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COGNITION AND SES RELATIONSHIPS AMONG THE MID-AGED AND ELDERLY: A COMPARISON OF CHINA AND INDONESIA

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Cognition and SES Relationships Among the Mid-Aged and Elderly: A Comparison of China and Indonesia

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ABSTRACT

In this paper, we use a measure of fluid intelligence, an adaptive number series test, to measure that part of cognition for respondents in two developing countries: China and Indonesia, both with very low educated elderly populations. This test was specially adapted by us and our collaborators from measures used in the United States to better fit such populations. We also use a measure of episodic memory and one measuring mental state intactness and examine their distributions and then the socio-economic gradients associated with each, concentrating on gender differences and how those change as SES and variables measuring community development are added.

We find large variation in our cognition measures in both countries, even among those 60 and over with no schooling. We explore the bivariate socio-economic gradients for these measures, separately for different age groups: 45-59 and 60 and above. We find strong gender, education and rural-urban gradients. Of these, the education gradient is the strongest, followed by the rural-urban gradient. China has a stronger rural-urban gradient than Indonesia, which is associated with the hukou residential permit system in China.

We find a significant, negative multivariate differential for women, that is significantly larger in China than Indonesia. The gender differential in both countries is smaller for the mid-aged, 45-59, for whom the gender schooling differentials are smaller. The gender differential declines substantially, and the China-Indonesia differential disappears once we control for SES characteristics. Adding community measures related to mean schooling and asset levels does not affect the gender differential.

Schooling levels are monotonically and significantly related to higher levels of cognition for all three of the variables we use. The magnitudes of the schooling coefficients are relatively large. Higher log of household per capita expenditure (pce) is positively associated with cognition, more so in China. Other SES characteristics such as height, are also positively related to the cognition measures, again more strongly so in China. Rural respondents have substantially lower levels of cognition measures, with a significantly stronger gradient in China. Mean community level schooling and log pce are also positively related to cognition outcomes, especially for elderly women.

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Introduction

In this paper, we use a measure of fluid intelligence, an adaptive block number series test, to measure that part of cognition for respondents in low income, low educated populations. We use population survey data from China and Indonesia, from the China Health and Retirement Longitudinal Study (CHARLS) and the Indonesia Family Life Survey (IFLS). The number series test was specially adapted by us and our collaborators from measures used by the Health and Retirement Study (HRS) in the United States to better fit such low income populations. We also use a measure of episodic memory and one measuring mental state intactness and examine their distributions and the socio-economic gradients associated with each, concentrating on gender differences and how these change as SES and variables measuring community development are added.

We use the fifth wave of IFLS, fielded in 2014/15, and the third wave of CHARLS, fielded in 2015/16, so this analysis is cross-sectional. The reason is that the main cognition variables we want to use are only available in wave 5 for IFLS and in wave 3 for CHARLS. IFLS covers all people within a surveyed household, and our cognition measures (except one) were asked of all respondents aged 15 and over. CHARLS is a nationally representative aging survey covering respondents aged 45 and over (and their spouses). In this paper we will make inter-country comparisons for comparably aged respondents, 45 and older and 60 and over.

Indonesia is a low-income country that has been growing economically at relatively high rates since the mid-1960s. There exists substantial variation within Indonesia, which IFLS well captures. China has grown from a low-income country to a middle-income country from 1980 until 2015. China's older population, however, has very little education, similar to Indonesia's elderly.

In this paper, we first examine the properties of our cognition measures, focusing on whether there exists variation by age and education groups and by education within age groups. We pay special attention to the lowest education within the oldest age group to see if there is variation with that group. This has been a concern of some social scientists in the past and some worry about the

number series test in this regard. We find for both IFLS and CHARLS that there does exist plentiful variation even among older people (aged 60 and above) with no schooling, specifically for the number series, as well as for the other cognition measures we use. The three measures are positively correlated, but not perfectly, so they are not measuring the exact same construct.

We explore the socio-economic gradients for these measures, separately for two different age groups: 45-59 and 60 and above. We find significant, negative differentials for women for all three cognition measures in both countries, that are lower for the mid-aged group, 45-59. The differentials are larger in China, significantly so, especially for the elderly age group. The gender differential declines substantially once we control for SES characteristics in both countries, and the country differential becomes insignificant. Adding community measures related to mean community schooling and mean community household per capita expenditure (pce) levels does not affect these gender differentials.

Schooling levels are monotonically and significantly related to higher levels of cognition for all three of the variables we use. The magnitudes of the schooling coefficients are relatively large in both countries. Higher household pce is also positively associated with cognition, more so in China. Other SES characteristics such as height, are also positively related to the cognition measures, again more so in China. Cognition measures are substantially lower among rural respondents, more so in China, the country differential being significant. Mean community levels schooling and household pce are also positively related to cognition outcomes, especially for elderly women.

Literature Review

Cognition psychologists separate cognition broadly into fluid and crystallized intelligence (Horn and Cattell, 1966, 1967; McArdle et al., 2002). Crystalized intelligence has to do with accumulated knowledge from school and from experiences. Fluid intelligence has to do with abstract reasoning ability. Past research has shown that fluid intelligence tends to peak during

adolescence or in young adulthood while crystallized intelligence in mid-age, around 50 (Horn and Cattell, 1967; McArdle et al., 2002). There are different dimensions of fluid intelligence. Quantitative reasoning is one, and has to do with reasoning with mathematical concepts. In this paper, we use a modification of an adaptive block number series test used in the HRS, which shows a series of numbers with one blank and asks a respondent to fill in the blank with no prompting of possible correct answers. Smith, McArdle and Willis (2010) have found the number series to be highly correlated with financial wealth in the HRS data.

Other dimensions of cognition include measures of episodic memory or mental status intactness. CHARLS and IFLS both use the HRS version of the CERAD immediate and delayed word recall to measure episodic memory (Ofsteddal et al., 2005). Ten 10 nouns are slowly read to the respondent who is then asked to recall as many as they can. After approximately 4 minutes of other questions the respondent is asked again to recall the nouns, without reading out the words a second time. Mental intactness is measured in HRS, CHARLS and IFLS using a series of questions from the Telephone Interview of Cognition Status (TICS) (Brandt et al., 1988). This includes recognition of date: month, day, year, season (CHARLS and IFLS allow using the lunar calendar and IFLS the Islamic calendar, in addition to Gregorian calendar), day of the week, how the respondent rates their own memory on an excellent, very good, good, fair, poor scale, and serial subtraction of 7s from 100 (up to five times). The respondent is also asked to redraw a picture of overlapping pentagons.

Lei et al. (2012, 2014) examine episodic memory and mental intactness using the China Health and Retirement Longitudinal Study (CHARLS) and document a large gender difference, with women having significantly lower scores. These gender differences are substantially larger for older women, in part because older women have a substantial disadvantage in schooling completed relative to older men. Among the youngest cohorts of women examined (who are mid-aged in

CHARLS) no gender differences were found. Controlling for education and other socio-economic (SES) covariates lowered but did not eliminate the gender differences.

However, adding community characteristics related to the level of community development did eliminate the gender difference for episodic memory, although not for mental intactness. Living in a more economically developed community is associated with better cognition scores, particularly for women.

Data

The data for this paper come from the fifth wave of the Indonesia Family Life Survey (IFLS) (see Strauss, Sikoki and Witoelar, 2016) and the third wave of the China Health and Retirement Longitudinal Study (CHARLS) (CHARLS, 2017).

The Indonesia Family Life Survey is a continuing longitudinal socioeconomic and health survey. It is based on a sample of households representing about 83% of the Indonesian population living in 13 of the nation's 26 provinces in 1993. The survey collects data on individual respondents, their families, their households, the communities in which they live, and the health and education facilities they use. The first wave (IFLS1) was administered in 1993 to individuals living in 7,224 households. IFLS5 was fielded in late 2014 and early 2015 on the same set of IFLS households and splitoffs: 16,204 households and 50,148 individuals were interviewed. IFLS has had cognition tests for part of the sample since the third wave in 2000. In IFLS5 new tests were added, plus the age range for old tests was expanded.

The China Health and Retirement Longitudinal Study (CHARLS) is a nationally representative survey of China. The CHARLS national baseline survey was conducted in 2011-12. It includes one person per household aged 45 years of age or older and their spouse (no matter the spouse's age), totaling 17,708 individuals, living in 10,257 households in 450 villages/urban communities (see Zhao et al., 2013). The sample includes 150 counties/districts in 28 of China's 30

provinces excluding Tibet. The sample is a stratified (by per capita GDP of urban districts and rural counties), multi-stage (county/district-village/community-household) sample, using PPS. In light of the outdated household listings at the village/community level due to population migration, CHARLS designed a mapping/listing software (CHARLS-GIS) that makes use of Google-earth map images to list all dwelling units in all residential buildings to create sampling frames. The third wave of CHARLS was administered from mid-2015 to early 2016 and covered 12,450 households with 21,057 respondents. As for IFLS, and HRS, CHARLS surveys split-off households, which is why the increase in sample size.

The major new cognition test added in IFLS5 and the 3rd wave of CHARLS, and the main subject of this paper, is an adaptive number series test, designed after the test used in the Health and Retirement Study (HRS) (see Fisher et al., 2013). In IFLS this is given to all respondents aged 15 and higher; in CHARLS to all respondents. The number series test measures a specific form of fluid intelligence related to quantitative reasoning. It has been found by Smith, McArdle and Willis (2010) to be highly correlated with the financial wealth of HRS respondents. The test requires a respondent to look at a series of numbers with one number missing and to fill in the missing number.

The HRS number series is a 6 question block adaptive test (with 15 questions in total that could be asked). All respondents are asked the same first three questions. Depending on how many correct they answer they go to a second block of four possible, each having three additional questions. The difficulty of the second block of questions is increasing with the number of correct answers for the first block of three questions. Within each block the 3 questions have an increasing level of difficulty.

We worried that the level of difficulty of the HRS version might be too difficult for countries with low levels of schooling and income. With the support of the Division of Behavioral and Social Research of the National Institute on Aging, Strauss, John McArdle (co-PI for cognition of HRS), Robert Willis (former PI of HRS) and Rebeca Wong (PI of the Mexican Health and Aging Study,

MHAS) had a series of discussions that led to efforts to develop and field test a revised version of the number series test. Under the leadership John McArdle and with the help of Dr. Richard Woodcock, a revised version of the HRS test was developed, with some of the same questions as HRS, plus some new questions of lesser difficulty. We pretested this new version extensively in both Indonesia and Mexico and found that the new version was well-suited to low schooling environments. In particular, even older respondents with no schooling could generally answer some of the questions correctly, so we had power to discriminate their fluid intelligence (see Prindle and McArdle, 2013). This is the version that is used in both IFLS and CHARLS.

The number series answers are scored using a standardized score called a W-score. These are comparable to the W-scores used in the Woodcock-Johnson III test battery (Jaffe, 2009). The W-scale is a transformation of the difficulty parameters from a Rasche item response model. It is an interval scale and the differences in scores is supposed to measure the same difference no matter where on the scale, for example between 400 and 410 and 500 and 510. In the particular test used in IFLS W-scores range from 299 to 635, with 17 different ordinal scores. The W-scores are comparable across surveys, even though not all of the questions are the same. So for instance, W-scores from IFLS can be compared to those of CHARLS, but also to those of HRS. This is because IFLS and CHARLS use some of the same questions as in HRS.

IFLS4 in 2007 introduced a measure of episodic memory as measured by immediate and delayed word recall, which was repeated in IFLS5. The HRS version of the word recall is used. CHARLS has used the same HRS version since wave 1. The respondent is told and shown 10 commonly used nouns, then asked to repeat as many as they can remember, both immediately and after approximately 4 minutes of other questions. In this paper we use the mean number of words recalled correctly on both immediate and delayed recall.

Finally, we examine a measure of mental status called mental intactness. It is a combination of nine different questions taken from the Telephone Interview of Cognitive Status (TICS): 3 having

to do with date orientation, up to 5 having to do with the ability of the respondent to subtract 7 from 100 5 successive times, and 1 having to do with the respondent being able to draw a figure with 2 overlapping pentagons, while looking at a picture of the drawing done correctly. These questions were partly introduced in IFLS4 and updated in IFLS5. They have been used in CHARLS since wave 1. They are also used in HRS. In IFLS some of the mental intactness questions are only given to respondents aged 50 and older, although in CHARLS all questions are given to everyone. The CHARLS mental intactness and episodic memory questions have been used in a number of related papers, including Lei et al. (2012, 2014).

IFLS and CHARLS are very broad-based population panel surveys, containing information on many dimensions of life. In this paper we look at SES measures and their correlations with these cognition measures for different age groups. We focus on gender differences controlling for five year age dummies, district (IFLS) or county (CHARLS) dummies and a dummy for rural area (IFLS or rural hukou (CHARLS). We then examine how the gender differences are intermediated by levels of schooling, a linear spline in log of household per capita expenditure (pce), height and marriage status. For levels of schooling, we include dummy variables for some primary, complete primary, complete junior high school, and complete senior high school or more, relative to the omitted category, no schooling. We also add community fixed effects and explore what factors could be responsible by including community mean levels of schooling levels and log pce and allow them to interact with the female dummy, similar to the work of Lei et al. (2012; 2014) using CHARLS data. For the SES regressions we use 2 broad age groups: 45-59 and 60+, for both IFLS and CHARLS.

Cognition test distributions and correlations

Table 1a shows the pattern of answers to the number series questions by all respondents 45 and older in both IFLS and CHARLS. As shown in Table 1b, the 3 entry block questions were all answered correctly by 17.5% of respondents 45 and older in China and 12.5% in Indonesia (a higher

fraction correctly answered all 3 among respondents under 45 years in Indonesia). Comparable fractions, 16.3% of respondents in China and 14.4% in Indonesia, did not answer any of the first three questions correctly. In general, within each block the first question, which is the easiest, is answered correctly by a higher percent than the second or third questions. It is not always the case that questions in the easier blocks after the opening block that all respondents answer are more frequently answered correctly than those in harder blocks, because of selection of the respondents who are answering each block.

Table 1b shows the distributions of W-scores for all age groups combined. We show for the entry block and for each second block, the number of respondents and the percent that get each number of correct answers, and the associated W-score. Some 12.9% in China and 8.5% in Indonesia 45 and older got no correct answers out of 6 possible and only 1.1% and 0.6% in China and Indonesia respectively got all 6 correct. Getting one correct in the opening block and one correct in the (easiest) second block is the modal score, 16.7% Chinese and 21.4% Indonesians did that. Getting two correct in the opening block and none in a harder second block has the next highest frequency in China, 15.8%, while one correct in the opening block and none in the second is the next highest in Indonesia, 18.3%. There is a good spread among the rest of the W-score categories.

Figure 1 displays the histograms of W-scores by 2 age groups: 45-59 and 60+, and by schooling level: no schooling, some primary, completed primary, completed junior high school and completed senor high school or more. The CHARLS and IFLS scores are plotted over each other. The W-score distribution shifts left for both distributions with older age and with less schooling. The W-score distribution is slightly shifted left for the CHARLS compared to the IFLS sample, both for age and schooling. Likewise the distribution shifts left for each education group for the elderly (60 and over).

