

Towards a world-wide valid scale of educational status

Harry BG Ganzeboom
VU University Amsterdam

Presentation at Leibniz Institute
Bamberg (DE), December 19 2023

Citation

- Please cite these materials as:

Ganzeboom, Harry BG (2023). “Towards a World-wide Valid Scale of Educational Status”. Amsterdam: Department of Sociology VU University. Presented at Leibniz-Institut für Bildungsverläufe LiBfi, Bamberg, December 19 2023.

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- Harmonization in international data files: occupation and education.
- ISEI: the optimal scaling model
- ISLED: optimal scaling model
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Background

- Harry Ganzeboom (1953), professor of Sociology and Social Research Methodology at Vrije Universiteit Amsterdam [VU University Amsterdam]
- Formerly: national coordinator for ESS and ISSP in the Netherlands.
- Also: co-principal investigator ISSP in Suriname.
- Comparative stratification research: intergenerational transmission [reproduction] of occupational and educational status.
- ISEI: International Socio-Economic Index of occupational status (Ganzeboom et al., 1992; Ganzeboom & Treiman, 1996, 2003; Ganzeboom, 2010).
- ISLED: International Standard Level of Education (Schröder & Ganzeboom, 2014).
- See: www.harryganzeboom.nl/index.htm

Acknowledgements

- Schröder, Heike. 2014. *Levels and Loadings. Two Methods to Improve the Measurement of Education in Comparative Research*. [PhD-thesis] Amsterdam: VU University.
- Van Ampt, Charlene. 2023. *Harmonisatie van land-specifieke opleidingsmetingen in het International Social Survey Programme ISSP*. [MA-thesis Sociology] Amsterdam: VU University.

Harmonizing occupational and educational status in international data files

- ESS and ISSP are important sources of comparative data on intergenerational reproduction.
- Occupation: detailed (4-digit) classification ISCO.
- Education: country-specific measures: each country uses its own classification system, adapted to national institutions. Both ESS and ISSP offer a crude common denominator harmonization: EDULVL and DEGREE.
- Both ESS and ISSP include a duration question on education.

Comparative measurement of education: duration

- Duration is a simple and effective way to make education comparable is. Two varieties:
 - Total length of stay in school
 - Age of leaving school.
- Advantages:
 - Ratio level measurement
 - Theoretically attractive: duration = amount of human capital investment.
- Duration has often been criticized for countries with tracked education systems, such as Germany and the Netherlands. In tracked systems it may take longer to obtain a lower level of education.
- In comprehensive education systems (such as in the US), grade (=nominal duration) is the natural unit of level of education.

Qualifications

- Level of education is more often conceptualized as the formal qualification one obtains.
- Qualifications are often required to enter into occupation. But:
 - Not all occupations have a formal entry qualifications
 - Many people work in occupations for which they are overqualified (= 'credential inflation').
 - Higher education does not only bring higher status and better paid occupations, but also other goodies, such as health and social participation.

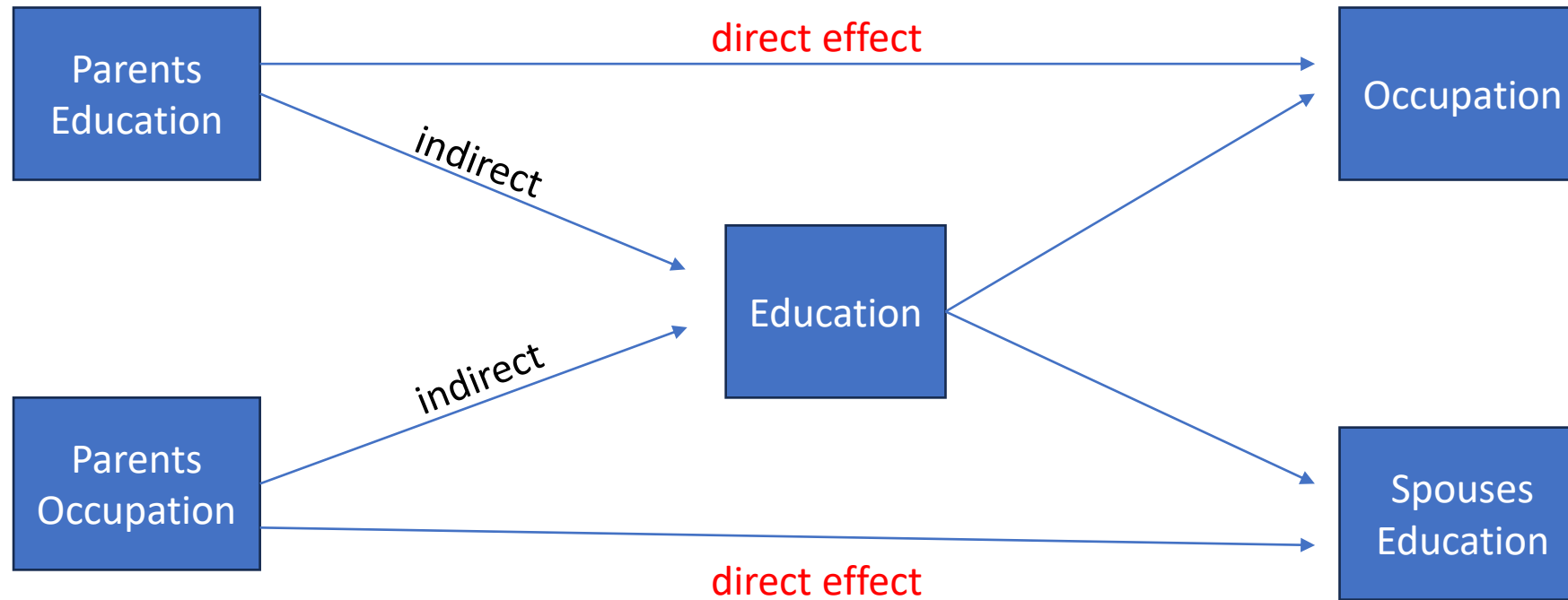
Two methods to measure education in comparative research

