

Harmonizing Education Measures in the European Social Survey (2004)

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Conceptualizing education

- Level: single hierarchy of competencies obtained.
- Duration: time spent in education.
- The two are identical if:
 - Single, comprehensive grade system
 - No grade repetition
- In fact, this never occurs in reality.

Problems with Duration measures

- Not equivalent to level measures in "divided" systems; the correlation varies between systems: in some systems the correlation could even be negative.
- Question formulation: "American interpretation" of "years" actually refers to level.
- Accounting problems:
 - What to do with part-time education
 - What to do with grade repetition
 - What to do with different starting ages
 - What to do with recurrent education
 - Special education

Good things about Duration

- One single, simple (?) question.
- In all systems there is some correlation between duration and level.
- Simple, cross-nationally comparable metric; ratio level, detailed.
- Has a nice interpretation in human capital accounting.

Problems with Level measures

- Hierarchy and metric need to be constructed using (A) judgement or (B) criterion variables.
- Hard to compare between countries (and within countries over time).

Good things about Level measures

- However you construct a level measure, the consistency between judges, or between criterion variables is impressive.
- The predictive power of education is (primarily) in level, not in duration.

Our aims

- Construct a cross-nationally (and historically?) valid and comparable index for level of education.
 - Establish valid singular hierarchies for each country at multiple time points.
 - Construct a comparative metric.
- Assess measurement error of the constructed measure using data in ESS.

ISCED

- International Standard Classification of Education (OECD).
- Comparative measure of level of education
 - Seven levels
 - Documented (in small print) for some 25 OECD countries for their education system in 1997.

ISCED – problems

- Researchers cannot consistently apply ISCED97 to their data.
 - Ambiguity about those currently enrolled.
 - Ambiguity about post-secondary, non-tertiary education (ISCED 4).
 - No differentiation within tertiary (ISCED 5/6).
- Too condensed. In many countries only 3-4 categories are effectively used and some of these are very large (> 50%).
- Not sensitive to divided systems.
- Not sensitive to historical variation.
- 'Common denominator' approach.

Education in ESS

- Respondent:
 - Showcard with national categories (except 7 countries).
 - National categories are recoded to ISCED by local researchers; documentation preserved and included in the data (except for Germany).
 - Independent question on duration.
- Father, mother, partner:
 - Showcard with national or ISCED categories.
 - National categories (if applied) are not preserved in the data, only ISCED is provided.

Problems in ESS education

- National categories tend to be replaced by ISCED categories in data collection; some countries have not used more categories or local specialties.
- Different treatment of respondent and the three others, both in data collection and data documentation.
- Researchers obviously have given their own interpretation to the ISCED categories.

Comparing different measures

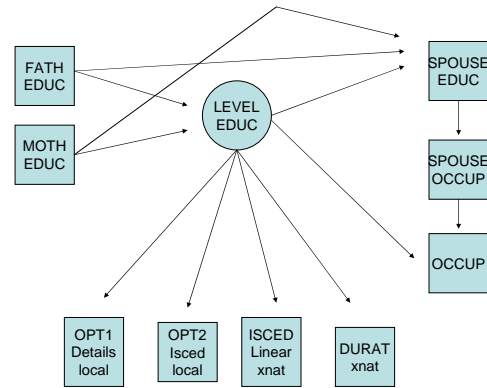
- Five measures:
 - OPT1: Detailed (local) categories, optimally scaled within countries.
 - OPT2: ISCED categories, optimally scaled within countries.
 - OPT3: *ISCED categories optimally scaled within countries, but constrained between father, mother, spouse, respondent.*
 - OPT4: *ISCED categories optimally scaled between countries, father, mother, spouse, respondent*
 - ISCED: linear interpretation (0..6) of ISCED categories.
- Note that these five measures are nested.
- Alternative measure:
 - DURATION in years, truncated at 23 years of education.