Table 2 shows the distributions for all respondents aged 45 and older and for each schooling level within this group. For the subset of the elderly with no schooling, the group we may be most

worried about, 34.2% in China and 30.6% in Indonesia got nothing correct, which means that 65-70% did get at least one correct answer; indeed one can observe there is a distribution of correct answers among this group. Figure 1 shows the histogram for this group, which shows that there exists variation in the W-scores.

Figure 2 exhibits the histograms for the word recall, again by age group and education level. The distributions are close between IFLS and CHARLS. They are somewhat right skewed for the mid-aged and elderly groups, similar to W-scores. The distributions have a lot of spread in it, even for elderly with no education, as shown in Table 3. By education, there is a strong skew for the elderly with no schooling, but the distribution is much more centered for high schooling groups, even among the elderly.

A very similar set of patterns exists for mental intactness for those 50 and over and 60 and over, as shown in Figure 3 and Table 4. The CHARLS distribution has somewhat more spread on both ends than that for IFLS. For both countries, the distributions by age group are centered for those with no schooling, but become left-skewed at higher levels of schooling. For mental intactness in Indonesia, a very trivial percent, 2.6%, gets nothing correct among the over 50 and no schooling group, while for China a much larger fraction, 16.9% got nothing correct.

Table 5 shows the simple correlations in the raw data between the number series, word recall and mental intactness for 45 and older and the two sub-age groups. The correlations between W-score and word recall are very close for China and Indonesia, .43 and .41 respectively. Between W-score and mental intactness (for 50 and over) the correlation is higher in China, .63, compared to .47 in Indonesia. There are small differences in the correlations across the 2 broad age groups, some of which may be due to correlations with age (and schooling, which in turn is correlated with age). For both countries, the correlations are slightly higher for the older age group.

Gender and SES gradients of cognition measures

We conduct this analysis in two parts. First we examine figures of cognition scores by age; stratified by gender, by education level and by urban-rural status. We then report regressions, focusing on the elderly, but run the same regressions for the 45-59 age group, which are reported in the Appendix. Figures are not weighted, but all regressions are, with cross-section sample weights that are corrected for non-response (see Zhao et al., 2013 and Strauss et al., 2016, for details on construction of these weights).

Figures 4-6 show the bivariate patterns of cognition by age for W-scores (Figure 4), word recall (Figure 5) and mental intactness (Figure 6). Each figure has three panels, showing the stratifications by gender, education level and rural-urban status. For the W-score, we can see in Figure 4a, that men score higher than women, and the difference is larger for older respondents. This is the pattern reported by Lei et al. (2012, 2014) for word recall and mental intactness, which they demonstrate is due in part to a wider schooling gender gap for older Chinese. The same pattern is displayed for word recall and mental intactness (remember that the scales differ for the three cognition measures).

For the W-score and to a lesser extent word recall, the scores tend to be higher for Chinese than for Indonesians, both men and women, consistent with the density plots. That is reversed for mental intactness for women, although not for men; the reasons for this are not clear.

The bivariate education gradients are very large, larger than the bivariate gender gaps. These seem to decline with younger age slightly for the W-scores, but not as much for word recall or mental intactness. As is true for gender, by education level the W-scores are higher for Chinese than for Indonesians, except at very old ages for women. This may result from differing mortality selection patterns between China and Indonesia. For word recall we see a similar pattern except that the differences within education groups are small compared to the W-scores. For mental intactness Indonesian women have higher scores across all ages, given their education level, although the reverse is true for men.

Chinese with agricultural hukou have lower cognition scores than those with non-agricultural hukou for all 3 measures. The difference is large, larger than the gender gap, but not as large as the education gap. For Indonesia, the rural-urban cognition gaps are considerably smaller than for China. This is not so surprising because in China the hukou status is mandated and hard for individuals to change, even when one migrates, whereas in Indonesia there do not exist residential permit requirements. Also in Indonesia the difference between urban and rural is often very blurred.

We now turn to the regression results. Table 6 presents descriptive statistics (weighted like the regressions) by gender for the SES variables for elderly group for both CHARLS and IFLS. Appendix Table 1 presents the same for the mid-aged group, 45-59.

For the elderly group presented in Table 6, mean W-scores are higher for men in China than in Indonesia (significant at the 1% level), and slightly higher for women (significant at 10%). Mean word recall scores are roughly the same in both countries for both genders, while for mental intactness, mean scores are slightly higher for men in China, but for women in Indonesia (both differences significant at 1%). Among the mid-aged group, W-scores are also higher in CHARLS, but the differences only significant for men.

Within each broad age group, CHARLS has a slightly older population than IFLS. To account for this and other age impacts in the regressions we control for 5-year age dummies. They are jointly significantly different between CHARLS and IFLS.

For the elderly, CHARLS has a larger fraction in the tails compared to IFLS, the education dummies being jointly significantly different between the countries at 1%. IFLS has a higher fraction of male respondents than CHARLS who have completed high school or more, 20% versus 10%, while for women the fractions are the same, 10%. However when we aggregate completing junior high plus senior high school or more, the fractions are a little higher in CHARLS for both men and women. The fraction of population with no schooling is a higher among the CHARLS elderly

than in IFLS, especially for women.[1] Some 54% of the elderly women in the CHARLS sample have no schooling, compared to 35% in IFLS. For men with no schooling the corresponding fractions are 19% for CHARLS and 13% for IFLS. Notice that when we aggregate no schooling with some primary (which means unfinished primary) the fractions are comparable for women across CHARLS and IFLS, while for men they are much higher in IFLS (62% versus 67% for women in CHARLS and IFLS respectively; 29% versus 46% for men).

As shown in Appendix Table 1 for the mid-aged, 45-59, schooling differentials are considerably narrower between CHARLS and IFLS samples, although they are still jointly significantly different. While the fraction with no schooling remains larger for women in CHARLS, 28% compared to 14%, for men they are roughly the same, at 8% and 9%. Aggregating no schooling with some primary, the fractions for men are larger in IFLS, as is true for the elderly. For women, the aggregate with low education is still now considerably larger in IFLS. On the other tail, aggregating junior high with senior high or more, the fractions for men are higher in CHARLS for both men and women.

As noted by Lei et al. (2012), the fraction of women with low education in CHARLS is much smaller for the mid-aged compared to the elderly. If we take the ratio of women with no schooling or some primary to those with junior high and above, for the elderly it is 62/11 and for the mid-aged it is 35/43. For men in CHARLS the same ratio is 29/33 for the elderly and 13/66 for mid-aged men. In IFLS the same ratios have a large turnaround, but smaller than for CHARLS, especially for women: 67/15 to 46/29.

Attained mean heights are larger in CHARLS for both men and women, by about 4.5cm, a fairly large amount and statistically significant at 1%. In both samples heights are larger for the mid-aged than the elderly, which had been shown with IFLS data by Strauss and Thomas (1995) among

[1]IFLS does not cover eastern Indonesia, which is the poorer part of the country. The sample weights help correct for this.

others, and is generally true over the twentieth century in developing countries, height has been increasing by later birth cohort in most countries.

Comparable fractions of elderly men are currently married between CHARLS and IFLS, but a much larger fraction of CHARLS women are married, again the country differences being significant, at 1%. This may reflect a higher older male mortality rate in Indonesia, and also lower divorce rates in China.

Finally, larger fractions of men and women have agricultural hukou in CHARLS than are rural residents in IFLS. Part of that is because recent urban migrants in China often have agricultural hukou. Since this comparison uses sampling weights, it should not reflect sampling factors, which are more urban-centered in IFLS than CHARLS.

Table 7 shows the coefficient on the female dummy variable in the base specification that contains 5-year age dummies within each of the two broad age groups, dummies for district or county of residence and a rural dummy.[2] The coefficient for each of the 2 broad age groups is shown for each of the 3 cognition measures. For mental intactness we only show it for the 60 and over age group since in IFLS it is only available for the respondents 50 and over.

The female coefficient is more negative for the elderly than the mid-aged in both China and Indonesia; it is statistically significant at under 5% in all cases. Furthermore, the coefficient is more negative, and significantly so at under 1%, in the CHARLS data for both W-scores and mental intactness, but is approximately the same for word recall. For example, for the W-scores, the female dummy coefficient for the 45-59 year group is -25.9 for IFLS and -33.7 for CHARLS. For the 60 and over group the coefficients are -36.7 for IFLS and -56.7 for CHARLS. Remember, these W-scores are directly comparable across the two countries.

For the other cognition measures, the gender differences by age groups also exist. For word recall in IFLS, the female coefficient is -.15 for the mid-aged group and -.29 for the elderly, both

[2] For CHARLS this is a hukou variable, not actual place of residence.

significant; while for CHARLS it is -.08 and -.27 respectively for the 45-59 and 60 plus age groups. For mental intactness for the elderly, the difference between IFLS and CHARLS female disadvantage is large, -.85 for IFLS and -1.95 for CHARLS.

We now examine how the gender differential is affected as we add additional SES covariates, discussed above. Tables 8 and 9 show results for number series, word recall and mental intactness for the 60 and older groups in CHARLS and Tables 10 and 11 for IFLS. Appendix Tables 2 and 3 show the results for 45-59 year respondents in CHARLS and Appendix Table 4 for IFLS. In each case we first add individual and household level SES covariates, then community variables with interactions with the female dummy allowing for differential effects for women and men; and finally community fixed effects.

The gender differential on the W-score moves to under 1/5 its level in CHARLS and under 1/3 in IFLS once own education level dummies are added along with a linear spline in household assets, linear height and a dummy for being married. It is still statistically significant at the 5% level. The female differential between CHARLS and IFLS is no longer significant once SES covariates are added. The female differentials in CHARLS and IFLS do not change further as we add community fixed effects in column 4 or community mean schooling levels and asset variables, interacted with the female dummy, in column 3.

For word recall, we see that the gender dummy turns sign to positive for both CHARLS and IFLS and is significant as SES variables are added (becoming positive is consistent with results for CHARLS in Lei et al., 2014). For CHARLS the mental intactness coefficient drops to ¼ of its level as SES covariates are added, while for IFLS it becomes slightly positive, but insignificant. For both word recall and mental intactness in both CHARLS and IFLS, the female coefficient does not change much when community variables or fixed effects are added.

All three cognition measures are monotonically decreasing in 5-year age groups within the broader age group categories and the age dummies are jointly significant at under 1% in both broad

age groups. For both 45-59 and 60 and above age groups the age gradients for all three cognition measures are smaller once own SES covariates are added, probably in part because older respondents have lower schooling in both countries and low education is associated with lower cognition.

Own schooling levels have positive, significant and monotonically increasing coefficients for all three cognition measures. The coefficient magnitudes are large for the W-scores, especially for the elderly. They are substantially larger in magnitude than the coefficients on the female and age dummies in the same regressions. Being larger in magnitude for the older age group may reflect a mortality selection effect that older respondents with higher levels of schooling are more positively selected than for younger age groups.

Log of household pce has positive, significant associations with the cognition measures, for values below the sample median (the knot point used) for the CHARLS sample, but the coefficient magnitudes are much smaller and are not significant for the IFLS sample. However, the differences between CHARLS and IFLS for household pce coefficients are not statistically significant.

Height is positively and significantly related to all the cognition measures in both CHARLS and IFLS samples. The magnitude of the height coefficients for the W-scores are small in IFLS, and larger, but not significantly so, in CHARLS. For word recall and mental intactness the coefficient magnitudes are similar. In the CHARLS sample, a 10 cm increase in height, which is very large, is associated with an 11.2 point increase in the W-score for the elderly, while in IFLS with only a 6.4 point increase. Height in this case is a reflection of childhood health, but its association with the W-scores is less in magnitude than are schooling levels or age, and less too than being female (except for an exceptionally large, 10 cm, increase in height).

The marriage dummy has differing associations with different cognition tests for the elderly in CHARLS and IFLS. In the CHARLS elderly sample, being married is generally associated with better cognition, significant in most cases, but the coefficient magnitudes are small compared to the other SES variables. In the IFLS elderly sample, for number series, being married is associated with

a significantly lower W-score, though the magnitude is small. The difference in the marriage coefficient is significant between CHARLS and IFLS. For word recall, there is a positive relationship, significant at 5%, while for mental intactness no relationship exists. For the mid-aged group, 45-59 in CHARLS, being married is positively and significantly associated only with word recall, not with the W-score or mental intactness. In IFLS it is only weakly significant (at 10%) with the number series.

Overall, a positive association of marriage with cognition may represent a selection effect. Those elderly who are married, conditional on age, may be healthier with healthier spouses, and have better cognition. It may also reflect the "protective" influences of marriage, so often observed on outcomes such as labor earnings. However, as seen, the association of marriage, conditional on other SES covariates, with cognition is not systematic across the different cognition measures, nor across the two country samples.

Community influences

The base specification contains district dummy variables, plus a dummy variable for living in a rural area for IFLS and a dummy for having an agricultural hukou for CHARLS. The agricultural hukou dummy is negative and significant in the CHARLS base specifications for all three cognition variables, and the magnitudes are large, a little less than the female dummy coefficients for the W-score and mental intactness, but more negative for word recall. The coefficient magnitudes drop considerably when SES covariates are introduced, but are still significant. They drop a little more, but still significant, when community covariates are introduced.

In the IFLS sample, the rural dummy coefficients are small, 1/3 of the female dummy coefficient for the W-score, but larger for word recall and mental intactness, roughly comparable in size to the gender differential. The rural coefficients are substantially and significantly smaller for IFLS than for CHARLS. When SES covariates are added the IFLS rural differential greatly shrinks and becomes insignificant for W-score and word recall. The difference between IFLS and CHARLS

coefficients are now not significant. For mental intactness it shrinks by 1/3 to ½ but is still significant when SES variables are added and the differential between CHARLS and IFLS is still significant at 5%. When community variables are added the rural dummy further shrinks and becomes insignificant for mental intactness. The same pattern is observed for the mid-aged group, except that in the CHARLS results, the rural hukou differentials are somewhat larger for the elderly than the mid-aged.

Following Lei et al. (2012, 2014) in the third columns we add community mean values for the schooling level dummies and log household pce, taking a linear spline again for mean log pce. We also include interactions of the community variables for females, allowing for differential effects by gender. We still control for respondent level schooling level and log pce of the respondent households, as well as for other individual characteristics. The community means are calculated removing values for the reference respondent. The community means will reflect several factors controlling for respondent covariates, including the relative position of the respondent within the community. In the fifth and final column we present results with community fixed effects, that will account for all observed and unobserved community influences. These results are similar to the results when we add SES covariates. The community dummies are always jointly significant.

The observed uninteracted community variables for IFLS are jointly significant at 5% or better for all three cognition measures, for the elderly group, but not for CHARLS. In the case of IFLS it is the community mean schooling level variables that are responsible for this. Increasing levels of community schooling, conditional on own schooling, are associated with higher W-scores and word recall correct answers. The size of the community mean schooling level coefficients are smaller than the coefficients for respondent schooling levels.

However, for CHARLS when we consider interactive community effects with the female dummy plus the level coefficients, they are always jointly significant. The interaction coefficients themselves are jointly significant for the W-score (at 10%) and mental intactness (at under 1%), but

not for word recall. Higher mean community schooling and higher mean log pce have significantly more positive associations for elderly women than men for W-scores and word recall, consistent with what Lei et al. (2014) found for the mid-aged and elderly in China. However, the community associations of mean schooling and mean pce for women are smaller than it is for respondent's own education and pce.

