

# Measuring Educational Attainment in Cross-National Surveys: The case of the European Social Survey\*

Silke Schneider  
Nuffield College, Oxford  
Silke.Schneider@nuffield.ox.ac.uk

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Over the last decades, more and more international data sets including more and more countries become available to researchers, and comparative research is more popular than ever. Cross-nationally comparable measurement of variables is one of the most important challenges of comparative social research methods. While comparable measurement of educational attainment is more or less relevant to most areas of social research, it is crucial for comparative social stratification and mobility research (see e.g. Shavit and Blossfeld, 1993; Müller, 1996; Shavit and Müller, 1998). Despite the wide utilisation of measures of education in cross-national research, validation studies of such harmonised measures are scarce (but see e.g. Braun and Müller, 1997; Kerckhoff and Dylan, 1999; Kerckhoff, Ezell, and Brown, 2002), and time and again, cross-national comparability remains a mere assumption.

The aim of this paper is to validate the cross-national measure of educational attainment used in the European Social Survey (ESS, Jowell and the Central Co-ordinating Team, 2003, 2005), a reduced version of the International Standard Classification of Education 1997 (ISCED–97, UNESCO

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Institute for Statistics, 2006 [1997]).<sup>1</sup> In the first part of the paper (section 1), two general ways of measuring educational attainment cross-nationally are presented: using years and levels of education. Then, some general challenges around the cross-nationally comparable measurement of years and levels of educational attainment are discussed, and two international classifications for measuring levels of education comparably are presented. Furthermore, the results of the above mentioned validation studies will be briefly summarised. The next step constitutes a section on the methods applied in the main part of this study (see section 2). In the main part of the paper (section 3), the measurement of education in the European Social Survey will be discussed and evaluated in several ways: firstly by looking closely at how ISCED–97 was implemented in the survey (section 3.1), secondly by checking the compliance of the resulting supposedly comparable variable with the criteria as set out by the UNESCO (UNESCO Institute for Statistics, 2006 [1997]; UNESCO, 1999) and the Organisation for Economic Co-Operation and Development (1999)(section 3.2), and thirdly by looking at the consequences of harmonising “indigenous” measures of educational attainment into a standard classification system on the distributions of educational attainment and estimates in occupational attainment research (section 3.3).

## 1 Cross-nationally comparable measurement of educational attainment

Educational attainment is intended to measure the final state of formal education for any individual, in terms of how much and what kind of education an individual has completed, irrespective of more informal types of life-long learning. In comparative research, there are basically two general ways of measuring educational attainment: using years of education or using a standardised set of categories.<sup>2</sup> Levels and types as well as the duration of specific educational programmes depend on the institutional structure of educational systems. Therefore, there are complex differences between countries (and also within countries over time) in the specification of different levels of attainment and in what *years of education* actually mean.

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<sup>1</sup>Apart from the ESS, also the PISA studies (Organisation for Economic Co-Operation and Development, 2001, 2004) use ISCED–97 (for parental educational attainment).

<sup>2</sup>With the PISA studies (Organisation for Economic Co-Operation and Development, 2001, 2004), academic achievement measures, which are very different from educational attainment measures, became popular in social stratification research, too. Such measures are restricted to specifically designed achievement surveys and usually very selected populations. They will not be discussed in this paper. There are also some other approaches to measuring educational attainment using educational attainment categories in comparative research (e.g. Rosenfeld, Van Buren, and Kalleberg, 1998; Smits, Ultee, and Lammers, 1998). As they are not widely used, they will not be discussed here either.

Although it is very difficult to harmonise national categorical variables measuring educational attainment over time and for different countries, *years of education* is not much better, as this measure is just nominally comparable: a year is a year is a year (but that's more or less it).

The (sometimes virtual) number of years of schooling or formal education, which is then used as an interval level variable (see e.g. Treiman and Yip, 1989) only measures the element of *how much*. The advantage of this measure is that it can theoretically be analysed in simple linear models and provides very parsimonious results when used as a predictor or response variable. In practice though the assumption of linearity can often be questioned. What is more, years of schooling hide qualitative differences in educational qualifications (Kerckhoff and Dylan, 1999, p. 760): The duration of very different educational programmes can be identical, within and between countries. Using a categorical variable, it is possible to measure *what kind* of education one achieved in terms of formal certificates and eligibility for subsequent educational or occupational paths, i. e. in a more functional way. In contrast to *years of schooling*, categorical measures of education can e.g. specify types of education, i. e. vocational or academic tracks, additionally to the amount of education completed.

This idea is fundamental to the so-called CASMIN scheme, developed in the project “Comparative Analysis of Social Mobility in Industrial Nations” for data from the 1970s (e.g. König, Lüttinger, and Müller, 1988; Müller, Lüttinger, König, and Karle, 1990), and the International Standard Classification of Education 1997 (ISCED–97, UNESCO Institute for Statistics, 2006 [1997]; UNESCO, 1999; Organisation for Economic Co-Operation and Development, 1999).<sup>3</sup> The basic idea of both international classifications of education is to provide a framework with which national classifications can be “translated” into one internationally standardised classification. Such a framework might be based on a set of definitions for the categories of the international classification (which can be more or less explicit) like CASMIN, or provide explicit definitions *plus* detailed mappings linking national educational programmes (as the basic unit of classification) to supposedly internationally comparable categories, like ISCED–97. Both CASMIN and ISCED–97 basically distinguish between primary, secondary and tertiary education, and then differentiate further within these levels. Not only are such measures more meaningful in European societies than *years of education*, but they can usually also be derived from national educational attainment measures available in virtually all social surveys.

The validity of international classifications of educational attainment largely depends on two factors:

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<sup>3</sup>When ISCED was first introduced by the UNESCO in 1976, types of education were not yet distinguished. This is only the case since the major revision of ISCED in 1997.

1. Criterion validity, which means that the assignment of national educational programmes to international categories follows the definitions given by the international classification framework in the same way in all countries, and
2. Discriminatory power, which means that educational programmes with different correlatives are assigned to different international categories.

The first factor mainly serves to achieve cross-national comparability, whereas the second serves to maintain meaningfulness, predictive power and unbiased estimates. Typical problems with designing international classifications of education are consequently

1. ambiguous, incomplete or otherwise problematic definitions, leading to misclassifications and controversial assignments of educational programmes to international categories on the one hand,<sup>4</sup> and
2. the merging of several national categories in one international one, on the other hand, necessarily lowering the classifications' discriminatory power.

Sometimes both aims conflict, and the researcher or the institution developing the international classification has to decide in favour of either aim, thereby decreasing the classifications validity—or adjust the framework. Adjusting the framework however runs the risk of producing an overly detailed classification with definitions so subtle that nobody will be able to use it any more. Categories that only exist in a very restricted number of countries are not very useful, either.

To complicate matters, it is “only” one step to design an internationally comparable classification of educational qualifications on paper. It is yet another to implement it in practice in large-scale cross-national surveys. Usually, the questionnaire would include an item on (usually the respondents) highest level of education completed in the national format. However, comparative measures cannot be better than the national classifications they are based on. If already at the stage of data collection a simplified national classification is used, there is no going back, and later adjustments are impossible. But to err is human, the assignment of national education programmes may change over time, or be controversial in the first place.

