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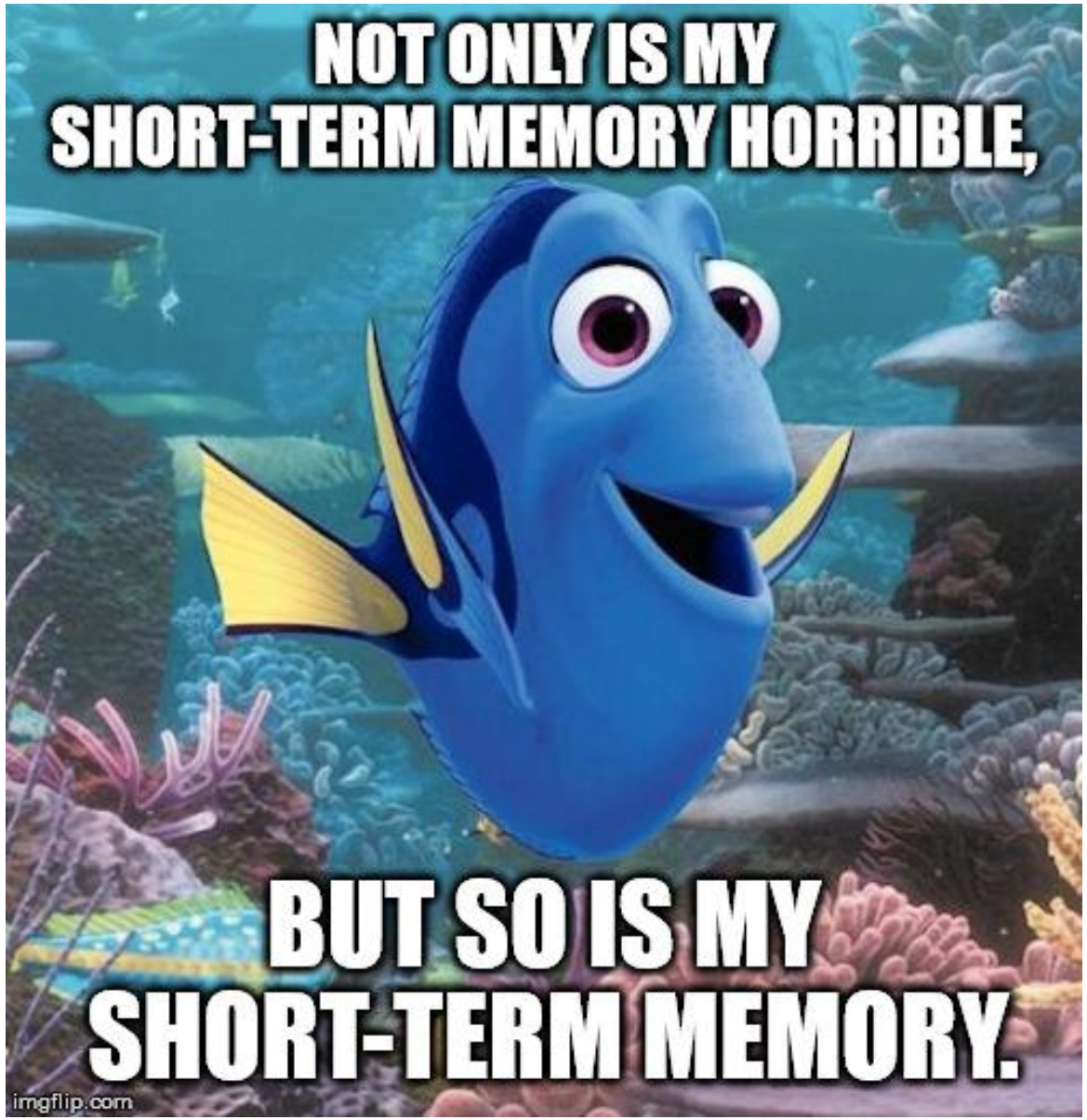
Who is telling the truth?
Biases in self-reported physical and cognitive health status of older Europeans

Sonja Spitzer and Daniela Weber

International Seminar at the European Centre for Social Welfare Policy and Research | 23.4.2019