- Schröder, Heike. 2014. *Levels and Loadings. Two Methods to Improve the Measurement of Education in Comparative Research [PhD thesis]*. Amsterdam: VU University.
- Schröder, Heike, and Harry BG Ganzeboom. 2014. “Measuring and Modelling Level of Education in European Societies.” *European Sociological Review* 30(1):119–36. doi: 10.1093/esr/jct026.
- The two methods are:
 - Optimal scaling of country-specific qualifications
 - Combine qualification and duration in a latent-variable measurement model.

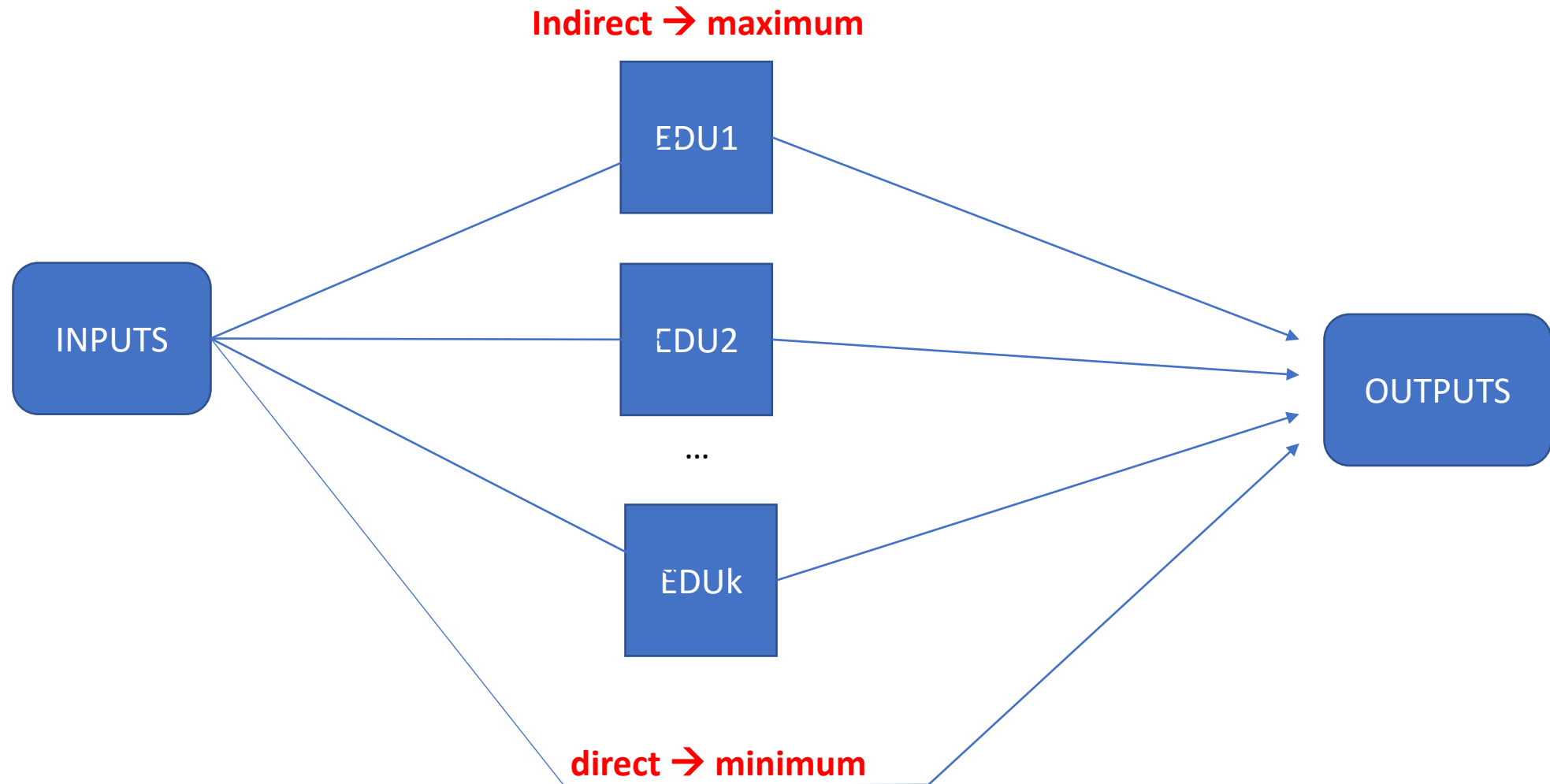
First method: Scaling the value (=level) of educational qualifications

- The value of qualifications can be determined in two ways:
- Output criteria:
 - Level of occupation
 - (Income)
 - Level of spouse's education
- Input criteria:
 - Level of parental education
 - Level of parents occupation.

