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# Life course social mobility and cognitive function among middle-aged and older adults in India: Exploring heterogeneity by gender

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ABSTRACT

This study investigates the link between life course social mobility and cognitive function among middle-aged and older adults in India, specifically emphasizing whether upward and downward mobility exerts symmetric associations and potential gender heterogeneity within these associations. Leveraging data from the Longitudinal Aging Study in India 2017–2018, encompassing 64,710 individuals aged 45 years or above, we classified social mobility as 'consistently high,' 'upward mobility,' 'downward mobility,' and 'consistently low,' based on socioeconomic position during childhood and late adulthood. Multivariable regression and gender-interaction analyses were employed to assess associations. Overall, 35.69% maintained a consistently high socioeconomic position, whereas 22.87% remained consistently low; 20.05% experienced upward mobility, and 21.39% faced downward mobility. Compared to consistently high socioeconomic position, consistently low socioeconomic position was associated with lower cognitive function ($b = -1.47$; 95% CI = −1.59, −1.34), followed by downward mobility ($b = -0.84$; 95% CI = −0.95, −0.72) and upward mobility ($b = -0.72$; 95% CI = −0.84, −0.61). Notably, the interaction model revealed significant differences by gender, especially between opposite social mobility groups. Among men, upward and downward mobility displayed asymmetric associations, with upward mobility being associated with a higher cognitive function than downward mobility ($b = 0.31$; 95% CI = 0.13, 0.50), whereas such differences were not observed for women ($b = -0.01$; 95% CI = −0.20, 0.17). These findings highlight the critical influence of life course social mobility on cognitive health, with implications for interventions tailored to the unique trajectories of social mobility by gender in India.

## 1. Introduction

With rapid population aging, cognitive health has emerged as a pressing public health concern worldwide, particularly given that cognitive impairments often serve as early markers for Alzheimer's disease and related dementias (ADRD) (Alzheimer's Association, 2019). The ramifications of these conditions extend well beyond the affected individuals, imposing significant burdens on societies through heightened healthcare utilization costs, caregiving responsibilities, and welfare system demands (Wimo et al., 2023). This challenge is particularly pronounced in low- and middle-income countries (LMICs), where demographic and epidemiologic shifts foreshadow a surge in ADRD prevalence, compounded by insufficient healthcare systems (Nichols et al., 2022; Prince et al., 2015). By 2050, an estimated 75% of the global ADRD burden will be concentrated in LMICs, highlighting the critical need for targeted research and intervention (Prince et al., 2015).

Cognitive decline, commonly recognized as a natural aspect of aging, exhibits substantial variability among individuals influenced by broader life course social determinants (Livingston et al., 2020). Within this spectrum, life course social mobility, defined as the movement between different socioeconomic positions (SEPs) over the life course, has emerged as a pivotal factor in life course research (Kuh et al., 2003). SEP at each life stage can uniquely contribute to later cognitive outcomes by providing or restricting resources that are fundamental to cognitive health. Furthermore, SEPs across the life course are interconnected, cumulatively shaping an individual's life trajectory through diverse

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biopsychosocial mechanisms (Hallqvist et al., 2004). Thus, social mobility can either mitigate risks or compound vulnerabilities, depending on the nature and direction of these shifts (Mishra et al., 2009; Park and Kim, 2024).

While research from high-income countries (HICs) has significantly advanced our understanding of how social mobility influences later cognitive health (Faul et al., 2021; Skoblow et al., 2024), it is uncertain if these insights are directly applicable to LMICs, where economic conditions, social structures, and public health resources differ substantially (Beller and Hout, 2006; Fu and Liu, 2022). Unlike HICs, where rates of upward mobility have been declining (Chetty et al., 2017), LMICs, like India, are undergoing rapid socioeconomic transformations and policy shifts that have made social mobility more frequent and visible (Crombach and Smits, 2022). Concurrently, such transitions often improve or exacerbate health inequalities (Bartley and Plewis, 2007; Boyle et al., 2009), highlighting the need to explore how these dynamics are linked with cognitive health disparities within these contexts. This paper aims to address this gap by examining the association between life course social mobility and mid-to-later life cognitive function within the context of India—a country exemplifying rapid socioeconomic development that is characteristic of many LMICs.

### 1.1. Life course social mobility and cognitive health

Individuals with higher SEP generally exhibit better cognitive health than their lower SEP counterparts (Wang et al., 2023). The benefits of higher SEP extend beyond mere socioeconomic advantage, often translating into less psychological stress, healthier lifestyles, supportive social networks, and enriched environments—all of which contribute to maintaining health and well-being over time (Islam and Jaffee, 2023). The association between SEP and cognitive health was observed consistently through various objective and subjective measures of SEP, including education level, occupation, income, and subjective social positions across diverse settings (Cagney and Lauderdale, 2002; Karp et al., 2004; Kobayashi et al., 2022). However, the traditional approach of assessing SEP at discrete life stages—childhood, midlife, or later life—does not adequately capture the dynamic nature of SEP (Dannefer, 2003; Graham, 2002; Wang et al., 2023).

Instead, the life course perspective offers a more comprehensive framework for understanding how SEP over time influences cognitive health in later life, emphasizing the intertwined nature of personal development and the social environment (Crosnoe and Elder Jr, 2004). Central to this perspective are theories like the cumulative (dis)advantage perspective and social mobility theory. The former posits that social inequalities in health are seeded early and widen over time as initial advantages or disadvantages are amplified throughout the life course (Dannefer, 2003). For instance, childhood SEP disadvantages cast long shadows over the lifespan, with early disadvantages limiting educational and subsequent employment opportunities, adversely affecting adulthood SEP, and compounding health disparities into later life (Hatch, 2005). Conversely, individuals who benefit from early SEP privileges often experience cumulative advantages, maintaining high SEP and achieving better cognitive health outcomes throughout their lives.

On the other hand, social mobility theory highlights that the trajectory of SEP is not invariably fixed; many individuals experience shifts—either upward or downward—throughout their lives (Heath and Li, 2023). These fluctuations can potentially counterbalance early life disadvantages or advantages, underscoring the importance of considering the dynamic nature of SEP (Graham, 2002; Luo and Waite, 2005). For instance, upward mobility can mitigate early disadvantages by providing access to better psychosocial resources and healthier environments in adulthood (Huoyun et al., 2023; Pollitt et al., 2005; Savelieva et al., 2017). Conversely, downward mobility might impose vulnerabilities in later life by eroding the benefits of any early-life advantages (Faul et al., 2021; Pudrovska and Anikputa, 2014). Nonetheless, the enduring impacts of early life (dis)advantages may not be completely neutralized despite subsequent shifts in SEP, mainly due to critical and sensitive childhood development periods (Pollitt et al., 2005). Consequently, individuals who experience upward or downward mobility will likely have cognitive health outcomes that fall somewhere between those who persistently remain in low SEP and those who consistently enjoy high SEP across the life course.

