Cumulative Socio-economic Status and Depressive Symptoms among Older Adults in Mexico

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INTRODUCTION

Research on the link between child and adult socio-economic status with later-life health outcomes in the Latin American context has grown in recent years (Huang et al., 2011; Monteverde et al., 2009), made possible by significant survey data collection efforts among older adults across the region, and in Mexico specifically (R Wong et al., 2006). Despite these advances, there are several important gaps in this literature. For one, there has been little attention paid to mental health outcomes of older adults. This is important given the increasing global burden of depression in particular and the close link between mental health and chronic disease and physical functioning in older adulthood (Wagner et al., 1999). A second key deficit in the extant literature is the limited examination of how socio-economic disadvantages accumulate across the life-course to influence health outcomes in later-life, including mental health, in the context of developing countries, where socioeconomic inequality prevails and population aging is accelerating. Given these gaps in the literature, the aim of this study is to examine the relationship of cumulative socio-economic disadvantage to later-life depressive symptoms among older adults in Mexico.

BACKGROUND

Depression in older adulthood

Depression is a mental disorder characterized by symptoms of sadness, tiredness, or low self-esteem, as well as poor concentration, loss of interest in conducting daily activities, and disturbances in sleep or appetite (World Health Organization, 2011). Although depression often

begins early in life, it can continue on or recur in older adulthood, often with adverse consequences for chronic disease and physical and cognitive functioning. In addition, depression can range in severity, varying from moderate symptoms that may not require specialist care to severe depression, or major depressive disorder that may require clinical mental health treatment. In addition, public health interventions around depression in the developing country context (e.g. campaigns to address stigma, use of community health workers for mental health prevention and screening) might be best suited to address older adults with a full range of depressive symptoms, before individuals have reached severe clinical depression requiring specialized psychiatric treatment (Reynolds III et al., 2012).

Major depressive disorder is rapidly increasing in its contribution to disability worldwide (Murray et al., 2012) and researchers have called for increasing attention to depression among older adults in low and middle income countries with limited clinical resources to treat the condition (Reynolds III et al., 2012). In Mexico, depression is the leading cause of disability for women and the ninth leading cause of disability for men (Berenzon et al., 2013). Prevalence estimates for depression among adults in Mexico range across measurement and study population and until recently, these studies have not included older adult samples (Wagner et al., 1999). Using the 2001/2002 Mexican National Comorbidity Study, Medina-Mora and authors (Medina-Mora et al., 2007) estimate that 9.6% of adults 55-65 years met the criteria for major depressive disorder in their lifetime. Bello and co-authors (2005) estimated the 12-month prevalence of major depression to be 9.5% among women and 5% for men 60 years and older in Mexico. There are much higher estimates of sub-clinical depressive symptoms, which is associated with increased functional limitations and higher risk of mortality in older adulthood (Bojorquez et al., 2009; Guerra et al., 2009).

In addition, depression has been labeled a hidden public health problem among older adults in Mexico and researchers there have called for further inquiry into the magnitude of the problem, as well as the social determinants of depression in later-life (Wagner et al., 1999). This line of research is particularly important as Mexico is undergoing a significant demographic transition, with a rapidly rising older adult population. Specifically, adults 60 years and older are expected to rise from 6% of the Mexican population in 2000 to 15% in 2027 (R. Wong & Palloni, 2009). The combination of increasing numbers of Mexicans living until older adulthood, the important link between depressive symptoms and other chronic health conditions faced by older adults, as well as the limited utilization and availability of mental health resources for addressing depression in the Mexican population generally (Berenzon et al., 2013) underscore the need for further inquiry into later-life depression in the Mexican context, including the determinants of depressive symptoms.

Socio-economic status (SES) refers to one's positioning along a continuum of achievement that has social and economic value in a given context (Muntaner et al., 2004). SES is understood to be an important contributor to depressive symptoms across the life-course (Lorant et al., 2003). A small number of studies have examined the link between socio-economic status and depression outcomes for older adults in the Latin American context more broadly. For example, Alvarado and authors (2007) studied the contribution of socio-economic status indicators at different points along the life-course to the odds of severe depression among older adults in several Latin American cities. The authors found that reporting childhood hunger was associated with 64% greater odds of severe depression in older adulthood compared with those who report not experiencing hunger – a significant difference even when controlling for education, lifetime occupation, current income, and current health conditions. However, this

study was limited in its inclusion of only urban older adults, and did not examine the effect of cumulative socio-economic advantage or disadvantage on depression outcomes. Other studies examining depression among older adults in Mexico have limited their socio-economic status indicators to discrete measures of educational attainment or current socio-economic status (Bojorquez-Chapela et al., 2012; Guerra et al., 2009). Elsewhere, we have examined the pathways linking childhood socio-economic disadvantage to later-life depressive symptoms for older Mexican adults in cross-section, but have not yet examined the persistent effects of cumulative socio-economic advantage or disadvantage over time (Torres & Wong, 2012). With the exception of Bojorquez-Chapela and authors (2012), who complete an 11-month follow-up with Mexican adults 70 years and older participating in the *70 y más* pension program, studies of depression among older Latin Americans have been done in cross-section.

We aim to contribute to current knowledge by examining the role of socio-economic status across the life-course in shaping inequalities in depressive symptoms later in life. We also make use of longitudinal data and pay particular attention to widening disparities in depressive symptoms over time and the stability of moderate to severe depressive symptoms by categories of cumulative socio-economic advantage and disadvantage over the life course.

CONCEPTUAL FRAMEWORK

Cumulative socio-economic advantage/disadvantage and older adult health

The idea of cumulative socio-economic advantage/disadvantage stems from theories of scientific career trajectories, based on observations by Merton and others that scientists who had already established high reputations might more quickly accumulate rewards for similar contributions relative to scientists without established reputations (Dannefer, 2003). Advantages early on in the scientific career (e.g. high recognition) led to greater rewards for the same kind of

contribution; conversely those without established reputations were at a cumulative disadvantage over the long run of their careers, creating divergent academic trajectories.

The idea of diverging trajectories has since been used to explain inequalities in attainment of socio-economic status or other resources across the life-course. Unequal accumulation of relative socio-economic advantage or disadvantage over time has in turn been linked to disparities in health outcomes, particularly for older adults who may have acquired a life's worth of economic disadvantage including low levels of education, poor material resources, poverty-related stressors, and little access to health care (Dannefer, 2003; Luo & Waite, 2005; O'Rand, 1996). Cumulative advantage/disadvantage theory emphasizes the stability of social, economic, and structural inequality over the life-course and draws attention to how the amount of exposure to socio-economic or other adversities, or the cumulative sum of this exposure, contributes to disparities in health later on (Dannefer, 2003). While the accumulation of material, social and economic resources over time suggests increasing disparities in health as individuals reach older adulthood (i.e. by older adulthood), there is also the possibility that health disparities based on lifetime socio-economic status diminish at much older ages if only the healthiest individuals are 'selected' into these older cohorts (Wickrama et al., 2013) – a possibility we pay attention to in our analysis.

Empirically, cumulative effects are commonly tested with measures of socio-economic status at three or more points across the life-course (Hallqvist et al., 2004). For example, Luo and Waite (2005) use a composite measure of amount of exposure to low or high socio-economic status during early childhood, young adulthood, and adulthood for respondents to the Health and Retirement Study (HRS). They found a consistent gradient between amount of socio-economic advantage/disadvantage across the life-course and a range of functional and chronic health

outcomes, with more points of disadvantage leading to higher rates of chronic disease and higher numbers of physical limitations. In a test of the relationship between "latent classes" of life-course advantage or disadvantage and heart attack risk for HRS respondents, O'Rand and Hamil-Luker (2005) find that those who were categorized as "disadvantaged" over their lifetime had 14% greater odds of being at high heart attack risk at baseline than those in the "advantaged" group; all respondents classified as "high risk" at baseline had heart attacks by a 10-year follow-up. These studies suggest that the combined exposures to socio-economic disadvantage can be influential for health outcomes later in life.