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<sup>4</sup>It is e.g. very problematic if the criteria are easily modifiable by national governments, as they might be interested in “boosting” their country’s educational profile without any actual improvement. As an example, a central criterion of ISCED–97 is *access to subsequent educational programmes*. Therefore, whenever a country opens access to a higher level educational programme (either by upgrading an existing qualification or introducing a new one), this leads to an assignment of the newly access-granting educational qualification to the ISCED-level of the previously required qualifications. Actual or typical rates of access are not reflected in ISCED–97. This is in practice a problem with many vocational upper-secondary qualifications (e.g. “bac pro” in France), which nominally give university access, but actually hardly any graduates proceed to university.

Therefore, it is important that detailed “best practice” *NCV* are used in cross-national surveys, e.g. those from national labour force surveys. Furthermore, it can be assumed that the recoding of national categories into international ones will reflect the criteria as set out in the international classification framework only imperfectly, particularly if it is performed by different people in different countries.

### **1.1 The CASMIN scheme of educational attainment**

The CASMIN educational attainment scheme (König et al., 1988; Müller et al., 1990) was designed for comparative sociological research. It intends to classify functionally equivalent qualifications together. The researchers developing the scheme aimed at categories which “should, to the greatest extent possible, both optimally reflect the typical, class specific barriers in the educational system, as well as grasp the differentiations relevant for utilization on the labor market” (Müller et al., 1990, 67).

The CASMIN scheme is two-dimensionally structured by the following two criteria: the vertical distinction of levels of education (proxied by the costs, length and quality of the educational programme completed, intellectual abilities required and value of the certificate awarded) and the horizontal distinction between “general” and “vocational” education, the latter of which is intended to convey practical knowledge and skills for specific occupations. The levels are denoted as 1 (elementary), 2 (secondary) and 3 (higher/tertiary). There are altogether eight categories:

- 1a.** Inadequately completed general elementary education
- 1b.** General elementary education
- 1c.** General elementary education and basic vocational qualification
- 2a.** Advanced vocational qualification or intermediate general education plus vocational qualification
- 2b.** Intermediate academic or general qualification
- 2c.** Full maturity secondary certificate
- 3a.** Lower tertiary certificate (usually vocational)
- 3b.** Higher tertiary certificate (university degree or above)

The CASMIN scheme was updated about ten years ago in order to reflect changes in the educational systems in three countries by Braun and Müller (1997). Still, the problem with using CASMIN for comparative research today is that it has only been applied to a limited number of countries in the past, that there are no formal guidelines for its implementation in other countries, and that it was developed for data gathered in the 1970s. There is also generally not much documentation available on CASMIN.

## 1.2 The International Standard Classification of Education

The International Standard Classification of Education 1997, (ISCED–97, UNESCO Institute for Statistics, 2006 [1997]; UNESCO, 1999; Organisation for Economic Co-Operation and Development, 1999), is a multidimensional multi-purpose classification for harmonising national educational programmes into a cross-national framework for levels and fields of education (the latter will not be discussed here). It is mostly used for enrolment statistics and other international statistical reports, but can be adapted for the measurement of individual educational attainment. It firstly distinguishes seven levels of education:

**ISCED level 0** Pre-primary education (early childhood education)

**ISCED level 1** Primary education (usually the first six years of formal schooling)

**ISCED level 2** Lower secondary education (usually coincides with the end of full-time compulsory schooling after around nine years of schooling)

**ISCED level 3** Upper secondary education (where university entrance certificates and vocational qualifications which require completion of level 2 are awarded)

**ISCED level 4** Post-secondary non-tertiary education (programmes that straddle the boundary between level 3 and 5, e.g. university entrance certificates for adults or non-tertiary vocational education after general upper secondary)

**ISCED level 5** First stage of tertiary education (all university and vocational college education exclusive of PhD/doctorate and equivalent)

**ISCED level 6** Second stage of tertiary education (leading to an advanced research qualification, i. e. PhD/doctorate and equivalent).

The core criteria for the assignment of national educational programmes to ISCED–97 levels is programme content, proxied by minimum entrance requirements, typical starting age, certificates awarded, staff qualifications, and duration (among others). ISCED–97 secondly differentiates within some of these levels, along three dimensions:

- Programme orientation: at levels 2, 3 and 4 there is a distinction between vocational (*V*) and general (*G*) programmes.
- Type of destination: at levels 2, 3, 4 and 5 there is a distinction between programmes leading to more advanced general/academic programmes (*A*); more advanced professional/vocational programmes

(*B*), and the labour market only (*C*; at level 3, this can also be another level 3 programme).<sup>5</sup> This dimension overlaps with the first one in countries where vocational education does not lead to subsequent general/academic education apart from “second chance education”.

- Programme duration: mainly at level 5, there is a distinction between short (vocational programmes of up to three years, usually classified as 5B), medium (three or four years, either vocational and thus 5B or corresponding to a Bachelor’s degree and thus 5A), and long (four years and more, corresponding to a Master’s degree and other post-graduate qualifications) educational programmes.

Therefore, in its entirety, ISCED–97 provides a quite large number of international categories, so that it is much more detailed than what is provided by the CASMIN classification. However, since this large amount of categories is impractical, surveys usually work with a reduced version of ISCED–97.

Compared to CASMIN, one of the biggest advantages of ISCED–97 is the availability background information. The Organisation for Economic Co-Operation and Development (1999) provides the most detailed documentation on ISCED–97 for all OECD countries, mapping national educational programmes to the appropriate ISCED–97 categories.

### 1.3 Previous evaluations of ISCED and CASMIN

Kerckhoff and colleagues published two articles concerned with the evaluation of ISCED–76 and CASMIN for a small number of countries, namely Great Britain, Germany, the Netherlands, Sweden and the United States (Kerckhoff and Dylan, 1999) and Great Britain, the Netherlands and the US (Kerckhoff et al., 2002). ISCED–76 differs from ISCED–97 in several respects: Firstly, in the earlier version, there were no complementary dimensions (*A*, *B* and *C* as well as vocational/general or programme duration). Secondly, ISCED–97 level 4 (post-secondary non-tertiary education) was not available. Thirdly, ISCED–97 levels 5 and 6 version were split in three levels in ISCED–76 (4: tertiary qualifications without academic degree; 5: first university degree or equivalent; 6: post-graduate university degree or equivalent).

The comparison of CASMIN and ISCED–76 in Kerckhoff et al. (2002) shows that in Great Britain and the Netherlands CASMIN performs better than ISCED–76. This is because ISCED–76 does not differentiate between vocational and general education; a distinction which is very important in most European countries. In the US in turn, ISCED–76 works better.

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<sup>5</sup>ISCED 5B does only give access to the labour market, so it might rather be labelled 5C. Also, higher education of professionals (e.g. architects) and engineers is classified as 5A even if there are no respective doctoral programmes these qualifications could give access to—two points where ISCED–97 remains somewhat inconsistent.

Therefore, as a first result, the reclassifications imposed by either international framework are not equally adequate in all countries. It however remains unclear if ISCED–76 works “equally bad” in all European countries (which would actually be better than as if there were differences between countries in the appropriateness of ISCED).

For the evaluation of ISCED–76, Kerckhoff and Dylan (1999) use data from the International Adult Literacy Study (Organisation for Economic Co-Operation and Development and Statistics Canada, 1995) from Great Britain and the United States.. They compare  $R^2$ s reached by regressing occupational prestige scores (Treiman, 1977) and cognitive skills on education measured in three ways: Using ISCED as implemented by the national researchers, using the national educational attainment classification, and using ISCED as recommended by the OECD. The national classification is effectively used as a benchmark. The authors summarise the results as follows:

1. “Relatively minor changes in the classification of the indigenous credentials into standard categories (in this case the ISCED categories) can alter the associations between educational attainment and both occupational prestige and cognitive skill.
2. Both of the constructions of the standard categories underestimate the associations between educational attainment and two important outcomes (occupational prestige and cognitive skill).
3. That underestimation is much greater in one country (Great Britain) than in another (the United States).
4. The different underestimates lead to misleading impressions of the relative importance of educational attainment in the two countries by making the differences look larger than they actually are” (Kerckhoff and Dylan, 1999, p. 770).