Additionally, the direction of social mobility—whether upward or downward—can have asymmetric impacts on health (Park and Kim, 2024). Given that individuals tend to perceive losses more intensely than equivalent gains, downward mobility can disproportionately worsen cognitive health, outweighing the positive effects of upward mobility (Schmidt and Zank, 2005). When individuals experience a decline in SEP during their lifetime, the loss of previously accessible resources, social status, and support networks can lead to significant psychological distress, which may exacerbate cognitive decline (Nicklett and Burgard, 2009; Park and Kim, 2024). In contrast, while upward mobility provides access to better resources and opportunities compared to persistently low SEP and downward mobility, its positive impact may be less pronounced due to the enduring effects of early-life disadvantages and the stress associated with adapting to new social environments (Chen et al., 2022). This underscores the necessity of distinguishing the associations of upward and downward mobility in influencing cognitive health.

### 1.2. Potential gender heterogeneity

The association between life course social mobility and cognitive health also necessitates consideration of potential gender heterogeneity. Studies have shown that women experiencing low SEP in childhood face more prolonged and profound consequences than men (Lee and Ryff, 2019; Pudrovska et al., 2014). These disparities are often magnified by entrenched social and structural gender inequalities (Wolfova et al., 2021). Gender-specific cultural norms and roles may restrict opportunities for recovery or advancement among women, making it more challenging for them to overcome early disadvantages and their cumulative health impacts compared to their male counterparts. Moreover, while upward mobility might generally offer a pathway to mitigate the adverse consequences of early-life SEP disadvantages, women may experience restricted benefits from such advancements due to enduring socioeconomic barriers that limit their access to critical resources. This is often supported by the diminishing return hypothesis, which suggests that the advantages of upward mobility are not evenly distributed across societies (Farmer and Ferraro, 2005); women may continue to face obstacles that impede them, thereby not experiencing the same improvements as men under similar conditions.

### 1.3. The Indian context

India—the most populous country in the world—is undergoing profound socioeconomic transformations, making it a critical setting for studying life course social mobility and cognitive health. The shift from socialist policies in the 1980s, combined with rapid economic growth and urbanization, has created new opportunities for social mobility. While India has made progress in economic and social terms, entrenched inequalities have grown across social strata (Krishna, 2014). Examining the impacts of life course social mobility in generations where social mobility has become more prominent is crucial to understanding the role of SEP across the life course in shaping cognitive health inequalities. Furthermore, the historical and cultural contexts of India underscores the necessity of exploring gender heterogeneity in these associations. Deeply ingrained gender roles and long-standing patriarchy have resulted in distinct cognitive aging trajectories for men and women (Jain et al., 2022). Beyond differences in cognitive function, it is also crucial to recognize that opportunities for social mobility can differ by gender (Urbaeva, 2019). Middle-aged and older Indian women, in particular, have faced significant challenges throughout their lives, limiting their

access to essential resources such as education and economic opportunities (Jain et al., 2022). Therefore, examining the interplay between life course social mobility and cognitive health in India, focusing on gender differences, is essential for gender disparities in cognitive health.

### 1.4. The present study

This study investigates the association between life course social mobility and cognitive health among middle-aged and older adults in India by utilizing childhood and adulthood SEP. Firstly, we assess whether SEP during childhood and adulthood are independently associated with later cognitive health. Additionally, we seek to examine the associations between life course social mobility and cognitive function, focusing on whether individuals who experience social mobility in opposing directions (i.e., upward and downward mobility) exert asymmetric associations. Lastly, our research objectives aim to explore potential gender heterogeneity in these associations. By doing so, this study provides valuable insights into understanding socioeconomic disparities across the life course in the context of rapidly developing countries like India, with a specific lens on gender dynamics.

## 2. Methods

### 2.1. Data and study population

This study utilized cross-sectional data from the first wave of the Longitudinal Aging Study in India (LASI) conducted in 2017–2018, which is comparable to the Health and Retirement Study (HRS) in the U. S. (Harvard, 2020). The LASI provides a nationally representative sample of approximately 73,000 individuals aged 45 years and above. This dataset includes comprehensive information on physical, psychological, and cognitive health, along with various social and economic well-being indicators. The survey followed a multistage stratified sampling design in both rural and urban areas across each state. More details regarding the study design, sampling strategies, and other data aspects can be found elsewhere (Harvard, 2020). The datasets are accessible through the Gateway to Global Aging Data (Sandy Chien et al., 2023).

This study applied the following inclusion/exclusion criteria. Initially, the sample was restricted to middle-aged and older adults aged 45 years or older (66,619 respondents). From this initial group, individuals with missing data on cognitive function (705 respondents), those with missing data on social mobility (696 respondents), and those with missing data on covariates (508 respondents) were excluded. Finally, 64,710 middle-aged and older adults were included in the primary analysis.

### 2.2. Dependent variable

Cognitive function was assessed using continuous measures of five global domains of cognition, including memory, orientation, arithmetic function, executive function, and object naming. Adopting the HRS cognition module, the LASI gathered information on cognitive function, demonstrating high validity and reliability in assessing cognitive impairment among aging populations in various settings (Gross et al., 2023). The specific cognitive measures included: Memory, measured through immediate word recall (0–10 points) and delayed word recall (0–10 points); Orientation, measured using the time (0–4 points) and place (0–4 points) measures; Arithmetic function, measured through backward counting (0–2 points), serial seven (0–5 points), and computation method (0–2); Executive function, measured through paper folding (0–3) and pentagon drawing method (0–1); Object naming (0–2) among the study participants. The overall cognitive score, obtained by summing the scores for each component, ranges from 0 to 43, with a higher score indicating better cognitive function (Cronbach's alpha = 0.81). For sensitivity analysis, cognitive impairment was defined as the lowest 10th percentile of cognitive function (Pandav et al., 2002). Further, to account for age-related variability, we also used standardized cognitive scores within 5-year age groups for sensitivity analysis, grouping individuals aged 100 years and older together due to the small sample size (38 participants). In our study, none of the respondents received assistance during the cognition module.

### 2.3. Independent variable

The primary independent variable in this study was life course social mobility, defined primarily by the financial position in childhood and adulthood.