There have been few tests of the relationship between cumulative disadvantage and later-life health outcomes in the Latin American context, including among Latin American immigrants to the U.S., and these have been largely limited to outcomes of cognitive function for older adults (Al Hazzouri et al., 2011; Haan et al., 2011; Nguyen et al., 2008). For example, Nguyen and co-authors (2008) found a clear gradient in the relationship between life-course socio-economic disadvantage and cognitive impairment for older adults in six Latin American cities. Two additional studies have examined the relationship between cumulative socio-economic disadvantage and later-life cognitive health for Mexican immigrants to the United States (Al Hazzouri et al., 2011; Haan et al., 2011). Using survey data for Mexican and Mexican-American older adults in the Sacramento Valley area of California (SALSA), Al Hazzouri and authors (2011) found that those with persistently low socio-economic status across the life-course had a higher risk of developing dementia or other cognitive impairment at a 9-year follow up compared to those with persistently high socio-economic status. Haan and authors (2011) observed a similar relationship between lifetime socio-economic disadvantage and lower cognitive function over time for Mexican and Mexican-American older adults in Sacramento, CA.

Despite the support for the link between lifetime socio-economic status and health for older adults in the U.S., including for older Mexican immigrants, and in urban Latin America, it is unclear whether the measures of lifetime socio-economic status used to construct cumulative SES in these cases translate to the Mexican context in general (i.e. urban and rural). The components of cumulative socio-economic measures may vary significantly from the developed to developing country context, and particularly in rural areas in these developing regions, given the conditions of greater material deprivation and lower average educational attainment among older cohorts. It is unclear whether the differing kinds of socio-economic disadvantage that accumulate over the life-course contribute to more or less adverse effects on health in developed versus developing country settings. The extant research nevertheless leads us to expect a similar, monotonic trend between greater amounts of exposure to socio-economic disadvantage and higher levels of depressive symptoms in later-life, as has been found in tests of cumulative socio-economic disadvantage and health outcomes in other studies (Al Hazzouri et al., 2011; Haan et al., 2011; Luo & Waite, 2005; Nguyen et al., 2008)

Linking depression and cumulative socio-economic advantage/disadvantage

There are a number of mechanisms by which cumulative advantage and/or disadvantage over one's life course might be linked to depressive symptoms in older adulthood. Within a related framework of cumulative bio-psychosocial vulnerability and resilience, Myers and Hwang (2004) suggest that the combination of stressors related to socio-economic status, environmental-level factors, age-related stresses, and major life events can contribute to allostatic load through chronic arousal of physiological response mechanisms, in turn increasing risk for chronic disease or functional impairments that are strongly linked to depression in older adulthood. Those living for longer periods of time in poverty or in conditions of material

deprivation may have greater levels of allostatic load due to prolonged periods of aroused physiological responses to such stressors (McEwen & Seeman, 1999). In addition, long-term periods of exposure to financial stress have been linked to poorer mental health outcomes by reducing one's self-esteem and sense of control over one's own life chances and self-esteem, which may contribute to later-life depressive symptoms (Kahn & Pearlin, 2006). Finally, long-term exposure to higher risk or manual occupations associated with lower socio-economic status may be associated with increased functional limitations in later life, which may constrain independence or lead to diminished quality of life, in turn influencing the number of depressive symptoms experienced in older adulthood (Myers & Hwang, 2004).

Based on theory linking cumulative socio-economic advantage/disadvantage to older adult health generally, and the proposed mechanisms for this link to depressive symptoms in particular, we postulate the following hypotheses:

H1a: Older Mexican adults who experienced low lifetime socio-economic status by a baseline survey will report significantly more depressive symptoms at two-year follow-up than those with persistently high lifetime socio-economic status.

H1b: The relationship between lifetime socio-economic status at baseline and depressive symptoms at two-year follow-up will be partially explained by the effect of lifetime SES on other measures of later-life health and access to health care, including chronic health conditions, functional limitations, and indicators of health insurance coverage and health service utilization.

H2: Older Mexican adults who experienced low lifetime socio-economic status will be significantly more likely to report four or more depressive symptoms at baseline and again at a two-year follow-up compared to those with persistently high socio-economic status.

METHODS

Data

Data for this analysis comes from the Mexican Health and Aging Study (MHAS), a nationally representative panel survey of Mexican adults born before 1951. Baseline interviews were conducted in 2001 and a second wave was conducted in 2003. The MHAS used a multistage area probability sample, stratifying by two Mexican regions consisting of: 1) six states with high rates of out-migration to the United States and 2) the remaining 26 states (R. Wong & Espinoza, 2004). Households in heavy out-migration states were oversampled and those in the remaining states were selected with probability proportionate-to-size. The MHAS study selected households with adults 50 years and older included in the nationally representative 2000 Mexican Employment Survey (ENE-2000). At the household level, each adult 50 years or older had an equal probability of being selected, proportionate to the number of age-eligible adults in the household. Spouses or cohabitating partners were also interviewed regardless of age. Proxy interviews were completed for respondents who could not answer directly due to health problems including cognitive impairment, or language difficulties. A next-of-kin interview was conducted on subjects who had died by the follow-up visit.

The MHAS had a baseline non-response rate of 10.3% and collected data from a total of n=15,156 respondents, spouses and proxy respondents in 2001. We excluded n=1032 proxy respondents because they did not report respondent depressive symptoms. The exclusion of proxy interviews may bias the sample towards healthier individuals with more education, given that health and language difficulties were primary reasons for interviewing a proxy. In addition, while long-term care facilities are rare in Mexico relative to the US, a growing number of older adults make use of these facilities and would not be represented in this study (R Wong et al., 2006). This may skew the MHAS sample towards younger adults with better physical, mental

and cognitive health indicators. We also excluded a total of n=1669 spouses that were younger than 50 years old across the study, for baseline sample of n=12,455 age-eligible direct respondents and spouses.

A total of n=10,469 non-proxy, age-eligible respondents completed follow-up interviews in 2003. Of those non-proxy, age-eligible respondents in 2001, n=831 had follow-up interviews completed by proxy interviews in 2003. Other respondents were lost to follow-up or deceased with next-of-kin completing interviews. The individual-level non-response rate for all respondents was 6.7% at the two-year follow up (Wong and Espinoza, 2004). Excluding proxy interviews and next-of-kin interviews for deceased respondents in 2003 may bias our sample towards healthier, younger individuals from the baseline sample. Finally, we excluded another n=172 (2% of the panel sample) who were missing key independent variables – occupation history, childhood sanitation facilities, migration history and chronic health conditions – for a total analytic sample of n=10,297.[1]

Measures

Dependent Variable

The dependent variable of depressive symptoms was originally measured with a 9-item version of the Center for Epidemiologic Studies Depression Scale (CES-D), meant for use in the general population (Radloff, 1977). The CES-D scale has been validated for use among older adult populations in Mexico (Sánchez-García et al., 2008). In a sample of adults 60 years and older insured by the Mexican Social Security Institute, a 35-item version of the CES-D correctly

[1] Appendix A describes the baseline characteristics for all of those missing from the analysis, including spouses younger than 50 years old and proxy interviews at baseline, as well as for those who were age-eligible and non-proxy respondents in 2001 but were either lost to follow-up or who were represented by proxies or next-of-kin in 2003. Those missing at follow-up only were more likely to be male, to be divorced/separated or widowed, had slightly higher rates of no formal education, had fewer mean household items, and were more likely to be in the lowest quartile of net assets. This group was similar on other demographic, socio-economic and health measures, including mean past-week depressive symptoms at baseline.

classified 82% of respondents who were diagnosed with significant depressive symptoms based on a clinical psychiatric interview; the tradeoff for such high sensitivity is that the CES-D correctly classified only 49% of adults with no depressive symptoms as determined by clinical diagnoses (Sánchez-García et al., 2008).