Additionally, both articles also come to the conclusion that ISCED is not always implemented in the way recommended by the OECD, and that it also matters *which* categories of the national classification are collapsed. In sum, “the important conclusion to be reached is that the way in which the standard categories are constructed from the indigenous categories *can* make a major difference in the kinds of results that are produced in comparative research” (Kerckhoff and Dylan, 1999, p. 769). More generally it is noted that neither CASMIN nor ISCED–76 (which is reduced to levels)



offer enough categories to adequately represent the important distinctions in educational credentials.<sup>6</sup>

These results are certainly worrying and very instructive. However, the studies by Kerckhoff and colleagues share three drawbacks: firstly, results achieved with ISCED–76 might differ from those achieved with ISCED–97. It is quite plausible that the major revision of ISCED undertaken in 1997 improved the measure. Therefore, these studies need updating. Secondly, as the IALS data only included the major occupational categories of ISCO-88, the measures of occupational status and prestige used in both studies are very crude, which might have influenced the results (probably by underestimating the degree of underestimation resulting from harmonising education measures). Thirdly, Great Britain and the US are the focal countries of comparison, and we still lack knowledge about the effects of harmonising education in most other countries. It is therefore vitally important to check (and improve) the implementation of comparable education measures like ISCED–97 in other cross-national surveys and assess their validity for a larger number of countries and using more detailed occupational attainment measures.

## 2 Methods

The evaluation of ISCED–97 in the ESS is performed in three steps. Firstly, it will be clarified how ISCED–97 was implemented in the ESS. It can be assumed that a complex measure like ISCED–97 is not easy to actually implement, so that the way this is done will have a big effect on the quality of the measurement achieved. This is also important because that is the point where improvements can be made centrally.

As a second step, criterion validity will be investigated. To this end, the compliance of the ISCED-variable in the ESS with the criteria set out by the UNESCO (UNESCO Institute for Statistics, 2006 [1997]; UNESCO, 1999) and the OECD mappings as the main basis for this task (Organisation for Economic Co-Operation and Development, 1999) will be checked. In order to find out how national education variables were translated into ISCED–97 in the many ESS countries, cross-tabulations of the national education variables by the cross-nationally comparable education variable are analysed in detail. The original response categories were reproduced from the country questionnaires, as the English value labels of the national categorical variables were often too generic.

In a third step, the discriminatory power of ISCED–97 is checked using construct validation procedures. As international classifications of ed-

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<sup>6</sup>Braun and Müller (1997) and Kerckhoff et al. (2002) evaluate CASMIN more in depth and both propose a number of changes. As the main focus of this paper is a validation of ISCED–97, these studies will not be further discussed here.

education have fewer categories than national education measures, Kerckhoff et al. (2002, p. 106) note that, “collapsing the indigenous credentials into either set of standard categories [CASMIN or ISCED] is very likely to reduce the power of the education measure to explain occupational outcomes. An evaluation of a standard scheme thus does not depend on whether its use lowers the explanatory power of educational attainment. Rather, it depends on the size of the reduction and how consistently it occurs across societies.” The crucial question that needs to be addressed here is therefore whether a reclassification of national education categories into international categories is *equally (in-)adequate* in all countries compared (Kerckhoff et al., 2002, p. 101).

In order to establish the amount of and cross-national differences in the loss of predictive power introduced by harmonising the national education variables into ISCED–97, a strategy very similar to the one used by Kerckhoff and Dylan (1999) is followed. Firstly, the distributions of educational attainment using ISCED–97 will be analysed. Secondly, regression analyses of occupational attainment on education will be conducted in the single countries included in the ESS, comparing the results of models including the national measure of educational attainment with different comparable ones. Education will be measured in six ways: using the national education variable included in ESS (if available), the corrected seven-level ISCED–97 variable *ISCED (7)*, three more aggregated versions of ISCED–97 (*ISCED (6) to (4)*) and finally *years of education*.<sup>7</sup> With the exception of *years of education*, the education variables are included in the models as dummy variables. A comparison of  $R^2$ s over measures of education within countries will reveal the loss of discriminatory power resulting from harmonisation.

### 3 Evaluating the measurement of educational attainment in the European Social Survey

The European Social Survey (ESS, Jowell and the Central Co-ordinating Team, 2003, 2005) covers the general population from age 15 upward in (currently) 27 mostly European countries.<sup>8</sup> For this study, the data for the first two rounds (collected in 2002/2003 for ESS 1 and 2004/2005 in the case of ESS 2) are analysed (data for round three will become available in early 2008).

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<sup>7</sup> *Years of education* are included in this study in order to show how this measure compares to the NCV and ISCED–97, i.e. as a measure of educational attainment. I do not consider other uses of the *years of education* variable here, e.g. as a measure of individual investments in education.

<sup>8</sup> These are Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine and the United Kingdom.

### 3.1 The implementation of ISCED–97 in the ESS

The ESS includes basically three measures of educational attainment:

**Years of education:** Respondents were asked about how many years they spent in education.<sup>9</sup> In the analyses presented in this paper, years of education are thus *not* derived from categorical data on the level of education completed (“virtual years of schooling”).

**National categorical variable (NCV):** Respondents were asked about their highest level of education using country-specific response categories.<sup>10</sup> A few countries (Finland, Iceland and Slovenia), however, used response categories which supposedly link directly into the cross-national variable (see below) and thus did not provide a national variable, as did Turkey.

**Cross-nationally comparable categorical variable:** The *NCVs* were reclassified into ISCED–97 in a reduced form, i. e. only levels of education, but neither programme orientation nor programme destination (general/academic or vocational) are distinguished, which was agreed upon centrally after some discussion (see Erikson and Jonsson, n.d.).<sup>11</sup> Apart from this, the only deviation of the cross-nationally comparable variable in the ESS from ISCED–97 is that ISCED 0, “pre-primary education” is changed into “not completed primary education”, as appropriate for educational attainment measurement.<sup>12</sup>

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<sup>9</sup>Questionnaire item F7, variable *eduyrs*: How many years of full-time education have you completed? [To be reported in full-time equivalents, including compulsory/mandatory years of schooling]

<sup>10</sup>Questionnaire item F6, variable *edlvxx* (with xx being a placeholder for the two-letter country codes according to ISO 3166-1 alpha-2): What is the highest level of education you have achieved?

<sup>11</sup>This is much less detail than originally recommended by Robert Erikson and Janne O. Jonsson, who were consulted as academic specialists on the measurement of social position during the ESS questionnaire development. In their proposal for measuring social structure to be included in the core module of the ESS, they had recommended to collect educational attainment data with an open question and subsequent coding (i. e. the same procedure like the one used for the coding of occupations in the International Standard Classification of Occupations 1988, ISCO–88). Erikson and Jonsson (n.d.) also proposed to use a less simplified version of ISCED covering ten categories, at least distinguishing general and vocational education at ISCED levels 2, 3, 4 and 5. The former was seen as unfeasible; why the latter was not implemented remains unclear. The result is that one of the original reasons for using ISCED rather than CASMIN in the first place, namely greater flexibility and more differentiation, was compromised during the implementation process.