NOT ONLY IS MY
SHORT-TERM MEMORY HORRIBLE,
BUT SO IS MY
SHORT-TERM MEMORY.
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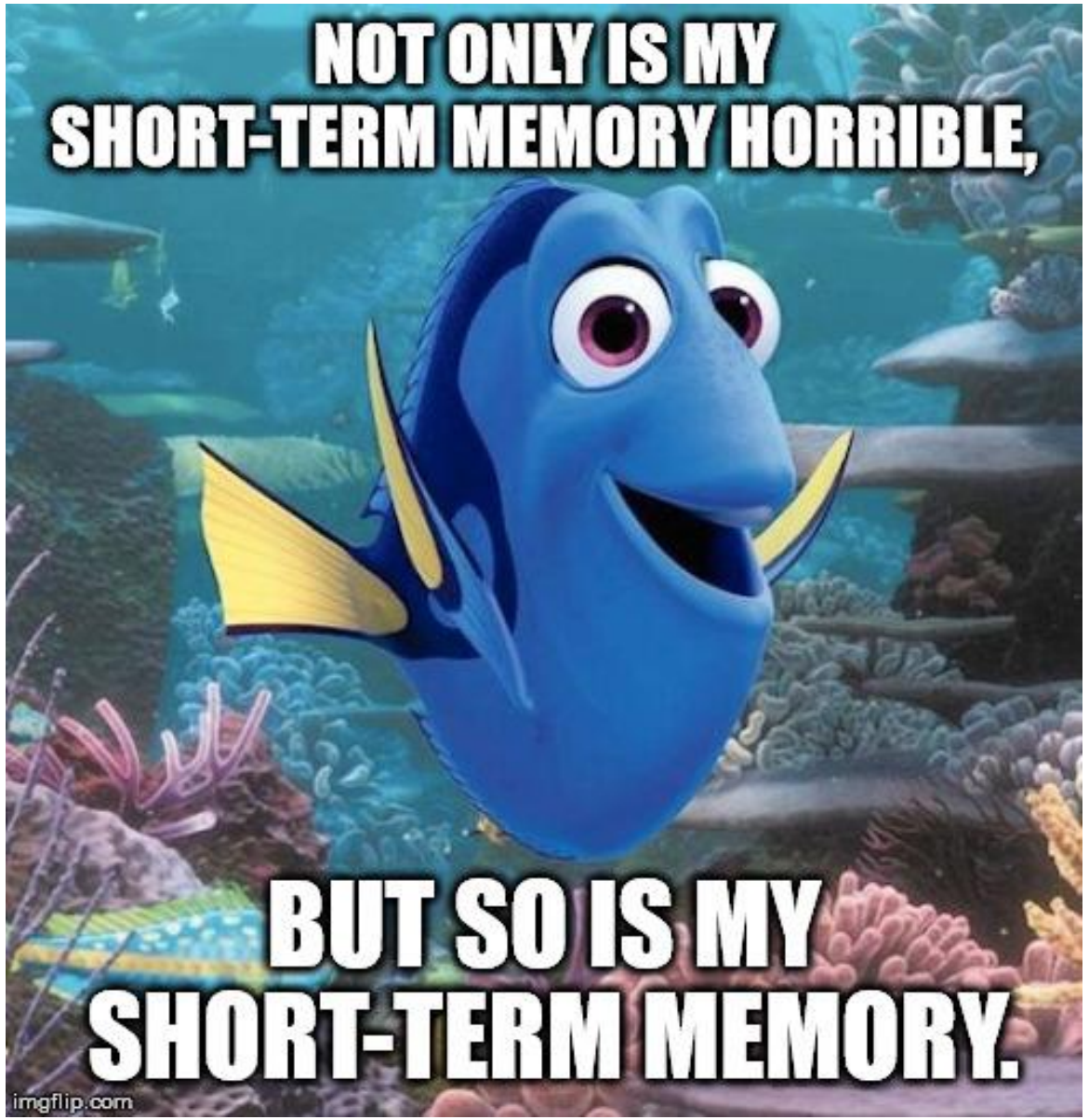
Problem:

Self-reported data are often the only information available to researchers and policymakers when asking health-related questions.

Overestimating health is associated with riskier behaviour, e.g. older individuals that overestimate their physical ability are more prone to fall (Sakurai et al. 2013).



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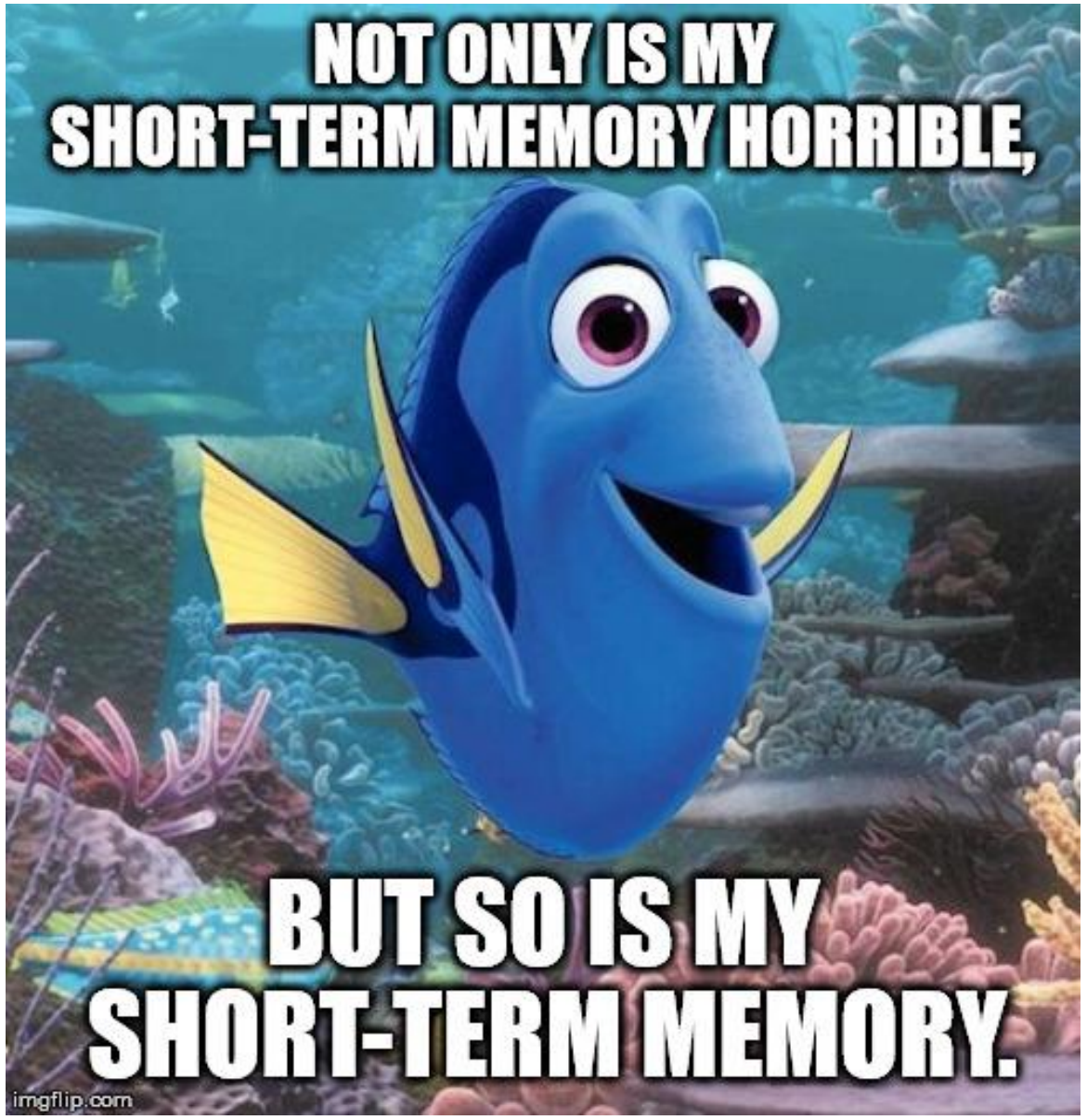
Aim:

This project quantifies the contribution of individual characteristics to the bias in self-reported physical and cognitive health status of the 50-plus population in 19 European countries.