For IFLS the coefficients on mean community education, and to a lesser extent mean household pce, are higher for women for W-scores and mental intactness, but are lower for word recall. The female interactions are jointly significant at 5% for all three cognition measures.

It is not clear what the exact pathways behind these relationships may be; one possibility is that higher community mean schooling may be correlated with better quality social networks within which one has social interactions, which may be better for elderly women than men in Indonesia.

These relationships are different for the mid-aged group. For IFLS, the community variables are not jointly significant for any of the cognition measures. However, once we allow for differential effects for women, the community coefficients plus the interactions are jointly significant at under the 1% level, being higher for women for both mean community education and household pce. For CHARLS it is again the interactions with female that make the community coefficients jointly significant. Now the associations with community education and pce are smaller for women than for men for the W-score, but the reverse for word recall, and mixed results for mental intactness. The coefficients for mean community education and pce are smaller than those for the respondent's own.

Conclusions

This paper examines three different measures of cognition in China and Indonesia among respondents aged 45 and older. We concentrate on a measure of fluid intelligence: an adaptive block number series test, plus a measure of episodic memory and a measure of mental intactness. The number series test is new for population surveys in developing countries, and has been specially

modified from the version used in the Health and Retirement Study in the US to be better suited to low income, low education environments.

We first examine the properties of our cognition measures, focusing on whether there exists variation, particularly among the lowest education and oldest age groups. This has been a concern of some social scientists in the past and some worry about number series in this regard. We find there does exist plentiful variation in both China and Indonesia even among older people (aged 60 and above) with no schooling. The three measures are correlated, but not perfectly, so they are not measuring the exact same dimension of cognition.

We explore the socio-economic gradients for these measures, separately for middle-aged 45-59 and elderly 60 and above. We focus in part on the gender differential, finding a significant, negative differential for women. This differential is less for the mid-aged group, for whom the schooling differentials are smaller, and considerably larger, statistically significantly so, in China. It declines substantially once we control for SES characteristics, with the country differences no longer being statistically significant. Adding community measures related to mean schooling and asset levels does not much affect the gender differential.

Schooling levels are monotonically and significantly related to higher levels of cognition for all three of the variables we use, in both China and Indonesia. The magnitudes of the schooling coefficients are relatively large. Higher household per capita expenditure is also positively associated with cognition, more so in China. Height, too, is positively associated with better cognition, although the magnitudes are not large in Indonesian, but larger in China.

There are large rural deficits for the elderly in cognition, larger and significantly so in China, which become smaller once socio-economic covariates are added, with the country differential no longer being significant. Community mean schooling and mean log pce for the elderly are generally positive and significantly related to the cognition measures we consider in Indonesia, especially for community schooling. For China it is only for women that the community variables are jointly

significant. The effects are often more positive for women, especially for elderly women. For mid-aged respondents the community variables have a much more mixed set of results.

We must stress that the data are cross-sectional because the number series measures are only available in one wave for both CHARLS and IFLS. Hence we cannot say anything about dynamics of fluid intelligence and its SES gradients. With future waves of CHARLS and IFLS we will be able to examine changes.

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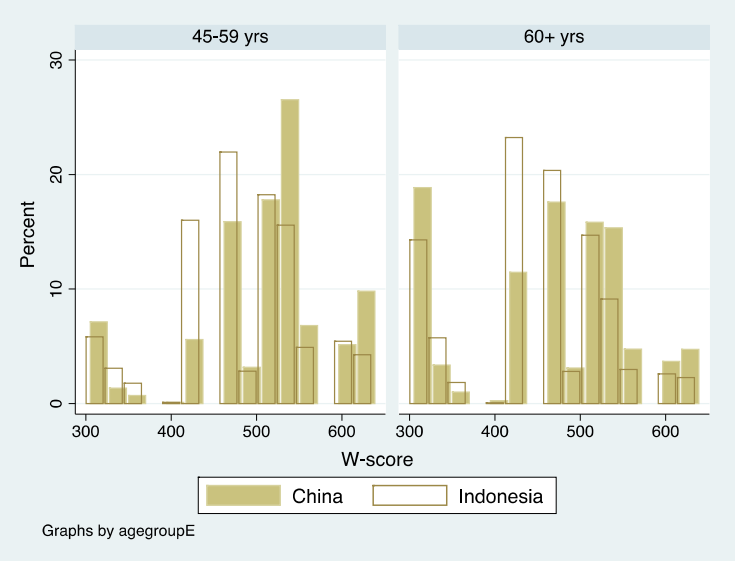
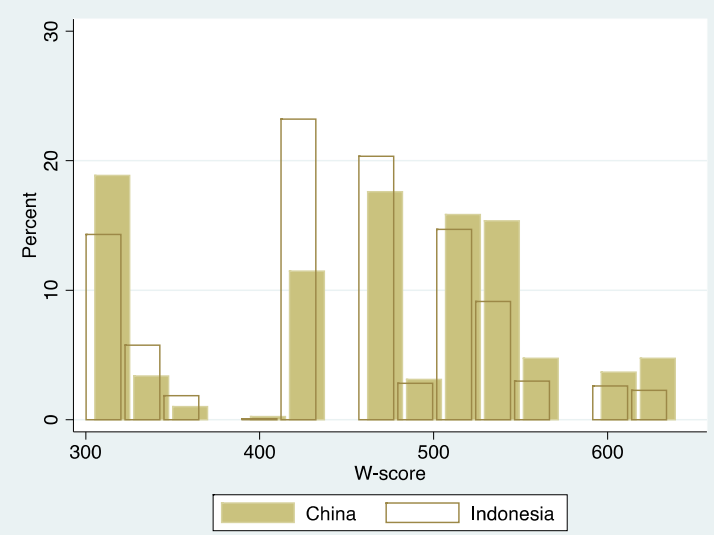
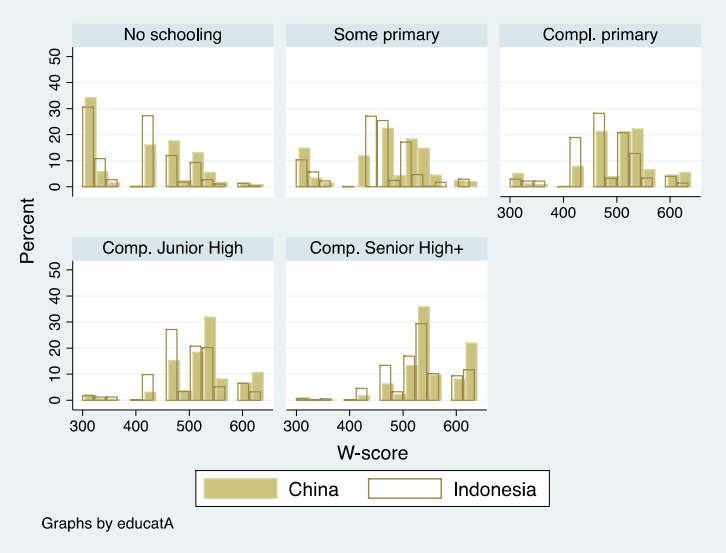
Figure 1. W-score by age group and by education





Age 45+

Age 60+



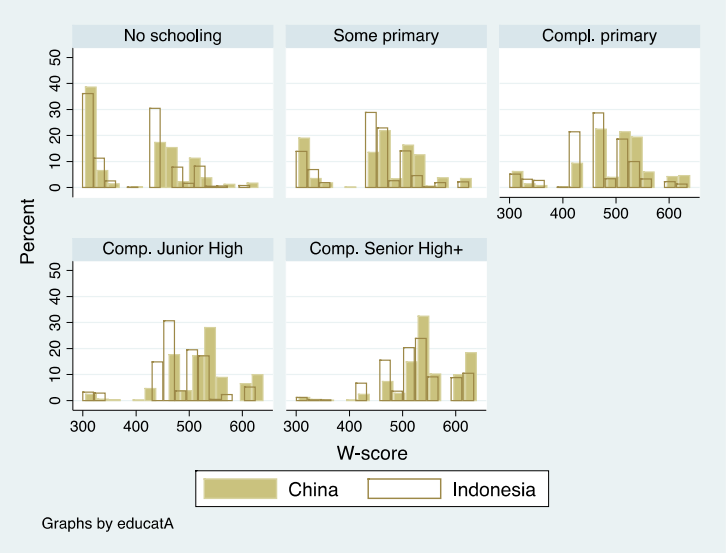
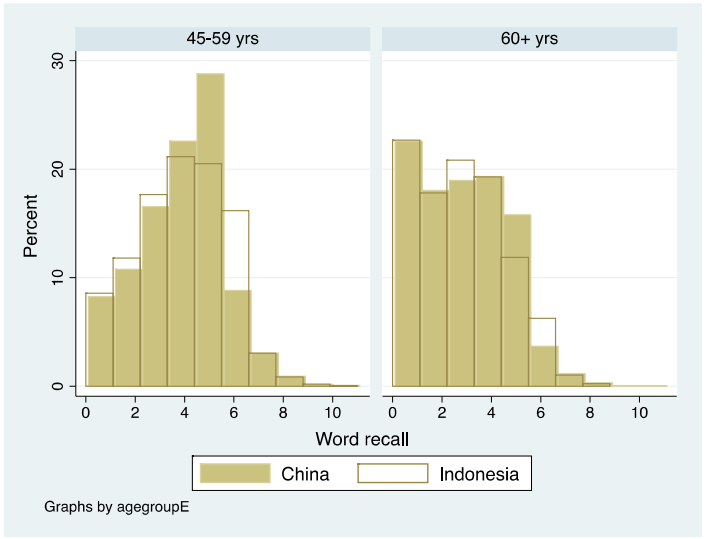
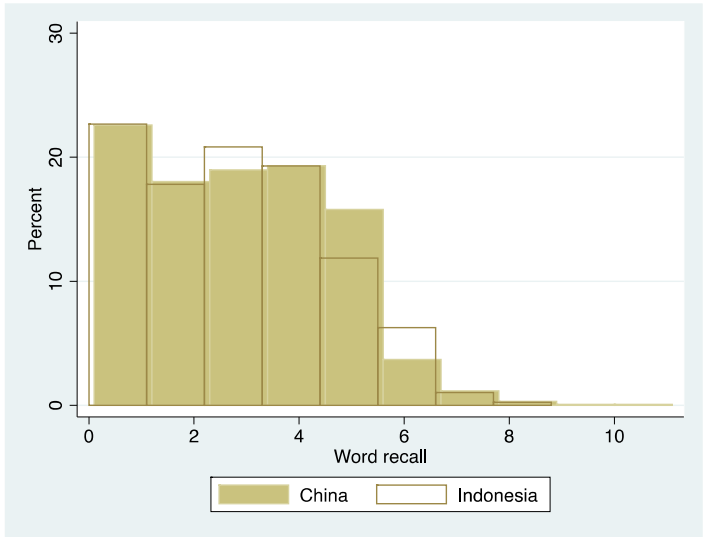


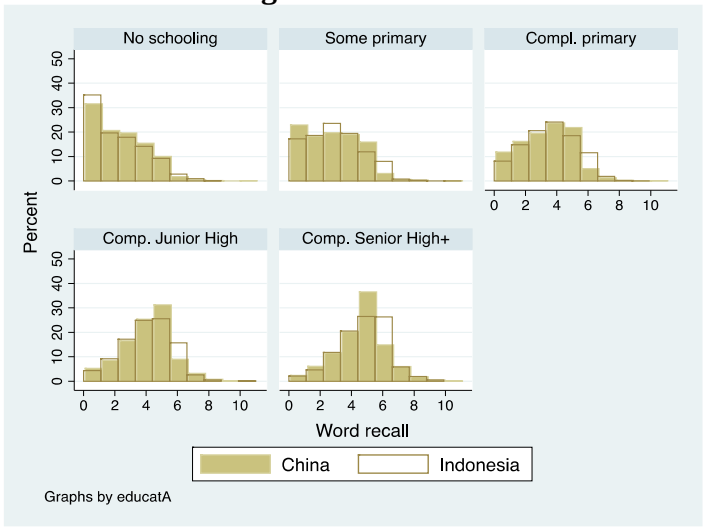
Figure 2. Word recall by age group and by education





Age 45+

Age 60+



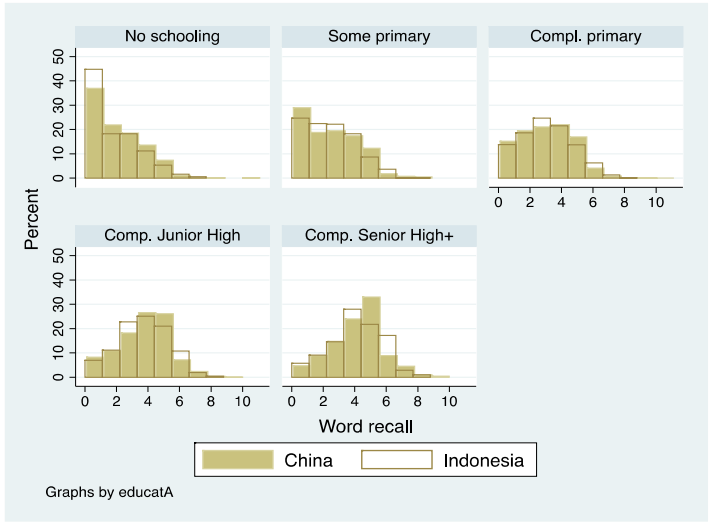
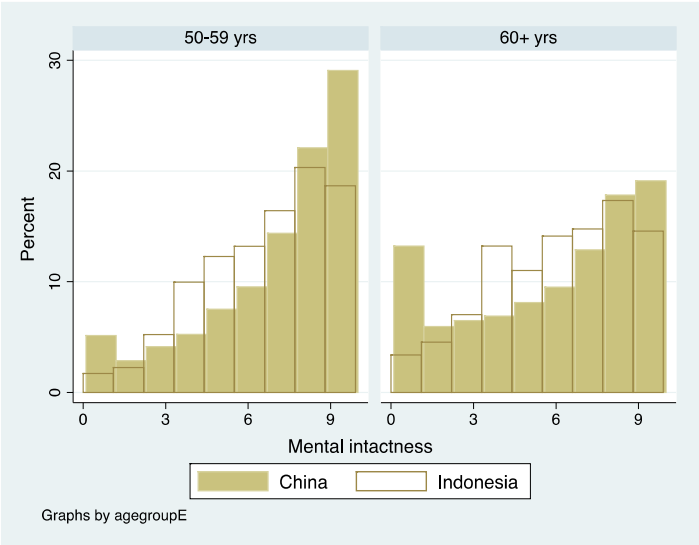
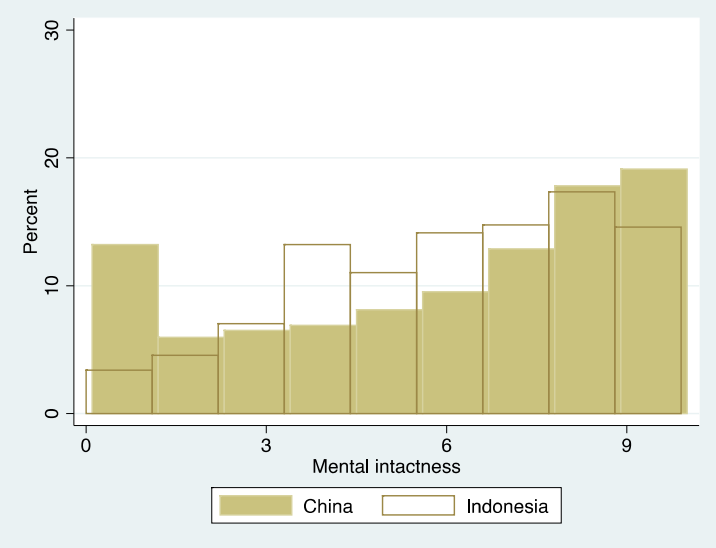
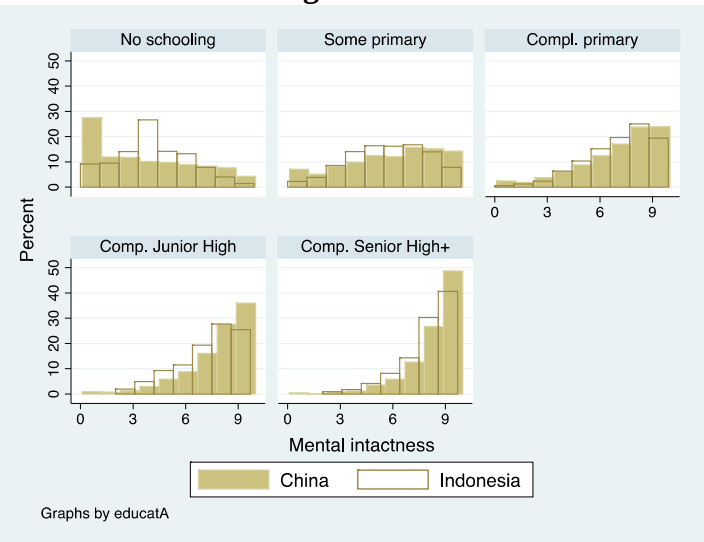