#### 2.3.1. Childhood SEP

For childhood SEP, we utilized respondents' family financial position during their childhood by using the questionnaire, "Now, think about your family when you were growing up, from birth to age 16. Compared to other families in your community, would you say your family during that time was pretty well off financially, about average, or poor?". The responses "pretty well off financially" and "average" were grouped as high SEP and "poor" was categorized as low SEP. We incorporated parental education levels as an additional indicator for sensitivity analysis. Parental education was classified based on whether either parent attended school, with high SEP defined as at least one parent having attended school (27.62%) and low SEP defined as neither parent having attended school (72.38%). Missing data for this variable accounted for 4.21% of the sample (2,726 respondents).

#### 2.3.2. Adulthood SEP

We determined adulthood SEP using the monthly per capita expenditure (MPCE) quintile based on household consumption data. The choice of MPCE over income or wealth was considered by its superiority as a measure in relatively older populations and LMICs (Hu et al., 2017). MPCE was calculated by considering total household consumption expenditures, encompassing food consumption, non-food consumption, and other non-food consumption. Although the original MPCE encompasses outpatient healthcare expenditures and inpatient healthcare expenditures, we excluded them from our calculation to minimize the risk of reverse causation by current health status. Including healthcare expenditures in the calculations did not alter our findings (data not shown). The top three quintiles of MPCE were classified as high SEP, while the lower two were categorized as low SEP. Additionally, as part of our sensitivity analysis, we dichotomized adulthood SEP using the median value of MPCE.

Furthermore, subjective social position was used as an alternative measure of adulthood SEP for sensitivity analysis. Subjective social position was assessed using the question: "Think of the ladder with ten stairs as representing where people stand in our society." Using a median value of five, we classified five and above as high SEP and below five as low SEP. Missing data for this variable accounted for 1.58% of the sample (1,024 respondents).

#### 2.3.3. Life course social mobility

Based on the childhood and adulthood SEPs, life course social mobility was categorized into four groups: "consistently high," with high SEPs in both childhood and adulthood; "upward mobility," with a low SEP in childhood but a high SEP in adulthood; "downward mobility," with a high SEP in childhood but a low SEP in adulthood; "consistently low," with low SEPs in both periods.

### 2.4. Covariates

A comprehensive set of sociodemographic characteristics was included as covariates to address potential confounding biases in the association between life course social mobility and cognitive function. These covariates included: gender (men; women), age (continuous and squared term), marital status (not married; married), religion (Hindu;

Muslim; Christian; Others), caste (Scheduled Caste; Scheduled Tribe; Other Backward Caste; Others), education level (no education; primary (1–5 years); secondary (6–9 years); higher (10 and above years)), working status (not working; working; retirement), place of residence (rural; urban), household size, and childhood self-rated health (poor; fair; good).

### 2.5. Statistical analysis

Descriptive statistics were used to present the study population's characteristics, incorporating sampling weights to address the complex survey design. Differences based on gender were assessed through chi-square and t-tests. First, we performed multivariable linear regressions to evaluate the independent associations of childhood and adulthood SEPs with cognitive function, adjusting for all covariates. In Model 1 and Model 2, we included either childhood or adulthood SEP alone, while in Model 3, we included SEPs from both periods to account for each other. The main analysis then examined the associations between the joint variable of life course SEPs (i.e., life course social mobility) and cognitive health, using the same set of covariates as in previous Models. Given that heterogeneity in choosing a reference group can lead to varying findings and implications (Islam and Jaffee, 2023), we compared all groups to each other to comprehensively delineate how social mobility is associated with cognitive health outcomes. To account for potential state-level variations, we also included state/Union Territory (UT) as a covariate in our regression models. Furthermore, gender heterogeneity in associations was examined in all analyses through gender-stratified analyses. The statistical significance of gender differences was assessed by fitting joint models for men and women, involving the interaction of gender with all independent variables (i.e., full interaction model).

To ensure the robustness of our findings, we conducted several sensitivity analyses. Regarding the independent variable, we first incorporated parental education as an alternative indicator for

**Table 1**
Descriptive statistics of study participation.

| | Total (N = 64,710) | Men (N = 30,123) | Women (N = 34,587) |
|---|---|---|---|
| | N (%) or M (SD) | N (%) or M (SD) | N (%) or M (SD) |
| **Dependent variable** | | | |
| **Cognitive Function*** | 25.33 (6.81) | 27.32 (6.23) | 23.06 (6.75) |
| **Independent variable** | | | |
| **Life Course Social Mobility*** | | | |
| Consistently High | 25,986 (35.69) | 11,869 (35.24) | 14,117 (36.20) |
| Upward Mobility | 12,557 (20.05) | 6,232 (21.35) | 6,325 (18.55) |
| Downward Mobility | 13,595 (21.39) | 6,158 (20.41) | 7,437 (22.52) |
| Consistently Low | 12,572 (22.87) | 5,864 (23.00) | 6,708 (22.73) |
| **Childhood socioeconomic position*** | | | |
| High | 39,581 (57.08) | 18,027 (55.65) | 21,554 (58.71) |
| Low | 25,129 (42.92) | 12,096 (44.35) | 13,033 (41.29) |
| **Adulthood socioeconomic position*** | | | |
| High | 38,543 (55.73) | 18,101 (56.60) | 20,442 (54.75) |
| Low | 26,167 (44.27) | 12,022 (43.40) | 14,145 (45.25) |
| **Covariates** | | | |
| **Age*** | 58.84 (10.19) | 58.02 (10.15) | 59.77 (10.15) |
| **Marital Status*** | | | |
| Not Married | 16,302 (23.29) | 3,673 (11.13) | 12,629 (37.18) |
| Married | 48,408 (76.71) | 26,450 (88.87) | 21,958 (62.82) |
| **Religion** | | | |
| Hindu | 47,434 (81.10) | 22,145 (81.37) | 25,289 (80.80) |
| Muslim | 7,527 (11.94) | 3,430 (11.96) | 4,097 (11.92) |
| Christian | 6,364 (3.25) | 2,928 (3.01) | 3,436 (3.53) |
| Others | 3,385 (3.70) | 1,620 (3.65) | 1,765 (3.75) |
| **Caste** | | | |
| Scheduled Caste | 10,738 (19.72) | 4,921 (19.56) | 5,817 (19.90) |
| Scheduled Tribe | 11,605 (8.61) | 5,395 (8.60) | 6,210 (8.61) |
| Other Backward Caste | 24,671 (44.59) | 11,570 (44.67) | 13,101 (44.50) |
| Others | 17,696 (27.08) | 8,237 (27.16) | 9,459 (26.99) |
| **Education Level*** | | | |
| No Education | 30,323 (52.13) | 9,333 (37.79) | 20,990 (68.52) |
| Primary | 11,879 (16.06) | 6,371 (18.43) | 5,508 (13.35) |
| Secondary | 10,263 (12.93) | 6,172 (16.67) | 4,091 (8.66) |
| Higher | 12,245 (18.87) | 8,247 (27.10) | 3,998 (9.46) |
| **Working Status*** | | | |
| Not Working | 29,780 (40.66) | 6,689 (18.63) | 23,091 (65.83) |
| Working | 31,922 (55.91) | 20,937 (76.01) | 10,985 (32.96) |
| Retirement | 3,008 (3.42) | 2,497 (5.36) | 511 (1.20) |
| **Place of Residence*** | | | |
| Rural | 42,118 (67.87) | 19,783 (68.19) | 22,335 (67.51) |
| Urban | 22,592 (32.13) | 10,340 (31.81) | 12,252 (32.49) |
| **Childhood Self-reported Health Status*** | | | |
| Poor | 953 (1.52) | 469 (1.58) | 484 (1.45) |
| Fair | 6,290 (9.55) | 2,783 (8.89) | 3,507 (10.31) |
| Good | 57,467 (88.93) | 26,871 (89.53) | 30,596 (88.25) |
| | 5.06 (2.68) | 5.14 (2.62) | 4.96 (2.74) |
| **Number of Household Members*** | | | |

