A Multilevel Hierarchical Age-Period-Cohort analysis

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Overview

- Life satisfaction
  - Time
  - Social stratification
  - International comparison

- Contextual analysis using repeated cross-sectional surveys
  - Eurobarometer trend data (1973-2012)
  - Hierarchical Age-Period-Cohort regression

- Results
  - Flanders
  - Flanders in Europe
Life satisfaction: time

- Three components: age, period, cohort
  - Age (life cycle)
    - Age-related developmental changes
  - Historical time (period, trend)
    - Cultural and economical changes unique to a specific time period
  - Birth cohort (Ryder, 1965)
    - A birth cohort experiences cumulatively the same kind of social experiences
Life satisfaction: time

• Increased with age?
  ‣ - : health problems, loss of social relationships
  ‣ + : maturity hypothesis (role theory)
  ‣ Empirics: -, +, 0, U-effects

• Evolution in recent decades?
  ‣ 0 : ‘relative’ theory (e.g, Davis, 1984)
  ‣ + : ‘absolute’ theory (Veenhoven, 2005)
  ‣ Empirics: 0 (Easterlin, ‘95); - (VS: Blanchflower, 2004)

• Birth cohort?
  ‣ - : post materialism (Rodgers, 1982)
  ‣ - : babyboomers (Easterlin, 1987)
  ‣ Empirics: 0
Life satisfaction: social

• Social stratification?
  ▸ Higher rank, more subjective well-being (Davis, '84)
  ▸ Empirics (review by Yang, '08):
    › Confirmation for SES: strong relationship
    › No confirmation for gender: women > men

• How evolves stratification during life cycle?
  ▸ Reversal of gender gap at older ages (Shmotkin, 90)
  ▸ SES: eg. divergence

• Period- and cohort-interactions?
  ▸ No specific hypotheses
Life satisfaction: international

• International stratification?
  ▶ Strong north-south gradient (Pittau, 2010)
    ◀ North (DK: 76%) > south (PT: 48%)
  ▶ Strong heterogeneity within countries
    ◀ Especially Belgium, Germany, Italy, Spain & Portugal
    ◀ Wallonia 7th decile, Flanders 3rd decile
    ◀ The Netherlands, very homogeneous (top decile)

• International trend 1973-2009 (Veenhoven, 2010)?
  ▶ Portugal (-4%)
  ▶ 0 Belgium, Ireland, Greece, West-Germany, Japan
  ▶ + Italy (+8%), US, UK, NL, FR, DK, ES, LU
Eurobarometer micro-data

• Combined cross-sectional surveys (1973-2012)
  ‣ Mannheim Eurobarometer Trend File 1973-2002
    › 53 time points, n = 414,996
  ‣ Specific Eurobarometer Surveys 2003-2012
    › 10 time points, n = 75,790

• Variables in the analysis
  ‣ Dependent variable: life satisfaction
    › 4 points scale: linear specification (Ferrer-i-Carbonell & Frijters, 2004)
  ‣ Time
    › 38 periods: 1973 to 2012 (not in 1974 and 1996)
    › 21 five-year cohorts: < 1895, ..., >= 1995
    › age (deviation from overall mean age, quadratic specification)
  ‣ Social stratification
    › Gender: women = ref
    › Age at end of studies: < 15 year, 16-19 (ref), > 20 year, student
  ‣ International: Flanders, Dk, Fr, Ge-W, GB, Ie, It & Nl
Hierarchical Age-Period-Cohort regression

- Birth cohort and time period
  - Each respondent (level 1) is member of
    - one birth cohort and one time period (level 2)
    - i.e. a cross-classification
  - Random intercept specification
    - Birth cohort
    - Time period
    - Person

- Country or region (level 3)
  - N = 8, no random models
  - ‘Separate regressions’ or ‘Fixed intercept specification’
Main effect of age (Flandres)
Main effect of period (Flanders)
Main effect of cohort (Flanders)
Gender & education (Flanders)

- Main effects
  - Gender gap: -0,008 (n.s.)
  - Education gap: +0,121 (high > low education)