Figure 3. Mental intactness, by age group and education





Age 50+



Age 60+

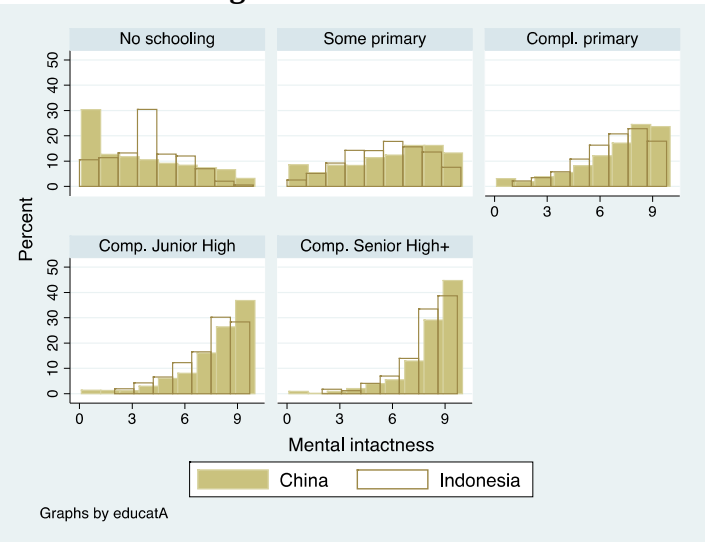


Figure 4a. W-score and age, by gender

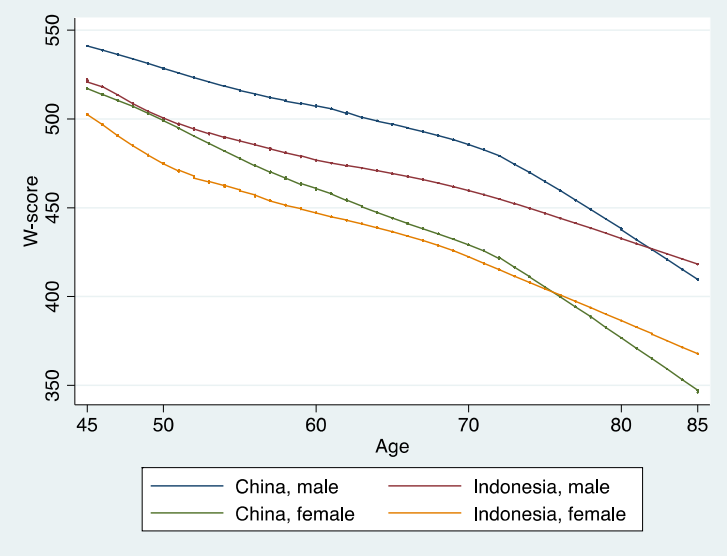


Figure 4b. W-score and age. highly educated vs no-schooling

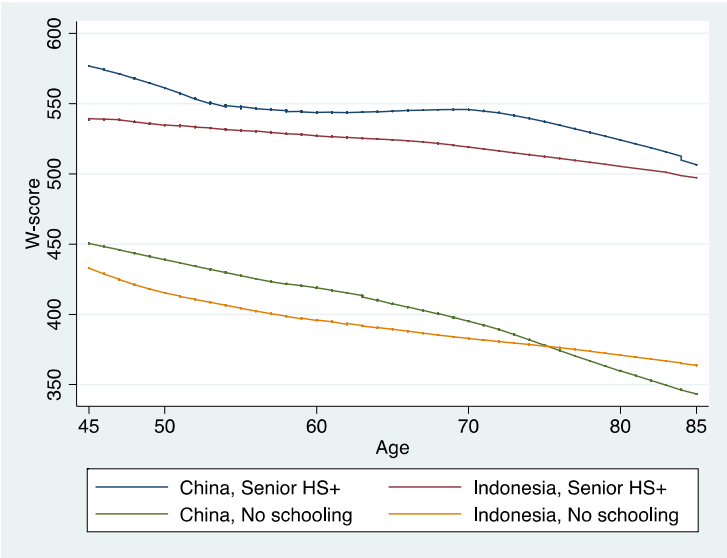


Figure 4c. W-score and age, by residence

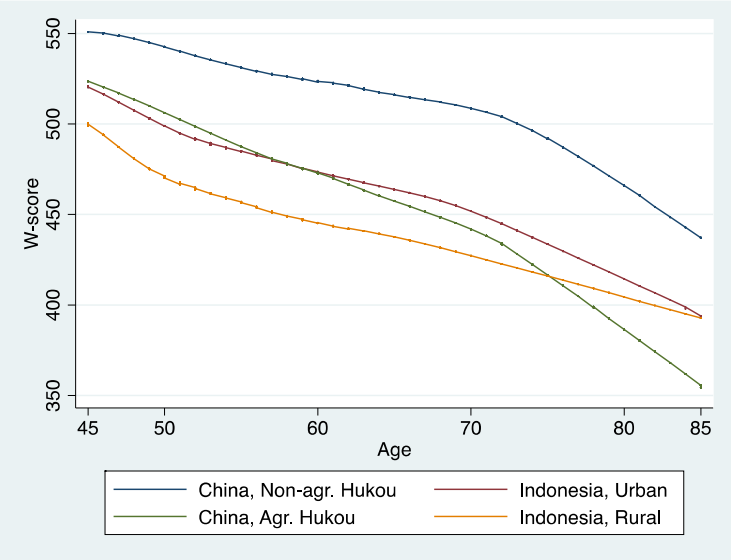


Figure 5a. Word recall and age, by gender

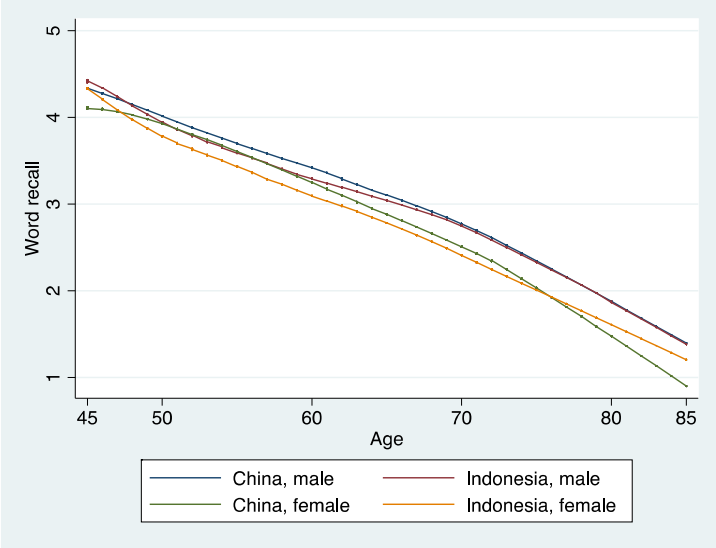


Figure 5b. Word recall and age. highly educated vs no-schooling

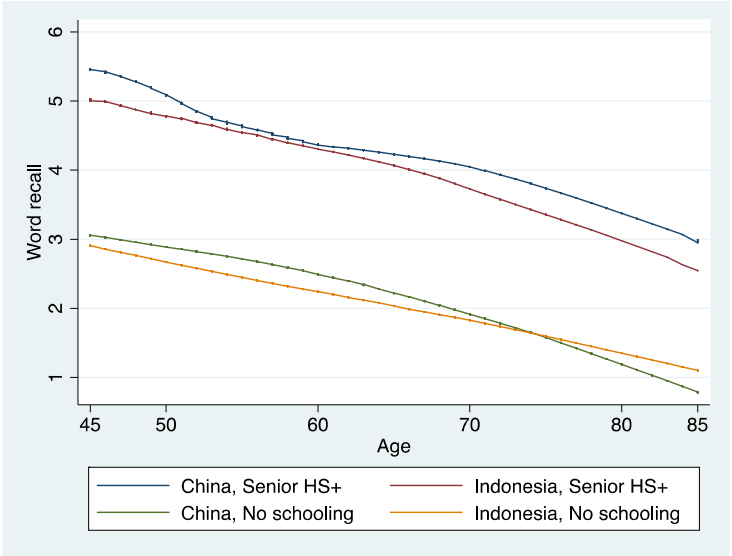


Figure 5c. Word recall and age, by residence

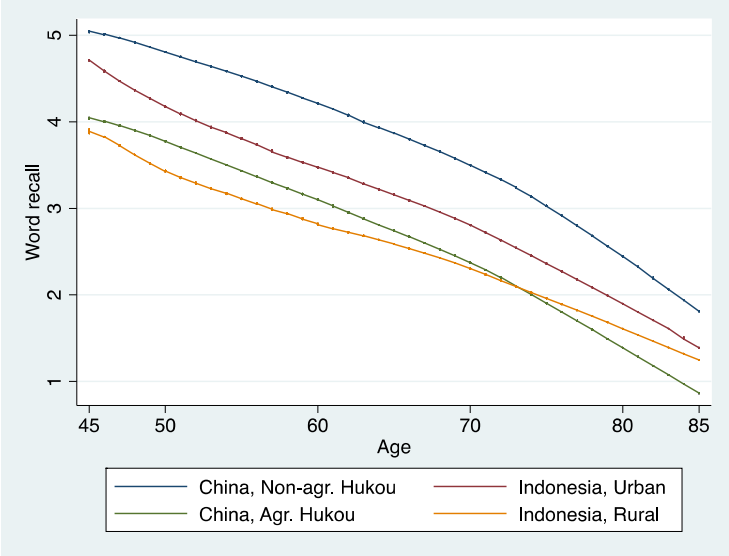


Figure 6a. Mental intactness and age, by gender

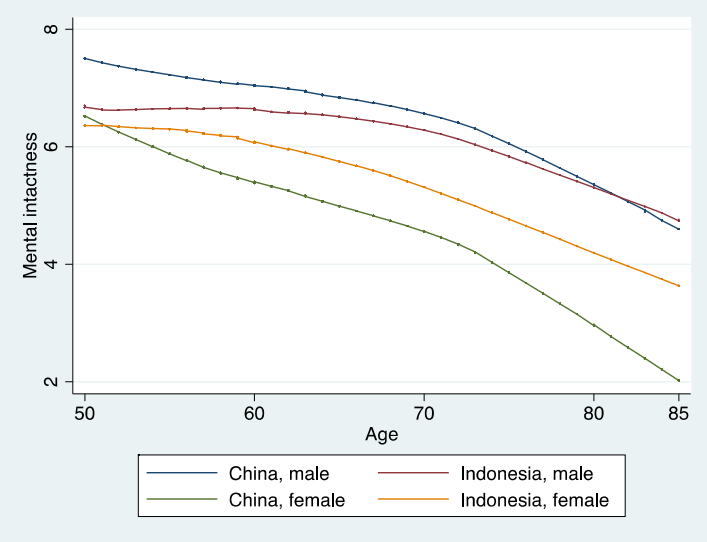


Figure 6b. Mental intactness. highly educated vs no-schooling

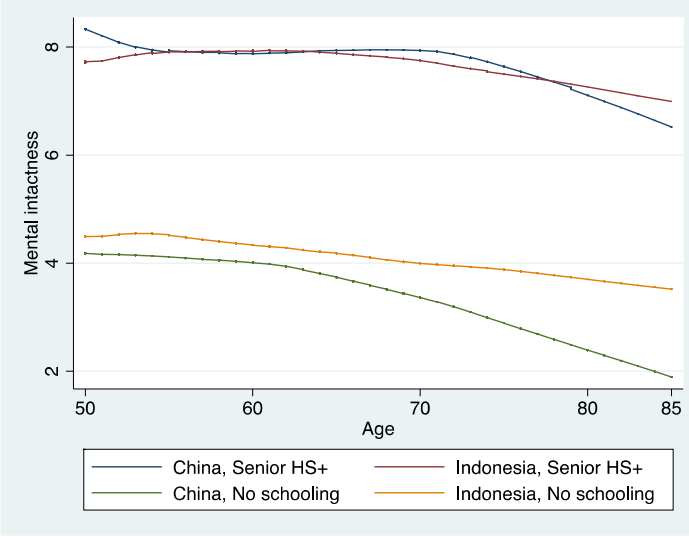


Figure 6c. Mental intactness and age, by residence

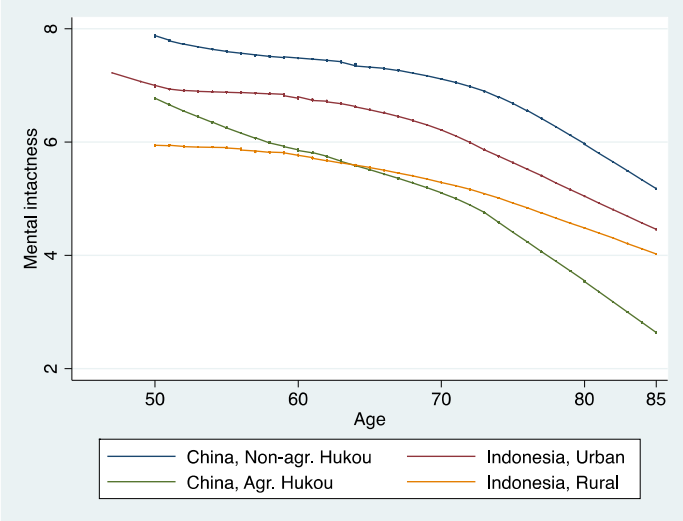


Table 1a. Adaptive number series test: pattern of answers, age 45+

			China		Indonesia	
Questions	Correct answer	Most frequent answer	# correct	% correct	# correct	% correct
7, 8, **?**, 10	9	9	15,058	82.61	7,641	83.07
8, **?** 12, 14	10	10	8,341	45.76	2,710	29.46
18, 10, 6, **?**, 3	4	4	4,968	27.25	2,466	26.81
n1			18,228		9,198	
1, 2, 3, **?**	4	4	557	18.79	487	36.89
6, 5, 4, **?**	3	3	222	7.49	203	15.38
12, **?**, 16, 18	14	13	50	1.69	29	2.2
n2			2,964		1,320	
5, **?**, 3, 2	4	4	3,646	68.11	2,238	54.79
4, 7, 10, **?**	13	11	245	4.58	205	5.02
?, 4, 6, 8	2	3	859	16.05	560	13.71
n3			5,353		4,085	
1, 3, 3, 5, 7, 7, **?**	9	9	2,081	31.04	581	21.95
3, **?** 8, 12, 17	5	5	2,269	33.84	839	31.7
17, **?**, 12, 8	15	15	1,750	26.1	450	17
n4			6,705		2,647	
10, **?**, 3, 1	6	6	978	30.66	382	33.33
18, 17, 15, **?**, 8	12	12	884	27.71	291	25.39
3, 3, 4, 6, 6, 7, **?**, ?	9	8	1,069	33.51	218	19.02
3, 3, 4, 6, 6, 7, ?, **?**	9	9	1,350	42.32	394	34.38
n5			3,190		1,146	