*Note*. Descriptive statistics are estimated using survey weight.
M = Mean; SD=Standard deviation.
*Signs indicate statistically significant differences between men and women, $p < 0.05$.

childhood SEP. Second, we utilized MPCE bisection rather than quintile, providing an alternative classification that mitigates potential biases arising from unequal group distributions. Third, we used subjective social position instead of MPCE to define adulthood SEP. For the outcome variable, we analyzed cognitive impairment as a secondary outcome using a linear probability model. Lastly, we conducted sensitivity analyses by standardizing cognitive scores within 5-year age groups.

Stata 18 (StataCorp, 2023) was used for all analyses, evaluating the association's strength and magnitude using beta coefficients ($b$) and 95% confidence intervals (CI).

## 3. Results

### 3.1. Descriptive statistics

The analytic sample comprised 64,710 participants, with a mean age of 58.84 years, consisting of 46.55% men and 53.45% women (Table 1). Regarding SEP, 57.08% of participants had high SEP in childhood, while 42.92% had low SEP. In adulthood, 55.73% had high SEP, and 44.27% had low SEP. When examining life course social mobility, participants showed diverse trajectories: 35.69% remained in the consistently high SEP, 20.05% experienced upward mobility, 21.39% underwent downward mobility, and 22.87% stayed in the consistently low SEP. Gender differences were prominent; men had higher cognitive function scores (men: 27.32; women: 23.06) and were more likely to be married, highly educated, and employed compared to women.

### 3.2. Independent associations of childhood and adulthood SEPs and cognitive function

Table 2 displays the independent associations of childhood and adulthood SEPs on cognitive function after adjusting for all covariates. In Models 1 and 2, which included only SEP from each respective period, low SEP was associated with lower cognitive function across the total sample and for both genders. When SEPs from both periods were accounted for in Model 3, the strength of the associations between childhood and adulthood SEP and cognitive function modestly decreased but remained consistent. For instance, among the total sample, low SEP in both childhood and adulthood were independently associated with lower cognitive function ($b = -0.68$; 95% CI: −0.77, −0.59 and $b = -0.80$; 95% CI: −0.89, −0.71, respectively). Notably, gender difference was statistically significant in the association of childhood SEP with cognitive function. Childhood low SEP was associated with poorer cognitive function across both genders, but more so among women than men ($b = -0.48$ for men vs $b = -0.82$ for women; interaction p-value <0.001). In contrast, there were no significant gender differences in the association of adulthood SEP with cognitive function ($b = -0.79$ for men vs $b = -0.80$ for women; interaction p-value = 0.90).

### 3.3. Associations of life course social mobility and cognitive function

The associations between life course social mobility and cognitive function among the total sample are detailed in Table 3. Compared to individuals who maintained a consistently high SEP, those who remained consistently low were associated with the lowest cognitive function ($b = -1.47$; 95% CI: −1.59, −1.34). This was followed by downward mobility ($b = -0.84$; 95% CI: −0.95, −0.72) and upward mobility ($b = -0.72$; 95% CI: −0.84, −0.61). When contrasted with the group with consistently low SEP, both downward mobility ($b = 0.63$; 95% CI: 0.50, 0.76) and upward mobility ($b = 0.74$; 95% CI: 0.61, 0.88) were associated with higher cognitive function. There was a marginally significant difference between the upward and downward mobility groups, with upward mobility associated with slightly higher cognitive function ($b = 0.11$; 95% CI: −0.02, 0.25; p = 0.09).

Fig. 1 depicts the gender-specific associations of life course social mobility on cognitive function, with detailed results shown in Supplementary Table 1. Overall, men exhibited higher cognitive function

**Table 3**
Regression coefficients and 95% confidence intervals for life course social mobility with cognitive function, by different reference categories.

| | Coef [95% CI] | Coef [95% CI] | Coef [95% CI] | Coef [95% CI] |
|---|---|---|---|---|
| **Cognitive Function** | | | | |
| Life Course Social Mobility | | | | |
| Consistently High | ref | 0.72 [0.61,0.84] | 0.84 [0.72,0.95] | 1.47 [1.34,1.59] |
| Upward Mobility | −0.72 [-0.84,-0.61] | ref | 0.11 [-0.02,0.25] | 0.74 [0.61,0.88] |
| Downward Mobility | −0.84 [-0.95,-0.72] | −0.11 [-0.25,0.02] | ref | 0.63 [0.50,0.76] |
| Consistently Low | −1.47 [-1.59,-1.34] | −0.74 [-0.88,-0.61] | −0.63 [-0.76,-0.50] | ref |

*Note*. Adjusted for respondent's gender, age, age-square, marital status, religion, caste, education level, working status, place of residence, household size, and childhood self-rated health; and state/UTs fixed effects. The coefficients presented in this table are derived from a single regression model. Reference categories were re-specified to compare each group directly to all others within the model.