For the scale, respondents were asked to indicate if for the majority of the past week they felt the following: depressed, lonely, sad, tired, that everything they did was an effort, or that their sleep was restless. An additional three positively worded items were included: whether respondents felt happy, enjoyed life, or felt they had a lot of energy. Each item originally had a response code of 1 for a "yes" and 0 for a "no" answer. The three positively worded items were reverse coded and all of the items were summed such that higher scores indicated more depression-related feelings. After assessing the reliability of the full 9-item scale, we decided to reduce the measure to an 8-item measure, dropping the item related to respondents' energy level, which slightly improved the reliability for this sample to $\alpha = 0.81$ (versus $\alpha = 0.80$ for the 9-item measure).

Constructing a measure of lifetime socio-economic status

Childhood socio-economic status

We assessed childhood socio-economic status with retrospective self-reports of whether or not respondents had sanitation facilities in their household before age 10 and whether or not respondents experienced constant hunger before age 10. Those who both lacked sanitation facilities and experienced hunger during childhood were classified as having the lowest relative socio-economic status. We base the use of these measures on literature from international agencies that suggests that childhood poverty be measured with indicators on nutrition, health,

sanitation facilities, shelter and education rather than household income or consumption, given that earnings and expenditures are not evenly distributed within the household (UNICEF, 2011).

We use educational attainment as an indicator of socio-economic status from childhood to young adulthood – a highly variable period given the low levels of educational attainment through young adulthood in this sample. Those who had no years of education were categorized as having the lowest relative socio-economic status during this period linking childhood to adult socio-economic status.

Adult socio-economic status

We construct a measure of adult socio-economic status using measures of lifetime occupation, baseline income, wealth and material conditions in the household. Occupational status was based on respondents' primary lifetime occupation based on the Mexican Classification of Occupations and grouped into six broad categories: *professional/administrative, agricultural, service sector (including informal services), factory/industrial, domestic labor and no history of work*. Mean depressive symptoms were analyzed across categories for men and women, given gendered occupational patterns. Given the relative disadvantage of those with a history of domestic or agricultural work in terms of current depressive symptoms, these two categories were grouped as indicating low occupational status, compared with the remaining four categories.

Net monthly income was calculated at the household level using a series of questions asking about the balance of respondents' positive earnings (e.g. employment income and pensions) with debts and expenditures. Respondent wealth was calculated with information about their total assets, including property and savings, as well as debts. Missing data for these measures were imputed by the MHAS study team (R. Wong & Espinoza, 2004). We categorize

these variables into quartiles and present them in terms of US dollars based on the conversion in 2000 of roughly 10 Mexican pesos to $1 US dollar.

Because older adult respondents can benefit from living with children with relatively good material conditions, we assessed household material conditions based on whether or not respondents had six different items in their household: a radio, a TV, a refrigerator, a washing machine, a phone, and a heater. A factor analysis of these items suggested that those with a radio and TV but nothing else loaded onto the same factor. We therefore created a binary variable indicating those who had a radio and TV only versus those who had any additional appliances (i.e. a radio, TV, and at least one more item).

The four measures of socio-economic status were combined by grouping those who had low socio-economic status across all four categories: low status lifetime occupation, in the bottom two quartiles of income and household wealth, and those who had a radio and TV only in their household. Combining these four measures yielded a summary score between zero points and four points; those with four points had the most indicators of socio-economic disadvantage in adulthood. We then created a binary indicator of low overall adult SES by dividing the summary score at a cutoff of two points. That is, those with two or more "points" or indicators of low SES in adulthood were coded as having low adult SES and those with fewer than two points were considered to have relatively higher SES in adulthood.

Cumulative socio-economic status

We subsequently developed categories of cumulative or lifetime socio-economic status using the measures of childhood socio-economic status, educational attainment, and adult socio-economic status, as follows:

1) Persistently low socio-economic status: If the lowest childhood SES, no educational attainment, and the lowest adult SES;
2) Mostly low socio-economic status: If positive for low socio-economic status at two out of three points across the life-course (e.g. lowest childhood SES and no educational attainment but not in the lowest adult SES category)
3) Mostly high socio-economic status: If one period of relatively low socio-economic status, and two periods of relatively higher socio-economic status over the life-course.
4) Persistently high socio-economic status: If not coded in any categories of the lowest socio-economic status either in childhood, in terms of educational attainment, or in adulthood.

Covariates

Demographic controls include respondent age, gender, marital status, residence, and migration history. We test linear and quadratic forms of age in years, given that depressive symptoms may actually decrease among those who survived or are 'selected' into older age. We prefer a categorical indicator with the following groups: 50-54, 55-59, 60-69, and 70 years and older. We control for gender given that women are expected to have higher mean depressive symptoms than men. Marital status categories include married or in a consensual union, never married, divorced or separated, and widowed. We control for urban versus rural residence, and whether or not respondents resided in one of the highest out-migration states to the U.S. Finally, we control for respondent migration history, including categories for non-migrants, only internal migration, and U.S. migration experience. It is possible that stress, isolation, and disruption associated with immigration experiences, both in transit and in the U.S., have an adverse effect on depressive symptoms in older adulthood.

Other health and access to health care indicators include a measure of *poor health status in childhood* with a measure of whether or not respondents had a serious health condition before age 10 that limited their ability to do regular activities for a month or more. Respondents were also asked whether or not they had ever been diagnosed with a number of *chronic health conditions*, including hypertension, diabetes, cancer, respiratory illness, or ever had a heart attack or stroke. These responses were collapsed to indicate if respondents had ever been diagnosed with any chronic condition (yes/no). Respondents who had never seen a doctor (n=211) were scored as "no", although this may result in some error given the possibility of undiagnosed conditions. We include an 8-item scale of lower-body *functional limitations* assessing whether or not respondents have difficulty walking, lifting, sitting or crouching, which higher scores indicating more functional limitations.

Lifetime socio-economic status and personal or family occupational history in particular, influenced *access to health insurance* coverage for older Mexican adults at the time of the survey, which may have in turn contributed to more chronic disease, and more undetected or poorly managed chronic disease, which may in turn contribute to greater depressive symptoms. We control for whether or not respondents had any kind of access to health insurance through the Mexican Social Security Institute (IMSS); the Institute for Social Security and Services for State Workers (ISSTE); PEMEX, the navy or military; private sources; or other sources. Finally, we indicate whether or not respondents made a *visit to the doctor in the past year* – a potential indicator of access to care, although also a potential indicator of poorer health.

Model Specification and Analytic Strategy

In order to test the two primary hypotheses about the relationship between cumulative life-course socio-economic status and past-week depressive symptoms, we consider two

potential models. To test our first hypothesis, that older Mexican adults who experienced more periods of low socio-economic status over their lifetime will have significantly more past-week depressive symptoms compared to those who had persistently high socio-economic status , we use a lagged-dependent variable model to analyze change in depressive symptoms across the two-wave panel survey (Johnson, 2005). The lagged-dependent variable model estimates depressive symptoms at follow-up (time t) but includes depressive symptoms at baseline (time t-1) on the right side of the equation. This model estimates the continued relationship between baseline characteristics and depressive symptoms two years later. The inclusion of depressive symptoms at baseline is due to the fact that earlier depressive symptoms may have a direct effect on those reported at follow-up, although we recognize the great deal of instability in past-week depressive symptoms on an individual basis.