Table 1b. W-score distribution, age 45+

Entry block # of correct answers:	China %	Indonesia %	2nd block # of correct answers:	China %	Indonesia %	W-score
0	16.3%	14.4%	0	12.9%	8.5%	299
			1	2.3%	3.9%	322
			2	0.9%	1.4%	360
			3	0.2%	0.1%	396
1	29.4%	44.4%	0	8.5%	18.3%	431
			1	16.7%	21.4%	467
			2	3.1%	2.8%	494
			3	1.0%	0.1%	510
2	36.8%	28.8%	0	15.8%	15.2%	516
			1	11.0%	8.0%	527
			2	7.6%	4.3%	535
			3	2.4%	1.3%	545
3	17.5%	12.5%	0	5.8%	4.3%	567
			1	4.4%	4.5%	604
			2	4.0%	2.1%	614
			3	2.2%	1.0%	625
			4	1.1%	0.6%	635
	100.0%	100.0%		100.0%	100.0%	

Table 2. W-score by education, age 45+

China

	No schooling		Some Primary		Compl. Primary		Compl. Junior High		Compl. Senior High+		All	
W-score	# resp.	%	# resp.	%	# resp.	%	# resp.	%	# resp.	%	# resp.	%
299	1,795	34.2	208	14.9	232	5.1	90	2.0	24	1.0	2,349	12.9
322	306	5.8	46	3.3	52	1.1	17	0.4	5	0.2	426	2.3
360	79	1.5	21	1.5	41	0.9	12	0.3	2	0.1	155	0.9
396	12	0.2	2	0.1	9	0.2	5	0.1	3	0.1	31	0.2
431	844	16.1	166	11.9	360	7.8	135	3.0	40	1.6	1,545	8.5
467	925	17.6	314	22.4	976	21.3	678	15.1	152	6.2	3,045	16.7
494	121	2.3	59	4.2	177	3.9	162	3.6	52	2.1	571	3.1
510	17	0.3	12	0.9	45	1.0	77	1.7	35	1.4	186	1.0
516	669	12.7	245	17.5	922	20.1	747	16.7	292	11.9	2,875	15.8
527	189	3.6	134	9.6	581	12.7	703	15.7	387	15.7	1,994	11.0
535	77	1.5	58	4.1	333	7.3	552	12.3	361	14.7	1,381	7.6
545	20	0.4	14	1.0	104	2.3	172	3.8	134	5.4	444	2.4
567	90	1.7	63	4.5	301	6.6	362	8.1	238	9.7	1,054	5.8
604	72	1.4	31	2.2	207	4.5	295	6.6	199	8.1	804	4.4
614	27	0.5	15	1.1	159	3.5	267	6.0	254	10.3	722	4.0
625	9	0.2	11	0.8	63	1.4	153	3.4	164	6.7	400	2.2
635	3	0.1	2	0.1	27	0.6	54	1.2	121	4.9	207	1.1
Total	5,255	100.0	1,401	100.0	4,589	100.0	4,481	100.0	2,463	100.0	18,189	100.0

Indonesia

	No schooling		Some Primary		Compl. Primary		Compl. Junior High		Compl. Senior High+		All	
W-score	# resp.	%	# resp.	%	# resp.	%	# resp.	%	# resp.	%	# resp.	%
299	421	30.57	275	10.37	61	2.86	16	1.75	11	0.52	784	8.52
322	149	10.82	152	5.73	46	2.15	11	1.2	4	0.19	362	3.93
360	38	2.76	59	2.22	47	2.2	11	1.2	10	0.47	165	1.79
396	2	0.15	2	0.08	1	0.05	1	0.11	3	0.14	9	0.1
431	376	27.31	718	27.06	403	18.87	90	9.84	96	4.53	1,683	18.29
467	165	11.98	675	25.44	602	28.18	248	27.1	284	13.39	1,974	21.45
494	25	1.82	65	2.45	70	3.28	30	3.28	69	3.25	259	2.81
510	2	0.15	13	0.49	31	1.45	34	3.72	91	4.29	171	1.86
516	126	9.15	441	16.62	413	19.34	155	16.94	268	12.64	1,403	15.25
527	30	2.18	92	3.47	180	8.43	113	12.35	321	15.13	736	8
535	5	0.36	33	1.24	75	3.51	63	6.89	219	10.33	395	4.29
545	2	0.15	6	0.23	17	0.8	8	0.87	82	3.87	115	1.25
567	14	1.02	44	1.66	73	3.42	47	5.14	217	10.23	395	4.29
604	18	1.31	56	2.11	86	4.03	59	6.45	198	9.34	417	4.53
614	3	0.22	16	0.6	25	1.17	17	1.86	129	6.08	190	2.06
625	0	0	6	0.23	5	0.23	9	0.98	68	3.21	88	0.96
635	1	0.07	-	0	1	0.05	3	0.33	51	2.4	56	0.61
Total	1,377	100	2,653	100	2,136	100	915	100	2,121	100	9,202	100

Table 3. Word recall by education, age 45+

China												
# words recalled (average)	**No schooling**		**Some Primary**			**Compl. Primary**		**Compl. Junior High**		**Compl. Senior High+**		**All**	
	# resp.	**%**	**# resp.**	**%**		**# resp.**	**%**	**# resp.**	**%**	**# resp.**	**%**	**# resp.**	**%**
0	881	17.8	143	10.7		217	4.8	74	1.7	16	0.7	1,331	7.6
0.5	229	4.6	61	4.6		97	2.2	44	1.0	13	0.5	444	2.5
1	453	9.1	101	7.6		215	4.8	116	2.6	28	1.2	913	5.2
1.5	501	10.1	106	8.0		358	8.0	163	3.7	50	2.1	1,178	6.7
2	526	10.6	138	10.4		368	8.2	215	4.9	99	4.1	1,346	7.6
2.5	448	9.0	121	9.1		404	9.0	298	6.8	104	4.3	1,375	7.8
3	528	10.7	142	10.7		470	10.5	431	9.8	178	7.3	1,749	9.9
3.5	390	7.9	108	8.1		495	11.1	499	11.3	188	7.7	1,680	9.5
4	376	7.6	145	10.9		567	12.7	622	14.1	305	12.5	2,015	11.4
4.5	222	4.5	94	7.1		415	9.3	508	11.5	309	12.7	1,548	8.8
5	194	3.9	74	5.6		340	7.6	516	11.7	311	12.8	1,435	8.1
5.5	81	1.6	44	3.3		225	5.0	353	8.0	268	11.0	971	5.5
6	62	1.3	31	2.3		141	3.2	261	5.9	210	8.6	705	4.0
6.5	25	0.5	10	0.8		87	1.9	134	3.0	151	6.2	407	2.3
7	16	0.3	6	0.5		46	1.0	88	2.0	88	3.6	244	1.4
7.5	7	0.1	3	0.2		14	0.3	52	1.2	57	2.3	133	0.8
8	9	0.2	3	0.2		10	0.2	28	0.6	29	1.2	79	0.5
8.5	2	0.0	2	0.2		3	0.1	8	0.2	16	0.7	31	0.2
9	1	0.0	-	0.0		3	0.1	4	0.1	8	0.3	16	0.1
9.5	-	0.0	-	0.0		1	0.0	2	0.1	3	0.1	6	0.0
10	6	0.1	10	1.0	0.08	3	0.1	-	0.0	3	0.1	13	0.1
Total	4,957	100.0	1,333	100.0		4,479	100.0	4,416	100.0	2,434	100.0	17,619	100.0

Indonesia

# words recalled (average)	No schooling		Some Primary		Compl. Primary		Compl. Junior High		Compl. Senior High+		All	
	# resp.	%	# resp.	%	# resp.	%	# resp.	%	# resp.	%	# resp.	%
0	245	17.8	150	5.7	42	2.0	10	1.1	7	0.3	454	4.9
0.5	76	5.5	97	3.7	29	1.4	7	0.8	8	0.4	217	2.4
1	164	11.9	211	8.0	102	4.8	23	2.5	30	1.4	530	5.8
1.5	106	7.7	206	7.8	119	5.6	38	4.2	37	1.7	506	5.5
2	164	11.9	288	10.9	198	9.3	46	5.0	60	2.8	756	8.2
2.5	103	7.5	301	11.4	181	8.5	68	7.4	95	4.5	748	8.1
3	143	10.4	323	12.2	259	12.1	89	9.7	155	7.3	969	10.5
3.5	98	7.1	271	10.2	254	11.9	112	12.2	203	9.6	938	10.2
4	97	7.0	246	9.3	262	12.3	116	12.7	233	11.0	954	10.4
4.5	72	5.2	164	6.2	211	9.9	132	14.4	269	12.7	848	9.2
5	55	4.0	153	5.8	185	8.7	102	11.2	292	13.8	787	8.6
5.5	22	1.6	119	4.5	116	5.4	69	7.5	233	11.0	559	6.1
6	14	1.0	66	2.5	80	3.8	53	5.8	200	9.4	413	4.5
6.5	3	0.2	28	1.1	51	2.4	21	2.3	124	5.9	227	2.5
7	10	0.7	15	0.6	23	1.1	12	1.3	77	3.6	137	1.5
7.5	3	0.2	5	0.2	18	0.8	11	1.2	47	2.2	84	0.9
8	1	0.1	5	0.2	3	0.1	3	0.3	31	1.5	43	0.5
8.5	1	0.1	3	0.1	2	0.1	2	0.2	10	0.5	18	0.2
9	-	0.0	1	0.0	1	0.1	-	0.0	7	0.3	9	0.1
9.5	-	0.0	-	0.0	-	0.0	-	0.0	3	0.1	3	0.0
10	-	0.0	1	0.0	-	0.0	1	0.1	-	0.0	2	0.0
Total	1,377	100.0	2,653	100.0	2,136	100.0	915	100.0	2,121	100.0	9,202	100.0

Table 4. Mental intactness by education, age 50+

Mental intact-ness (0-9)	No schooling		Some Primary		Compl. Primary		Compl. Junior High		Compl. Senior High+		All	
	# resp.	%	# resp.	%	# resp.	%	# resp.	%	# resp.	%	# resp.	%
China												
0	751	16.9	42	3.8	39	1.1	14	0.4	4	0.2	850	7.8
1	492	11.1	47	4.2	63	1.7	18	0.5	7	0.3	627	5.4
2	534	12.0	54	4.8	77	2.1	26	0.8	4	0.2	695	6.0
3	529	11.9	92	8.2	146	4.0	40	1.2	21	1.0	828	6.5
4	455	10.2	103	9.2	224	6.1	115	3.5	27	1.3	924	6.9
5	425	9.6	144	12.9	318	8.7	211	6.3	80	3.9	1,178	8.1
6	396	8.9	139	12.4	463	12.6	329	9.9	134	6.5	1,461	9.5
7	356	8.0	180	16.1	630	17.2	572	17.1	277	13.3	2,015	12.9
8	335	7.5	170	15.2	859	23.4	898	26.9	568	27.4	2,830	17.8
9	178	4.0	147	13.2	849	23.2	1,114	33.4	955	46.0	3,243	19.1
Total	4,451	100.0	1,118	100.0	3,668	100.0	3,337	100.0	2,077	100.0	14,651	100.0
Indonesia												
0	29	2.6	12	0.6	1	0.1	-	0.0	-	0.0	42	0.6
1	75	6.6	36	1.7	8	0.5	-	0.0	-	0.0	119	1.8
2	108	9.5	82	3.9	20	1.3	2	0.4	2	0.2	214	3.2
3	160	14.1	181	8.6	38	2.4	9	1.6	8	0.7	396	6.0
4	303	26.7	298	14.1	101	6.4	28	4.9	20	1.7	750	11.4
5	161	14.2	347	16.4	164	10.3	53	9.2	49	4.2	774	11.7
6	150	13.2	344	16.3	241	15.2	66	11.5	96	8.2	897	13.6
7	89	7.8	355	16.8	312	19.6	111	19.3	168	14.3	1,035	15.7
8	46	4.1	296	14.0	398	25.0	159	27.7	356	30.3	1,255	19.0
9	16	1.4	166	7.8	308	19.4	146	25.4	478	40.6	1,114	16.9
Total	1,137	100.0	2,117	100.0	1,591	100.0	574	100.0	1,177	100.0	6,596	100.0

Table 5. Correlation matrices

China				Indonesia			
Age 45+*	**W-score**	**Word recall**	**Mental Intactness**	**Age 45+ ***	**W-score**	**Word recall**	**Mental Intactness**
W-score	1.0000			W-score	1.0000		
Word recall	0.4331	1.0000		Word recall	0.4142	1.0000	
Mental Intactness	0.6146	0.4653	1.0000	Mental Intactness	0.4662	0.3988	1.0000

* pairwise correlations with mental intactness are for people 50 and above

Age 45-59*	**W-score**	**Word recall**	**Mental Intactness**	**Age 45-59***	**W-score**	**Word recall**	**Mental Intactness**
W-score	1.0000			W-score	1.0000		
Word recall	0.3596	1.0000		Word recall	0.3909	1.0000	
Mental Intactness	0.5481	0.4064	1.0000	Mental Intactness	0.4466	0.3533	1.0000

* pairwise correlations with mental intactness are for people 50 -59

Age 60+	**W-score**	**Word recall**	**Mental Intactness**	**Age 60+**	**W-score**	**Word recall**	**Mental Intactness**
W-score	1.0000			W-score	1.0000		
Word recall	0.4414	1.0000		Word recall	0.3967	1.0000	
Mental Intactness	0.6291	0.4698	1.0000	Mental Intactness	0.4716	0.4276	1.0000