**Table 2**
Regression coefficients and 95% confidence intervals for childhood and adulthood socioeconomic position with cognitive function.

| | Model 1 | | | | Model 2 | | | | Model 3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Coef [95% CI] | Men Coef [95% CI] | Women Coef [95% CI] | p[a] | Total Coef [95% CI] | Men Coef [95% CI] | Women Coef [95% CI] | p[a] | Total Coef [95% CI] | Men Coef [95% CI] | Women Coef [95% CI] | p[a] |
| Cognitive Function | | | | | | | | | | | | |
| Childhood SEP (ref: High) | | | | | | | | | | | | |
| Low | −0.73 [-0.82,-0.64] | −0.52 [-0.65,-0.40] | −0.87 [-1.00,-0.75] | <0.001 | | | | | −0.68 [-0.77,-0.59] | −0.48 [-0.61,-0.36] | −0.82 [-0.94,-0.69] | <0.001 |
| Adulthood SEP (ref: High) | | | | | | | | | | | | |
| Low | | | | | −0.84 [-0.93,-0.75] | −0.82 [-0.95,-0.69] | −0.86 [-0.99,-0.74] | 0.63 | −0.80 [-0.89,-0.71] | −0.79 [-0.92,-0.66] | −0.80 [-0.93,-0.68] | 0.90 |

*Note*. Model 1 is adjusted for respondent's age, age-square, marital status, religion, caste, education level, working status, place of residence, household size, and childhood self-rated health; and state/UTs fixed effects. Model 2 additionally includes adulthood SEP.

[a] p-value of comparing coefficients between men and women in the full interaction model.

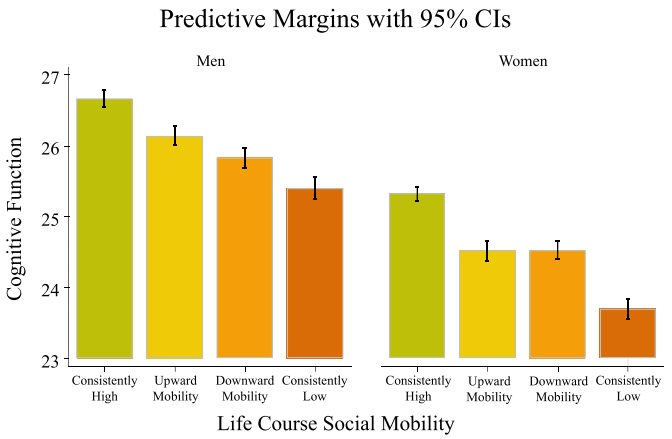


**Fig. 1.** Predictive values of cognitive function based on life course social mobility, stratified by gender.
*Note.* Marginal probabilities are estimated based on the full interaction model in Supplementary Table 1.

scores compared to women across all social mobility groups. Notably, men with consistently low SEP had similar cognitive function scores to women with consistently high SEP. Additionally, women in the consistently low SEP group exhibited the lowest cognitive function scores. Notably, we found asymmetric associations of upward and downward mobility contingent on gender. Among men, upward mobility was associated with a higher cognitive function than downward mobility ($b$ = 0.31; 95% CI: 0.13, 0.50). Conversely, there was no significant difference in women between the upward and downward mobility groups ($b$ = −0.01; 95% CI: −0.20, 0.17).

### 3.4. Sensitivity analyses

Several sensitivity analyses confirmed the robustness of our findings. Using parental education as an alternative indicator for childhood SEP yielded consistent results with the main findings, demonstrating similar gender patterns (Supplementary Table 2). Employing MPCE bisection, the marginal difference between upward and downward mobility was no longer significant in the total sample; however, the gender-specific pattern in the difference between upward and downward mobility was consistently observed (Supplementary Table 3). When substituting MPCE with subjective social position in later life to reconstruct the independent variable, we found asymmetric associations between upward and downward mobility for women ($b$ = 0.24; 95% CI: 0.04, 0.45), though this difference remained smaller than for men ($b$ = 0.50; 95% CI: 0.31, 0.70) (Supplementary Table 4).

Using cognitive impairment as the outcome measure revealed a gender difference: only 5.95% of men were cognitively impaired, compared to 16.29% of women. Furthermore, the overall results of the associations aligned with the primary results (Supplementary Table 5). Specifically, among women, there was a statistically significant increase of three percentage points in the likelihood of cognitive impairment when comparing upward mobility to consistently high SEP ($b$ = 0.03; 95% CI: 0.02, 0.04). In contrast, among men, the upward mobility group did not exhibit a statistically significant increase in the likelihood of cognitive impairment compared to the consistently high SEP group. Lastly, standardized cognitive scores yielded consistent results, reaffirming gender differences (Supplementary Table 6).

## 4. Discussion

In recent decades, the prevalence of dementia in India has risen dramatically and is projected to triple to approximately 11 million by 2050 (Nichols et al., 2022). Given the country's current socioeconomic development and frequent social mobility, it is imperative to understand the role of life course social mobility in influencing cognitive health among middle-aged and older populations (Krishna, 2014). However, significant knowledge gaps exist regarding these dynamics in the context of India. For example, while gendered expectations and societal norms in India might significantly influence the association between life course social mobility and cognition, potential gender differences in these associations have been understudied. To address these voids, this study utilized a nationally representative sample of middle-aged and older adults in India to examine the associations between life course social mobility and cognitive function, with a particular focus on gender heterogeneity.

Our findings revealed significant associations of SEPs throughout the life course with cognitive outcomes in later life. Consistent with existing research from HICs, we observed that individuals with high SEP at different life stages (childhood and adulthood) exhibited better cognitive health compared to those with low SEP (Kobayashi et al., 2024). SEP in each stage is deeply linked to vital resources for developing and reserving cognitive health over time (Hertzman and Power, 2020). Low childhood SEP, in particular, may be linked to biosocial risk factors, such as poor childhood health and limited access to quality education, which can hinder cognitive development (Zhang et al., 2020). Another mechanism by which SEP at each life stage might contribute to cognitive health disparities is through psychological stress processes; exposure to low SEP results in consistently lower levels of daily well-being, thereby increasing the severity and frequency of stressors (Baum et al., 1999). This underscores the critical role of childhood and adulthood SEP as potent social determinants of cognitive health in later life.

Our results also showed that the impact on cognitive health is most pronounced when both childhood and adulthood SEPs are either advantageous or disadvantageous, illustrating their additive effect. These results also align with the cumulative (dis)advantage theory, which highlights that social inequalities in health expand or contract over the life course according to an individual's socioeconomic trajectory (Dannefer, 2003). Consistently high SEPs can lead to enriched environments that promote cognitive health through improved nutrition, access to health care, and opportunities for cognitive engagement and social support (Luo and Waite, 2005). Conversely, consistently low SEPs can exacerbate cognitive decline due to sustained exposure to adverse conditions, financial strain, and limited access to health-promoting resources (Hatch, 2005). Notably, our findings that women in the consistently low SEP exhibited the lowest cognitive function scores highlight the disproportionate impact of cumulative disadvantage on women. This may stem from their heightened vulnerability to early-life socioeconomic adversity and the persistent structural barriers they face throughout the life course (Wolfova et al., 2021).