Causal model: intergenerational status attainment



ISLED optimal scaling model



How do you optimize an indirect effect?

- Ganzeboom, Harry BG, Paul M. De Graaf, and Donald J. Treiman. 1992. “A Standard International Socio-Economic Index of Occupational Status.” *Social Science Research* 21(1):1–56. doi: 10.1016/0049-089X(92)90017-B.
- Basic algorithm consists of finding a relative weight of input and output variables as means of the scaled categories.
- Ganzeboom et al. applied this algorithm to 273 categories of the International Standard Classification of Occupations → ISEI [International Socio-Economic Index of occupational status].
- Education → Occupation → Earnings
- Data: N=70.000 cases from 16 countries (world-wide).

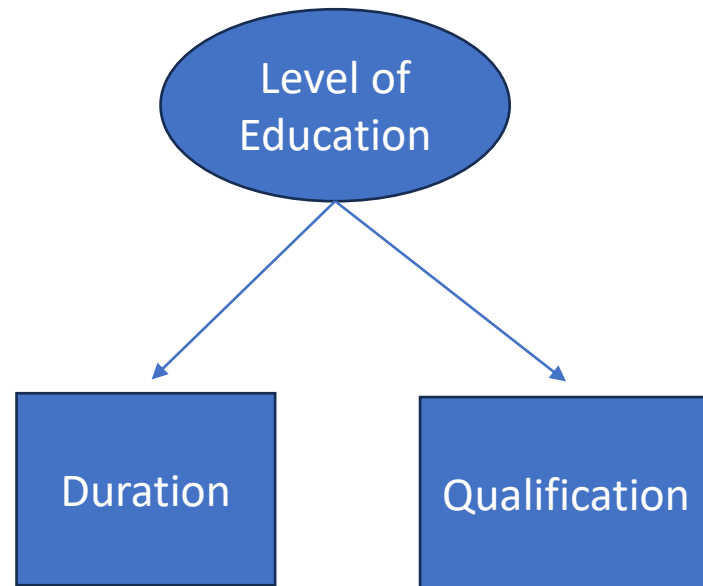
ISLED

- Schröder & Ganzeboom (2014) applied the method of optimizing the indirect effect to **country-specific educational qualifications** in the European Social Survey R1-R4, 2002-2008.
- ISLED improves comparative measurement of level of education by about 10%, relative to existing measures.
- However, this can be improved, by using the second method.

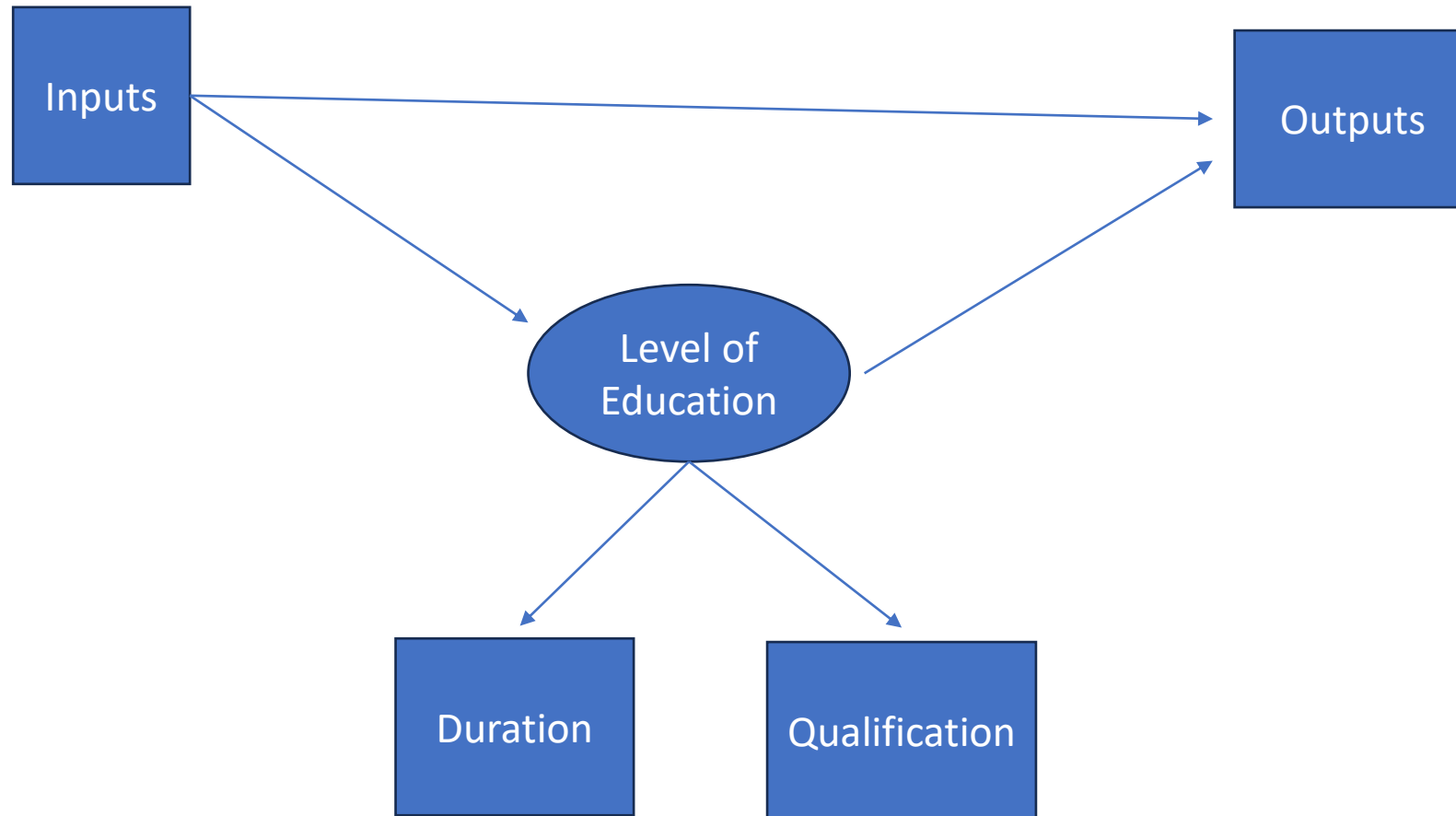
Second method: latent-variable measurement