Here, the outcome is a continuous measure of past-week depressive symptoms in 2003, estimated by the following two models:

$$\mathbf{Y_{it} = Y_{i,\,t-1} + L_{i,\,t-1} + X'_{i,\,t-1}}$$

$$\mathbf{Y_{it} = Y_{i,\,t-1} + L_{i,\,t-1} + X'_{i,\,t-1} + H'_{I,\,t-1}}$$

Where Y_{it} are depressive symptoms by person-i at follow-up, time t and $Y_{i,\,t-1}$ are depressive symptoms at baseline (t-1); $L_{i,\,t-1}$ is the categorical indicator of cumulative lifetime socio-economic status as of baseline and $X'_{i,\,t-1}$ is a vector of demographic covariates from the baseline wave. In order to test the additional hypothesis that the effect of lifetime socio-economic status on past-week depressive symptoms will be explained in part by other indicators of physical health and aging, in the second model we add a vector of baseline health and access to healthcare measures, $H'_{i,\,t-1}$. This will allow us to understand whether or not the relationship between lifetime socio-economic status and depressive symptoms in older adulthood holds above

and beyond the effect that lifetime SES has on health, functionality, and access to care. This also allows us to understand how cumulative, lifetime SES might influence depressive symptoms in older adulthood indirectly through the effect on chronic health conditions, aging, and health care.

For this first model, we estimate a series of nested Ordinary Least Squares regression models that first estimate the relationship between past-week depressive symptoms in 2003 in lifetime socio-economic status categories, controlling for baseline depressive symptoms, and then subsequently control for additional demographic characteristics. Finally, we add the vector of health-related measures and examine the changes in the regression coefficients for the lifetime socio-economic status indicator as the result of adding these other health-related variables. We additionally test each of these models using negative binomial logistic regression given that the outcome measure is collected as a count of past-week depressive symptoms. Given similar results, we prefer an OLS model for greater simplicity in assessing the mediating effects of other health-related measures in the relationship between lifetime socio-economic status by baseline and past-week depressive symptoms at two-year follow-up. For the purpose of comparison, we also include a test for the 'change-score' method of examining changes in past-week depressive symptoms in Appendix B (Johnson, 2005).

In order to test our second hypothesis, that older Mexican adults who experienced low lifetime socio-economic status will be significantly more likely to have four or more past-week at the baseline survey period (2001) and again at a two-year follow-up (2003) compared to those with persistently high socio-economic status, we estimate a second model where the outcome is a binary measure of whether or not respondents had four or more depressive symptoms (on an 8-point scale) at *both* study waves. While we understand the potential for a great deal of variability in weekly depressive symptoms between the study waves, perhaps dependent on immediate

health, family, and individual circumstances, this measure approximates those individuals who report depressive symptoms consistent with moderate to severe depression over time. For this second hypothesis, we estimate the following model:

$$\mathbf{ln[Y_{it} \geq 4 \;\&\; Y_{i,\,t-1} \geq 4] = L_{i,\,t-1} + X'_{i,\,t-1} + H'_{I,\,t-1}}$$

The outcome measure here is the log odds of reporting four or more depressive symptoms in both 2001 and 2003. As with the previous model, the key predictor variable, $L_{i,\,t-1}$, is a categorical indicator of cumulative life-course socio-economic status up to the baseline study. We also include the full set of baseline demographic controls and health and healthcare measures.

All of the models account for the clustering of members of the same household (i.e. respondents and spouses). Descriptive proportions, means, and bivariate associations are weighted based on the probability of being included in the analytic sample. Multivariate models that include age, gender, marital status, urban residence and high-migration state residence variables do not include probability weights since these same indicators were used to construct the weights. Analyses were completed in STATA V. 11.

RESULTS

The descriptive findings show that nearly half of the sample was below 60 years of age. Over half of the sample was female, and two-thirds were currently married or in a consensual union. Just under half the sample resided in an urban area at the time of the survey and about 20% lived in states with historically high out-migration to the U.S. Only 8% of respondents were return U.S. migrants while another 50% had migrated internally at some point in their lifetime.

The majority of respondents (72%) reported having no sanitation facilities in their household before age 10 and a third reported going hungry during childhood. Thirty-percent of

respondents had no formal education and only 5% completed primary school or more education. Over a third of respondents spent the majority of their lifetime working in domestic jobs or agriculture. The mean number of current household assets was 4.3 out of six possible items, with the majority owning at least a radio and television. Those in the lowest quartile of monthly income reported either negative income, up to the equivalent of $10 USD per month, while those in the highest quartile reported the equivalent of more than $363 USD per month in 2001 terms. On average, those in the lowest quartile of wealth reported having the equivalent of $5000 USD in net household assets. Those in the highest wealth quartile reported an equivalent of more than $42,870 in net household assets.

Based on the constructed measures of cumulative socio-economic advantage/disadvantage, we found that a third of respondents were classified as having "persistently high" socio-economic status across their lifetime whereas 11% had "persistently low" cumulative socio-economic status. This implies that 11% of respondents reported both no sanitation facilities and experiences of hunger before age 10, no education, and indicated at least three markers of low socio-economic status in adulthood (e.g. domestic or agricultural occupation, bottom two income quartiles, bottom two wealth quartiles, and fewer than four household items).

Respondents had a mean of 2.5 past-week depressive symptoms at baseline on a scale of 0 to 8; the mean was just slightly lower at two-year follow-up at 2.45 past week depressive symptoms. Despite low average past-week depressive symptoms, 27% of respondents had four or more depressive symptoms in both 2001 and 2003. Regarding other health conditions, 10% of respondents reported a serious health condition before age 10 and nearly 50% reported at least one doctor-diagnosed chronic health condition. Respondents had an average of 2.6 lower-body

functional limitations (range: 0-8). Over half had some form of health insurance coverage – and 45% did not – although 64% reported a past-year medical visit.

Linear Regression Results

In Table 3 we show the results of regressing past-week depressive symptoms at two-year follow-up on a number of baseline characteristics, including baseline depressive symptoms (the lagged dependent variable) and categories of cumulative socio-economic status by baseline. Compared with those who had persistently high socio-economic status across their lifetime, each level of increasing lifetime socio-economic disadvantage (i.e. mostly high SES, mostly low SES, and persistently low SES) is associated with significantly greater CES-D scores of past-week depressive symptoms in 2003. For example, older Mexican adults categorized as having persistently low socio-economic status are estimated to have a higher 2003 CES-D score by nearly one full point ($b = 0.97$, $p < 0.001$) compared to those with persistently high socio-economic status, even when baseline CES-D scores are held constant. Note that the F-statistics and R-squared values are inflated given the inclusion of baseline CES-D score as a predictor variable.

Adding the demographic controls for gender, age, marital status, residence indicators and migration history yields only small changes in the regression coefficients for the categories of cumulative socio-economic status. Specifically, there are very small reductions in the regression coefficients for the "mostly low" and "persistently low" lifetime socio-economic status as compared to those categorized as having "persistently high" socio-economic status and a 17% increase in the regression coefficient of past-week depressive symptoms in 2003 for those with "mostly high" SES compared with "persistently high" socio-economic status over the life-course; there are no differences in the significance level for these categories of cumulative SES.

With regard to the demographic predictors themselves, women were associated with a significantly higher CES-D score in 2003 by half a point ($b=0.52$, $p<0.001$) all else equal. Being 70 years or older at baseline is associated with significantly higher CES-D scores at a two-year follow-up compared to those between 50 and 54 years old net of baseline CES-D, cumulative SES and other demographic factors. Finally, all else equal, being never married at baseline was associated with significantly higher past-week depressive symptoms in 2003 compared to being married or in a consensual union at baseline.