Table 6. Descriptive Statistics, 60+

	Male					Female				
	China (n = 3,715)		Indonesia (n = 1,399)		Difference (signif.)	China (n = 3,793)		Indonesia (n = 1,489)		Difference (signif.)
	Mean	Std. Dev.	Mean	Std. Dev.		Mean	Std. Dev.	Mean	Std. Dev.	
W-score	493.6	84.72	463	83.36	***	437.6	99.34	426.6	87.68	*
Word recall	3.0	1.78	2.9	1.66		2.7	1.86	2.6	1.78	
Mental intactness	6.8	2.35	6.3	2.11	***	4.9	3.04	5.5	2.33	***
Age group:										
60-64	0.37	0.48	0.48	0.50	***	0.40	0.49	0.45	0.50	
65-69	0.28	0.45	0.23	0.42	**	0.25	0.43	0.23	0.42	**
70-74	0.17	0.38	0.16	0.37		0.18	0.38	0.20	0.40	**
75+	0.18	0.39	0.13	0.33	***	0.17	0.38	0.12	0.32	
Own education:										
No schooling	0.19	0.39	0.13	0.33	***	0.54	0.50	0.35	0.48	***
Some primary	0.1	0.29	0.33	0.47	***	0.08	0.28	0.32	0.46	***
Compl.primary	0.36	0.48	0.28	0.45	***	0.21	0.41	0.20	0.40	
Compl. junior high	0.22	0.41	0.08	0.28	***	0.1	0.31	0.05	0.23	***
Compl. senior high+	0.1	0.35	0.20	0.39	***	0.1	0.23	0.1	0.28	***
Height (cm)	163.1	6.78	158.7	6.13	***	151.2	6.21	146.6	6.18	***
Married = 1	0.83	0.37	0.88	0.33	***	0.70	0.46	0.45	0.50	***
Own pce										
Spline pce 1	8.48	0.95	13.3	0.41		8.43	1.09	13.3	0.41	
Spline pce 2	0.27	0.47	0.20	0.43		0.27	0.47	0.20	0.45	
Rural=1	0.7	0.46	0.49	0.5	***	0.76	0.43	0.50	0.50	***
Community education										
No schooling	0.15	0.36	0	0.04	***	0.15	0.36	0.01	0.11	***
Some primary	0.14	0.34	0.04	0.18	***	0.13	0.33	0.04	0.20	***
Compl.primary	0.44	0.5	0.48	0.5	***	0.44	0.50	0.46	0.50	***
Compl. junior high	0.23	0.42	0.27	0.44	***	0.22	0.41	0.27	0.45	***
Compl. senior high+	0.05	0.22	0.21	0.41	***	0.06	0.23	0.21	0.41	***
Comm. Pce										
Spline pce 1	8.85	0.2	13.5	0.18		8.84	0.2	13.4	0.18	
Spline pce 2	0.13	0.23	0.1	0.24		0.13	0.23	0.1	0.22	

Statistical significance of the differences between CHARLS and IFLS are denoted by *** (0.01%), **(0.05%), and * (0.10%). Differences in pce are not tested since currencies differ.

Table 7. Female coefficients

China		
Dependent variable:	**45-59**	**60+**
W-score	-33.74***	-56.70***
	(2.048)	(2.108)
Word recall	-0.08**	-0.27***
	(0.039)	(0.037)
Mental intactness	-1.27***	-1.95***
	(0.067)	(0.070)
Indonesia:		
Dependent variable:	**45-59**	**60+**
W-score	-25.85***	-36.65***
	(1.729)	(3.050)
Word recall	-0.15***	-0.29***
	(0.039)	(0.059)
Mental intactness	-	-0.85***
	-	(0.086)

Table 8. W-score and Word Recall, China, 60+

VARIABLES	W-score				Word Recall			
	Female only	+ height + married +SES	+ female interacted w/ comm. var	community FE	Female only	+ height + married +SES	+ female interacted w/ comm. var	community FE
Female =1	-56.70***	-11.70***	-193.4**	-14.05***	-0.27***	0.35***	-1.787	0.32***
	(2.108)	(2.752)	(95.79)	(2.712)	(0.037)	(0.053)	(1.825)	(0.056)
Age group								
65-69 years old = 1	-0.97	0.35	0.557	0.74	-0.33***	-0.28***	-0.277***	-0.27***
	(2.648)	(2.373)	(2.368)	(2.314)	(0.050)	(0.048)	(0.0482)	(0.047)
70-74 years old = 1	-17.48***	-13.18***	-13.18***	-11.47***	-0.71***	-0.63***	-0.626***	-0.60***
	(2.967)	(2.637)	(2.641)	(2.695)	(0.060)	(0.057)	(0.0570)	(0.055)
75+ years old = 1	-65.42***	-41.30***	-41.27***	-39.65***	-1.51***	-1.14***	-1.146***	-1.11***
	(3.245)	(3.133)	(3.121)	(2.917)	(0.062)	(0.062)	(0.0619)	(0.061)
Own education								
Some primary =1		40.84***	39.28***	39.12***		0.49***	0.478***	0.46***
		(3.924)	(3.962)	(3.476)		(0.074)	(0.0737)	(0.072)
Compl. Primary = 1		73.29***	71.34***	71.19***		0.87***	0.853***	0.85***
		(2.589)	(2.640)	(2.503)		(0.052)	(0.0527)	(0.052)
Compl. Junior High = 1		89.92***	87.93***	88.76***		1.32***	1.292***	1.30***
		(2.928)	(2.936)	(3.181)		(0.065)	(0.0659)	(0.065)
Compl. Senior High =1		108.06***	106.7***	106.59***		1.72***	1.675***	1.71***
		(3.609)	(3.597)	(4.256)		(0.093)	(0.0955)	(0.087)
Height (cm)		1.16***	1.124***	1.12***		0.02***	0.0150***	0.01***
		(0.156)	(0.158)	(0.159)		(0.003)	(0.00300)	(0.003)
Married=1		3.72	4.321*	4.74**		0.13***	0.137***	0.14***
		(2.334)	(2.338)	(2.322)		(0.047)	(0.0474)	(0.048)

Own pce								
Spline pce 1		3.60***	3.460***	3.78***		0.07***	0.0688***	0.08***
		(0.998)	(0.997)	(0.957)		(0.020)	(0.0203)	(0.020)
Spline pce 2		4.37**	2.792	3.33		0.03	0.000340	-0.01
		(2.107)	(2.178)	(2.187)		(0.046)	(0.0464)	(0.045)
Rural=1	-44.40***	-16.61***	-12.47***		-0.76***	-0.32***	-0.240***	
	(2.904)	(2.550)	(2.715)		(0.060)	(0.058)	(0.0603)	
Comm. average educ								
Some primary =1			-11.25				0.103	
			(6.900)				(0.138)	
Compl. Primary = 1			5.124				0.120	
			(4.963)				(0.114)	
Compl. Junior High = 1			13.31**				-0.00394	
			(6.575)				(0.146)	
Compl. Senior High =1			6.735				-0.112	
			(11.74)				(0.242)	
Comm. average pce								
Spline pce 1			19.90*				0.228	
			(10.93)				(0.209)	
Spline pce 2			8.869				0.254	
			(10.60)				(0.205)	
Female x comm. variables interaction								
Female x Some Primary			6.502				0.0866	
			(5.244)				(0.101)	
Female x Compl. Primary			3.980				0.0525	
			(4.652)				(0.0915)	
Female X Comp. Junior High			2.964				0.220*	
			(5.853)				(0.123)	
Female x Compl. Senior High			5.403				0.280	
			(9.847)				(0.214)	
Female x ln spline pce 1			9.400				-0.131	
			(9.020)				(0.170)	

Female x ln spline pce 2			12.17				0.283*	
			(8.604)				(0.165)	
Constant	490.17***	194.69***	120.1	217.85***	3.40***	-0.85	0.366	-0.70
	(22.189)	(33.730)	(83.84)	(26.982)	(0.092)	(0.524)	(1.601)	(0.560)
Observations	7,368	7,368	7,368	7,368	7,102	7,102	7,102	7,102
R-squared	0.271	0.396	0.401	0.426	0.207	0.282	0.284	0.319
F-tests of joint significance								
Age groups	168.30	74.45	75.83	72.57	210.00	123.70	124.30	121.50
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Own educ. vars		319.80	304.60	306.30		138.40	129.10	149.10
p-value		0.000	0.000	0.000		0.000	0.000	0.000
Own pce vars			8.82	11.41			6.11	8.77
p-value			0.000	0.000			0.002	0.000
Comm vars. (level): education and pce			1.21				2.23	
p-value			0.299				0.039	
Comm vars. (level): education only			0.42				1.16	
p-value			0.795				0.327	
Comm vars. (level): pce only			1.96				1.53	
p-value			0.142				0.217	
Comm. vars (level), comm. vars x female interactions (education and pce			5.17				2.47	
p-value			0.000				0.004	
Comm. vars (level), comm. vars x female interactions: education			2.24				0.97	
p-value			0.024				0.457	
Comm. vars (level), comm. vars x female interactions: pce			5.84				3.23	
p-value			0.000				0.013	
Interaction vars: comm. pce vars x female, comm. educ vars x female			5.07				1.05	

p-value	0.000		0.392	
Interaction vars: comm. educ vars x female	3.33		0.64	
p-value	0.011		0.638	
Interaction vars: comm. pce vars x female	2.63		1.99	
p-value	0.073		0.138	
Comm. vars + comm. vars x female interactions (educ and pce	9.22		4.16	
p-value	0.000		0.000	
Comm. vars + comm. vars x female interactions (educ only)	3.96		0.99	
p-value	0.004		0.411	
Comm. vars + comm. vars x female interactions (pce only)	5.67		1.60	
p-value	0.004		0.203	
Community dummy vars		1.71		1.84
p-value		0.000		0.000

The dependent variables are W-score (columns 1-4) and Word Recall (columns 5-8) described in the text. Base specification in columns (1) and (5) include female, age group, and rural dummy variables only. Columns (2) and (6) add height, marital status dummy variables, and SES. Columns (3) and (7) add community level variables as well as interaction variables between community level variables and female dummy variables. Finally, columns (4 and (8) use community FE in place of community variables. Omitted variables dummy variables for are male, some primary schooling, age 60-64 and urban. Standard errors are clustered at the community level, with statistical significance at p<0.01 (***), p<0.05(**), and p<0.1(*) reported.

Table 9. Mental Intactness, China, 60+

	Mental Intactness			
VARIABLES	Female only	+ height+ married +SES	+ female interacted w/ comm. var	community FE
Female =1	-1.95***	-0.50***	-5.020*	-0.56***
	(0.070)	(0.082)	(2.890)	(0.079)
Age group				
65-69 years old = 1	-0.05	-0.04	-0.0282	-0.03
	(0.075)	(0.065)	(0.0648)	(0.067)
70-74 years old = 1	-0.52***	-0.40***	-0.403***	-0.39***
	(0.090)	(0.076)	(0.0753)	(0.079)
75+ years old = 1	-1.79***	-1.02***	-1.022***	-1.05***
	(0.095)	(0.089)	(0.0878)	(0.086)
Own education				
Some primary =1		1.81***	1.751***	1.74***
		(0.110)	(0.111)	(0.103)
Compl. Primary = 1		2.67***	2.602***	2.63***
		(0.082)	(0.0825)	(0.073)
Compl. Junior High = 1		3.10***	3.028***	3.06***
		(0.094)	(0.0960)	(0.092)
Compl. Senior High =1		3.24***	3.203***	3.25***
		(0.109)	(0.110)	(0.123)
Height (cm)		0.03***	0.0320***	0.03***
		(0.004)	(0.00443)	(0.005)
Married=1		0.15**	0.172**	0.16**
		(0.071)	(0.0710)	(0.068)
Own pce				

Spline pce 1		0.15***	0.149***	0.15***
		(0.029)	(0.0290)	(0.028)
Spline pce 2		-0.02	-0.0538	-0.03
		(0.057)	(0.0580)	(0.064)
Rural=1	-1.31***	-0.52***	-0.401***	
	(0.085)	(0.075)	(0.0794)	
Comm. average educ				
Some primary =1			-0.194	
			(0.205)	
Compl. Primary = 1			0.356**	
			(0.160)	
Compl. Junior High = 1			0.690***	
			(0.206)	
Compl. Senior High =1			0.904***	
			(0.323)	
Comm. average pce				
Spline pce 1			0.473	
			(0.330)	
Spline pce 2			0.115	
			(0.302)	
Female x comm. variables interaction				
Female x Some Primary			0.163	
			(0.157)	
Female x Compl. Primary			0.0304	
			(0.135)	
Female X Comp. Junior High			0.106	
			(0.179)	
Female x Compl. Senior High			-0.263	
			(0.251)	
Female x ln spline pce 1			0.0163	
			(0.236)	
Female x ln spline pce 2			0.341	

			(0.227)	
Constant	7.21***	-1.90**	-1.828	-1.80**
	(0.334)	(0.802)	(2.136)	(0.792)
Observations	7,035	7,035	7,035	7,035
R-squared	0.296	0.456	0.461	0.482
F-tests of joint significance				
Age groups	133.40	49.48	51.00	56.03
p-value	0.000	0.000	0.000	0.000
Own educ. vars		335.90	312.40	432.30
p-value		0.000	0.000	0.000
Own pce vars			13.48	15.00
p-value			0.000	0.000
Comm vars. (level): education and pce			1.10	
p-value			0.363	
Comm vars. (level): education only			1.43	
p-value			0.225	
Comm vars. (level): pce only			1.21	
p-value			0.300	
Comm. vars (level), comm. vars x female interactions (education and pce			6.06	
p-value			0.000	
Comm. vars (level), comm. vars x female interactions: education			4.47	
p-value			0.000	
Comm. vars (level), comm. vars x female interactions: pce			2.56	
p-value			0.038	
Interaction vars: comm. pce vars x female, comm. educ vars x female			8.79	
p-value			0.000	

Interaction vars: comm. educ vars x female	5.69	
p-value	0.000	
Interaction vars: comm. pce vars x female	1.30	
p-value	0.275	
Comm. vars + comm. vars x female interactions (educ and pce	8.90	
p-value	0.000	
Comm. vars + comm. vars x female interactions (educ only)	7.18	
p-value	0.000	
Comm. vars + comm. vars x female interactions (pce only)	2.31	
p-value	0.100	
Community dummy vars		1.85
p-value		0.000

The dependent variable is Mental Intactness (column 1) as described in the text. Base specification in column (1) includes female, age group, and rural dummy variables only. Columns (2) add height, marital status dummy variables, and SES. Column (3) adds community level variablesc as well as interaction variables between community level variables and female dummy variables. Finally, column (4) uses community FE in place of community variables. Omitted variables dummy variables for are male, some primary schooling, age 60-64 and urban. Standard errors are clustered at the community level, with statistical significance at p<0.01 (***), p<0.05(**), and p<0.1(*) reported.