- When we try to improve measurement, e.g. attitudes, as standard strategy is to use multiple-indicator measurement, and form an index-scale.
- Assess validity (factor-analysis) and reliability (Cronbach's alpha).
- This practice is standard in attitude measurement, but hardly ever applied in measurement of social-structural variables.
- However, the ideas and the methods (validity and reliability assessment) are equally applicable.
- Problem is: how can we find multiple indicators to measure education?
- Solution: take both qualification and duration, and combine them in a latent-variable (=factor-analytic model).

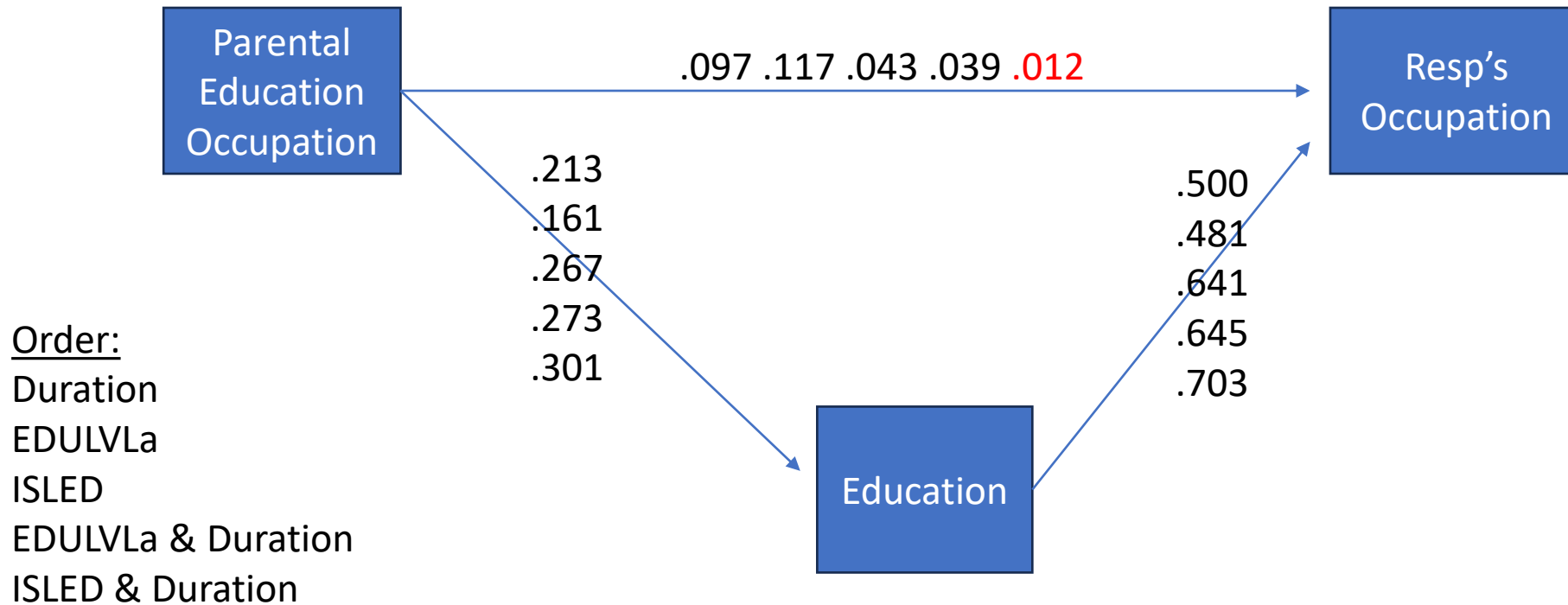
Latent-variable measurement



Latent-variable measurement



Example: Intergenerational status reproduction in Germany (from Schröder & Ganzeboom, 2014, p.12)