- Interaction with age?
  - Gender: men improve their position as they get older, but no reversal of position.
  - Education: divergence, lag for lower educated gradually increases

- Random variation according to period?
  - Limited: gender
  - Not: education

- No random variation according to cohort
  - Lag for men and lower educated people remains constant
<table>
<thead>
<tr>
<th>Country/region</th>
<th>Intercept</th>
<th>N</th>
</tr>
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<tbody>
<tr>
<td>Denmark</td>
<td>3.56</td>
<td>63.527</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>3.39</td>
<td>64.584</td>
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<tr>
<td>Flanders</td>
<td>3.25</td>
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<td>Ireland</td>
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<td>63.342</td>
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<tr>
<td>Great Britain</td>
<td>3.18</td>
<td>66.215</td>
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<tr>
<td>Germany-West</td>
<td>3.03</td>
<td>65.649</td>
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<tr>
<td>France</td>
<td>2.91</td>
<td>66.106</td>
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<tr>
<td>Italy</td>
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<td>66.647</td>
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<td><strong>Total</strong></td>
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## International: Period, cohort and indiv. variance

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<thead>
<tr>
<th>Country/region</th>
<th>Period Variance</th>
<th>Period Rank</th>
<th>Cohort Variance</th>
<th>Cohort Rank</th>
<th>Individual Variance</th>
<th>Individual Rank</th>
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<tr>
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<td>0.001</td>
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<td>0.988</td>
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<td>The Netherlands</td>
<td>0.006</td>
<td>7</td>
<td>0.007</td>
<td>5</td>
<td>0.987</td>
<td>3</td>
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<tr>
<td>Flanders</td>
<td>0.026</td>
<td>1</td>
<td>0.013</td>
<td>3</td>
<td>0.960</td>
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<tr>
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<td>6</td>
<td>0.992</td>
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<td>0.015</td>
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<td>0.962</td>
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International: life cycle

<table>
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<tr>
<th>Country/region</th>
<th>Age</th>
<th>p</th>
<th>Age²</th>
<th>Funct. Form</th>
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<tbody>
<tr>
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<td>0.0001</td>
<td>Quadratic +</td>
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<tr>
<td>Ireland</td>
<td>0.0042</td>
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<td>0.0001</td>
<td>Quadratic +</td>
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<tr>
<td>Great Britain</td>
<td>0.0017</td>
<td>***</td>
<td>0.0001</td>
<td>Quadratic +</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>-0.0011</td>
<td>***</td>
<td>0.0001</td>
<td>Quadratic -</td>
</tr>
<tr>
<td>Flanders</td>
<td>-0.0021</td>
<td>***</td>
<td>0.0001</td>
<td>Quadratic -</td>
</tr>
<tr>
<td>Italy</td>
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<td>**</td>
<td>0</td>
<td>Linear -</td>
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<td>Germany-West</td>
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<td></td>
<td>Nul 0</td>
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<tr>
<td>Denmark</td>
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<td></td>
<td></td>
<td>Nul 0</td>
</tr>
</tbody>
</table>

*p < 0.05; **p < 0.01; ***p < 0.001
### International: gender gap

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Men</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
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<td>***</td>
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<tr>
<td>France</td>
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<td></td>
</tr>
<tr>
<td>Germany-West</td>
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<td></td>
</tr>
<tr>
<td>Flanders</td>
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</tr>
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<td>***</td>
</tr>
<tr>
<td>Great Britain</td>
<td>-0.037</td>
<td>***</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>-0.062</td>
<td>***</td>
</tr>
<tr>
<td>Ireland</td>
<td>-0.077</td>
<td>***</td>
</tr>
</tbody>
</table>

*p < 0.05; **p < 0.01; ***p < 0.001
For Flanders (1973-2012)

- Period > age > cohort
- Gender:
  - Women (n.s.)
  - Age: convergence, but no reversal
  - Period: limited variance
- Education:
  - Higher educated
  - Age: divergence

International

- Heterogeneity

Measure of progress?