We contribute to the growing literature on reporting biases in self-reported health by

(i) quantifying which individual characteristics most relevantly contribute to the overall bias in subjective health via **relative importance analysis**

(ii) directly matching performance-based measures of mobility and cognition with their self reported equivalent for a **large cross-country data set;** response behaviour of each survey participant can be directly evaluated in view of his or her individual characteristics.

(iii) **comparing the reporting bias** of mobility and cognition

DATA

The Survey of Health, Ageing and Retirement in Europe (SHARE)

- **Wave 2**, 2004-2005
- **Wave 4**, 2010-2012
- **Wave 5**, 2012-2013

19 countries:

Austria, Belgium, Czechia, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland

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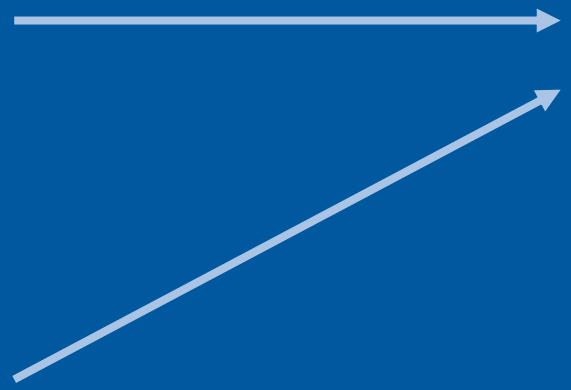

88,087 observations for mobility

19 countries:

Austria, Belgium, Czechia, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland

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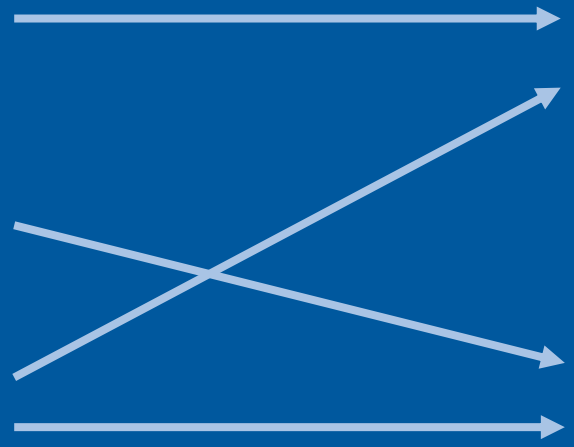

88,087 observations for mobility

115,785 observations for cognition

19 countries:

Austria, Belgium, Czechia, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland

Self-reported mobility

Self-reported activity limitations

"Because of a health problem, do you have difficulty …

… getting up from a chair after sitting for long periods?"

Self-reported mobility

Self-reported activity limitations

"Because of a health problem, do you have difficulty …

... getting up from a chair after sitting for long periods?"

Tested mobility

Chair stand test

"The next test measures the strength and endurance in your legs. I would like you to fold your arms across your chest and sit so that your feet are on the floor; then stand up keeping your arms folded across your chest. Like this... "

Self-reported cognition

Self-reported memory

"How would you rate your memory at the present time?" (1) "excellent", (2) "very good", (3) "good", (4) "fair", (5) "poor"

Self-reported cognition

Self-reported memory

"How would you rate your memory at the present time?" (1) "excellent", (2) "very good", (3) "good", (4) "fair", (5) "poor"

How would YOU rate your memory at the present time?

Self-reported cognition

Self-reported memory

"How would you rate your memory at the present time?" (1) "excellent", (2) "very good", (3) "good", (4) "fair", (5) "poor"

Tested cognition

Immediate world recall

"Now, I am going to read a list of words from my computer screen. [...] Please listen carefully, as the set of words cannot be repeated. When I have finished, I will ask you to recall aloud as many of the words as you can, in any order [...]"

How many words do you recall?

Hotel

River

Tree

Skin

Gold

Market

Paper

Child

King

Book

Self-reported cognition

Self-reported memory

"How would you rate your memory at the present time?" (1) "excellent", (2) "very good", (3) "good", (4) "fair", (5) "poor"

➡ **Cut-off at "fair"**
(Gardner, Langa, and Yaffe 2017)

Tested cognition

Immediate world recall

"Now, I am going to read a list of words from my computer screen. [...] Please listen carefully, as the set of words cannot be repeated. When I have finished, I will ask you to recall aloud as many of the words as you can, in any order [...]"