Problems of ISLED (current version)

- Developed on a European database (ESS), only R1-R4.
- Hard to apply outside the ESS (even for European countries)
 - Country-specific categories differ between surveys
 - Nobody uses the country-specific education information (in ESS and ISSP).
- At the time (ca 2010), there seemed to be no way to code country-specific education in a way that is manageable to outsiders.

ISCED (67 and 97)

- ISCED – International Standard Classification of Education.
- Developed by UNESCO in 1967, update in 1997.
- While ISCED67 and ISCED97 could be used to harmonize country-specific education programmes at a detailed level, this was hardly ever done.
- Exception: European Value Study 2008.
- Two reasons:
 - No standard mappings of country-specific programmes in ISCED available.
 - Inconvenient organization of the ISCED codes (numbers and characters).
- ISCED67 and ISCED97 were used to define crude level of education. ESS: EDULVL; ISSP: DEGREE. These ‘common denominator’ harmonizations were not very stable, and changed between rounds: EDULVL_a, EDULVL_b etc. In ESS; ISSP changed the meaning of DEGREE between rounds without warning.

Common denominator DEGREE in the ISSP

DEGREE IN ISSP2019		DEGREE IN ISSP2009	
	Percent		Percent
0 No formal education	3.7	0 No formal qualification	5.0
1 Primary school (elementary education)	6.6	1 Lowest formal qualification	15.8
2 Lower secondary (secondary completed that does not allow entry to university: end of obligatory school)	19.7	2 Above lowest qualification	19.6
3 Upper secondary (programs that allows entry to university)	24.1	3 Higher secondary completed	26.4
4 Post secondary, non-tertiary (other upper secondary programs toward the labour market or technical formation)	13.0	4 Above higher secondary level, other qualification	15.4
5 Lower level tertiary, first stage (also technical schools at a tertiary level)	20.2	5 University degree completed	17.1
6 Upper level tertiary (Master, Doctor)	11.7		
Total	44488	Total	55634

ISCED2011

- ISCED2011 was effectively introduced in 2013.
- Three-digit code.
- Mappings of country-specific classifications are available from UNESCO.
 - However, these mappings refer to currently existing programmes, which is of limited help when harmonizing educational qualifications of the current population, who were educated in earlier educational systems (and sometimes: abroad).
- ESS adopted ISCED2011 in 2010 (EDULVLb). However, it adapted the classification (as suggested by Silke Schneider).
- ISSP adopted ISCED2011 in 2020. Original [UNESCO] version.

ISCED2011 – the three digits

- ISCED2011 consists of three digits.
- Digit 1: nine crude levels of education, ranging from (000) no education attended to (800) Post-tertiary level [PhD].
 - ISCED97 had only seven crude categories.
- Digit 2: General [academic] versus vocational [professional] programs: 40 and 50. This would cover the major secondary and tertiary level tracks in European [German, Dutch] systems.
 - Academic versus vocational may be relevant to the true level of education, although not always clear how.
- Digit 3: (1) Incomplete (2) Partial completion, (3) Completion, but no access to next level, (4) Completion, with access to next level.
 - ISCED2011 acknowledges that partial (even incomplete) education may have value. This idea is very foreign to ISSP and ESS, that specify education to be the highest completed qualification.
 - It is clear that Digit 3 contains information about the true level of education.

ISCED2011 -- Digit 1

- 000 No or incomplete Primary
- 100 Primary
- 200 Lower Secondary
- 300 Higher Secondary
- 400 Post-Secondary but not Tertiary
- 500 Short-cycle Tertiary
- 600 First degree Tertiary (BA)
- 700 Second degree Tertiary (MA)
- 800 Post-tertiary degree, PhD

ISCED 2011 -- Digit 2

- 40 Academic / General education
- 50 Vocational / Professional

ISCED2011 -- Digit 3

- 1 Incomplete
- 2 Partial completion
- 3 Completion NO access to next level
- 4 Completion WITH access to next level

Excursion: the value of incomplete qualifications

- ISSP (as well as ESS) specify that education measurement should refer to highest **completed** qualification.
- However, there are many countries in which incomplete qualifications are very frequent and have a positive value.
 - Sno, Tamira & Harry BG Ganzeboom, 2022. *Measuring Level of Education in Suriname, With Special Reference To Incomplete Qualifications – An Optimal Scaling Approach*, Bratislava SK: ISSP Research Session.
- In Suriname, more than 50% of the population did not finish the last attended education.
- (In the Netherlands, the amount of people who did not finish their last attended education is over 25%.)
- Sno & Ganzeboom estimate the value of incomplete qualifications in-between the completed and the next lower level.
- It is interesting that ISCED-2011 has opened up the opportunity to research the value of incomplete education.
- Country-specific information in ISSP often refers to “incomplete” levels (e.g.: Poland, Argentina, USA).