<sup>12</sup>The resulting variable is *edulvl*, with the following response categories: 0: Not completed primary education; 1: Primary or first stage of basic; 2: Lower secondary or second stage of basic; 3: Upper secondary; 4: Post secondary, non-tertiary; 5: First stage of tertiary; 6: Second stage of tertiary; 7: Refusal; 8: Don’t know; 9: No answer.

The recoding of the *NCV* into the *CCV* was performed by the national teams in the respective countries, so that the reclassification decisions in the different countries were most probably autonomous, which could have led to inconsistencies in the application of ISCED–97. The Norwegian Social Science Data Services (NSD), hosting the ESS data archive, provided the following pieces of information about ISCED–97 on a special website in order to support the national teams with the recoding work:<sup>13</sup>

- For ESS round 1, the UNESCO’s operational manual (UNESCO, 1999) as well as a short description of the differences between ISCED–97 and *edulvl* was provided.
- For ESS round 2, in addition to the UNESCO’s operational manual, a two-page document (Norwegian Social Science Data Services, 2004) with more instructions on how to process the national education variables was provided, including table 1 (levels of education at a glance) from UNESCO Institute for Statistics (2006 [1997], p. 19).
- For ESS round 3 finally, also the mappings linking national educational programmes to ISCED–97 categories were provided, and the two-page document referred to above was improved. National co-ordinators are however *not* asked to follow these mappings – they are rather provided as an example on how ISCED–97 was coded in other surveys.

The instructional document (Norwegian Social Science Data Services, 2004) explicitly states that

Countries should use the best possible nationally designed question(s) to measure respondent’s highest level of education. [...] National measurements must when necessary be adjusted to ensure complete coverage of relevant categories in *edulvl*. All categories 0-6 should be represented in national questionnaire.

Therefore, more and more documentation about ISCED–97 became available to national teams in the ESS over the years, with the *NCV*–ISCED–97-mappings unfortunately only from round three onwards. The quality of *NCVs* was also emphasised more strongly over the single rounds. It can thus be expected that the implementation of ISCED–97 in the ESS improved from round one to round two, and will improve again in round three. Generally speaking, a good effort was made to ensure adequate coding practice. It is unclear however how much effort the national teams in the different countries put into the recoding of the *NCVs* into *edulvl*, e.g. in terms of reading the documentation on ISCED–97 provided, and thus if they applied

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<sup>13</sup>I would hereby like to thank the staff at NSD, especially Hilde Orten, for their co-operation and the provision of information on the implementation of ISCED–97 in the ESS.

consistent decision rules (which is problematic whenever national teams apply an international classification to the national data, Kerckhoff and Dylan, 1999). This can only be evaluated if the reclassification practice is compared over countries by one researcher (or just a few people), which is the strategy followed here. Therefore, the next section will more closely look into how the recoding was actually done.

### 3.2 Evaluating criterion validity

When examining the cross-tables of *edulvl* and *edlvxx*, it turned out that in many instances, the national teams did not follow the definitions established by the UNESCO Institute for Statistics (2006 [1997]) and the recommendation given in the OECD’s manual on the application of ISCED–97 (Organisation for Economic Co-Operation and Development, 1999). Different classification decisions were taken with respect to similar educational programmes in different countries, leading to *edulvl* in fact *not being cross-nationally comparable*. Thus, a number of corrections are proposed and corrected ISCED–97 variables with differing levels of detail coded. The most common classification errors and problems were the following:

1. Problems with respect to the distinction between ISCED levels 0, 1 and 2: Firstly, in seven countries,<sup>14</sup> either ISCED level 0 or 1 are not used. These countries only distinguish between *compulsory education completed* or the lowest national certificate as ISCED 2 and *less than compulsory education completed* or no certificate as ISCED 0 or 1. Just because such a low level of education is not supposed to occur in a country does not mean that it should not be covered during data collection in a large cross-national survey: there are countries participating in the ESS which due to their later economic development have substantial numbers of (particularly elderly) people in these categories. For reasons of comparability, low levels of education should be covered in all *NCVs*. Here, in order to achieve comparability, ISCED 0 and 1 are distinguished post-hoc using *years of education* as a proxy variable: those with less than 4, 5 or 6 years of education were assigned to ISCED 0, and those with more than 4, 5 or 6 years of education respectively to ISCED 1 (depending on the duration of primary education in the respective country, taken from Organisation for Economic Co-Operation and Development, 1999).

Secondly, in a number of ESS countries, primary school and lower secondary school are integrated into “basic school”, which lasts 8 to 10 years and usually covers compulsory education. Most of these countries properly coded the end of basic school as ISCED 2, whereas in

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<sup>14</sup>Namely Austria, the Czech Republic, Germany, Israel, Poland, Slovakia and Switzerland.

Hungary, Iceland, Slovenia and Sweden “primary education” in terms of ISCED–97 was mistaken for basic or elementary education in the respective country and coded as ISCED 1. Thus, completed basic education had to be re-coded to level 2 in these countries, and uncompleted basic education to level 0 or 1, depending on the years of education necessary to complete ISCED 1 (again derived from Organisation for Economic Co-Operation and Development, 1999).

2. Problems with respect to the differentiation of ISCED 3 and 4: Sometimes the distinction between ISCED 3 and ISCED 4 is difficult or even impossible, because the certificates awarded are the same, and just the pathway taken differs (this is e.g. often the case when the university entrance certificate is acquired after vocational education at ISCED level 3, or the other way round).<sup>15</sup> As programmes at level 4 are usually no more advanced than those at level 3 (UNESCO Institute for Statistics, 2006 [1997], p.31), this distinction could theoretically be dropped. The consequence of this will be tested by comparing models with an ISCED variable differentiating between ISCED 3 and 4 and models with a simplified ISCED variable aggregating both categories. This test can of course only be done for those countries where the *NCV* allows a distinction between ISCED levels 3 and 4 (e.g. Germany).
3. Problems with respect to the distinction between ISCED 4 and ISCED 5: The differentiation of what constitutes (particularly vocational) tertiary education is difficult in many countries. As a general rule, the OECD manual was applied here, revealing that qualifications at level 5(B) (e.g. master craftsmen, higher technicians, nursing and teacher qualifications) were falsely assigned to level 4 in a number of countries (namely Austria, the Czech Republic, Denmark, Greece, Hungary (in 2004), Ireland, Israel, Italy, Slovenia, Spain, Switzerland and the UK). The reason for this is probably that national teams had ISCED–76 rather than ISCED–97 in mind when doing the reclassifications, where level 4 in fact referred to below-degree tertiary qualifications. In order to maintain the differentiation between vocational and academic/professional tertiary studies, it would be very worthwhile to distinguish between ISCED 5B and ISCED 5A. This is unfortunately currently not implemented in the ESS, but could be achieved by the appropriate recoding of the national variables for the large majority of the countries.
4. Problems with respect to the distinction between ISCED 5 and ISCED 6: In 17 of the 27 countries, ISCED level 6, “second stage of tertiary”, was mistaken to relate to all post-graduate degrees, i. e. Master’s de-

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<sup>15</sup>This applies e.g. to Austria, Germany, Hungary and Switzerland.

degrees and upward,<sup>16</sup> and in Austria all tertiary qualifications were coded as ISCED 6. ISCED 6 however is actually “reserved for tertiary programmes which lead to the award of an advanced research qualification” (UNESCO Institute for Statistics, 2006 [1997], p. 39) and should thus only include PhDs and equivalent degrees. The reason for this mistake is probably again that national teams still had ISCED–76 in mind when doing the reclassifications, where level 6 in fact referred to all post-graduate degrees. Thus, the corrected detailed 7-level ISCED variable is only available for 13 countries<sup>17</sup>. In order to achieve a comparable variable including all countries, a less precise ISCED–97 variable with 6 categories (*ISCED (6)*) was constructed, aggregating ISCED 5 and 6 in one category covering all tertiary education.<sup>18</sup>