In Model 3, we add other health and access to health care measures. There are some reductions in the magnitude of the regression coefficients for the lifetime socio-economic status indicators in this final model. For example, the regression coefficient for past-week depressive symptoms at two-year follow-up for those with persistently low life-course socio-economic status compared to those with persistently high socio-economic status is reduced by about 7% (from $b=0.94$ to $b=0.87$, both $p<0.001$). This reduction in regression coefficients may be explained by the indirect relationship between life-course socio-economic status and past-week depressive symptoms through the effect of life-course SES on other health conditions. These include chronic health conditions and functional limitations and, particularly in Mexico, access to health insurance coverage – all factors that might in turn lead to depressive symptoms and growth in depressive symptoms over time.

In terms of the specific health indicators, any chronic health condition, functional limitations, and having no access to health insurance at baseline were each significantly associated with greater past-week depressive symptoms at a two-year follow-up. Although we used an indicator of having made past-year doctor's visits as a proxy measure of better access to and utilization of health care, it was associated with a significantly higher CES-D score in 2003.

Since having made a past-year doctor's visit is endogenous to other health conditions, the mechanism through which health care access and utilization influences past-week depressive symptoms over the long run remains unclear.

Finally, Figures 1a and 1b show the predicted values of depressive symptoms in 2001 and then at two-year follow-up controlling for baseline depressive symptoms, for each level of lifetime socio-economic status. We use the full set of demographic and health-related covariates, assuming respondents are married or in a consensual union and have internal migration history, with the remaining predictors set to their mean values. We show different results by age group to assess how the disparities in depressive symptoms at each time point operate differently for those at different points in older adulthood. The figures for the youngest (50-54 years at baseline) and oldest respondents (70+ at baseline) suggest that the disparities in past-week depressive symptoms do appear to widen by cumulative socio-economic status over the two-year study for both of these age groups. We found similar gradients for the other two age groups (not shown).

Logistic Regression Results

Table 4 shows the results of a logistic regression predicting the odds of reporting four or more depressive symptoms in both 2001 and 2003. Four or more depressive symptoms might be consistent with moderate to clinical depression given an 8-point scale of past-week depressive symptoms. There is a clear pattern whereby those with more periods of cumulative socio-economic disadvantage have significantly greater odds of reporting four or more depressive symptoms at both time points compared to respondents with persistently high socio-economic status across their life-course. For example, the odds of having four or more depressive symptoms in both 2001 and 2003 is significantly greater for those categorized as having low socio-economic status across their lifetime (OR: 2.26; 95% CI: 2.18, 3.15) compared with those

categorized as having persistently high socio-economic status. Those categorized as having mostly high and mostly low socio-economic status over their lifetime each have significantly greater odds of four or more depressive symptoms at both survey points compared to those with persistently high socio-economic status over their lifetime. Figure 2 shows the predicted probabilities of having four or more past-week depressive symptoms in both 2001 and 2003 by categories of lifetime socio-economic status, with the values for the remaining covariates set at their means. There is a clear gradient in the predicted probability of reporting four or more depressive symptoms both at baseline and at a two-year follow-up, with increasing probability for those in categories with more socio-economic disadvantage over their lifetime, all else equal.

DISCUSSION

Taken together, our analyses show a clear gradient in the relationship between a categorical measure of cumulative lifetime socio-economic status and later-life depressive symptoms, including change in depressive symptoms over time and the odds of having four or more depressive symptoms at a baseline survey and two-year follow-up. As suggested by the theory of cumulative advantage/disadvantage, we found evidence that the accumulation of socio-economic advantage or disadvantage over time contributes to widening disparities in depressive symptoms in older adulthood. This widening disparity in past-week depressive symptoms over time does not seem to diminish with age, as suggested by the notion that the least healthy (and potentially the poorest) individuals are disproportionately 'selected' out of older age cohorts.

Our findings raise a couple of important questions about the methodological and policy implications of combining indicators of life-course socio-economic status in a summary, cumulative measure. For example, one might wonder about the value in studying a composite measure of life-course socio-economic status as opposed to discrete indicators of, say, childhood

SES, education, income, occupation, and the like. Focusing on the long-term health effects of poverty in early childhood and or low educational attainment, for example, can draw attention to critical periods in earlier life for establishing later health outcomes, as well as other life chances, as has been suggested in other studies of later life depressive symptoms among older adults in Latin America and Mexico in particular (Alvarado et al., 2007; Torres & Wong, 2012).

However, by summing up socio-economic status indicators across the life-course, we are drawing attention to those older adults who have experienced persistent socio-economic disadvantage for prolonged periods of time. While many older adults in Mexico experienced poor material conditions during childhood, as shown with our indicator of household sanitation facilities, significant improvements in the Mexican economy and in the educational and occupational opportunities of the children of these older adults have allowed some socio-economic advancement among those who reached 50 years and older. A much smaller group of older adults not only experienced hunger and lack of sanitation facilities in childhood, but also completed no education, and remained in occupations associated with more depressive symptoms (i.e. domestic or agricultural work). By older adulthood, these individuals continued to have few material assets in their homes and remained in the bottom two quartiles of income and wealth. A summary indicator identifying these individuals sheds light on an important segment of the Mexican older adult population that may be the focus of public health interventions targeting depression (Reynolds III et al., 2012). Finally, while the magnitude of the relationship between later-life health outcomes and individual measures of socio-economic status at different points across the life-course can be very small given the distal, but fundamental, influence of some of these social determinants of health (Link & Phelan, 1996), a summary

measure of lifetime socio-economic status draws attention to the magnitude of the relationship between the *accumulation* of advantage and disadvantage on later-life health outcomes.

LIMITATIONS

One limitation in terms of translating these findings to public health efforts for depression in older adulthood is that older adults who experienced persistently low socio-economic status across their lifetimes are likely concentrated in specific regions of Mexico; we were not able to analyze cumulative disadvantage measures by more refined geographical information than with our indicators of historically high out-migration state versus other states and urban versus rural residence. There is also evidence from that depression prevalence and the availability of treatment for depression varies widely by Mexican state(Belló et al., 2005); we could not address this variability in the present study.

Another significant limitation is that we are unable to assess age of onset of depressive symptoms. In Mexico, the average age of onset of any clinical mental health disorder has been estimated at 21 years old (Medina-Mora et al., 2007). Cases of early onset (i.e. adolescence) may have different etiological pathways compared to cases of onset in older adulthood (Myers & Hwang, 2004). For example, early onset of depressive symptoms may relate more to stressful family conditions and parental mental health status and may recur through adulthood and later-life. Onset of depressive symptoms in older adulthood may relate more directly to current life stresses, including financial and social-status stresses, or to current health conditions. We were not able to assess age of onset and tease apart the family and socio-economic status indicators in contributing to this onset.

Another limitation is that the categories of lifetime advantage and disadvantage were constructed rather than developed through latent-class analysis that might allow for other,

unexpected dimensions of adversity that have a cumulative effect on health over the life-course. For example, O'Rand and Hamil-Luker (2005) discovered through a latent class analysis of older adults in the U.S. that family-related stressors in childhood, including a move during childhood due to parental unemployment and paternal absence led to the creation of another "class" of life-course disadvantage in addition to markers of childhood socio-economic advantage and disadvantage. Although we tested a number of measures related to parental socio-economic status and absence (e.g. parental migration to the U.S.) and found no significant relationship with current depressive symptoms above and beyond the other measures of childhood SES, we were unable to test the lasting impact of significant changes or shocks to the family, such as family moves due to unemployment, as was examined for HRS respondents.

