

Inequality in Old Age Cognitive Abilities Across the World

Javier Olivera^{a,c} ; Anja Leist^b ; Louis Chauvel^b

a) Luxembourg Institute of Socio-Economic Research (LISER); b) University of Luxembourg; c) KU Leuven

Motivation

An adequate cognitive functioning in old age means better levels of autonomy and wellbeing. A country may be performing better than others if this shows a higher level of later-life cognition (e.g. using an average score). But, what about the dispersion of these cognitive abilities among the elderly? Do we need to look at this inequality? What this inequality is really showing and what mechanisms can explain its levels?

Perhaps, we are observing the long-term effects of initial educational inequalities in the country. It is also needed inquiring about the role of cohort and gender differential survival rates because socio-economic status is related with mortality and education. Our hypothesis is that past educational inequalities and differential in survival rates are important drivers for present inequality of later-life cognition.

Variables and Indicators

Cognition tests:

Immediate memory: the respondent must recall a 10-words list immediately after it is read by the interviewer.

Delayed recall memory: the respondent must recall the same list of 10 words after some minutes.

Averaged memory: the average of both memory tests

Verbal fluency: the respondent must name as many as possible animals in one minute.

The memory tests are divided by 10 and the verbal fluency is divided by 100, and therefore, all test scores ranges from 0 to 1.

Partition of population:

The population is divided in 6 cohorts: 50-54 ... 70-79 within each country. The sample size is composed of 159 cohort-country points.

Inequality measures

Gini indices are computed for cognitive tests and years of education within each cohort-country observation. The Gini of years of education is also computed in the past when the cohort was aged 25-29 (Barro-Lee data).

Survival rates

This is the division of the population of cohort j in 2010 by the population of this cohort in year k (when was aged 25-29). It is computed for total population and by gender (UN data).

Data Sources

27 countries for cognition values:

SHARE: Austria13, Germany13, Sweden13, Netherlands13, Spain13, Italy13, France13, Denmark13, Greece07, Switzerland13, Belgium13, Israel13, CzechRep13, Poland12, Ireland07, Luxembourg13, Hungary11, Portugal11, Slovenia13, Estonia13