Furthermore, we found that upward and downward mobility are associated with higher cognitive function than consistently low SEP, but to an extent that is smaller than consistently high SEP. These findings suggest that shifts in SEP across the life course can partially mitigate early life disadvantages, although they do not completely eliminate them, partly due to the challenges of adapting to new social environments (Chen et al., 2022). Importantly, our results revealed that the benefits of upward mobility and the detriments of downward mobility are likely not equal depending on one's gender, indicating the complex interplay between life course social mobility, cognitive function, and gender. The gender differences in the associations of upward and downward mobility can be explained by the theory of causal attribution (Gugushvili et al., 2019; Miller and Ross, 1975), which suggests that men are more likely to attribute their successes to internal factors such as their own abilities and efforts. This may lead men to perceive upward mobility in a way that substantially bolsters their cognitive resilience (Gugushvili et al., 2019; Meece et al., 2009). Conversely, women are often less likely to attribute their upward mobility to their own merits, potentially reducing the psychological benefits of upward mobility. This issue might be particularly pronounced in India, where women's SEP is

largely influenced by external factors such as marriage due to their disproportionately low labor force participation rates and sociocultural norms (Chattopadhyay et al., 2023). Socioeconomic advancement through marriage may not necessarily lead to increased personal agency or access to resources, thereby failing to improve cognitive health.

Furthermore, early SEP disadvantages may impact women more severely than men, potentially overshadowing the gains from upward mobility, resulting in the observed symmetric associations of upward and downward mobility on cognitive function among women. This aligns with previous findings from India, indicating that early life disadvantages have a more lasting and detrimental effect on women compared to men (Muhammad et al., 2022). Additionally, women might benefit less from upward mobility than men due to the persistent socioeconomic barriers and gender norms that continue to affect women's access to resources and social support, even after achieving higher SEP (Farmer and Ferraro, 2005; Wolfova et al., 2021). The stress and effort required for women to overcome entrenched obstacles and adapt to higher SEP environments may impose additional health costs, potentially leading to psychological distress and reduced cognitive benefits of upward mobility. Consequently, while women may enhance SEP across the life course, the lingering effects of early life disadvantages and ongoing challenges can limit the cognitive health improvements that upward mobility might otherwise offer.

Another explanation for the observed gender differences in cognitive health outcomes related to life course social mobility could be the nature of the exposure measures used in our study. Specifically, adulthood SEP was assessed based on household financial status, which may not accurately reflect women's own SEP due to their often limited decision-making power within households in LMICs (Acharya et al., 2010). High household financial status might not reflect personal economic autonomy for women, potentially diminishing the apparent benefits of upward mobility. This is supported by our sensitivity analysis using subjective social position, which found asymmetric associations of upward and downward mobility for women. We encourage future studies to incorporate different measures of social mobility to provide a comprehensive understanding of the interplay between life course social mobility, cognitive health, and gender dynamics in patriarchal societies, including India.

Our findings underscore the importance of addressing socioeconomic deprivation throughout the lifespan to improve cognitive health in later life. Policymakers should implement interventions targeting both childhood and adulthood to mitigate the independent and joint impacts of low SEP throughout the life course. This includes enhancing access to quality education, healthcare, and nutritional support from early childhood and providing continuous opportunities for skill development and employment in adulthood to reduce inequalities between high and low SEP. Furthermore, special attention should be given to the potential gender differences in the association between life course social mobility and cognitive health. Women, in particular, might face persistent socioeconomic barriers and gender norms that limit their access to resources and social support. Policies must address these gender-specific challenges by promoting gender equality in education, employment, and healthcare access. These considerations are critical in shaping public health interventions and social policies to reduce cognitive health disparities across SEP and gender.

These findings must be considered in light of several limitations. First, the cross-sectional design of this study limits the ability to draw any causal inferences. For instance, reverse causality may occur, as cognitive health during childhood could shape socioeconomic trajectories, thereby influencing adulthood SEP. Additionally, unmeasured confounding factors, such as life-course traumatic events and spousal characteristics, if married, may also impede causal interpretation. More research using longitudinal data with quasi-experimental approaches is needed to determine causality. Second, childhood SEP was based on self-reported retrospective questions, which could lead to misclassification due to recall bias (Batty et al., 2005; Bong et al., 2024). While previous research indicated that retrospective studies could contribute valuable information (Hardt and Rutter, 2004), longitudinal data spanning from childhood to older adulthood is warranted. Third, while individuals might experience multiple instances of social mobilities throughout their lives, we only assessed social mobility at one point in childhood and one point in adulthood, which may overlook meaningful variations in social mobility patterns over time. Moreover, although we used both objective and subjective SEP measures to capture slightly different but related constructs, our primary focus on financial mobility may not fully account for other important dimensions of socioeconomic mobility, such as intergenerational educational mobility. Future studies should consider other operationalizations of social mobility using diverse SEP indices like educational mobility. Finally, potential respondents who were disadvantaged in childhood might have been excluded due to poor health or mortality selection, potentially leading to an underestimation of the associations related to low childhood SEP.

Despite these limitations, this is the first study, to our knowledge, to use a nationally representative sample in India to study cognitive health framed based on life course social mobility and gender dynamics. Overall, our findings indicate that SEP at each life stage independently and cumulatively influences cognitive health, underscoring the importance of considering SEP throughout life, from childhood to adulthood, in shaping cognitive health outcomes. Importantly, our research also reveals the stark gender differences in these associations, with women facing more severe cognitive health impacts from early-life disadvantages and benefiting less from upward mobility due to persistent socioeconomic barriers and gender norms. Targeted interventions that consider both the timing and nature of social mobility, as well as gender-specific challenges, are essential for enhancing cognitive health outcomes in rapidly developing countries like India.

## CRediT authorship contribution statement

**Soohyeon Ko:** Writing – original draft, Investigation, Formal analysis, Data curation, Conceptualization. **Hannah Oh:** Writing – review & editing, Investigation. **S.V. Subramanian:** Writing - review & editing, Investigation. **Rockli Kim:** Writing – review & editing, Supervision, Investigation, Conceptualization.

## Compliance with ethical standards

This project used publicly accessible secondary data obtained from Longitudinal Aging Study in India (LASI). The LASI data are not collected specifically for this study and no one on the study team has access to identifiers linked to the data. These activities do not meet the regulatory definition of human subject research. As such, an Institutional Review Board (IRB) review is not required.

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None.

## Declaration of competing interest

The authors report no conflicts of interest.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2024.117640.

## Data availability

The authors do not have permission to share data.

## References


Acharya, D.R., Bell, J.S., Simkhada, P., Van Teijlingen, E.R., Regmi, P.R., 2010. Women's autonomy in household decision-making: a demographic study in Nepal. Reprod. Health 7, 1–12.