Table 10. W-score and Word Recall, Indonesia, 60+

	W- score				Word Recall			
VARIABLES	Female only	+ height + married +SES	+ female interacted w/ comm. var	community FE	Female only	+ height + married +SES	+ female interacted w/ comm. var	community FE
Female =1	-36.65***	-9.86**	-205.36	-10.99**	-0.29***	0.31***	-5.13	0.31***
	(3.050)	(4.537)	(251.584)	(4.570)	(0.059)	(0.087)	(4.550)	(0.093)
Age group								
65-69 years old = 1	-10.03***	-6.64**	-6.83**	-4.92	-0.16**	-0.07	-0.08	-0.05
	(3.637)	(3.212)	(3.238)	(3.824)	(0.082)	(0.080)	(0.080)	(0.078)
70-74 years old = 1	-24.44***	-14.11***	-14.63***	-10.68**	-0.51***	-0.26***	-0.26***	-0.24***
	(4.144)	(4.138)	(4.157)	(4.218)	(0.080)	(0.079)	(0.079)	(0.086)
75+ years old = 1	-46.37***	-26.28***	-26.23***	-23.28***	-1.27***	-0.84***	-0.84***	-0.78***
	(5.304)	(5.293)	(5.307)	(5.042)	(0.096)	(0.094)	(0.096)	(0.103)
Own education								
Some primary =1		42.79***	42.03***	40.66***		0.51***	0.50***	0.47***
		(4.748)	(4.757)	(4.475)		(0.088)	(0.089)	(0.091)
Compl. Primary = 1		68.70***	67.13***	67.45***		1.03***	0.99***	1.00***
		(5.368)	(5.404)	(5.066)		(0.094)	(0.095)	(0.104)
Compl. Junior High = 1		81.14***	77.84***	81.53***		1.51***	1.47***	1.50***
		(6.913)	(6.997)	(7.453)		(0.130)	(0.133)	(0.152)
Compl. Senior High =1		122.91***	118.32***	116.53***		1.78***	1.71***	1.62***
		(6.243)	(6.544)	(6.743)		(0.126)	(0.135)	(0.138)
Height (cm)		0.69***	0.72***	0.64**		0.02***	0.02***	0.02***
		(0.260)	(0.262)	(0.265)		(0.005)	(0.005)	(0.005)
Married=1		-7.32**	-7.29**	-4.77		0.16**	0.16**	0.19**
		(3.547)	(3.580)	(3.725)		(0.066)	(0.067)	(0.076)
Own pce								
Spline pce 1		-0.89	-0.67	2.65		0.20**	0.20**	0.21**
		(4.539)	(4.613)	(4.455)		(0.091)	(0.094)	(0.091)

Spline pce 2		1.19	1.06	-1.01		0.11	0.08	0.13
		(3.612)	(3.719)	(4.194)		(0.080)	(0.080)	(0.086)
Rural=1	-13.90**	-3.10	0.83		-0.28*	-0.08	-0.02	
	(6.112)	(4.785)	(4.912)		(0.146)	(0.128)	(0.134)	
Comm. average educ								
Some primary =1			-21.73**				0.65**	
			(8.695)				(0.254)	
Compl. Primary = 1			-30.89**				1.10***	
			(14.226)				(0.282)	
Compl. Junior High = 1			-18.39				1.11***	
			(14.999)				(0.294)	
Compl. Senior High =1			-9.56				1.10***	
			(15.531)				(0.311)	
Comm. average pce								
Spline pce 1			-17.09				-0.41	
			(17.179)				(0.332)	
Spline pce 2			2.75				0.55**	
			(9.502)				(0.222)	
Female x comm. variables interaction								
Female x Some Primary			63.33***				-0.23	
			(13.052)				(0.304)	
Female x Compl. Primary			74.32***				-0.93***	
			(11.579)				(0.175)	
Female X Comp. Junior High			69.32***				-0.83***	
			(12.054)				(0.187)	
Female x Compl. Senior High			69.39***				-0.56***	
			(12.726)				(0.209)	
Female x ln spline pce 1			9.20				0.47	
			(19.110)				(0.345)	
Female x ln spline pce 2			4.46				-0.36	
			(12.788)				(0.270)	
Constant	349.55***	181.10**	428.21*	278.75***	0.57***	-5.93***	-1.58	-3.59**
	(6.844)	(70.647)	(234.542)	(70.455)	(0.154)	(1.422)	(4.398)	(1.440)

Observations	2,886	2,886	2,886	2,886	2,886	2,886	2,886	2,886
R-squared	0.24	0.367	0.37	0.46	0.219	0.313	0.318	0.426
F-tests of joint significance								
Age groups	28.21	9.11	9.20	7.50	64.02	28.83	28.32	20.73
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Own educ. vars		102.10	84.60	81.77		65.40	53.79	45.37
p-value		0.000	0.000	0.000		0.000	0.000	0.000
Own pce vars		0.06	0.04	0.18		4.86	3.87	5.72
p-value		0.941	0.957	0.837		0.008	0.021	0.003
Comm vars. (level): education and pce			3.865				3.614	
p-value			0.00				0.00	
Comm vars. (level): education only			4.199				3.979	
p-value			0.00				0.00	
Comm vars. (level): pce only			0.496				3.267	
p-value			0.61				0.04	
Comm. vars (level), comm. vars x female interactions (education and pce)			11.020				7.792	
p-value			0.00				0.00	
Comm. vars (level), comm. vars x female interactions: education			7.723				9.475	
p-value			0.00				0.00	
Comm. vars (level), comm. vars x female interactions: pce			0.370				1.800	
p-value			0.83				0.13	
Interaction vars: comm. pce vars x female, comm. educ vars x female			11.010				6.653	
p-value			0.00				0.00	
Interaction vars: comm. educ vars x female			10.590				9.131	

p-value	0.00				0.00		
Interaction vars: comm. asset vars x female	0.266				1.303		
p-value	0.77				0.27		
Comm. vars + comm. vars x female interactions (educ and pce	3.358				2.217		
p-value	0.00				0.04		
Comm. vars + comm. vars x female interactions (educ only)	4.291				2.374		
p-value	0.00				0.05		
Comm. vars + comm. vars x female interactions (pce only)	0.205				0.024		
p-value	0.65				0.88		
Community dummy vars		1.20				1.39	
p-value		0.002				0.000	

The dependent variables are W-score (columns 1-4) and words recalled(columns 5-8) described in the text. Base specification in columns (1) and (5) include female, age group, and rural dummy variables only. Columns (2) and (6) add height, marital status dummy variables, and SES. Columns (3) and (7) add community level variables and interaction variables between community level variables and female dummy variables. Finally, columns (4) and (8) use community FE in place of community variables. Omitted variables dummy variables for are male, some primary schooling, age 60-64, and urban. Standard errors are clustered at the community level, with statistical significance at p<0.01 (***), p<0.05(**), and p<0.1(*) reported.

Table 11. Mental Intactness, Indonesia, 60+

	Mental intactness			
VARIABLES	Female only	+ height + married +SES	+ female interacted w/ comm. var	community FE
Female =1	-0.85***	0.18	4.40	0.15
	(0.086)	(0.115)	(6.932)	(0.115)
Age group				
65-69 years old = 1	-0.06	0.08	0.07	0.03
	(0.094)	(0.083)	(0.083)	(0.096)
70-74 years old = 1	-0.56***	-0.20**	-0.21**	-0.22**
	(0.110)	(0.098)	(0.097)	(0.107)
75+ years old = 1	-1.23***	-0.53***	-0.54***	-0.54***
	(0.152)	(0.143)	(0.145)	(0.128)
Own education				
Some primary =1		1.29***	1.27***	1.21***
		(0.125)	(0.126)	(0.114)
Compl. Primary = 1		2.31***	2.26***	2.27***
		(0.136)	(0.140)	(0.128)
Compl. Junior High = 1		2.76***	2.70***	2.62***
		(0.161)	(0.166)	(0.188)
Compl. Senior High =1		3.08***	3.04***	2.96***
		(0.155)	(0.163)	(0.170)
Height (cm)		0.03***	0.03***	0.03***
		(0.006)	(0.006)	(0.007)
Married=1		0.03	0.03	0.02
		(0.089)	(0.090)	(0.094)
Own pce				
Spline pce 1		0.08	0.07	0.05
		(0.107)	(0.110)	(0.112)

Spline pce 2		0.02	0.01	0.05
		(0.083)	(0.085)	(0.106)
Rural=1	-0.59***	-0.27**	-0.18	
	(0.170)	(0.118)	(0.114)	
Comm. average educ				
Some primary =1			-1.18***	
			(0.276)	
Compl. Primary = 1			-0.51	
			(0.350)	
Compl. Junior High = 1			-0.31	
			(0.369)	
Compl. Senior High =1			-0.47	
			(0.386)	
Comm. average pce				
Spline pce 1			0.39	
			(0.415)	
Spline pce 2			0.04	
			(0.254)	
Female x comm. variables interaction				
Female x Some Primary			0.63	
			(0.454)	
Female x Compl. Primary			0.32	
			(0.319)	
Female X Comp. Junior High			0.55	
			(0.333)	
Female x Compl. Senior High			0.84**	
			(0.345)	
Female x ln spline asset 1			-0.35	
			(0.526)	
Female x ln spline asset 2			0.13	
			(0.327)	
Constant	5.44***	-3.09*	-7.62	-1.21
	(0.188)	(1.776)	(5.661)	(1.774)

Observations	2,825	2,825	2,825	2,825
R-squared	0.287	0.437	0.442	0.509
F-tests of joint significance				
Age groups	25.76	6.80	6.79	7.59
p-value	0.000	0.000	0.000	0.000
Own educ. vars		126.80	107.60	105.40
p-value		0.000	0.000	0.000
Own pce vars		0.41	0.28	0.32
p-value		0.667	0.759	0.729
Comm vars. (level): education and pce			3.432	
p-value			0.00	
Comm vars. (level): education only			5.036	
p-value			0.00	
Comm vars. (level): pce only			0.553	
p-value			0.58	
Comm. vars (level), comm. vars x female interactions (education and pce)			7.075	
p-value			0.00	
Comm. vars (level), comm. vars x female interactions: education			7.214	
p-value			0.00	
Comm. vars (level), comm. vars x female interactions: pce			0.365	
p-value			0.83	
Interaction vars: comm. pce vars x female, comm. educ vars x female			2.049	
p-value			0.06	
Interaction vars: comm. educ vars x female			2.337	
p-value			0.05	

Interaction vars: comm. asset vars x female	0.236	
p-value	0.79	
Comm. vars + comm. vars x female interactions (educ and pce	2.863	
p-value	0.01	
Comm. vars + comm. vars x female interactions (educ only)	3.655	
p-value	0.01	
Comm. vars + comm. vars x female interactions (pce only)	0.006	
p-value	0.94	
Community dummy vars		1.12
p-value		0.042

The dependent variables is mental intactness score (columns 1-4) described in the text. Base specification in column (1) includez female, age group, and rural dummy variables only. Column (2) adds height, marital status dummy variables, and SES. Column (3) adds community level variables and d interaction variables between community level variables and female dummy variables. Finally, column (4) uses community FE in place of community variables. Omitted variables dummy variables for are male, some primary schooling, age 60-64, and urban. Standard errors are clustered at the community level, with statistical significance at p<0.01 (***), p<0.05(**), and p<0.1(*) reported.

Appendix Table 1. Descriptive statistics, 45-59

	Male					Female				
	China (n = 3,282)		Indonesia (n = 2,925)		Difference (signif.)	China (n = 3,940)		Indonesia (n = 3,289)		Difference (signif.)
	Mean	Std. Dev.	Mean	Std. Dev.		Mean	Std. Dev.	Mean	Std. Dev.	
W-score	525.5	69.06	495.4	74.75	***	495.6	84.34	470.7	79.99	
Word recall	3.86	1.68	3.80	1.74		3.9	1.83	3.70	1.79	
Mental intactness	7.4	1.91				6.3	2.58			
Age group:										
45-49	0.31	0.46	0.37	0.48	**	0.31	0.46	0.42	0.49	*
50-54	0.36	0.48	0.35	0.48		0.37	0.48	0.33	0.47	**
55-59	0.34	0.47	0.28	0.45	***	0.32	0.47	0.24	0.43	***
Own education:										
No schooling	0.08	0.28	0.09	0.29	***	0.28	0.45	0.14	0.35	***
Some primary	0.05	0.21	0.24	0.43	***	0.07	0.25	0.32	0.47	***
Compl.primary	0.21	0.41	0.24	0.43	***	0.22	0.42	0.25	0.43	
Compl. junior high	0.41	0.49	0.12	0.33	***	0.28	0.45	0.10	0.30	***
Compl. senior high+	0.25	0.43	0.3	0.46	***	0.15	0.36	0.19	0.39	***
Height (cm)	165.9	6.23	161.20	5.94	***	154.9	5.89	150	5.49	***
Married = 1	0.91	0.28	0.94	0.24	***	0.86	0.34	0.79	0.41	***
Own pce										
Spline pce 1	8.43	1.09	13.40	0.35		8.67	0.59	13.40	0.36	
Spline pce 2	0.27	0.47	0.30	0.46		0.34	0.50	0.30	0.48	
Rural =1	0.77	0.42	0.49	0.50	***	0.78	0.42	0.48	0.50	***
Comm. Education										
No schooling		0.33	0.00	0.05	***	0.12	0.33	0.01	0.07	***
Some primary	0.11	0.31	0.04	0.19	***	0.11	0.31	0.04	0.19	***
Compl.primary	0.46	0.5	0.40	0.49	***	0.47	0.50	0.41	0.49	***
Compl. junior high	0.27	0.44	0.32	0.47	***	0.25	0.43	0.31	0.46	***
Compl. senior high+	0.04	0.19	0.23	0.42	***	0.04	0.20	0.24	0.42	***
Comm. Pce										
Spline pce 1	8.85	0.2	13.50	0.18		8.86	0.19	13.50	0.18	
Spline pce 2	0.14	0.23	0.10	0.26		0.14	0.23	0.10	0.27	

Statistical significance of the differences between CHARLS and IFLS are denoted by *** (0.01%), **(0.05%), and * (0.10%). Differences in pce are not tested.