#### 5. Problems with the *NCVs*:

Firstly, some countries (DK, HU, NO, PL, ES, UK) changed their national education variables in-between the two first rounds of the ESS. The consequences of this are to be shown in section 3.3. DK omitted one marginal category and changed the questionnaire wording for the higher education responses. HU added two vocational categories. NO switched from register data to actually asking people for their level of education (no other country uses register data). PL omitted two categories measuring non-completed educational programmes in 2002. ES firstly added three and changed two categories at the primary/lower secondary level, in order to better accommodate for the changes in primary and lower secondary education in Spain over the last 30 years. Secondly, the assignment of lower and advanced vocational education to *edulvl* was changed. For the construction of the corrected ISCED–97 variable here, the ESS 1 coding was applied to ESS 2, thus following the OECD manual. The mean years of education of both vocational qualifications suggest that this is more appropriate than the alternative. In the UK, in the second round of the ESS vocational qualifications were not covered in the questionnaire.

Secondly, some countries (e. g. Israel, Poland in 2002, Sweden) use specific categories like “not completed University” or “dropouts from

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<sup>16</sup>this happened in Belgium, the Czech Republic, Estonia, France, Hungary, Iceland, Ireland, Israel, Italy, Norway, Poland, Slovakia, Slovenia, Sweden, Switzerland, Turkey, Ukraine

<sup>17</sup>Four countries, namely Belgium, Estonia, Hungary and Norway despite the misclassification distinguished Master degrees from PhDs in the *NCV*, so that the full classification can still be achieved

<sup>18</sup>As the difference between different amounts and kinds of tertiary education are substantial in terms of later life consequences, it might actually also make sense to further distinguish either professional and academic studies from vocational tertiary education (thus 5A and 5B) and/or first/undergraduate and second/post-graduate degrees (thus 5A–short/medium and 5A–long).

...”. These were re-coded downward so that the variable reflects the highest levels of education completed in all countries.

Thirdly, despite the NSD’s request, a number of countries did not collect sufficiently detailed information on educational attainment for coding into ISCED–97. With such sparse information, the correction of misclassifications, let alone refinements of the cross-nationally comparable variable, are ruled out. The worst case in this respect is Austria. *Edlvat* cannot be correctly coded into ISCED at all: Apart from putting all ISCED 5(A) qualifications into ISCED 6, coding ISCED 3(A) qualifications as ISCED 4 and not covering ISCED 1, in the second round of the ESS, programmes belonging to level 4 and 5(B) are mixed up in ISCED level 4 (while such programmes are not covered in the first round at all). Austria is therefore excluded from the analyses in this paper. Also very sparse is the information for the UK. In the second round, vocational qualifications were not covered at all, so that these data have to be excluded from the analysis. In the first round, the national variable just provides enough information for coding into *edulvl*, but does not allow any distinction between vocational and general qualifications (particularly GCSEs and NVQ 1 and 2) or first and second degrees. The national team also did not follow the OECD manual in a case where the assignment is controversial.<sup>19</sup>

Lastly, in contrast, other countries collect quite detailed information, with sometimes 15 “indigenous” categories or more (CH, LU, ES 2004). In the case of Germany, however, it was very obscure how the comparable variable *edulvl* was constructed from *edlvde*, as there was no obvious matching. As all source variables were available, however, a very detailed *NCV* could be constructed and ISCED–97 derived from it easily, with somewhat deviating results from *edulvl* as originally included in the data set.

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<sup>19</sup>The issue here is that in the UK, it is important to distinguish people who left school at age 15 or 16 without any credential from those who left school with GCSEs on the one hand, but also to distinguish people with GCSEs from those with A-Levels on the other hand. In British research, even different results achieved in GCSEs (A to C and D to G) are usually taken into account. Concerning the reclassification into ISCED, when ISCED subcategories A, B and C are not used, one is confronted with the thankless choice of merging GCSEs either with the *no qualification* category or the *A-Levels* category, each of which is unsatisfactory. The OECD manual recommends the latter, which leads to an unrealistic upgrading of the British population’s distribution of education. However, the OECD solution was found to lead to much higher explanatory power than the alternative (Kerckhoff and Dylan, 1999). In the corrected variables, the OECD manual was followed. This is a prime example for the conflict between comparability and explanatory power, as GCSEs are, from an international point of view, no upper secondary qualification. The only workable solution which would be in accordance with ISCED–97 really seems to distinguish ISCED 2A (GCSEs, giving access to more advanced general education) from ISCED 2B (leaving secondary school without a qualification giving access to upper secondary education, thus leading to some vocational education or the labour market).



As the OECD manual can be assumed to provide a good coding standard, corrected cross-nationally comparable education variables were constructed, generally following the OECD's mappings of *NCV*s to ISCED–97. Variable *ISCED(7)* corresponds to *edulvl*, but includes all corrections of misclassifications or problematic assignments made. It thus consists of the full number of seven categories, but is only available for 13 countries. *ISCED (6)* summarises both stages of tertiary education into one category, resulting in six categories. *ISCED (5)* additionally collapses upper secondary and post-secondary non-tertiary qualifications. *ISCED (4)* finally also aggregates the two lowest levels into “less than compulsory/lower secondary education” and has only four categories. Misclassifications and problematic codings specific to single countries have been corrected as well, usually following the OECD manual.<sup>20</sup>

Clearly, in the first two rounds of the ESS, the implementation of ISCED–97 was not yet optimal. Due to the availability of the national education variables in the ESS data sets as well as the collection of information on the *years of education completed*, it was fortunately possible to spot and correct misclassifications in order to improve cross-national comparability. It would however be preferable if such misclassifications were avoided from the outset, e. g. by providing the national teams with the OECD's mappings (Organisation for Economic Co-Operation and Development, 1999) for their country, which is fortunately done from the third round onward. Sometimes the misclassifications made simply look like the result of a lack of knowledge about how ISCED–97 works. Maybe national teams have to be advised more explicitly to take a closer look at the documentation on ISCED–97, particularly if they have been working with ISCED–76 before. An alternative would be to provide a very concise summary of ISCED–97 to the national teams, which would be actually read by the recoders, which maybe cannot be expected with respect to the lengthy manuals from UNESCO and the OECD.

### 3.3 Evaluation of the effects of harmonising national educational attainment variables

In this section, the results of the statistical analyses for the evaluation of ISCED–97 are presented. Firstly, the distribution of ISCED–97 will be looked at in order to check for relatively obvious problems. Then, the results of the regression analyses are presented and discussed.

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<sup>20</sup>A detailed overview over the actual coding of ISCED–97 in the ESS and ideal coding is given in table A in the appendix.

### 3.3.1 Distributions of ISCED categories

Table 1 shows the distribution of ISCED categories (seven and six levels, i. e. the most detailed version available for each country) in the single ESS countries for both rounds of the ESS separately.