Alzheimer's Association, 2019. 2019 Alzheimer's disease facts and figures. Alzheimer's Dementia 15 (3), 321–387. https://doi.org/10.1016/j.jalz.2019.01.010.

Bartley, M., Plewis, I., 2007. Increasing social mobility: an effective policy to reduce health inequalities. J. Roy. Stat. Soc. Stat. Soc. 170 (2), 469–481.

Batty, G.D., Lawlor, D.A., Macintyre, S., Clark, H., Leon, D.A., 2005. Accuracy of adults' recall of childhood social class: findings from the Aberdeen children of the 1950s study. J. Epidemiol. Community Health 59 (10), 898–903.

Baum, A., Garofalo, J., Yali, A.M., 1999. Socioeconomic status and chronic stress: does stress account for SES effects on health? Ann. N. Y. Acad. Sci. 896 (1), 131–144.

Beller, E., Hout, M., 2006. Welfare states and social mobility: how educational and social policy may affect cross-national differences in the association between occupational origins and destinations. Res. Soc. Stratif. Mobil. 24 (4), 353–365.

Bong, S., Lee, K., Dominici, F., 2024. Differential recall bias in estimating treatment effects in observational studies. Biometrics 80 (2), ujae058.

Boyle, P.J., Norman, P., Popham, F., 2009. Social mobility: evidence that it can widen health inequalities. Soc. Sci. Med. 68 (10), 1835–1842.

Cagney, K.A., Lauderdale, D.S., 2002. Education, wealth, and cognitive function in later life. J. Gerontol. B Psychol. Sci. Soc. Sci. 57 (2), P163–P172.

Chattopadhyay, S.K., Nath, S., Sengupta, S., 2023. Recent dynamics of women labour force participation in India. Indian J. Lab. Econ. 66 (4), 1041–1059.

Chen, E., Brody, G.H., Miller, G.E., 2022. What are the health consequences of upward mobility? Annu. Rev. Psychol. 73, 599–628.

Chetty, R., Grusky, D., Hell, M., Hendren, N., Manduca, R., Narang, J., 2017. The fading American dream: trends in absolute income mobility since 1940. Science 356 (6336), 398–406.

Crombach, L., Smits, J., 2022. The demographic window of opportunity and economic growth at sub-national level in 91 developing countries. Soc. Indicat. Res. 161 (1), 171–189.

Crosnoe, R., Elder Jr, G.H., 2004. From childhood to the later years: pathways of human development. Res. Aging 26 (6), 623–654.

Dannefer, D., 2003. Cumulative advantage/disadvantage and the life course: cross-fertilizing age and social science theory. J. Gerontol. B Psychol. Sci. Soc. Sci. 58 (6), S327–S337.

Farmer, M.M., Ferraro, K.F., 2005. Are racial disparities in health conditional on socioeconomic status? Soc. Sci. Med. 60 (1), 191–204.

Faul, J.D., Ware, E.B., Kabeto, M.U., Fisher, J., Langa, K.M., 2021. The effect of childhood socioeconomic position and social mobility on cognitive function and change among older adults: a comparison between the United States and England. J. Gerontol.: Ser. B 76 (Suppl. _1), S51–S63.

Fu, R., Liu, Y., 2022. Intergenerational socioeconomic mobility and cognitive impairment among Chinese older adults: gender differences. J. Appl. Gerontol. 41 (7), 1733–1743.

Graham, H., 2002. Building an inter-disciplinary science of health inequalities: the example of lifecourse research. Soc. Sci. Med. 55 (11), 2005–2016.

Gross, A.L., Li, C., Briceño, E.M., Rentería, M.A., Jones, R.N., Langa, K.M., Manly, J.J., Nichols, E., Weir, D., Wong, R., 2023. Harmonisation of later-life cognitive function across national contexts: results from the Harmonized Cognitive Assessment Protocols. Lancet Healthy Longev. 4 (10), e573–e583.

Gugushvili, A., Zhao, Y., Bukodi, E., 2019. 'Falling from grace'and 'rising from rags': intergenerational educational mobility and depressive symptoms. Soc. Sci. Med. 222, 294–304.

Hallqvist, J., Lynch, J., Bartley, M., Lang, T., Blane, D., 2004. Can we disentangle life course processes of accumulation, critical period and social mobility? An analysis of disadvantaged socio-economic positions and myocardial infarction in the Stockholm Heart Epidemiology Program. Soc. Sci. Med. 58 (8), 1555–1562.

Hardt, J., Rutter, M., 2004. Validity of adult retrospective reports of adverse childhood experiences: review of the evidence. JCPP (J. Child Psychol. Psychiatry) 45 (2), 260–273.

Hatch, S.L., 2005. Conceptualizing and identifying cumulative adversity and protective resources: implications for understanding health inequalities. J. Gerontol. B Psychol. Sci. Soc. Sci. 60 (Special_Issue_2), S130–S134.

Heath, A., Li, Y., 2023. Social Mobility. John Wiley & Sons.

Hertzman, C., Power, C., 2020. Health and human development: understandings from life-course research. In: The Biological and Social Determinants of Child Development, pp. 719–744.

Hu, P., Wang, S., Lee, J., 2017. Socioeconomic gradients of cardiovascular risk factors in China and India: results from the China health and retirement longitudinal study and longitudinal aging study in India. Int. J. Publ. Health 62, 763–773.

Huoyun, Z., Shilong, M., Zhaoqi, L., Huiqin, X., 2023. Early socioeconomic status, social mobility and cognitive trajectories in later life: a life course perspective. Econ. Hum. Biol. 50, 101281.

Islam, S., Jaffee, S.R., 2023. Social mobility and mental health: a systematic review and meta-analysis. Soc. Sci. Med., 116340

Jain, U., Angrisani, M., Langa, K.M., Sekher, T., Lee, J., 2022. How much of the female disadvantage in late-life cognition in India can be explained by education and gender inequality. Sci. Rep. 12 (1), 5684.

Karp, A., Kåreholt, I., Qiu, C., Bellander, T., Winblad, B., Fratiglioni, L., 2004. Relation of education and occupation-based socioeconomic status to incident Alzheimer's disease. Am. J. Epidemiol. 159 (2), 175–183.

Kobayashi, L.C., Morris, E.P., Harling, G., Farrell, M.T., Kabeto, M.U., Wagner, R.G., Berkman, L.F., 2022. Subjective social position and cognitive function in a longitudinal cohort of older, rural South African adults, 2014–2019. J. Epidemiol. Community Health 76 (4), 385–390.

Kobayashi, L.C., Peterson, R.L., Yu, X., Avila-Rieger, J., Amofa-Ho, P.A., Vila-Castelar, C., Meza, E., Shaaban, C.E., Whitmer, R.A., Gilsanz, P., 2024. Life course financial mobility and later-life memory function and decline by gender, and race and ethnicity: an intersectional analysis of the US KHANDLE and STAR cohort studies. Lancet Healthy Longev. 5 (9).