➡ **Cut-off at three words**
(Grodstein et al. 2001; Purser et al. 2005)

Three possible outcomes:

Self-reported measure = tested measure ➡ **concordance**

Self-reported measure > tested measure ➡ **overestimating**

Self-reported measure < tested measure ➡ **underestimating**

Step 1

MULTINOMIAL LOGIT MODEL

Estimate the effects of individual characteristics on the probability to over- or under-estimate health

Determinants of interest: country of residence, age, education, gender
Control variable: wave (and later learning effect)

$$\ln\left(\frac{P(y=\text{overestimating})}{P(y=\text{concordance})}\right) = \beta_{1.0} + \beta_{1.1}\text{COUNTRY}_i + \beta_{1.2}\text{AGE}_i + \beta_{1.3}\text{EDUC}_i + \beta_{1.4}\,\text{GENDER}_i + \beta_{1.5}\text{WAVE}_i + \varepsilon_i$$

$$\ln\left(\frac{P(y=\text{underestimating})}{P(y=\text{concordance})}\right) = \beta_{2.0} + \beta_{2.1}\text{COUNTRY}_i + \beta_{2.2}\text{AGE}_i + \beta_{2.3}\text{EDUC}_i + \beta_{2.4}\,\text{GENDER}_i + \beta_{2.5}\text{WAVE}_i + \varepsilon_i$$

Step 2

RELATIVE IMPORTANCE ANALYSIS

Which individual characteristics most relevantly contribute to the overall bias in self-reported health?

Decompose the fit statistics of the regression models to evaluate how much of the variation in concordance, overestimating and underestimating is explained by the regressors (Luchman 2013; Luchman 2014)

BIASES IN SELF-REPORTED MOBILITY

Descriptive statistics mobility (all countries)

	Self-reported impairment	Tested impairment	S=T	S>T	S<T	
	%	%	%	%	%	N
Total	19.2	17.2	80.4	9.4	10.2	88,087
Gender						
Men	14.9	15.2	82.8	9.3	7.9	39,417
Women	22.7	18.8	78.4	9.6	12.0	48,670
Age						
50–54	10.3	10.0	85.5	7.1	7.4	11,229
55–59	12.7	11.6	83.9	7.5	8.5	16,196
60–64	14.9	12.5	82.3	7.6	10.0	16,836
65–69	16.6	14.7	80.2	9.0	10.8	15,721
70–74	20.7	19.5	78.0	10.5	11.5	12,906
75–79	26.9	25.0	75.8	11.7	12.5	7,347
80–84	34.4	36.7	71.4	15.9	12.7	4,664
85–89	42.6	49.8	69.1	19.5	11.4	2,438
90–94	46.9	60.2	65.6	24.7	9.7	750
Education						
Low	24.7	23.6	76.4	12.2	11.4	35,808
Medium	16.9	14.4	81.4	8.4	10.3	31,953
High	11.8	9.5	86.3	6.0	7.7	19,058

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- Prevalence of mobility impairment varies by measure
- Overall concordance is only 80.4 %

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- Under- and over-estimating differs by gender

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- Overall concordance is only 80.4 %
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- Concordance decreases drastically with age

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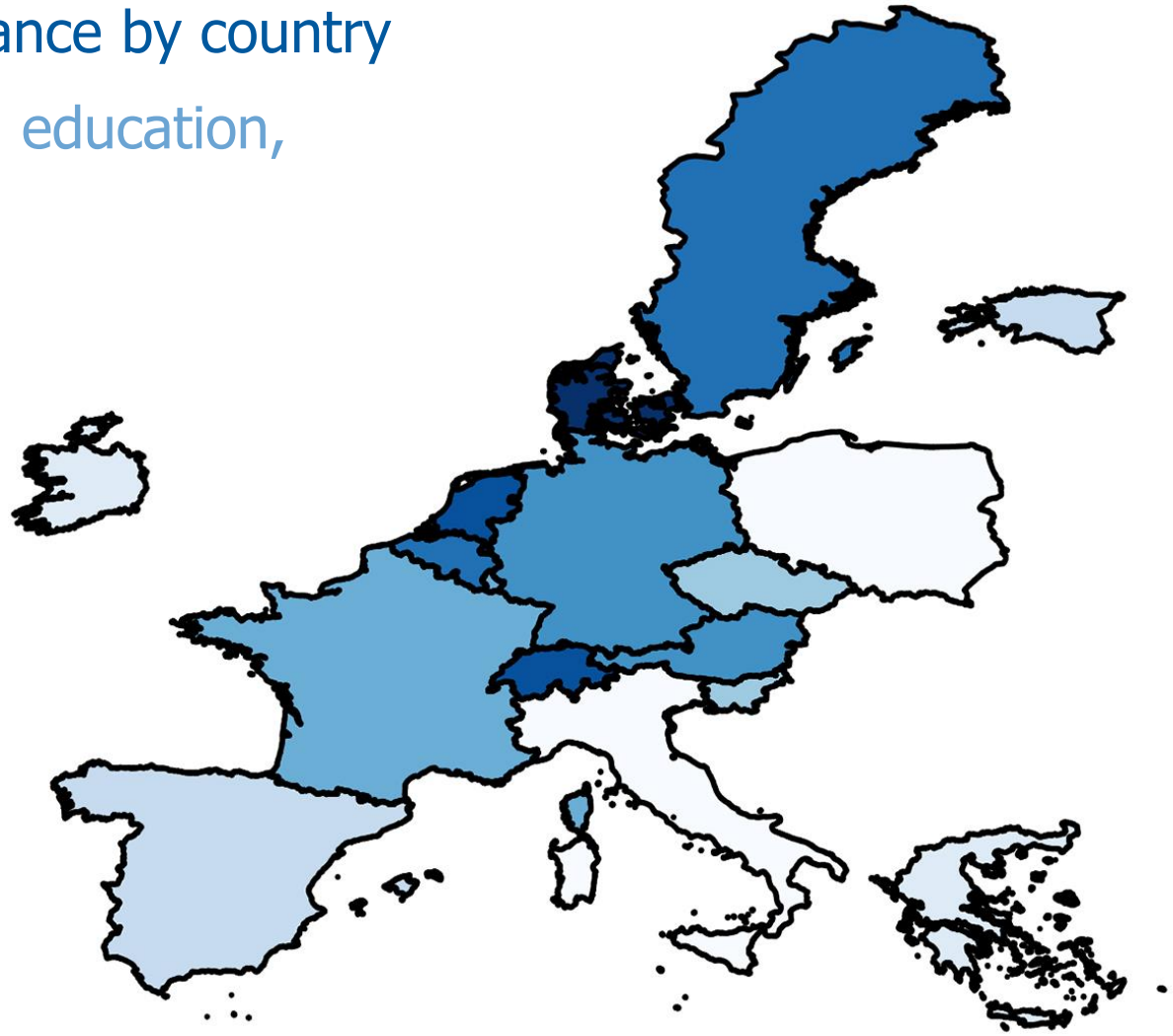
- Prevalence of mobility impairment varies by measure
- Overall concordance is only 80.4 %
- Under- and over-estimating differs by gender
- Concordance decreases drastically with age
- Strong education gradient