Table 1: Distributions of ISCED–97 in the first two rounds of the ESS in percent

country	ESS round	ISCED–97 levels						valid cases		
		0	1	2	3	4	5		6	
Belgium	1	1.0	6.3	15.5	39.0		36.7	1.5	840	
	2	0.4	5.3	13.9	42.0		37.1	1.3	828	
Czech Republic	1		0.1	5.3	79.4			15.3	598	
	2		0.1	5.6	80.8			13.5	1248	
Denmark*	1	0.1	0.2	14.7	48.9	2.5	32.6	1.1	853	
	2	0.2	0.1	10.4	37.2		50.8	1.2	815	
Estonia	2		0.2	7.0	45.8	8.9	37.8	0.3	957	
Finland	1	0.2	8.8	16.7	39.1		34.1	1.1	1034	
	2	0.2	7.0	11.7	39.7		39.0	2.4	1048	
France	1	1.7	8.4	11.7	43.8			34.4	683	
	2	1.2	6.8	13.5	44.5			34.0	902	
Germany	1		0.2	5.0	52.4	6.2	34.6	1.6	1398	
	2		0.4	5.1	49.7	5.7	37.7	1.4	1346	
Greece	1	3.4	20.8	19.8	34.0		21.0	1.1	1002	
	2	2.0	22.5	17.3	33.0		25.2		970	
Hungary*	1	0.7	1.0	15.6	62.8		19.0	0.7	678	
	2	0.0	0.1	8.9	51.4	7.7	30.5	1.4	664	
Iceland	2	0.4	1.1	21.6	39.9			37.0	273	
Ireland	1	1.8	11.8	21.7	24.3			40.5	967	
	2	2.6	9.6	19.2	27.9			40.7	1029	
Israel	1	0.4	0.9	12.0	34.5			52.2	1044	
Italy	1	1.0	9.6	36.1	40.9			12.3	568	
Luxembourg	1		11.6	17.9	40.1	3.0	26.3	1.1	499	
	2	2.5	10.3	21.3	36.9	5.0	22.8	1.1	756	
Netherlands	1	0.4	1.9	29.1	30.8	8.4	28.9	0.5	1018	
	2	0.1	4.0	24.9	29.2	8.3	32.8	0.7	889	
Norway*	1	0.1	0.1	7.4	52.7	2.8	36.1	0.9	1027	
	2			15.4	30.2	9.1	44.1	1.2	1029	
Poland*	1	0.1	0.4	12.9	62.4	6.4		17.8	871	
	2		0.3	10.3	66.1	6.3		17.1	765	
Portugal	1	2.2	53.2	15.3	16.0			13.2	0.1	692
	2	1.9	50.3	16.5	17.5			12.8	0.9	860
Slovakia	2	0.1	0.9	5.9	74.6	3.5		14.9	677	
Slovenia	1		1.7	16.2	59.3			22.8	587	
	2	0.4	1.1	12.0	62.7			23.8	534	
Spain*	1	6.1	14.0	21.7	21.6	11.4	24.3	0.9	703	

Continued on the next page ...

Table 1: Distributions of ISCED–97 in the first two rounds of the ESS in percent (*continued . . .*)

country	ESS round	ISCED–97 levels							valid cases
		0	1	2	3	4	5	6	
Sweden	2	3.6	16.4	20.5	15.4	11.0	32.2	1.0	718
	1	0.1	6.8	32.8	30.4		29.9		1129
Switzerland	2	0.1	5.9	32.1	31.2		30.7		1100
	1	0.2	0.2	8.9	54.9		35.8		1024
Turkey	2	0.1	1.2	6.8	55.9		36.1		1125
	2	7.0	44.1	12.2	22.6		14.0		489
Ukraine	2		0.2	3.1	26.9	47.4	22.4		791
United Kingdom	1		0.2	17.1	39.6		41.6	1.4	991
average		1.3	8.0	15.2	42.5	9.0	29.5	13.3	38019

Note: ESS 2002/2003, 2004/2005, own calculations. Respondents aged 25-65 and in the labour force. \*: NCV changed in-between rounds.

Three things stand out here: Firstly, the most substantial changes within countries over rounds can be observed in some of the five countries where the *NCV* was changed. Particularly for DK, HU, NO and maybe also Spain, comparability over time is possibly not given. The changes in the Polish questionnaire were obviously less consequential. But even in those countries where the *NCV* was not changed at all in-between the two rounds, there are sometimes substantial differences in the ISCED distributions between 2002/2003 and 2004/2005 (e. g. (LU, NL and SI). This can hardly be attributed to actual change, but will rather be due to sampling variation, and maybe systematic differences in data collection between rounds (the reclassification of *NCV*s into ISCED–97 was made identical in both rounds during the process of criterion validation and correction, if there were any differences). Secondly, there are enormous differences between countries in the distribution of ISCED–97, with all but ISCED level 6 being substantial in at least some countries. These differences largely reflect differences in economic development and educational expansion, but also in the historically varied evolution of the 26 educational systems.

Thirdly, and most importantly, there are many instances where more than 40% of the population fall into a single ISCED–97 category. This makes clear that ISCED–97 in this reduced form does not reflect the diversity of national credentials, and must have less explanatory power than could be achieved with a more differentiated scheme. This is clearly worst at ISCED level 3, and particularly in Central and Eastern European Countries: In the CZ, DE, HU, NO (2002), PL, SK, SI and CH, close to or more than 50% of the population are classified as ISCED level 3. With respect to ISCED level 5 (or 5/6, where 5 and 6 couldn't be distinguished) in DK (2004), IL, IE, NO (2004) and the UK, more than 40% are classified here. It is however

also a problem at ISCED level 1 in PT and TR, and at ISCED level 4 in UA (which looks very weird anyway, as ISCED 4 is usually no major category). Obviously distinguishing general and vocational programmes at level 3 and academic/professional and vocational programmes at level 5 would help a lot in order to achieve a more adequate picture of educational distributions cross-nationally.

### 3.3.2 Evaluating loss of information through the collapsing of categories

In this section, the fit measures of the regression models will be compared within countries in order to answer the question how much predictive power is firstly lost by reclassifying *NCV*s into ISCED–97, and secondly by further collapsing the categories of this international classification.

Table 2 shows the  $R^2$ s from regressing ISEI scores on education as measured by the *NCV*, ISCED–97 in four levels of detail (with 7, 6, 5 and 4 categories), and years of education for each of the 27 countries included in the ESS.

Table 2:  $R^2$ s from regressing ISEI on different measures of education

country	ESS round	n of cat's	$R^2$ s NCV	$R^2$ s (ISCED with n cat's)				years educ
				(7)	(6)	(5)	(4)	
Austria	1	5	21.8	–	–	–	–	21.1
Belgium	1	11	41.9	37.2	37.1	37.1	37.1	25.0
	2	11	41.6	37.2	36.5	36.5	36.5	18.9
Czech Republic	1	11	47.5	–	33.9	33.9	33.9	34.7
	2	11	51.4	–	35.1	35.1	35.1	41.7
Denmark*	1	10	33.0	27.3	25.4	23.8	23.8	29.3
	2	9	40.1	31.9	31.3	31.3	31.3	24.9
Estonia	2	13	33.3	27.0	26.9	26.8	26.8	31.3
Finland	1	–	–	34.1	32.2	32.2	32.2	30.0
	2	–	–	35.8	32.0	32.0	31.9	33.1
France	1	11	40.9	–	31.9	31.9	31.8	29.2
	2	11	40.0	–	30.8	30.8	30.6	27.6
Germany	1	24	52.3	25.2	21.4	20.9	20.9	30.9
	2	24	49.1	26.0	23.3	22.3	22.3	31.9
Greece	1	7	57.2	54.3	54.0	54.0	53.9	43.4
	2	7	45.6	41.4	41.4	41.4	41.3	37.0
Hungary*	1	11	53.3	42.1	41.9	41.9	41.9	38.7
	2	14	57.5	42.8	42.8	41.7	41.7	35.6
Iceland	2	–	–	–	19.3	19.3	19.1	24.6
Ireland	1	7	37.1	–	30.1	30.1	30.1	26.1
	2	7	35.7	–	29.0	29.0	29.0	22.7
Israel	1	14	35.9	–	28.2	28.2	28.0	32.9

Continued on the next page ...