Research questions

- Can we develop a world-wide scale for level of education [ISLED], using the information in all three digits of ISCED-2011?
 - How much hierarchical information [=value] do digit-2 and digit-3 contain?
- Does such a world-wide ISLED scale improve the measurement of level of education?
 - Compared to existing crude harmonization?
 - Compared to duration measurement?
 - Compared to the existing ISLED?
 - Compared to country-specific measurement?

Data: five ISSP Social Inequality modules

- ISSP organized Social Inequality modules in 1987, 1992, 1999, 2009 and 2019:
- ‘World-wide’.
- Country-specific measures of education.
- Parental occupation, respondent’s and spouse’s occupation, personal and household income.
- These data do NOT contain: ISCED codes.
- Occasionally available: parental education, spouse’s education. Mostly in older waves.
- I use only 2019 and 2009 in the current analysis. Rest to come.

Coding file

- All country-specific educational titles ('value labels') are brought together in a single coding file: 1700 records
- Additional information:
 - N of cases.
 - Existing crude harmonization
 - Average duration
 - Age
- ISCED-2011 codes are generated in three steps:
 - Digit 1: mostly in line with existing crude harmonization
 - Digit 2: academic or vocational?
 - Digit 3: completed?

Coding resources

- ISCED manual (UNESCO, OECD).
- UNESCO mapping for current educational programs
- Labels of the qualifications in the ISSP documentation
- Peaking at ESS, EVS and ISSP2020.
- Wikipedia
- Rank order of the qualifications
- Consistency between rounds

ISCED in ISSP 2009 and 2019

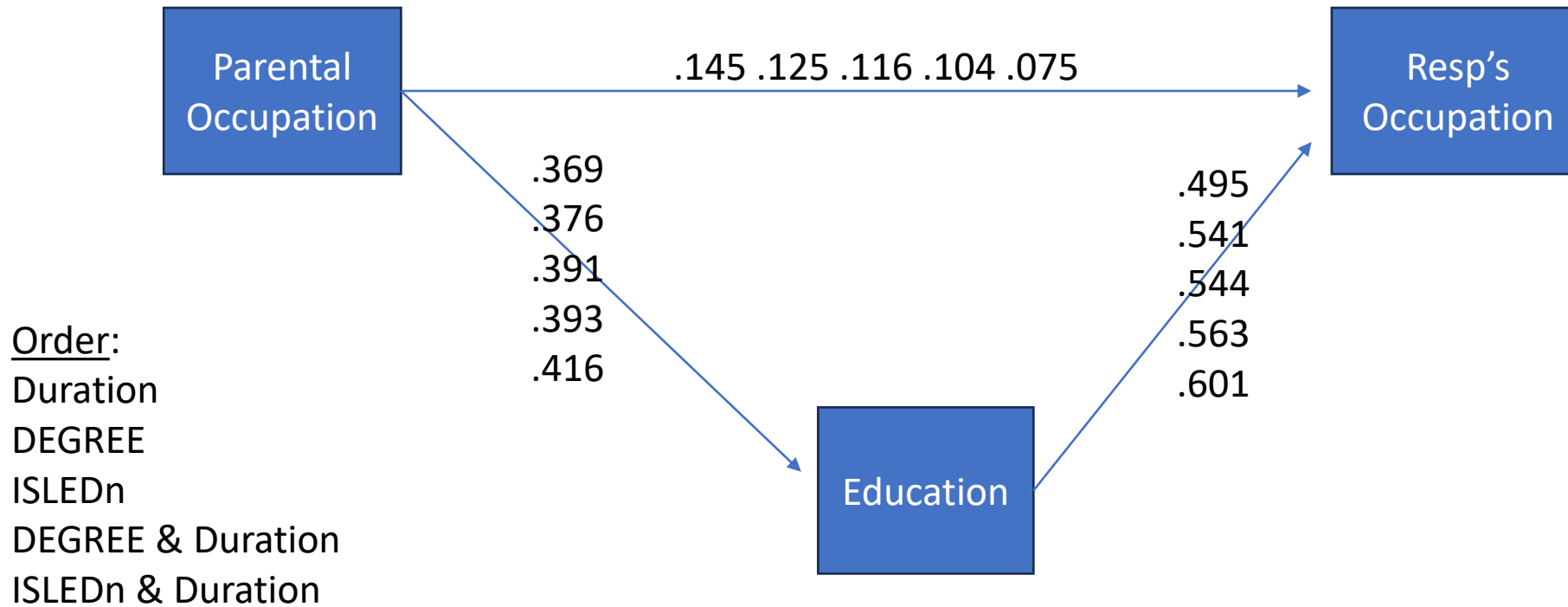
- Digit 1 (levels 000-800) is easy to code. It is basically a refinement of the existing harmonization DEGREE.
- Digit 2 (vocational / professional vs general / academic) can mostly be inferred from the country-specific title.
- Digit 3 (continuation) is hard.
 - The distinction between (1) Incomplete and (2) Partial completion is vague and never enters the country-specific information.
 - The distinction between (3) Completion with NO access to next level and (4) Completion WITH access to next level cannot be made on the basis of the country-specific information.