MOBILITY

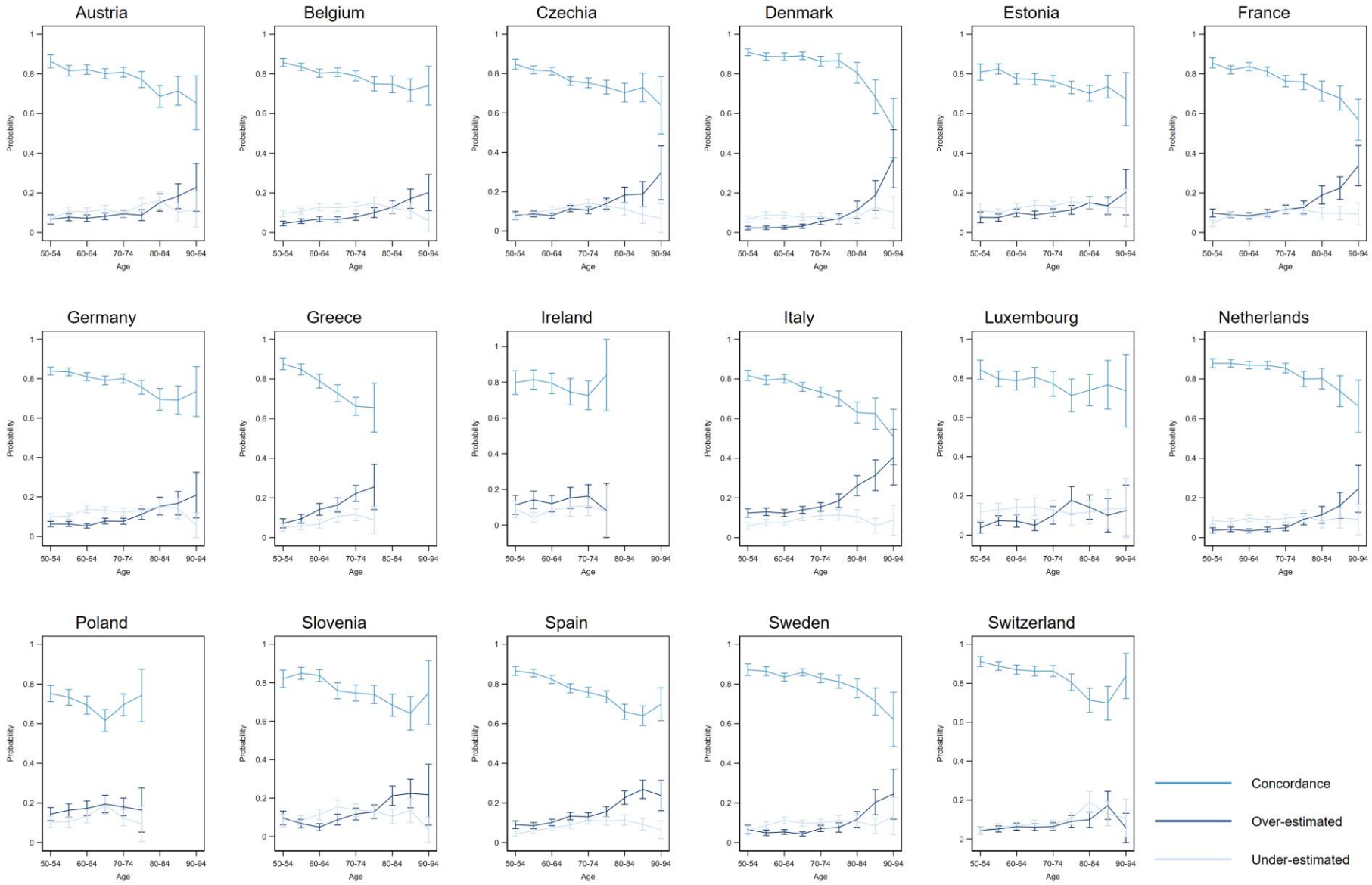
Predicted concordance by country

Controlled for age, education, gender, wave



MOBILITY: Predicted concordance by age

Controlled for education, gender, wave

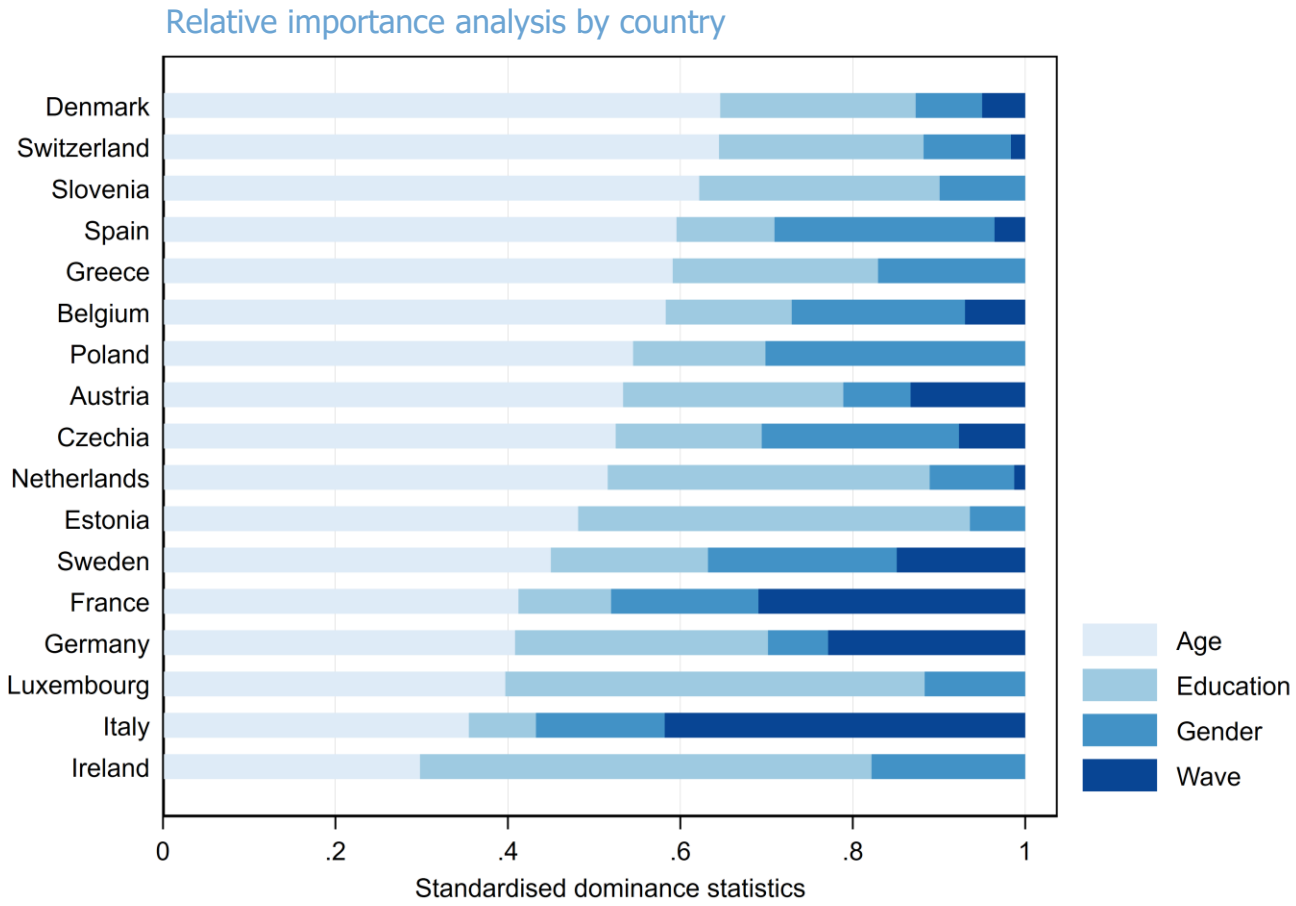


MOBILITY

Relative importance analysis: Which variable contributes most to the bias?

- **Country** differences in reporting behavior explain 35% of the deviation between self-reported and tested mobility measures
- **Age** differences explain 32%
- **Education** explains some parts of the bias (17%)
- **Gender** seems less relevant (11.3%)