Future work in the Mexican context might explore other dimensions of cumulative life-course advantage or disadvantage related to the childhood, mid-life and current family structure, in addition to those we considered in the constructed measures here. Other adverse experiences that occurred between waves of the MHAS, including widowhood, increased functional limitations, or chronic disease onset might contribute to change in depressive symptoms over time. Of particular interest in the Mexican context, Antman (2010) has found that adult child migration is associated with more depressive symptoms for MHAS respondents, and partner migration has been linked to depressive symptoms for adult women (Bojorquez et al., 2009). Family-level changes due to U.S.-Mexico migration might be an area of future research in the study of depressive symptoms, and the growth in depressive symptoms over time, for older Mexican adults.

There are additional mechanisms linking lifetime socio-economic status to later-life depressive symptoms, potentially serving as moderators of this relationship that might also be

examined in future analyses. For example, Bojorquez-Chapela and co-authors (2012) found significant associations between two measures of individual autonomy – literacy and functional independence – and incidence of depression at an 11-month follow-up among rural-dwelling Mexican adults 70 years and older even when controlling for socio-economic status and a number of adverse health and family-related events. Although we capture some aspects of autonomy, as with our measure of functional limitations, future iterations of our research might examine mastery or personal control, and social support in the broader community as potential explanations or even protective factors in the relationship between cumulative socio-economic status and depressive symptoms.

CONCLUSION

Our analysis points to the significant influence of cumulative socio-economic advantage and disadvantage over the life-course on disparities in depressive symptoms in older adulthood, and on the persistence of symptoms consistent with moderate to severe depressive disorder. This relationship should be seen in light of important policy changes in Mexico to investments in health and education across the life-course. For example, the conditional cash transfer program, *Oportunidades,* started in the late 1990s, has made strides towards improving educational attainment for children in the poorest families in Mexico, an effort to reduce the intergenerational transmission of poverty and material deprivation (Lomelí, 2008). Health reforms in Mexico, in the form of *Seguro Popular*, also represents an important investment in health and access to health care for the nearly 50 million Mexicans, including older adults, who were previously without health coverage under the labor-based system (Knaul et al., 2012). These efforts were not underway until 2003, although Knaul and authors (2012) report much higher enrollment of the Mexican population in some form of insurance program by 2011.

Despite important policies around poverty reduction and improving health and health care in Mexico, there are persistent challenges in terms of adequate health professionals and organizational structures to respond to many health needs, including the availability of medical specialists, and health care services more generally in rural Mexico. While some mental health services are covered under *Seguro Popular*, it remains to be seen whether availability and utilization of mental health services will increase in Mexico from its currently low rate (Berenzon et al., 2013). For example, in a study of late-life depression, Guerra and authors (2009) found that 87% of those surveyed in Mexico City and 96% of those in rural Morelos who had a past-month (ICD-10) depressive episode never received treatment for their depression. Even those who do utilize mental health services report waiting over a decade on average to do so, and often lack adequate care (Berenzon et al., 2013). Continued efforts to invest in mental health of Mexicans, including the growing older adult population, should address a range of concerns, from the lack of trained mental health personnel to community-level stigma around mental health conditions. As suggested by our results, these efforts should target older adults who experienced the most cumulative poverty over their lifetime, since this appears to represent a significant risk factor for experiencing depressive symptoms in middle and old age, and for contributing to the persistence of moderate to high number of depressive symptoms over time.

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TABLES, FIGURES, AND APPENDICES

Table 1. Demographic and life-course socio-economic status measures for Mexican adults 50 years and older in 2001 (n=10297)

	n	(%)
Age		
50-54	2177	(0.21)
55-59	2736	(0.26)
60-69	3232	(0.31)
70+	2152	(0.22)
Female	5745	(0.56)
Marital Status[b]		
Married/Union	7148	(0.69)
Divorced/Separated	410	(0.05)
Never Married	890	(0.09)
Widowed	1849	(0.18)
Urban Residence	6801	(0.46)
High-migration state	2890	(0.19)
Migration History		
U.S.	932	(0.08)
Internal	5603	(0.52)
Never Migrant	3762	(0.40)
Childhood Socio-economic Status		
No sanitation facilities before age 10	6962	(0.72)
Hunger before age 10	3345	(0.35)
Education		
No education	2541	(0.30)
Some or completed primary school (1-6 y)	7189	(0.66)
More than primary school (7+ y)	567	(0.05)
Adult Socio-economic Status		
Lifetime occupation		
Domestic or agricultural	3313	(0.38)
Service, professional, factory, no work[c]	6984	(0.62)
Household assets (range: 0-6) – Mean (S.D.)		4.3 (1.7)
Monthly income quartiles[d]		
$\leq$ \$10.4	2563	(0.26)
> \$10.4 to $\leq$ \$128.3	2758	(0.29)
> \$128.3 to $\leq$ \$363.4	2621	(0.24)
> \$363.4	2355	(0.21)
Wealth quartiles		
$\leq$ \$5000	2094	(0.24)
> \$5000 to $\leq$ \$18,471	2591	(0.25)
> \$18471 to $\leq$ \$42,874	2792	(0.26)
> \$42,874	2820	(0.25)
Cumulative Socio-economic Status		
Persistently high	3982	(0.34)
Mostly high	3224	(0.31)
Mostly low	2219	(0.26)
Persistently low	872	(0.11)

Source: Mexican Health and Aging Study 2001. Notes: b. Movement in/out of marriage and widowhood by 2003 is as follows: 218 went from married to widowed, 91 went from married to divorced, 14 went from widowed to married, 45 went from divorced/separated to married and 2 went from single to married; c. Those with no work history did not work for pay in any capacity, or without pay at a business or farm; this group was primarily comprised of women working inside the home; d. Based on a 2000 conversion rate of 10 Mexican pesos to \$1USD

Table 2. Health and access to health care indicators for Mexican adults 50 years and older, (n=10297)

	n	(SD)	%	mean
Past-week depressive symptoms, CES-D (range: 0-8)				
Past-week depressive symptoms, 2001		2.51	(0.04)	
Past-week depressive symptoms, 2003		2.45	(0.04)	
4+ depressive symptoms, 2001 and 2003	2811			(0.27)
Additional health and access to health care indicators, 2001				
Poor childhood health before age 10[b]	1143			(0.10)
Any chronic health condition[c]	5071			(0.46)
Number of lower-body functional limitations (range: 0-8)		2.56	(0.03)	
No access to health insurance coverage[d]	3891			(0.45)
No past year doctor's visit	6672			(0.64)