ISLEDn by ISCED	Mean	N
010 Less than primary: Never attended an education programme	1.3	273
020 Less than primary: Some early childhood education	10.6	877
030 Less than primary: Some primary education (excl. level completion)	9.7	3900
100 Primary education	12.2	8995
240 Lower secondary education: General	21.7	12893
242 Lower sec general: Partial level completion, excl. direct access to upper sec educ	14.5	1436
250 Lower secondary education: Vocational	20.2	7424
252 Lower sec voc: Partial level completion, NO direct access to upper sec educ	17.8	196
340 Upper secondary education: General	42.8	19967
342 Upper sec general: Partial level completion, excl. direct access to tert educ	65.9	185
350 Upper secondary education: Vocational	37.4	6703
440 Post-secondary non-tertiary education: General	56.6	2275
450 Post-secondary non-tertiary education: Vocational	37.3	5325
454 Post-sec non-tert educ voc: Level completion, WITH direct access to tert educ	57.9	82
540 Short-cycle tertiary education: General	58.9	4317
550 Short-cycle tertiary education: Vocational	50.6	752
640 Bachelor's or equivalent level: Academic	74.3	9866
650 Bachelor's or equivalent level: Professional	55.9	1858
740 Master's or equivalent level: Academic	93.6	9759
750 Master's or equivalent level: Professional	69.7	1015
840 Doctoral or equivalent level: Academic	94.1	1967
850 Doctoral or equivalent level: Professional	100.3	23
Total	43.6	100088