Table 2:  $R^2$ s from regressing ISEI on different measures of education (*continued . . .*)

country	ESS round	n of cat's	$R^2$ s	$R^2$ s (ISCED with n cat's)				years educ
			NCV	(7)	(6)	(5)	(4)	
Italy	1	7	43.3	–	41.0	41.0	41.0	41.4
Luxembourg	1	18	50.1	38.7	38.6	37.7	37.7	34.1
	2	19	56.2	46.2	44.3	44.2	44.0	35.9
Netherlands	1	13	36.8	32.1	32.0	31.6	31.5	20.6
	2	13	37.7	32.3	31.9	31.3	31.3	22.4
Norway*	1	9	31.5	29.0	28.0	27.3	27.3	27.8
	2	8	32.0	27.0	25.2	25.0	25.0	25.8
Poland*	1	11	56.7	–	45.5	44.0	44.0	50.2
	2	9	47.2	–	40.9	39.3	39.3	41.2
Portugal	1	8	42.5	42.6	42.5	42.5	41.9	41.1
	2	8.0	45.3	46.9	46.8	46.8	46.4	43.5
Slovakia	2	8	42.4	–	33.3	32.2	32.2	25.6
Slovenia	1	–	–	–	45.1	45.1	45.1	42.1
	2	–	–	–	50.0	50.0	50.0	44.0
Spain*	1	14	49.4	44.7	43.3	43.2	43.0	32.7
	2	17	40.8	35.3	34.4	34.4	34.3	30.0
Sweden	1	12	37.9	–	31.5	31.5	31.4	30.7
	2	12	41.3	–	35.6	35.6	35.6	34.7
Switzerland	1	15	34.1	–	26.2	26.2	26.1	19.5
	2	15	33.6	–	24.0	24.0	23.9	19.3
Turkey	2	–	–	–	48.0	48.0	47.8	40.3
Ukraine	2	7	45.8	–	48.7	44.2	44.2	36.1
United Kingdom	1	8	31.8	26.5	25.3	25.3	25.3	23.5
average/total			42.9	36.0	35.2	34.8	34.7	32.1

Note: ESS 2002/2003, 2004/2005, own calculations. Respondents aged 25-65 and in the labour force. \* NCV changed in-between rounds; – variable not available.

Let's first have a look at the results with reference to the  $NCV$  (column  $R^2$ s  $NCV$ , which, needless to say, achieves the highest  $R^2$ s compared to the other columns. Relatively high  $R^2$ s here mean that firstly, there is a high association between educational attainment and occupational status in a country, and secondly, that educational attainment was probably measured with a high degree of discriminatory power. Relatively low  $R^2$ s using the  $NCV$  in turn do not necessarily mean that education is less important for occupational attainment in the respective country. It could equally well mean that important differences in educational attainment are not mirrored by the  $NCV$ . Although the  $NCVs$  can assumed to be the most appropriate measures for educational attainment available in the ESS, the  $NCV$  must be assumed to produce still rather conservative estimates for those countries where the  $NCV$  is not sufficiently detailed.

The number of categories of the *NCV* (column *n of cat's*) can be used to proxy the quality of the national measure,<sup>21</sup> Particularly worrying are the *NCV* for Austria, Greece, Ireland, Italy and the Ukraine—all being no more detailed than the seven-level ISCED variable, and probably not well representing the full range of educational qualifications in the respective countries. For Portugal, Slovakia and the UK it does not look much better, as only eight national categories are distinguished. The  $R^2$ s with respect to the *NCV* in all these countries will be possibly underestimated. There is indeed a correlation of 0.34 between the  $R^2$ s resulting from regressing ISEI scores on the *NCV*s, and the number of categories in the national education measure. The results for the UK are also below the ones reported by Kerckhoff et al. (2002).

In the case of Estonia, the Netherlands and Switzerland, it rather looks as if educational attainment is really less important than in most other countries, as their national education measures are relatively detailed, and still the  $R^2$ s from regressing ISEI on education are comparably low. The highest  $R^2$ s in turn are estimated for Germany, Hungary, Luxembourg and Poland. The *NCV*s in these countries all distinguish at least 11 categories. Nevertheless, Greece follows closely, with only seven categories. Either the Greek national measure works really well, or the actual association between educational attainment and occupational status is even higher than estimated here. For those countries which changed their *NCV* between rounds, there is a clear improvement for Denmark and Hungary, whereas in Poland and Spain, the *NCV* got actually substantially worse.

Comparing the different measures of education, there is no country where years of education are a better predictor of occupational status than education as measured by the *NCV*, apart from Austria, where as shown above (p.16), the *NCV* is particularly bad. More importantly, there are large differences between countries in the appropriateness of *years of education* as compared to the *NCV*. The difference between the explanatory power of *years of education* and *NCV* is largest in Belgium, Germany, Hungary and Luxembourg—countries where the *NCV* is very detailed and in which vocational education, which is not reflected in *years of education*, plays a crucial role in social stratification processes. The difference in predictive power between *years of education* and the *NCV* is rather small in Estonia,

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<sup>21</sup>Although of course less detailed measures are not necessarily bad, and detailed measures not necessarily good. This is best shown by looking at the changes of the *NCV* in Denmark and Spain: Denmark used one category less in 2004, but the discriminatory power of the *NCV* improved, whereas in Spain, discriminatory power substantially decreased despite the addition of 3 categories. Maybe the new categories in the Spanish questionnaire were too difficult to use for the respondents—there were e.g. seven response categories covering no to lower secondary education. More generally though it is clear that an appropriate degree of differentiation facilitates answering the questionnaire and improves discriminatory power, but there is probably no such thing as the *optimal number of categories* in a *NCV*.

Israel, Italy, and Portugal. There is also a substantial degree of association ( $r = 0.48$ ) between the number of categories of the *NCV* and the difference in predictive power of *years of education* and the *NCV*: the more differentiated the national measure, the larger its advantage in predictive power compared to *years of education*.

Let's now turn to the effect of collapsing categories, from the national variable to ISCED with seven categories (where available), then six, five, and four categories. Relatively detailed harmonised measures like ISCED (7) can be simplified by further collapsing international categories, e. g. in order to analyse the data in more parsimonious and more easily interpretable ways, or because the source variables do just not allow any further differentiation. Firstly, harmonising the national education variables even into the most detailed version of ISCED–97 leads to a visible deterioration of predictive power in all countries. This effect is strongest for Germany, Hungary and Luxembourg, with more than 10% of the original  $R^2$  lost. As the distribution of ISCED–97 shows (see table 1), in Germany and Hungary more than 50% of the respondents get categorised in ISCED 3, and in Luxembourg, it is still more than 35%. The loss of explanatory power is weakest in Portugal, Norway, Greece and Spain (2002). In all the latter countries but Spain this might be attributed to the rather crude *NCV*, so that even in the national variables some categories can be assumed to be highly heterogeneous and there *was* hardly any merging of categories which could have decreased explanatory power. For Spain, this interpretation is implausible, as the national measure consists of 14 (2002) and 17 (2004) categories and predicts ISEI rather well.