Krishna, A., 2014. Examining the structure of opportunity and social mobility in India: who becomes an engineer? Dev. Change 45 (1), 1–28.

Kuh, D., Ben-Shlomo, Y., Lynch, J., Hallqvist, J., Power, C., 2003. Life course epidemiology. J. Epidemiol. Community Health 57 (10), 778.

Lee, C., Ryff, C.D., 2019. Pathways linking combinations of early-life adversities to adult mortality: tales that vary by gender. Soc. Sci. Med. 240, 112566.

Livingston, G., Huntley, J., Sommerlad, A., Ames, D., Ballard, C., Banerjee, S., Brayne, C., Burns, A., Cohen-Mansfield, J., Cooper, C., 2020. Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. Lancet 396 (10248), 413–446.

Luo, Y., Waite, L.J., 2005. The impact of childhood and adult SES on physical, mental, and cognitive well-being in later life. J. Gerontol. B Psychol. Sci. Soc. Sci. 60 (2), S93–S101.

Meece, J.L., Glienke, B.B., Askew, K., 2009. Gender and motivation. Handbook of Motivation at School, pp. 425–446.

Miller, D.T., Ross, M., 1975. Self-serving biases in the attribution of causality: fact or fiction? Psychol. Bull. 82 (2), 213.

Mishra, G., Nitsch, D., Black, S., De Stavola, B., Kuh, D., Hardy, R., 2009. A structured approach to modelling the effects of binary exposure variables over the life course. Int. J. Epidemiol. 38 (2), 528–537.

Muhammad, T., Debnath, P., Srivastava, S., Sekher, T., 2022. Childhood deprivations predict late-life cognitive impairment among older adults in India. Sci. Rep. 12 (1), 12786.

Nichols, E., Steinmetz, J.D., Vollset, S.E., Fukutaki, K., Chalek, J., Abd-Allah, F., Abdoli, A., Abualhasan, A., Abu-Gharbieh, E., Akram, T.T., 2022. Estimation of the global prevalence of dementia in 2019 and forecasted prevalence in 2050: an analysis for the Global Burden of Disease Study 2019. Lancet Public Health 7 (2), e105–e125.

Nicklett, E.J., Burgard, S.A., 2009. Downward social mobility and major depressive episodes among Latino and Asian-American immigrants to the United States. Am. J. Epidemiol. 170 (6), 793–801.

Pandav, R., Fillenbaum, G., Ratcliff, G., Dodge, H., Ganguli, M., 2002. Sensitivity and specificity of cognitive and functional screening instruments for dementia: the Indo-US Dementia Epidemiology Study. J. Am. Geriatr. Soc. 50 (3), 554–561.

Park, H., Kim, J., 2024. Perceived social position, active engagement with life, and depressive symptoms among older adults. Soc. Sci. Med., 116716

Pollitt, R.A., Rose, K.M., Kaufman, J.S., 2005. Evaluating the evidence for models of life course socioeconomic factors and cardiovascular outcomes: a systematic review. BMC Publ. Health 5, 1–13.

Prince, M., Wimo, A., Guerchet, M., Ali, G.-C., Wu, Y.-T., Prina, M., 2015. World Alzheimer Report 2015. The Global Impact of Dementia: An Analysis of Prevalence, Incidence, Cost and Trends. Alzheimer's Disease International.

Pudrovska, T., Anikputa, B., 2014. Early-life socioeconomic status and mortality in later life: an integration of four life-course mechanisms. J. Gerontol. B Psychol. Sci. Soc. Sci. 69 (3), 451–460.

Pudrovska, T., Reither, E.N., Logan, E.S., Sherman-Wilkins, K.J., 2014. Gender and reinforcing associations between socioeconomic disadvantage and body mass over the life course. J. Health Soc. Behav. 55 (3), 283–301.

Sandy Chien, C.Y., Phillips, Drystan, Wilkens, Jenny, Wang, Yuxuan, Gross, Alden, Meijer, Erik, Angrisani, Marco, Lee, Jinkook, 2023. Harmonized LASI, version A.3. In: The Gateway to Global Aging Data, vol. 2023. https://doi.org/10.25549/h-lasi.

Savelieva, K., Pulkki-Råback, L., Jokela, M., Kubzansky, L.D., Elovainio, M., Mikkilä, V., Tammelin, T., Juonala, M., Raitakari, O.T., Keltikangas-Järvinen, L., 2017. Intergenerational transmission of socioeconomic position and ideal cardiovascular health: 32-year follow-up study. Health Psychol. 36 (3), 270.

Schmidt, U., Zank, H., 2005. What is loss aversion? J. Risk Uncertain. 30, 157–167.

Skoblow, H.F., Proulx, C.M., Palermo, F., 2024. Childhood socioeconomic position and later-life cognitive functioning in the US: a critical review. Dev. Rev. 71, 101104.
StataCorp, 2023. Stata Statistical Software: Release 18. StataCorp LLC, College Station, TX.
The Longitudinal Ageing Study in India 2017-18 - national report, 2020. International Institute for Population Sciences, National Programme for Health Care of Elderly, Ministry of HEalth and Family Welfare, Harvard T. H. Chan School of Public Health, and the University of Southern California.
Urbaeva, J., 2019. Opportunity, social mobility, and women's views on gender roles in Central Asia. Soc. Work 64 (3), 207–215.
Wang, A.-Y., Hu, H.-Y., Ou, Y.-N., Wang, Z.-T., Ma, Y.-H., Tan, L., Yu, J.-T., 2023. Socioeconomic status and risks of cognitive impairment and dementia: a systematic review and meta-analysis of 39 prospective studies. J. Prev. Alzheimer's Dis. 10 (1), 83–94.
Wimo, A., Seeher, K., Cataldi, R., Cyhlarova, E., Dielemann, J.L., Frisell, O., Guerchet, M., Jönsson, L., Malaha, A.K., Nichols, E., 2023. The worldwide costs of dementia in 2019. Alzheimer's Dementia 19 (7), 2865–2873.
Wolfova, K., Csajbok, Z., Kagstrom, A., Kåreholt, I., Cermakova, P., 2021. Role of sex in the association between childhood socioeconomic position and cognitive ageing in later life. Sci. Rep. 11 (1), 4647.
Zhang, Z., Liu, H., Choi, S.-w., 2020. Early-life socioeconomic status, adolescent cognitive ability, and cognition in late midlife: evidence from the Wisconsin Longitudinal Study. Soc. Sci. Med. 244, 112575.