SAGE: China08, Ghana08, Russia08, SouthAfrica08

MHAS: Mexico12

LASI: India10

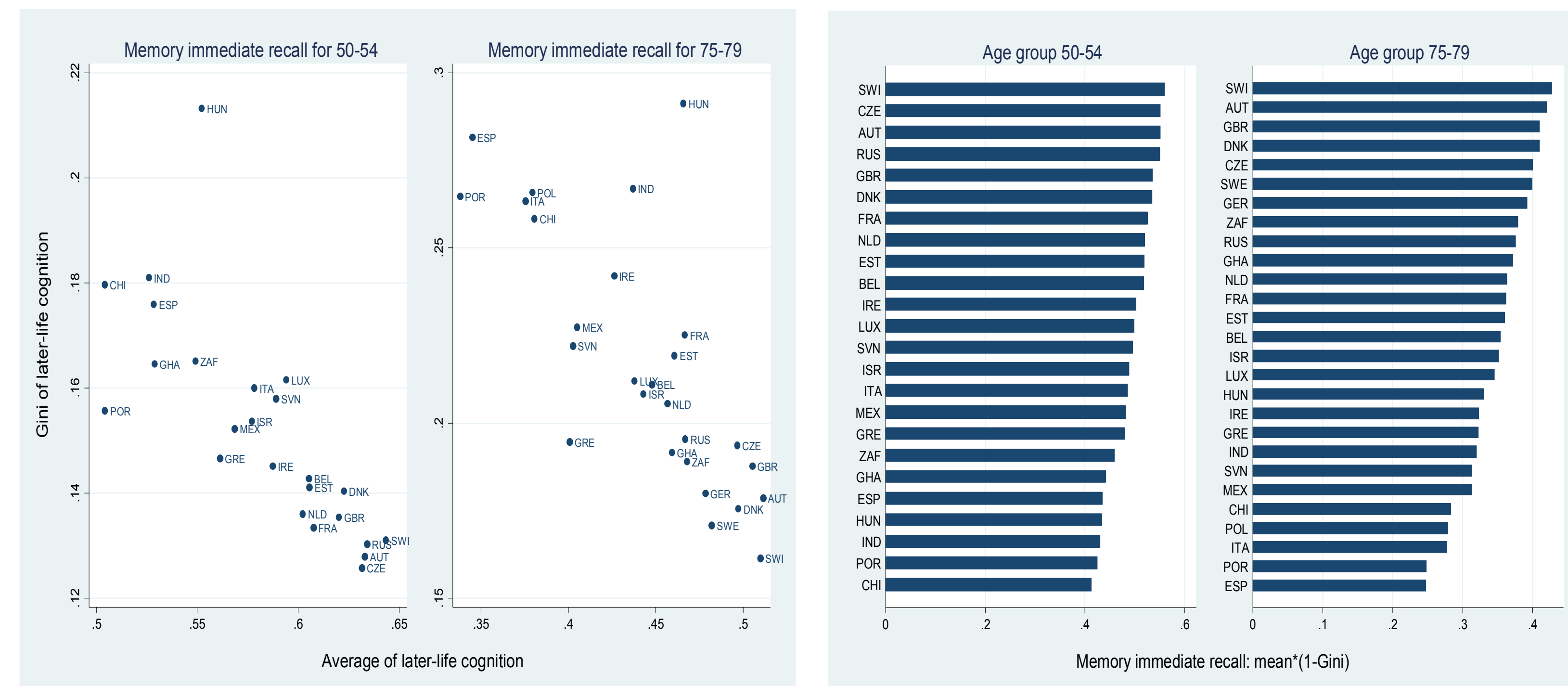
ELSA: UK10

Other datasets:

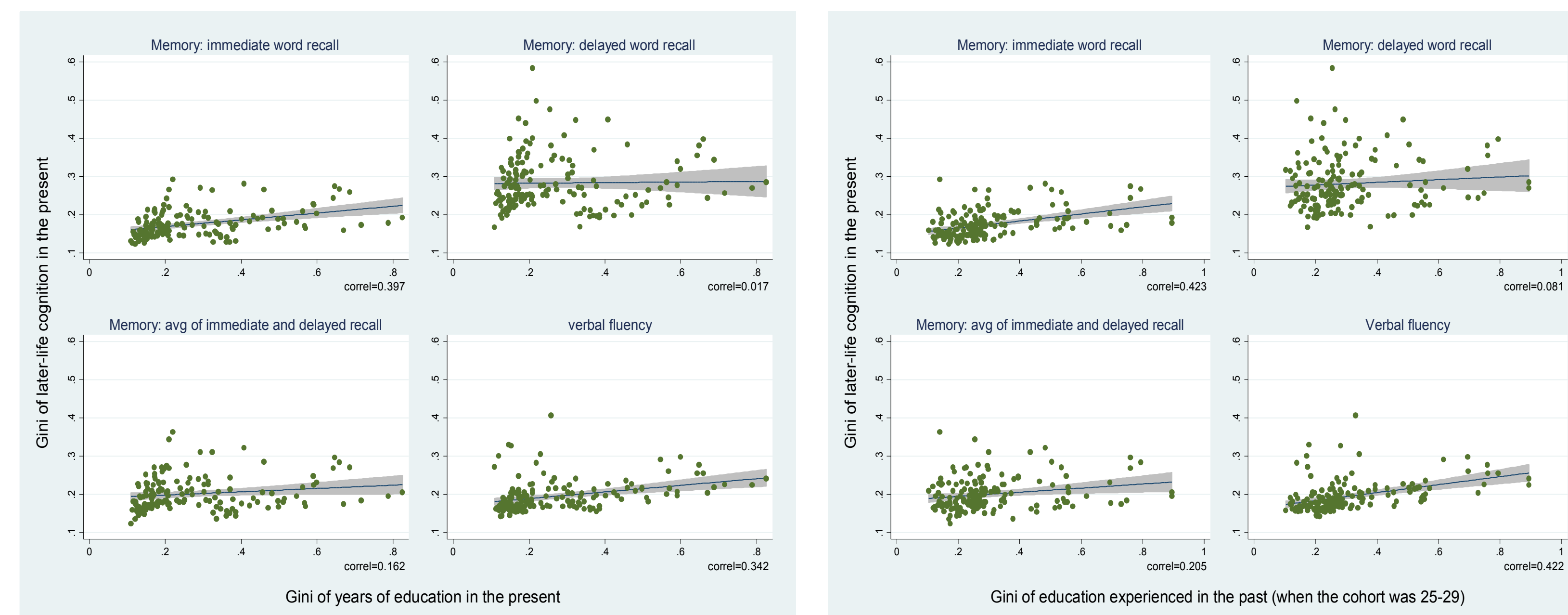
Barro-Lee dataset of educational attainment 1950-2010

World Population Prospects (2015 Revision, United Nations)