Design

- Develop optimal scores: first approximation is effect-proportional scoring for a composite of criterion variables: father's and mother's education, spouse's education (FISCED, MISCED, PISCED), occupation (ISEI), spouse's occupation (PISEI).
- Use duration (DUR) as an alternative source of information (independent measurement and measurement error!).
- Assess loss of quality of measurement in a multiple indicator status attainment model, estimated as a simultaneous equations model [SEM].

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Expectations on measurement relationships

- Criteria
 - Loss of measurement quality is expressed relative to OPT1 (reference measurement relationship).
 - Parallel measurement makes for a true score model.
- Expectations:
 - Quality of measurement will decrease as we allow fewer degrees of freedom.
 - Duration will be a much worse measure of the true score than any the level measures.
 - Duration measure will not work as well in divided systems.

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Problems with this approach

- Circularity: we use the optimal scores, generated by the same data.
 - Potential solution: estimate optimal scores in ESS02 and apply in ESS04.
- We currently use a primitive method of generating optimal scores.
 - Solution: use Princals or LEM.
- Design assumes
 - single hierarchy,
 - hierarchy is the same for father, mother, spouse, respondent,
 - hierarchy is the same for ED/OCC, FED/MED, FED/ED.
- We have not done the SEM models yet.

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Data in ESS04

- 24 countries to start with.
- 2 countries dropped because of missing or invalid education data (GB, PT)
- 4 countries do not have a local measure of education (AT, FI, IS, SI) and 2 other have local measure identical to ISCED (IR, UA).
- 18 countries with all relevant data.
- Only men & women with valid occupation codes (whether currently employed or not), N=29057.

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Special case: Germany

- Germany claims to have a uniquely complicated education system.
- So they ask two questions: one on academic training and on vocational training.
- Hoffmeyer & Warner (2005) show how these two questions can best be combined in one single hierarchy with 10/12 levels. Not used by ESS researchers.
- Germany is the only country in the ESS that used a many-to-many mapping between local education measure and ISCED (measures are not nested).
- Correlation FED/MED (0,45) is relatively low to other countries (0,65) and other German data. Something went wrong!

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Correlations

1	.917	.848	.744	.402	.364	.575	.422	.582
.917	1	.923	.740	.392	.353	.586	.393	.559
.848	.923	1	.769	.432	.403	.556	.401	.559
.744	.740	.769	1	.413	.391	.523	.380	.513
.402	.392	.432	.413	1	.696	.400	.262	.285
.364	.353	.403	.391	.696	1	.366	.218	.236
.575	.586	.556	.523	.400	.366	1	.562	.402
.422	.393	.401	.380	.262	.218	.562	1	.420
.582	.559	.559	.513	.285	.236	.402	.420	1

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Results on level measures (based on correlations)

- Bias relative to OPT1 (cross-national)
 - OPT1: 1.00
 - OPT2: 0.96
 - ISCED: 0.96
- Conclusions:
 - Comparison OPT1/OPT2 shows bias due to aggregation over local variation: 4% over all countries that used a different local classification.
 - Comparison OPT2/ISCED (linear) shows bias by using cross-national constraints: hardly noticeable.
 - However, these results vary by country (and level of detail used in detailed codes). Large differences between optimal local codes and ISCED scale is found in CZ.
- There is also evidence that the optimal scaling varies between relationships (ED/OCC, FED/ED, ED/PED).

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Results on Duration measure

- Considerably loss occurs in duration measure: OPT1 / DUR = 1.00 / 0.88.
- This loss varies considerably among countries, which may also indicate measurement error in the detailed local classifications. Outliers here: DE.
- However, there is significant independent information in the duration measure in 14 of 18 countries.

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Advice

- Researchers should measure all educations in locally valid categories (preferably in one question / showcard), in a much detail as is appropriate in their country.
- ISCED is useful as a cross-national metric, but should be recoded only after collection of the local measure.
- Preserve both local and cross-national information (for all persons involved).
- Duration measure contributes independently to the quality of measurement in many countries. Keep it.

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Perspectives

- How can we rescale the optimal scores to a cross-nationally valid measure?
 - Use either Duration or ISCED as the metric of the true score.
 - CILE: Use anchoring points for the local scales and extra/interpolate the other points.

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