Socioeconomic Inequalities and Age at Menarche:
Assessing Early-Life Ecological Stress in Girls in Germany.

Tobias Vogt[1,2*], Lara Bister[1,3], Roberta Rutigliano[4,5]

Our study's objective:

An intersectional approach to investigate the effect of early-life ecological stress on girls' age at menarche across socioeconomic strata.

Take-home-message:

Especially girls of a lower socioeconomic background are burdened by ecological stress.

Motivation

DEFINITION

Age at menarche = age at "the first menstrual period in a female adolescent" (NIH, 2023)

RELEVANCE

Early age at menarche is associated with many health hazards over the life course (e.g., increased cancer risk and all-cause mortality)

Age at menarche as an objective long-term distress marker in girls: early menarche among girls who are exposed to

- Early-life adversities (e.g., low socioeconomic status, discrimination, other types of individual-/family-level stressors)
- Ecological stress (e.g., wars, political instability, recessions)

▸ Research gap: double burden of individual- and ecological stress

CONTEXT

Post-reunification East Germany: political, economic and political

Methods

DATA

German Child Health and Development Survey (KiGGS)

SAMPLE

n = 4,440 girls born 1985 to 2005 in East Germany (n = 1,636) and West Germany (n = 2,804) (excl. Berlin) observed over N = 60,767 prs-yrs

ANALYSIS

Accelerated failure time model (log-logistic regression) to predict age at menarche by environmental and family stress exposures

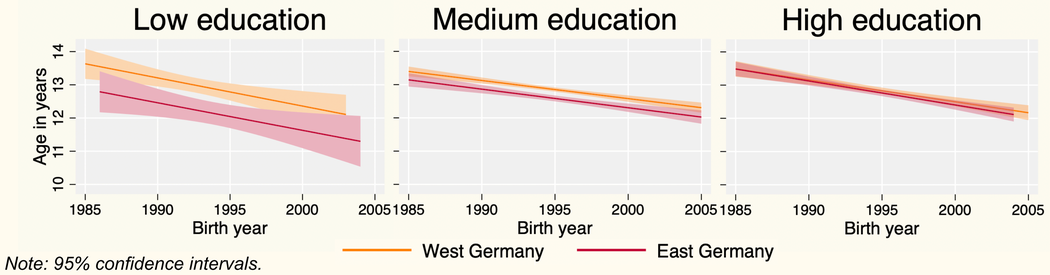
MEASURES

Outcome variable: Age at menarche in years;
Exposure: Ecological stress in East Germany (ref.: West Germany);
Moderation assessment: Maternal education (ISCED v11);
Controls: Demographics, family composition, child's health

Results

- General decline in average age at menarche in Germany with younger birth cohorts
- Younger age at menarche in East Germany: 12.66 (vs. 12.85 in West Germany, difference: 0.19*** years)
- COHORT PERSPECTIVE (Figure 1):
  - ▸ East-West German age-at-menarche gap decreases with higher maternal education
  - ▸ Age at menarche is significantly lower among East German than West German girls for
    (a) low maternal education: cohorts 1990 to 1995
    (b) medium maternal education: cohorts 1990 to 2000

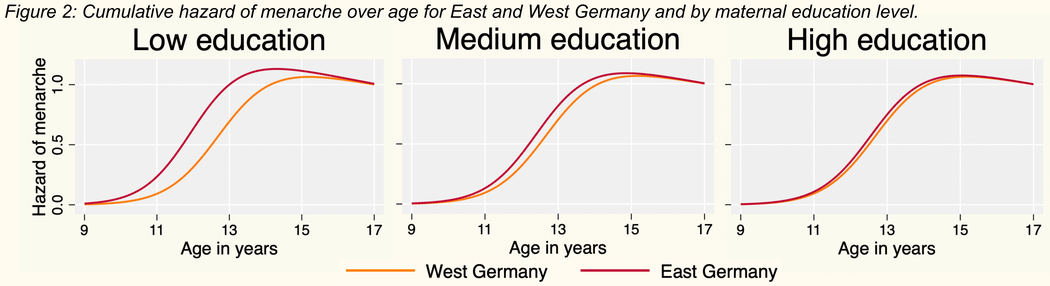
Figure 1: Linear prediction of age at menarche over birth years for West and East Germany and by maternal education level.



Note: 95% confidence intervals.

- AGE PERSPECTIVE (Figure 2):
  - ▸ Hazard of menarche converges between East and West Germany with higher maternal education
  - ▸ The hazard for East German girls is accelerated compared to West German girls by up to
    (a) low maternal education: 0.05***
    (b) medium maternal education: 0.02*
    (c) high maternal education: 0.01

Figure 2: Cumulative hazard of menarche over age for East and West Germany and by maternal education level.



Note: 95% confidence intervals are omitted for improved readability; regression tables available upon request.

Significance levels: ***p<0.001, **p<0.01, *p<0.05

Conclusions

MAIN FINDINGS

- Overall decline in age at menarche for German girls and consistently lower age in East German girls
- Difference between East and West German girls driven by lower and medium educational groups
- Disadvantage for East German girls still prevalent 20 years after German reunification

CONTRIBUTIONS

- Use of objective long-term distress marker: age at menarche
- Exploitation of "quasi experimental" setting in post-reunification East and West Germany
- First study to analyze age at menarche for younger (post-reunification) cohorts in Germany

IMPLICATIONS

▸ Protection of double-burdened, vulnerable population groups during crises is warranted to ensure sustainable population health.

Download our poster and reference list, and connect with us here:

Affiliations: 1 Population Research Centre, Faculty of Spatial Sciences, University of Groningen, The Netherlands; 2 Prasanna School of Public Health, Manipal Academy for Higher Education, India; 3 International Max Planck Research School for Population, Health and Data Sciences, Max Planck Institute for Demographic Research, Germany; 4 Department of Sociology and Social Work, University of the Basque Country (UPV/EHU), Spain; 5 Research Group on Social Determinants of Health and Demographic Change—OPIK, Spain
(c) Poster designed by Lara Bister, graphics obtained from Freepic / Keynote / Emojis ! * Corresponding author: Tobias Vogt, contact: t.c.vogt@rug.nl