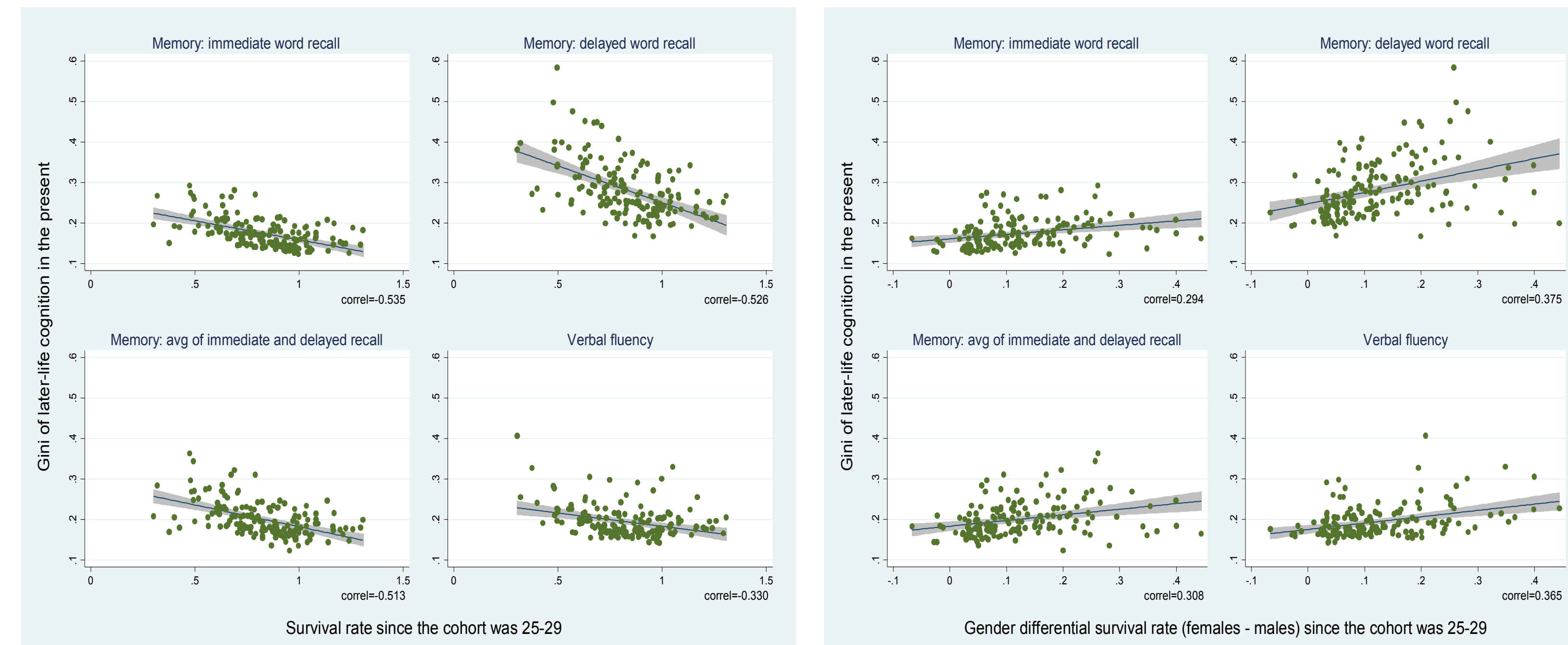
Gini and Means of Cognition



Cognition & Education Levels



Cognition & Survival Rate



Estimation Results

OLS estimates for Gini of later-life cognition

Variables	gini of immediate memory			gini of delayed memory		
	(1)	(2)	(3)	(4)	(5)	(6)
past gini of education	0.286*** (0.063)	0.092 (0.067)	0.191*** (0.059)	0.570*** (0.121)	0.167 (0.121)	0.345*** (0.093)
survival rate		-0.105*** (0.020)			-0.218*** (0.044)	
survival rate (female - male)			0.192*** (0.047)			0.456*** (0.090)
constant	0.088*** (0.019)	0.233*** (0.033)	0.093*** (0.015)	0.109*** (0.037)	0.412*** (0.064)	0.121*** (0.025)
observations	159	159	159	159	159	159
R-squared	0.615	0.749	0.706	0.604	0.754	0.737

Robust standard errors are clustered by country and are in parentheses. Regressions include country dummies.
* p<0.10, ** p<0.05, *** p<0.01.

Variables	gini of averaged memory			gini of verbal fluency		
	(7)	(8)	(9)	(10)	(11)	(12)
past gini of education	0.356*** (0.073)	0.112 (0.079)	0.232*** (0.064)	0.117*** (0.033)	0.021 (0.044)	0.074* (0.038)
survival rate		-0.132*** (0.027)			-0.052*** (0.016)	
survival rate (female - male)			0.252*** (0.058)			0.087** (0.037)
constant	0.093*** (0.022)	0.276*** (0.042)	0.099*** (0.017)	0.159*** (0.010)	0.231*** (0.024)	0.162*** (0.009)
observations	159	159	159	159	159	159
R-squared	0.591	0.738	0.699	0.824	0.849	0.838

Robust standard errors are clustered by country and are in parentheses. Regressions include country dummies.
* p<0.10, ** p<0.05, *** p<0.01.

Conclusion

We find evidence of long term effects of past educational inequality on present cognitive inequality among the elderly. Inequality of educational attainment experienced by the cohort in the past has a positive and significant effect on present cognitive inequality within the cohort.

Cohort's survival rate has an equalizing effect on the distribution of present cognition. It seems that the dead have contributed to counterbalance the increase of cognitive inequality. As we can see from the gender differential survival rates, the relative better fit of females contributes to increase cognitive inequality.

Surviving females bring such a relative cognitive profile into old age that this results in an increase of cognitive inequality. Given the lower educational attainment of old females, and the positive relationship between education and cognitive abilities, we can highlight that countries that experienced a large gender gap in education are more prone to suffer more later-life cognitive inequality.

Contact Information

javier.olivera@liser.lu; anja.leist@uni.lu; louis.chauvel@uni.lu