Appendix Table 2. W-score and Word Recall, China, 45-59

	W-score				Word Recall			
VARIABLES	Female only	+ height + married +SES	+ female interacted w/ comm. var	community FE	Female only	+ height + married +SES	+ female interacted w/ comm. var	community FE
Female =1	-33.74***	-5.13**	-86.22	-5.62**	-0.08**	0.43***	-1.714	0.43***
	(2.048)	(2.293)	(75.48)	(2.353)	(0.039)	(0.052)	(1.509)	(0.056)
Age group								
50-54 years old = 1	-15.86***	-16.86***	-16.95***	-17.32***	-0.23***	-0.27***	-0.272***	-0.25***
	(2.062)	(1.903)	(1.907)	(2.033)	(0.052)	(0.048)	(0.0477)	(0.048)
50-59 years old = 1	-40.90***	-29.39***	-29.69***	-30.18***	-0.69***	-0.52***	-0.511***	-0.51***
	(2.127)	(2.081)	(2.073)	(2.174)	(0.054)	(0.053)	(0.0531)	(0.052)
Own education								
Some primary =1		39.44***	37.50***	40.19***		0.49***	0.461***	0.52***
		(4.664)	(4.628)	(3.847)		(0.095)	(0.0947)	(0.092)
Compl. Primary = 1		62.33***	59.43***	61.87***		0.85***	0.816***	0.83***
		(2.912)	(2.925)	(2.585)		(0.062)	(0.0622)	(0.062)
Compl. Junior High = 1		79.19***	76.24***	78.70***		1.32***	1.285***	1.32***
		(2.888)	(2.906)	(2.554)		(0.059)	(0.0592)	(0.061)
Compl. Senior High =1		99.58***	96.48***	99.68***		1.75***	1.691***	1.73***
		(3.321)	(3.318)	(3.113)		(0.068)	(0.0687)	(0.074)
Height (cm)		0.67***	0.673***	0.68***		0.01***	0.0133***	0.01***
		(0.150)	(0.149)	(0.148)		(0.004)	(0.00361)	(0.004)
Married=1		2.32	2.300	1.80		0.13**	0.128**	0.15**
		(2.515)	(2.515)	(2.539)		(0.062)	(0.0620)	(0.060)
Own pce								
Spline pce 1		6.32***	6.419***	6.19***		0.13***	0.121***	0.12***
		(2.014)	(2.002)	(1.584)		(0.045)	(0.0457)	(0.038)
Spline pce 2		-1.80	-1.845	-2.30		-0.02	-0.0389	-0.05
		(1.743)	(1.753)	(1.827)		(0.042)	(0.0426)	(0.043)

Rural=1	-25.58***	-4.36*	-1.906		-0.79***	-0.37***	-0.273***	
	(2.579)	(2.282)	(2.396)		(0.068)	(0.061)	(0.0656)	
Comm. average educ								
Some primary =1			4.211				0.0912	
			(7.217)				(0.162)	
Compl. Primary = 1			16.89***				0.187*	
			(5.700)				(0.113)	
Compl. Junior High = 1			28.55***				0.140	
			(6.739)				(0.137)	
Compl. Senior High =1			29.90***				0.466**	
			(10.98)				(0.227)	
Comm. average pce								
Spline pce 1			7.238				0.223	
			(8.649)				(0.173)	
Spline pce 2			6.589				0.121	
			(8.220)				(0.211)	
Female x comm. variables interaction								
Female x Some Primary			-5.586				0.203*	
			(4.441)				(0.116)	
Female x Compl. Primary			-2.255				0.0567	
			(3.938)				(0.0951)	
Female X Comp. Junior High			-6.236				0.0782	
			(5.021)				(0.118)	
Female x Compl. Senior High			-1.716				0.305	
			(9.739)				(0.218)	
Female x ln spline pce 1			-14.46**				0.0279	
			(6.158)				(0.148)	
Female x ln spline pce 2			2.801				0.364**	
			(6.967)				(0.180)	
Constant	494.73***	254.96***	387.3***	301.60***	4.14***	-0.50	-0.639	-0.48
	(6.826)	(31.549)	(61.11)	(27.856)	(0.132)	(0.730)	(1.429)	(0.662)
Observations	7,032	7,032	7,032	7,032	6,896	6,896	6,896	6,896
R-squared	0.201	0.339	0.344	0.368	0.144	0.233	0.238	0.271
F-tests of joint significance								

Age groups	184.90	103.40	105.80	97.08	81.97	47.20	46.81	48.67
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Own educ. vars		240.40	226.00	315.00		195.80	182.20	166.20
p-value		0.000	0.000	0.000		0.000	0.000	0.000
Own pce vars			5.15	7.64			3.51	4.89
p-value			0.006	0.000			0.031	0.008
Comm vars. (level): education and pce			1.63				2.75	
p-value			0.138				0.012	
Comm vars. (level): education only			0.77				1.20	
p-value			0.545				0.310	
Comm vars. (level): pce only			2.76				2.33	
p-value			0.064				0.098	
Comm. vars (level), comm. vars x female interactions (education and pce			4.87				4.89	
p-value			0.000				0.000	
Comm. vars (level), comm. vars x female interactions: education			4.81				2.67	
p-value			0.000				0.007	
Comm. vars (level), comm. vars x female interactions: pce			1.97				4.21	
p-value			0.098				0.002	
Interaction vars: comm. pce vars x female, comm. educ vars x female			7.16				2.84	
p-value			0.000				0.010	
Interaction vars: comm. educ vars x female			6.16				1.41	
p-value			0.000				0.229	
Interaction vars: comm. pce vars x female			1.00				1.45	
p-value			0.368				0.236	
Comm. vars + comm. vars x female interactions (educ and pce			6.75				9.18	

p-value	0.000			0.000			
Comm. vars + comm. vars x female interactions (educ only)	8.10			4.55			
p-value	0.000			0.001			
Comm. vars + comm. vars x female interactions (pce only)	1.90			2.70			
p-value	0.151			0.068			
Community dummy vars		1.71				1.82	
p-value		0.000				0.000	

The dependent variables are W-score (columns 1-4) and Word Recall (columns 5-8) described in the text. Base specification in columns (1) and (5) include female, age group, and rural dummy variables only. Columns (2) and (6) add height, marital status dummy variables, and SES. Columns (3) and (7) add community level variables as well as interaction variables between community level variables and female dummy variables. Finally, columns (4 and (8) use community FE in place of community variables. Omitted variables dummy variables for are male, some primary schooling, age 45-49 and urban. Standard errors are clustered at the community level, with statistical significance at p<0.01 (***), p<0.05(**), and p<0.1(*) reported.

Appendix Table 3. Mental Intactness, China, 45-59

VARIABLES	Mental Intactness			
	Female only	+ height + married +SES	+ female interacted w/ comm. var	community FE
Female =1	-1.27***	-0.24***	-4.628*	-0.26***
	(0.067)	(0.073)	(2.600)	(0.069)
Age group				
50-54 years old = 1	-0.39***	-0.39***	-0.396***	-0.39***
	(0.065)	(0.057)	(0.0565)	(0.060)
50-59 years old = 1	-0.91***	-0.46***	-0.468***	-0.45***
	(0.072)	(0.064)	(0.0632)	(0.064)
Own education				
Some primary =1		1.32***	1.244***	1.34***
		(0.145)	(0.145)	(0.113)
Compl. Primary = 1		2.25***	2.143***	2.22***
		(0.099)	(0.0996)	(0.076)
Compl. Junior High = 1		2.88***	2.773***	2.86***
		(0.097)	(0.0978)	(0.075)
Compl. Senior High =1		3.18***	3.080***	3.18***
		(0.097)	(0.0980)	(0.091)
Height (cm)		0.03***	0.0281***	0.03***
		(0.004)	(0.00439)	(0.004)
Married=1		-0.02	-0.0225	-0.02
		(0.078)	(0.0775)	(0.075)
Own pce				
Spline pce 1		0.16***	0.155***	0.16***
		(0.053)	(0.0531)	(0.047)
Spline pce 2		0.02	0.0113	-0.02
		(0.048)	(0.0483)	(0.054)
Rural=1	-0.92***	-0.29***	-0.197***	

	(0.070)	(0.065)	(0.0691)	
Comm. average educ				
Some primary =1			0.177	
			(0.214)	
Compl. Primary = 1			0.694***	
			(0.155)	
Compl. Junior High = 1			0.857***	
			(0.185)	
Compl. Senior High =1			0.547**	
			(0.272)	
Comm. average pce				
Spline pce 1			0.426	
			(0.296)	
Spline pce 2			0.161	
			(0.244)	
Female x comm. variables interaction				
Female x Some Primary			0.0788	
			(0.138)	
Female x Compl. Primary			0.0255	
			(0.107)	
Female X Comp. Junior High			-0.0368	
			(0.147)	
Female x Compl. Senior High			-0.195	
			(0.270)	
Female x ln spline pce 1			-0.330	
			(0.202)	
Female x ln spline pce 2			0.379**	
			(0.188)	
Constant	6.34***	-2.13**	1.037	-0.81
	(0.225)	(0.905)	(1.892)	(0.822)
Observations	6,918	6,918	6,918	6,918
R-squared	0.212	0.389	0.396	0.420
F-tests of joint significance				
Age groups	80.35	34.22	35.10	30.19

p-value	0.000	0.000	0.000	0.000
Own educ. vars		296.70	274.90	428.00
p-value		0.000	0.000	0.000
Own pce vars			5.15	6.02
p-value			0.006	0.002
Comm vars. (level): education and pce			0.93	
p-value			0.470	
Comm vars. (level): education only			0.32	
p-value			0.862	
Comm vars. (level): pce only			2.66	
p-value			0.071	
Comm. vars (level), comm. vars x female interactions (education and pce			5.31	
p-value			0.000	
Comm. vars (level), comm. vars x female interactions: education			5.83	
p-value			0.000	
Comm. vars (level), comm. vars x female interactions: pce			3.21	
p-value			0.013	
Interaction vars: comm. pce vars x female, comm. educ vars x female			6.97	
p-value			0.000	
Interaction vars: comm. educ vars x female			8.13	
p-value			0.000	
Interaction vars: comm. pce vars x female			1.82	
p-value			0.164	
Comm. vars + comm. vars x female interactions (educ and pce			9.36	
p-value			0.000	

Comm. vars + comm. vars x female interactions (educ only)	10.38		
p-value	0.000		
Comm. vars + comm. vars x female interactions (pce only)	2.80		
p-value	0.062		
Community dummy vars			1.89
p-value			0.000

The dependent variable is Mental Intactness (column 1) as described in the text. Base specification in column (1) includes female, age group, and rural dummy variables only. Columns (2) add height, marital status dummy variables, and SES. Column (3) adds community level variablesc as well as interaction variables between community level variables and female dummy variables. Finally, column (4) uses community FE in place of community variables. Omitted variables dummy variables for are male, some primary schooling, age 45-49 and urban. Standard errors are clustered at the community level, with statistical significance at p<0.01 (***), p<0.05(**), and p<0.1(*) reported.

Appendix Table 4. W-score and Word Recall, Indonesia, 45-59

	W- score				Word recall			
VARIABLES	Female only	+ height + married +SES	+ female interacted w/ comm. var	community FE	Female only	+ height + married +SES	+ female interacted w/ comm. var	community FE
Female=1	-25.81***	-10.89***	-110.52	-12.13***	-0.15***	0.13**	-4.26	0.13**
	(1.729)	(2.622)	(144.682)	(2.592)	(0.039)	(0.056)	(3.596)	(0.060)
Age group								
50-54 years old = 1	-25.52***	-14.47***	-14.57***	-15.62***	-0.50***	-0.30***	-0.31***	-0.31***
	(2.213)	(2.054)	(2.049)	(2.173)	(0.051)	(0.048)	(0.048)	(0.051)
50-59 years old = 1	-37.37***	-21.03***	-21.14***	-22.34***	-0.77***	-0.48***	-0.48***	-0.48***
	(2.322)	(2.198)	(2.212)	(2.402)	(0.054)	(0.051)	(0.051)	(0.056)
Own education								
Some primary =1		36.23***	35.85***	34.43***		0.54***	0.53***	0.53***
		(4.144)	(4.202)	(3.312)		(0.082)	(0.084)	(0.077)
Compl. Primary = 1		65.38***	64.82***	63.14***		1.03***	1.02***	1.02***
		(4.228)	(4.316)	(3.533)		(0.086)	(0.087)	(0.082)
Compl. Junior High = 1		80.24***	79.38***	78.68***		1.23***	1.22***	1.28***
		(4.552)	(4.683)	(4.214)		(0.100)	(0.101)	(0.098)
Compl. Senior High =1		103.42***	102.98***	100.72***		1.85***	1.86***	1.83***
		(4.451)	(4.666)	(3.948)		(0.092)	(0.094)	(0.092)
Height (cm)		0.32*	0.33*	0.26		0.01**	0.01**	0.01*
		(0.168)	(0.168)	(0.166)		(0.004)	(0.004)	(0.004)
Married=1		4.85*	4.93*	4.80*		-0.03	-0.03	-0.01
		(2.512)	(2.517)	(2.676)		(0.061)	(0.061)	(0.062)
Own pce								
Spline pce 1		-1.36	-1.30	-0.05		0.13	0.10	0.07
		(3.260)	(3.372)	(3.077)		(0.077)	(0.080)	(0.072)
Spline pce 2		7.08***	7.09***	7.74***		0.09*	0.11**	0.11**

		(2.055)	(2.171)	(2.380)		(0.047)	(0.049)	(0.055)
Rural=1	-20.85***	-5.80**	-5.09*		-0.49***	-0.21***	-0.21***	
	(3.374)	(2.803)	(3.000)		(0.075)	(0.063)	(0.067)	
Comm. average educ								
Some primary =1			-4.74				0.09	
			(45.181)				(1.134)	
Compl. Primary = 1			-4.19				0.01	
			(45.692)				(1.128)	
Compl. Junior High = 1			-0.06				-0.06	
			(45.861)				(1.130)	
Compl. Senior High =1			-3.38				-0.15	
			(45.942)				(1.132)	
Comm. average pce								
Spline pce 1			-1.61				0.25	
			(8.843)				(0.258)	
Spline pce 2			-6.75				-0.16	
			(5.799)				(0.145)	
Female x comm. variables interaction								
Female x Some Primary			38.85				0.54	
			(35.473)				(1.053)	
Female x Compl. Primary			42.56				1.01	
			(34.287)				(1.034)	
Female X Comp. Junior High			40.28				1.05	
			(34.309)				(1.035)	
Female x Compl. Senior High			45.22				1.22	
			(34.479)				(1.036)	
Female x spline pce 1			4.14				0.25	
			(10.735)				(0.260)	
Female x spline pce 2			9.81				-0.05	
			(6.880)				(0.177)	
Constant	538.64***	446.19***	471.65***	395.15***	4.18***	0.34	-2.66	0.93
	(8.265)	(55.115)	(123.959)	(48.019)	(0.528)	(1.256)	(3.630)	(1.116)

Observations	6,214	6,214	6,214	6,214	6,214	6,214	6,214	6,214
R-squared	0.195	0.336	0.337	0.417	0.174	0.269	0.272	0.378
F-tests of joint significance								
Age groups	141.70	49.91	50.04	48.06	111.70	46.74	47.77	39.68
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Own educ. vars		197.40	173.30	193.70		134.20	128.80	119.90
p-value		0.000	0.000	0.000		0.000	0.000	0.000
Own pce vars		6.49	5.80	5.98		5.17	4.87	3.48
p-value		0.002	0.003	0.003		0.006	0.008	0.031
Comm vars. (level): education and pce			0.65				0.93	
p-value			0.691				0.470	
Comm vars. (level): education only			0.49				0.67	
p-value			0.740				0.614	
Comm vars. (level): pce only			0.81				0.87	
p-value			0.443				0.421	
Comm. vars (level), comm. vars x female interactions (education and pce)			3.16				2.90	
p-value			0.000				0.001	
Comm. vars (level), comm. vars x female interactions: education			3.45				2.57	
p-value			0.001				0.009	
Comm. vars (level), comm. vars x female interactions: pce			0.71				1.53	
p-value			0.587				0.191	
Interaction vars: comm. pce vars x female, comm. educ vars x female			1.53				2.57	
p-value			0.165				0.018	

Interaction vars: comm. educ vars x female	0.72		2.93	
p-value	0.580		0.020	
Interaction vars: comm. asset vars x female	1.35		0.46	
p-value	0.260		0.631	
Comm. vars + comm. vars x female interactions (educ and pce	1.48		3.28	
p-value	0.182		0.003	
Comm. vars + comm. vars x female interactions (educ only)	1.86		2.58	
p-value	0.115		0.036	
Comm. vars + comm. vars x female interactions (pce only)	0.07		4.66	
p-value	0.793		0.031	
Community dummy vars		1.14		1.53
p-value		0.002		0.000

The dependent variables are W-score and words recalled (columns 5-8) described in the text. Base specification in columns (1) and (5) include female, age group, and rural dummy variables only. Columns (2) and (6) add height, marital status dummy variables, and SES. Columns (3) and (7) add community level variables and interaction variables between community level variables and female dummy variables. Finally, columns (4) and (8) use community FE in place of community variables. Omitted variables dummy variables for are male, some primary schooling, age 45-49, and urban. Standard errors are clustered at the community level, with statistical significance at p<0.01 (***), p<0.05(**), and p<0.1(*) reported.