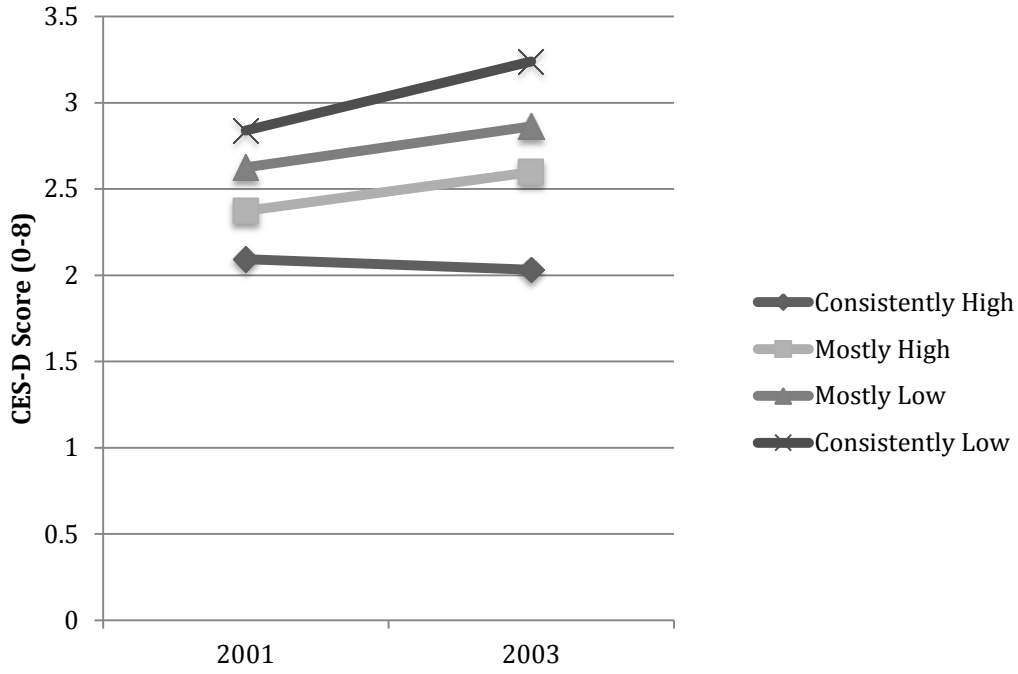
Source: Mexican Health and Aging Study 2001 and 2003. Notes:b. Had a serious health condition before age 10 that limited regular activities for a month or more; c. 242 respondents reported they never visited a doctor as of 2001 and therefore did not know about doctor-diagnosed conditions; d. Had rights to IMSS, ISSSTE, PEMEX/defense/navy, private, or other medical services; there was some movement in and out of insurance; 907 not covered in 2001 were covered in 2003 and 601 covered in 2001 were not covered in 2003

Table 3. OLS regression models of number of past-week depressive symptoms (range 0-8) at two-year follow-up on categories of cumulative lifetime socio-economic status by baseline (2001) for Mexican adults 50 years and older, (n=10297).[a]

	Model 1			Model 2			Model 3		
	B		SE	B		SE	B		SE
Baseline CES-D (range 0-8)	0.34	***	(0.02)	0.34	***	(0.01)	0.28	***	(0.01)
Cumulative SES (persistently high=ref)									
Mostly high	0.41	***	(0.08)	0.48	***	(0.05)	0.43	***	(0.05)
Mostly low	0.67	***	(0.09)	0.66	***	(0.92)	0.62	***	(0.05)
Persistently low	0.97	***	(0.12)	0.94	***	(0.08)	0.87	***	(0.08)
Demographics at Baseline									
Age (50-54 = ref)									
55-59				<0.01		(0.05)	-0.04		(0.05)
60-69				0.04		(0.05)	-0.05		(0.05)
70+				0.15	*	(0.06)	-0.02		(0.06)
Female				0.52	***	(0.04)	0.41	***	(0.04)
Marital Status (married = ref)									
Divorced/Separated				-0.01		(0.10)	0.04		(0.10)
Never Married				0.16	*	(0.07)	0.20	**	(0.07)
Widowed				0.04		(0.05)	0.07		(0.05)
Urban Residence				-0.02		(0.05)	-0.05		(0.05)
High Out-Migration State				-0.01		(0.04)	-0.01		(0.04)
Migration History (nonmigrant = ref)									
Internal migrant				0.01		(0.04)	-0.01		(0.04)
U.S. migrant				-0.04		(0.07)	-0.06		(0.07)
Health status and access to healthcare at baseline									
Serious health condition in childhood							0.05		(0.06)
Any chronic health conditions							0.22	***	(0.04)
Lower-body functional limitations							0.10	***	(0.01)
No access to health insurance coverage							0.11	*	(0.04)
Past-year doctor's visit							0.21	***	(0.04)
Constant	1.18			0.97			0.72		
F-statistic	142.2		***	185.4	***		159.8	***	
R-squared	0.16			0.19			0.21		

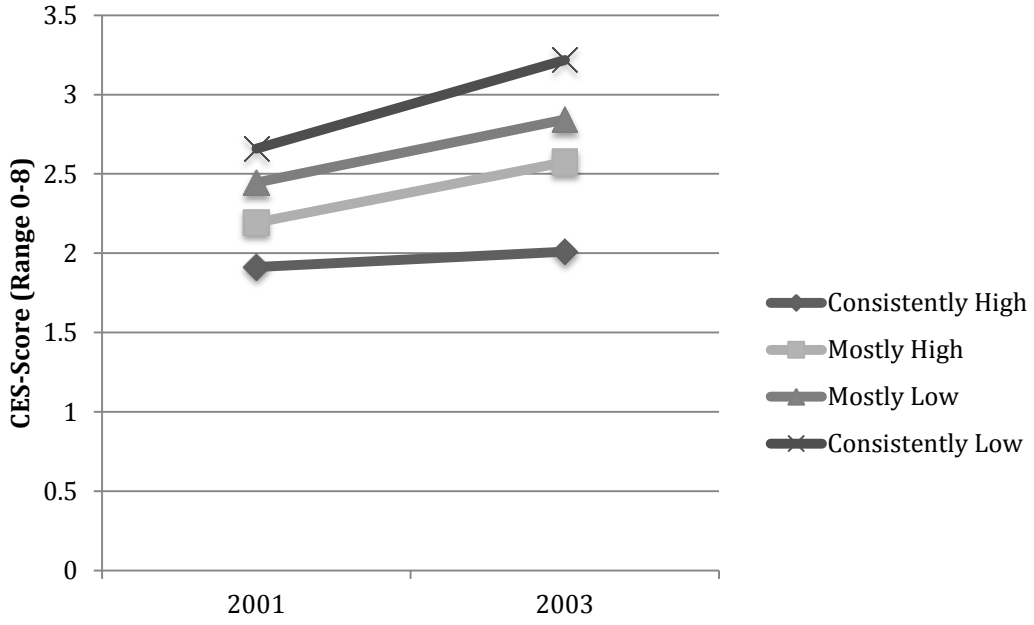
Source: Mexican Health and Aging Study 2001 and 2003. Notes: a. Regressions are performed with clustering for individuals in the same household; *p<0.05, **p<0.01, ***p<0.001

Fig 1a. Predicted past-week depressive symptoms in 2001 and 2003 for older Mexican adults 50-54 years old at baseline, by lifetime socio-economic status



Source: Mexican Health and Aging Study. Both models based on OLS regression assuming mean values for gender, residence, chronic health conditions, functional limitations, health coverage, past-year doctor's visits and assuming respondents are married/in a union with some internal migration history; 2003 value controls for 2001 CES-D.

Fig 1b. Predicted past-week depressive symptoms in 2001 and 2003 for older Mexican adults 70+ years old at baseline, by lifetime socio-economic status



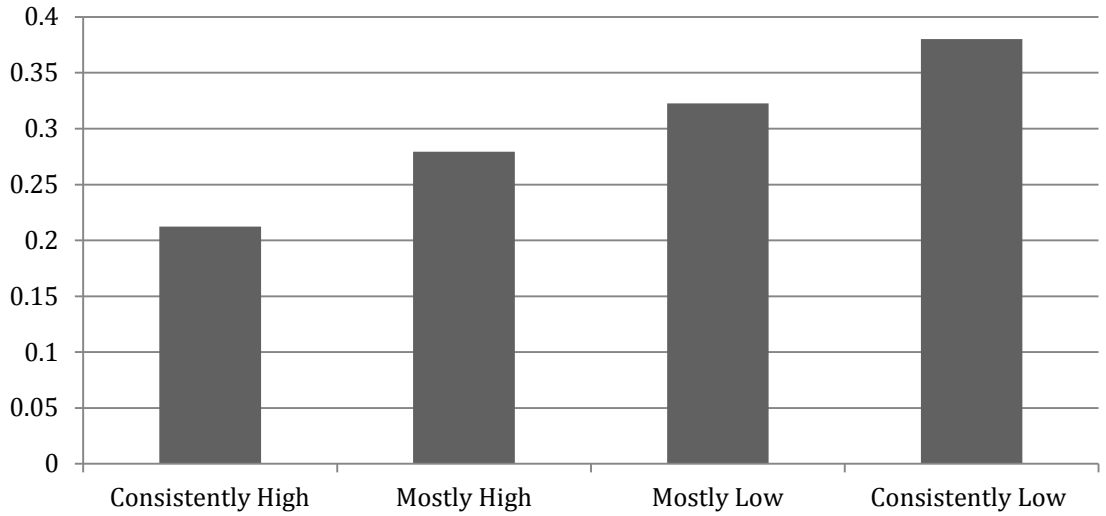
Source: Mexican Health and Aging Study. Both models based on OLS regression assuming mean values for gender, residence, chronic health conditions, functional limitations, health coverage, past-year doctor's visits and assuming respondents are married/in a union with some internal migration history; 2003 value controls for 2001 CES-D.