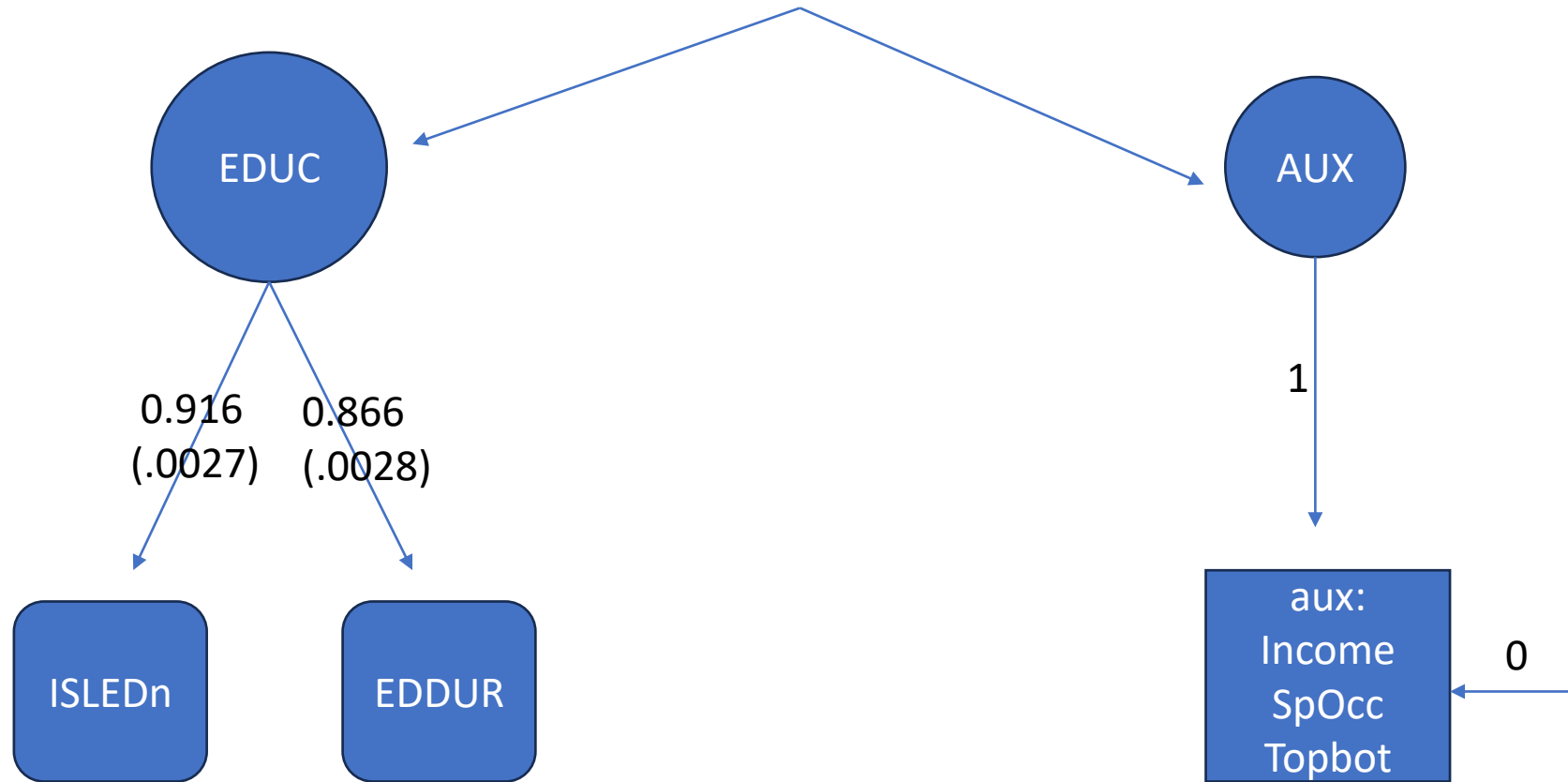
Constructing the new ISLEDn

- Input variables: father's and mother's occupation (so: not their educations).
- Output variable: occupational status of respondent and spouse (so not: spouse's education).
- Validation variables

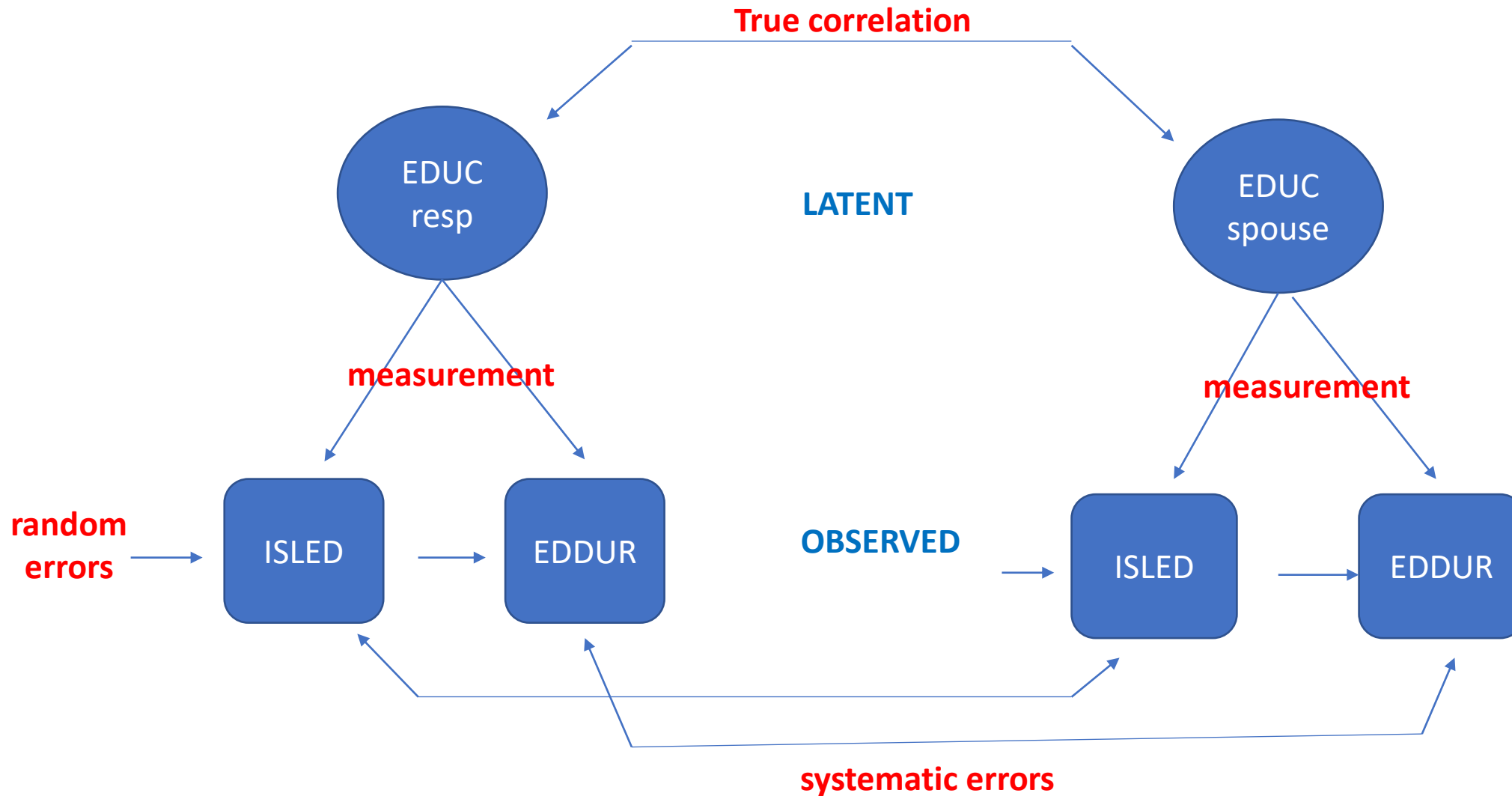
Testing: Intergenerational status reproduction in ISSP 2009 & 2019



Correlational model with validation criteria



MTMM measurement validation model



Next steps

- Extend the analysis with ISSP 1999, 1992, 1987
- Test ISLEDn on ESS.
- Determine the value of qualifications per digit of ISCED.
- Presentation in Konstanz, April 2024