Subjective Life Expectancy: Differences by Smoking, Education

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Subjective Survival Probability (SSP)

• *What are the chances that you will live to be age $T$ or more?*

• The target age $T$ depends on the age of the respondent:
  • it is equal to 75 for those aged 50–65
  • to 80 for those aged 66–69
  • 85 for those aged 70–74
  • 90 for those aged 75–79
  • 95 for those aged is 80–84
  • 100 for those aged 85–89
SSP

- SSP survey question is a **good predictor of mortality**

- **People know** the effects of their characteristics & behaviours on their survival probabilities
  - SSPs are consistent with the observed survival patterns (Hurd 2009; Hurd & McGarry 2002; Novak & Palloni 2013)

- SSPs incorporate **private and subtle information** on mortality (Perozek 2008)
  - often used to predict individuals’ economic and health behaviours
Sub-group differences

- **Sub-groups behave differently** (also because of individual perceptions of ageing)

- Thus, understanding the **variability of SSPs** within a population is important because they may affect life-cycle decisions

- Yet, sub-groups may be **more or less able to predict** the own survival probability
Aims

1. To compare sub-groups SSPs obtained from a population survey
2. To study sub-group differences in objective survival probability (OSP) calculated from survey data
3. To compare subjective and objective survival probabilities

Particular attention to sub-group differences (i.e., by education and smoking behaviour)
Hypotheses

- Current smoking is negatively correlated with SSPs (see also Aktas & Sanderson (2015) on a negative association between smoking and SSP)

- Reporting heterogeneity in SSP
  - focusing on the differences between smokers and non-smokers, with a further distinction between more and less educated individuals
Data

Health and Retirement Study (HRS)
Age-cohort–based longitudinal panel survey of persons aged 50 years and older in the United States

- N = 23,895 older adults aged 50–89 years, excluding nursing home residents
Outcome variables

SSP
• What are the chances that you will live to be age $T$ or more?
  • The target age $T$ depends on the age of the respondent

OBJECTIVE SURVIVAL PROBABILITY (OSP)
• We know whether respondents died between first interview and 2013
  • Information on vital status obtained by HRS through tracking of respondents & matches to the National Death Index (year and month of death, match score, and an alive/deceased flag)

GAP
• From these two variables, we calculate a measure of how close the SSPs are to the OSPs, as the difference between SSP and OSP
Explanatory & control variables

1) **Education**
   - higher (master degree, professional degree; 21%)
   - lower (no degree, GED, two year college degree, four year college degree)

2) **Smoking behaviour**
   - the respondent has *never smoked* (41.2%);
   - *smoked* in the past, but currently does not smoke (40.1%);
   - *currently smokes* cigarettes (18.7%)

- **Ethnicity** (White/Caucasian; Black/African American; other)
- **Health** (diagnosed with cancer, stroke, lung problems, and/or heart disease)
- **Wave** at which the interview was carried out
Methods

- **Linear models** on the association between smoking & education and SSPs (outcome bounded at 0 and 100)
  - we obtain *predicted survival probabilities for different sub-groups*

- We apply a **Gompertz survival model** to real mortality data to assess the association between smoking & education and OSP
  - we obtain *estimates of OSPs by smoking behaviour and education*

- We **compare** respondents’ SSPs and their predicted OSPs
Predicted SSP by education and smoking behaviour

- **Introduction/Background**
- **Research question**
- **Hypotheses**
- **Data & Method**
- **Results**
Predicted SSP by education and smoking behaviour
Predicted SSP by education and smoking behaviour
Predicted SSP by education and smoking behaviour

![Graph showing predicted SSP by education and smoking behaviour]
Predicted logarithm of the gap

Smaller gap = smaller “mistake”
Probabilities of being correct in estimating survival probabilities

More likely to be “correct”
Probabilities of under/over-estimating survival probabilities

More likely to underestimate

More likely to overestimate
Conclusions

- **Smokers** and **low educated** people are **less able to correctly predict** their survival probabilities (SSPs)
  - Low educated tend to either underestimate or overestimate SSPs
  - Smokers tend to overestimate SSPs

- **Interaction** between smoking and education
  - Among the smokers, the effect of education on the probabilities of incorrect estimation is not significant
Thank you!

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