Table 4. Odds Ratios and 95% Confidence Intervals for a logistic regression of four or more past-week depressive symptoms at both baseline (2001) and at two-year follow-up on cumulative life-course socio-economic status indicator for Mexican adults 50 years and older (n=10297)

	OR		95% CI
Cumulative SES (persistently high=ref)			
Mostly high	1.52	***	(1.35, 1.72)
Mostly low	1.94	***	(1.69, 2.23)
Persistently low	2.62	***	(2.18, 3.15)
Demographics			
Age (50-54 = ref)			
55-59	0.96		(0.83, 1.11)
60-69	0.94		(0.81, 1.08)
70+	0.91		(0.77, 1.07)
Female	1.86	***	(1.67, 2.07)
Marital Status (married = ref)			
Divorced/Separated	1.11		(0.87, 1.42)
Never Married	1.57	***	(1.32, 1.86)
Widowed	1.46	***	(1.28, 1.66)
Urban Residence	0.99		(0.88, 1.10)
High Out-Migration State	1.19	**	(1.07, 1.33)
Migration History (ref = non-migrant)			
Internal migrant	1.05		(0.94, 1.17)
U.S. migrant	0.99		(0.81, 1.20)
Health status and access to healthcare			
Serious health condition in childhood	1.33	***	(1.15, 1.53)
Any chronic health conditions	1.32	***	(1.20, 1.44)
Lower-body functional limitations	1.30	***	(1.27, 1.32)
No access to health insurance coverage	1.10		(0.98, 1.23)
Past-year doctor's visit	1.33	***	(1.19, 1.49)

Source: Mexican Health and Aging Study, **p<0.01, ***p<0.001

Fig 2. Predicted probabilities of reporting four or more depressive symptoms at baseline (2001) and at two-year follow-up (2003) for older Mexican adults by categories of lifetime socio-economic status (n=10,297)



Source: Mexican Health and Aging Study, 2001 and 2003. Predicted probabilities are across mean values of age, gender, marital status, residence, migration history, other health and access to health care.

Appendix A. Characteristics of missing cases, for Mexican adults 50 years and older in 2001 (n=5279)[a]

	All missing (n=5279)		Missing at follow-up (n=2030)[b]	
	n	(%)	n	(%)
50-54	647	(0.18)	428	(0.19)
55-59	732	(0.21)	471	(0.22)
60-69	894	(0.25)	572	(0.28)
70+	1283	(0.36)	559	(0.31)
Female	2937	(0.60)	937	(0.45)
Marital Status[b]				
Married/Union	3364	(0.76)	1390	(0.64)
Divorced/Separated	254	(0.06)	164	(0.11)
Never Married	129	(0.03)	73	(0.04)
Widowed	686	(0.15)	403	(0.22)
Urban Residence	3225	(0.66)	1402	(0.48)
High-migration state	1297	(0.27)	546	(0.18)
Migration History				
U.S.	437	(0.09)	226	(0.09)
Internal	2597	(0.54)	1097	(0.53)
Never Migrant	1768	(0.37)	698	(0.38)
Childhood Socio-economic Status				
No sanitation facilities before age 10	---	---	1296	(0.70)
Education				
No education	1111	(0.21)	526	(0.35)
Some primary school (1-6 y)	3417	(0.65)	1343	(0.59)
Primary school or more (7+)	751	(0.14)	161	(0.06)
Adult Socio-economic Status				
Lifetime occupation				
Domestic or agricultural	1415	(0.30)	618	(0.38)
Service, professional, factory, no work[c]	3377	(0.70)	1390	(0.62)
Household assets		4.15 (0.03)		3.78 (0.11)
Monthly income quartiles[d]				
$\leq$ \$10.4	1261	(0.24)	514	(0.27)
> \$10.4 to $\leq$ \$128.3	1071	(0.20)	492	(0.28)
> \$128.3 to $\leq$ \$363.4	1208	(0.23)	481	(0.21)
> \$363.4	1739	(0.33)	543	(0.24)
Wealth quartiles				
$\leq$ \$5000	1109	(0.21)	520	(0.34)
> \$5000 to $\leq$ \$18,471	1169	(0.22)	443	(0.20)
> \$18471 to $\leq$ \$42,874	1199	(0.23)	469	(0.20)
> \$42,874	1802	(0.34)	598	(0.25)
Past-week depressive symptoms	---	---		2.54 (0.10)
Any chronic health condition	2219	(0.46)	1017	(0.46)
Never have seen a doctor	153	(0.03)	56	(0.06)
Lower body functional limitations (0-8)		1.65 (0.03)		2.93 (0.14)
No health insurance coverage	2035	(0.42)	799	(0.49)
Past year doctor's visit	3489	(0.66)	1325	(0.64)

Source: Mexican Health and Aging Study. Notes: a. Missing at follow-up includes respondents who were age-eligible (50+), non-proxy respondents in 2001 but were either lost or answered by proxy respondents in 2003, b. Numbers don't always sum up to total given some 'don't know' or 'refused' responses on some variables; frequencies and percentages for "all missing" are both unweighted given the inclusion of spouses younger than 50 years old who were given a zero weight; for those missing at follow-up, frequencies are unweighted and percentages are weighted. c. Those with no work history did not work for pay in any capacity, or without pay at a business or farm; this group was primarily comprised of women working inside the home; d. Based on a 2000 conversion rate of 10 Mexican pesos to \$1USD

Appendix B. First-differences regression of change in past-week depressive symptoms between 2001 and 2003 for Mexican adults 50 years and older, (n=10297)[a]

	B		SE
Cumulative SES (persistently high=ref)			
Mostly high	0.23	***	(0.06)
Mostly low	0.24	***	(0.07)
Persistently low	0.33	**	(0.10)
Demographics			
Age (50-54 = ref)			
55-59	-0.03		(0.07)
60-69	-0.01		(0.08)
70+	-0.12		(0.05)
Female	0.09		(0.05)
Marital Status (married=ref)			
Divorced/Separated	-0.05		(0.12)
Never Married	-0.06		(0.08)
Widowed	-0.25	***	(0.07)
Urban Residence	-0.01		(0.06)
High Out-Migration State	-0.19	***	(0.05)
Migration History (non-migrant=ref)			
Internal migrant	-0.04		(0.05)
U.S. migrant	-0.10		(0.08)
Health status and access to healthcare			
Serious health condition in childhood	-0.18	*	(0.07)
Any chronic health conditions	0.04		(0.04)
Lower-body functional limitations	-0.11	***	(0.01)
No access to health insurance coverage	0.05		(0.05)
Past-year doctor's visit	0.07		(0.05)
Constant	0.18		
F-statistic	9.3	***	
R-squared	0.02		

Source: Mexican Health and Aging Study. Notes: a. Regressions are performed with clustering for individuals in the same household, *p<0.05, **p<0.01, ***p<0.001.