As the most detailed version of ISCED–97 is not available for half of the countries, let's now turn to the effect of harmonising the national education variables into the six-level version of ISCED. In addition to the countries mentioned in the previous paragraph, the Czech Republic, Israel and Poland are very problematic, losing more than 10% of the  $R^2$  achieved with the national variable. Clearly least problematic is the Ukraine, followed by Portugal, Italy and Greece. Again, this is largely determined by the number of categories in the national variable, losses being highest for countries with the most detailed *NCVs*, and where thus more categories need to be collapsed ( $r = 0.69$ ). This supports the hypotheses put forward by Kerckhoff and Dylan (1999, p. 769), that “the greater the diversity of the indigenous credentials, the more heterogeneous the standard categories are bound to be, and the more they will underestimate the association between educational attainment and other variables.” However it is again unclear in how far the “simple” national education variables in some countries are appropriate or already abstractions from an actually more diverse reality. The rank-correlation between the  $R^2$ s from *NCV* and ISCED (6) is 0.67, which is certainly too low for a valid comparable measure. It e. g. means that when ranking countries in terms of how important educational attainment

is for occupational status, we would come to quite different conclusions, depending on which education measure (harmonised or not) is being used.

Further aggregating different levels of ISCED–97 into single categories does hardly change anything anymore. In the Ukraine, summarising ISCED levels 3 and 4 into one category is quite consequential (losses in  $R^2$  of 5.6%), and leads to still visible losses in  $R^2$  in Denmark (2002), the Netherlands (2004), Poland, Slovakia and Hungary (2004). Collapsing ISCED levels 0 and 1 into one category has sizeable effects only in Portugal (2002). In all the other countries, both aggregations lead to losses of 1% or less.

To summarise, it is pretty clear that important distinctions between educational attainment categories in most countries are not well captured by ISCED–97, at least in its reduced form (levels only); whereas rather unimportant distinctions are made. The worst step is from national variable to years of education and the second worst from national variables to ISCED. The degree to which this is a problem varies over countries, and is most visible when the NCV is very detailed. However, this is hard to evaluate, as the measurement quality of the national variables is often unclear. Overall it seems as if Central and Eastern European countries are most problematic, probably because the reduced version of ISCED–97 does not differentiate general from vocational qualifications—a distinction which is paramount in these countries. This was already suspected by just looking at the distributions of ISCED in the different countries (see above). Thus, also from the point of view of discriminatory power, the implementation of ISCED–97 needs serious improvement. The distinction between general and vocational education is possibly more important than the distinction between ISCED levels 0 and 1 or ISCED levels 3 and 4.<sup>22</sup>

## 4 Conclusions

There are two problems with the measurement of education using ISCED–97 in the ESS: misclassification and lack of detail. The first problem can be solved for most countries by checking and correcting the recoding from the national to the cross-nationally comparable variable, which is tedious, but possible. The second problem is more tricky, though. The results of the analyses performed here support the findings of Kerckhoff and Dylan (1999) and Kerckhoff et al. (2002) on the base of a larger number of countries and with a more detailed measure of occupational attainment. ISCED–97 produces different results from the national education variables, and the deviations produced differ over countries. The design of ISCED–97 with seven distinct levels of education suggests that the biggest differences in education are found between these levels, which is however a misjudgment:

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<sup>22</sup>It would be a next step to actually construct a version of ISCED–97 from the NCVs including this distinction, and including this improved measure in the analyses.



In the European context, in many countries lower secondary education is virtually universal, ISCED 0 and 1 are negligible (as is ISCED 6, for obvious reasons) and ISCED 4 does not exist in all countries and is marginal in most others. Therefore, the bulk of people are found at ISCED 2, 3 and 5, which are by no means homogeneous categories. This is most obvious at the upper secondary level of education. In some countries, more than 50% of the respondents end up in this category (see 1), although looking at the national variables, their qualifications differ substantially.

ISCED–97 however provides for this by being inherently multidimensional (see section 1.2); this possibility is however hardly being used in surveys.<sup>23</sup> At ISCED level 3, it would be very worthwhile to distinguish general/academic programmes giving access to higher education from vocational ones that prepare for the labour market or more advanced vocational training. Similarly, it would make sense to either distinguish academic/professional and vocational programmes at the tertiary level, thus differentiating ISCED 5B from 5A. By distinguishing BAs and MAs within 5A one could even go further, differentiating 5B, 5A (short) and 5A (long). In fact many countries have these distinctions in their NCV, so that a more detailed version of ISCED–97 might be achieved by just more detailed recoding for the current data (losing those countries who did not differentiate these qualifications), and negligible changes in a few countries in future rounds of the ESS.

ISCED–97 is quite a good and flexible international classification of education. It has however not been implemented in the ESS in a way that reflects important distinctions in people’s educational attainment in Europe, namely vocational and general. In order to make such distinctions possible (or even standard), it would be necessary to ask national teams for a higher level of detail of the national education variables (particularly asking for a distinction between vocational and general/academic programmes at levels 3 and 5, and maybe also distinguishing short and long university degrees). It could also make sense to distinguish within lower secondary education between individuals who were in general education and qualify to continue to general upper secondary education and those who do not qualify or completed vocational education (e.g. in order to differentiate between those with GCSEs and those without in the UK, or between “Hauptschulabschluss” and “Mittlere Reife” in Germany). Table 3 shows a less reduced version of ISCED–97 which would have considerably more discriminatory power than the corrected *edulvl*, but at the same time not be overly demanding for the national teams to be implemented. This would presumably improve cross-national comparability and discriminatory power of the educational attainment measure in the ESS a lot. Looking back to the im-

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<sup>23</sup>In the PISA studies, for the measurement of parental education, since 2003 there is a distinction taken between 3A vs. 3B/C and 5A/6 and 5B

Table 3: Optimal ISCED–97 coding scheme for the European Social Survey

Category name	ISCED level	additional ISCED criteria	description
0	0		less than primary education
1	1		only primary education completed
2(gen)	2	A, general	lower secondary general education completed, access to 3(gen)
2(voc)	2	A, vocational or B	lower secondary vocational education completed, or general without access to 3(gen)
3(gen)	3	A, general	upper secondary general education completed (including maturity certificate)
3(voc)	3	vocational (A, B, and C)	upper secondary vocational education completed (with or without maturity certificate)
4	4		post-secondary non-tertiary education, e.g. 3(gen) + 3(voc)
5B	5	B, vocational	vocational tertiary education (vocational college)
5A (short)	5	A, academic (short)	First/short university degree (max 4 years), e.g. BA
5A (long)	5	A, academic (long)	Second/long university degree, e.g. MA and postgraduate
6	6		Second stage of tertiary education, i.e. PhD/doctorate

plementation process and seeing that it was originally planned to explicitly ask respondents if they had completed general or vocational education, this is particularly unfortunate—how much additional questionnaire time does such an item or a more detailed national classification to pick from take?

One question to be answered in a future version of the paper is how actual regression coefficients change when adjacent educational categories are merged, first from national to international measures, and then from detailed to less detailed international measures.<sup>24</sup> This would enable us to see more clearly where exactly predictive power is lost by harmonising NCVs into the reduced ISCED–97. A further step would be to do similar analyses as those conducted in this paper with other dependent variables, e.g. social

<sup>24</sup>I hope to be able to present the results of this analysis at the conference.

class membership, values such as authoritarianism/liberalism and social attitudes like anti-immigrant prejudice, all of which are known to be strongly related to educational attainment. It can be expected that at least for social class membership, the results should be similar or pointing even more in the direction indicated here.

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## A Appendix

Table 4: Reclassification table from national to ESS-ISCED and ISCED-97

See extra Excel file “NationalVarsIntoISCED.xls”