transfer from children				-0.03 [-0.14, 0.07]
Financial transfer to children				-0.02 [-0.11, 0.07]

Variables	Regression coefficient (β), 95% confidence intervals [lower, upper]		
	Model I	Model II	Model III
<i>R</i> ²	.14	.17	.37

Note. Self-rated health: 1 = *very good* to 5 = *very bad*. HRS = Health and Retirement Study; MHAS = Mexican Health and Aging Study; KLoSA = Korean Longitudinal Study of Aging.

* Statistically significant at an alpha level of .05.

Family and Social Factors on Functional Status in the Three Individual Regression Models Across the United States, Mexico, and Korea in 2012.

Table 3.

Variable	Regression coefficient (β), 95% confidence intervals [lower, upper]		
	HRS	MHAS	KLoSA
Sex (female)	-0.80 [-0.92, -0.69] *	-0.66 [-0.92, -0.69] *	0.16 [0.00, 0.32] *
Living arrangement (single)	-0.30 [-0.43, -0.16] *	-0.01 [-0.16, 0.14]	-0.02 [-0.19, 0.15]
Currently employed	0.50 [0.36, 0.64] *	0.74 [0.57, 0.90] *	0.30 [0.14, 0.47] *
No. of living people in house	-0.09 [-0.19, 0.01]	-0.02 [-0.05, 0.00]	-0.12 [-0.19, -0.04] *
No. of living parents	0.07 [-0.14, 0.28]	0.03 [-0.10, 0.16]	-0.24 [-0.48, 0.01]
No. of living siblings	0.04 [0.02, 0.06] *	0.04 [0.01, 0.06]	0.00 [-0.04, 0.03]
No. of living children	-0.02 [-0.05, 0.00]	0.00 [-0.03, 0.03]	0.09 [0.01, 0.17] *
No. of grandchildren	-0.06 [-0.19, 0.08]	-0.01 [-0.02, 0.00] *	-0.03 [-0.06, 0.01]
Any children co-resides	0.05 [-0.15, 0.25]	-0.18 [-0.35, 0.00] *	-0.09 [-0.31, 0.13]
Financial transfer from children	-0.46 [-0.71, -0.22] *	0.01 [-0.12, 0.15]	0.19 [0.01, 0.37] *

Note. HRS = Health and Retirement Study; MHAS = Mexican Health and Aging Study; KLoSA = Korean Longitudinal Study of Aging.

* Statistically significant at an alpha level of .05.