- **Results hold for estimations by country**

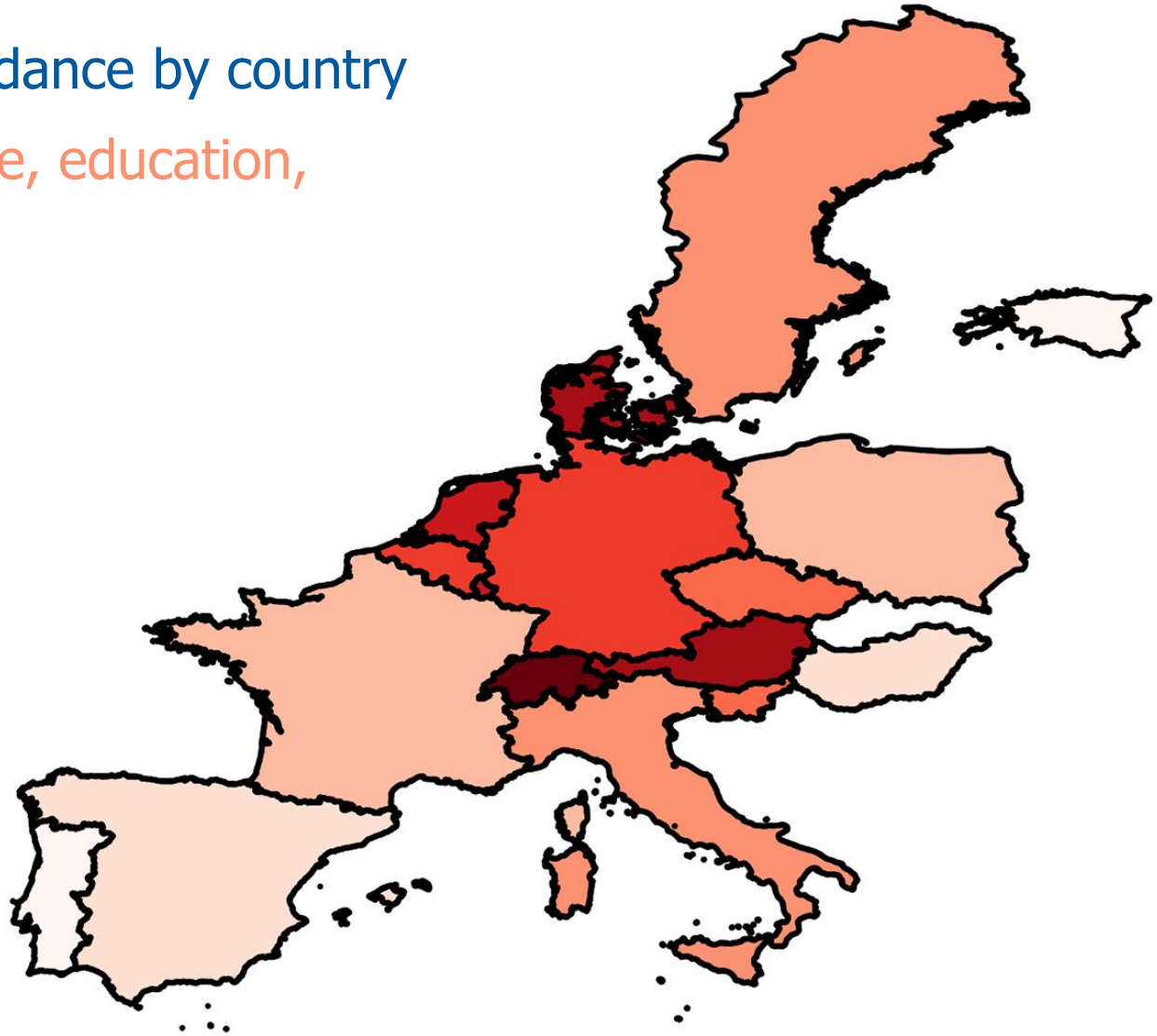


BIASES IN SELF-REPORTED COGNITION

COGNITION

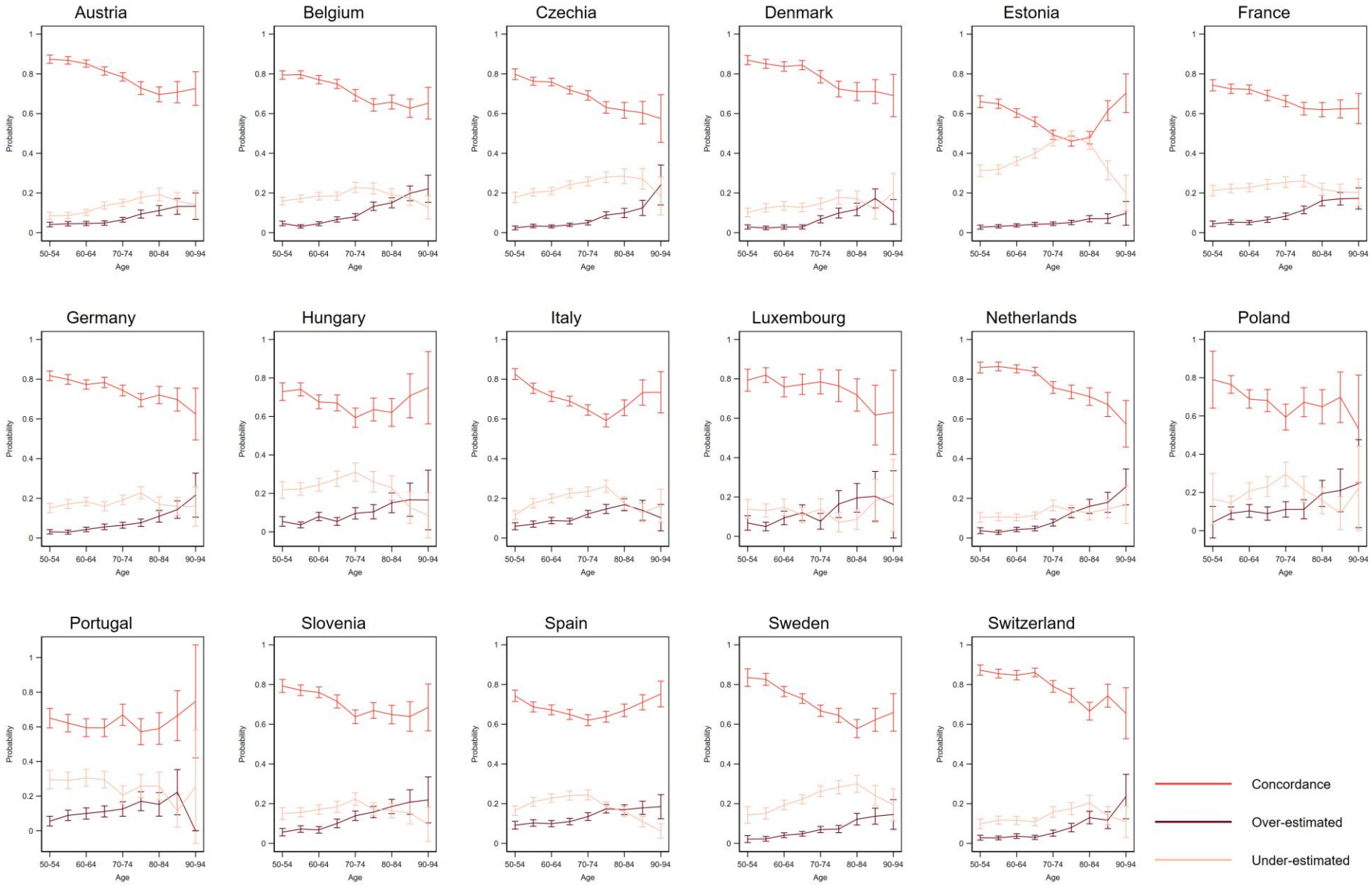
Predicted concordance by country

Controlled for age, education, gender, wave



COGNITION: Predicted concordance by age

Controlled for education, gender, wave

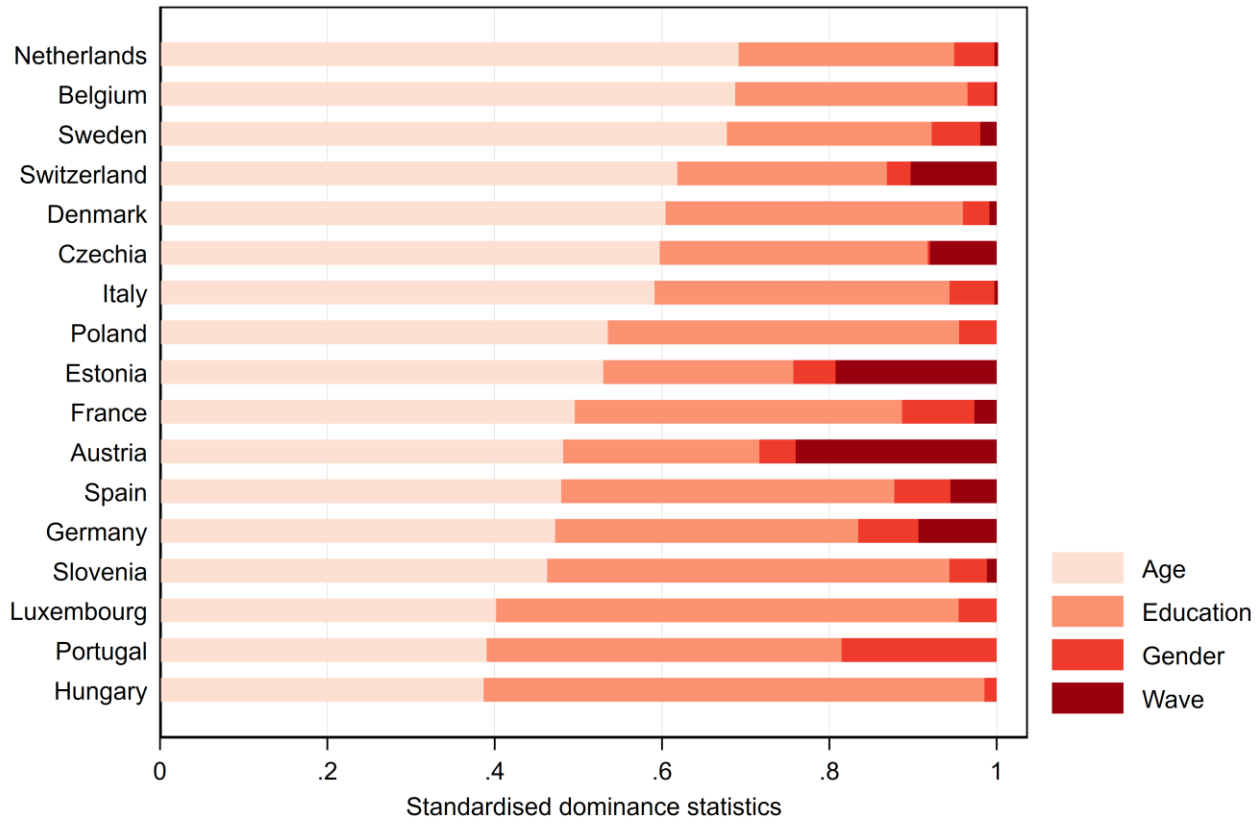


COGNITION

Relative importance analysis: Which variable contributes most to the bias?

- According to the pooled model, deviation is largely explained by **country** (44.9%), **age** (29.7%) and **education** (22.7%)
- **Education** is much more important for explaining the bias in cognition than for explaining the bias in mobility
- **Gender** is even less relevant than for mobility

Relative importance analysis by country



CONCLUSION

- Biggest bias due to reporting heterogeneity between **countries** and **age** groups
- Concordance in mobility and cognition measures is highly related, but their are still some differences
  - Cultural bias is even more relevant for cognition (44.9%) than for mobility (35%)
  - **Education** explains more of the bias in self-reported cognition than in mobility
  - **Gender** explains relatively little of the bias in both health dimensions

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- Persons from **Southern** and **Central and Eastern European countries** as well as **Ireland** are more likely to misreport than persons from Northern and Western Europe; **Southern Europeans** are particularly prone to overestimate their health
- Concordance drastically decreases with age, yet less for cognition than for mobility

Working Paper

Who is telling the truth? Biases in self-reported physical and cognitive health status of older Europeans

Tools

Spitzer S & Weber D (2019). Who is telling the truth? Biases in self-reported physical and cognitive health status of older Europeans. IIASA Working Paper. IIASA, Laxenburg, Austria: WP-19-002

Text
WP-19-002.pdf - Published Version

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Project: Reassessing Ageing from a Population Perspective (RE-AGEING, FP7 323947), The Demography of Sustainable Human Wellbeing (EmpoweredLifeYears, H2020 741105)

Abstract

This paper quantifies the contribution of individual characteristics to the bias in self-reported physical and cognitive health status of the 50-plus population in 19 European countries. The analysis utilises micro-data from the Survey of Health, Ageing and Retirement in Europe to compare performance-tested outcomes of mobility and memory with their self-reported equivalents. Relative importance analysis shows that the bias in self-reported health is mostly due to reporting heterogeneities between countries and age groups, whereas gender contributes little to the discrepancy. For self-reported cognition specifically, education is an important factor explaining the misreporting. Southern as well as Central and Eastern Europeans are much more likely to misreport their physical and cognitive abilities than Northern and Western Europeans. Overall, our results suggest that comparisons of self-reported health between countries and age groups are prone to significant biases, whereas comparisons between genders are credible for most European countries.

Questions?
Suggestions?

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This project received funding from the Austrian Federal Ministry of Science, Research, and Economy in the framework of the Joint Programming Initiative "More Years, Better Lives – The Challenges and Opportunities of Demographic Change". Furthermore, the research leading to these results received funding from the European Research Council (ERC) under the European Union's Seventh Framework Programme (FP7/2007-2013)/ERC under Grant ERC2012-AdG 323947-Re-Ageing and under the European Union's Horizon 2020 Research and Innovation Programme (Grant Agreement No. 741105). The funder had no role in the design and execution of the study; in the collection, analysis, and interpretation of the data; or in the preparation, review, and approval of the manuscript.

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