

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

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Abstract

Educational attainment is a core social background variable covered in each and every single social survey. Cross-national surveys are particularly vulnerable to sub-optimal measurement of education. In this paper, the cross-national measurement of educational attainment is evaluated using data of the European Social Survey (ESS). After discussing some theoretical background of the comparable measurement of education generally, the most commonly used comparable measures are introduced. A brief overview over previous evaluations is given. In the main part of the paper, the implementation of a simplified version of the International Standard Classification of Education 1997 (ISCED-97) in the ESS is discussed and evaluated in several ways: By looking at the consistency of the reclassification of national education variables into the comparable variable; at how the comparable variable is distributed, how much explanatory power of educational attainment is lost by harmonising the national variables (using occupational status as the criterion), and which steps of the harmonisation process affect the results most strongly in the single countries. Finally, an alternative way of simplifying ISCED-97 is proposed, which could improve the measure's comparability and predictive power.

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Over the last decades, more and more international data sets including more and more countries became available to researchers. Cross-nationally comparable measurement is one of the most important challenges of comparative social research. While harmonised 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, 2006 [1997]).¹

In the first part of the paper (section 1), 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 are presented. Furthermore, the results of the above mentioned validation studies will be briefly summarised.

In the main part of the paper (section 2), after a short section on the methods applied, the measurement of educational attainment 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 2.2), secondly by checking the compliance of the resulting supposedly comparable variable with the criteria as set out by the UNESCO (2006 [1997]; 1999) and the OECD (1999) (section 2.3), and thirdly by looking at the consequences of harmonising country specific measures of educational attainment into a standard classification system on the distributions of educational attainment and the association between educational and occupational attainment (section 2.4).

As a result of this extensive evaluation, the usefulness of ISCED-97 for comparative survey research in Europe will be discussed. As a final step, an alternative version of ISCED-97 will be proposed which would be more efficient and more powerful than the reduced version of ISCED-97 commonly used.

¹Apart from the ESS, also the PISA studies (OECD, 2001, 2004) use ISCED-97 (for the measurement of parental educational attainment).

1 Cross-nationally comparable measurement of educational attainment

Measurement of educational attainment requires a clarification of the underlying concept, which is particularly important for comparative research. For social stratification research, the acquisition of educational *certificates and credentials* that “testify the acquisition of particular sets of skills and knowledge” (Braun and Müller, 1997, p. 168) is the most important outcome of an individual’s educational career. Educational attainment in this sense means the highest level of education in terms of how much and what kind of education an individual has completed, as manifested by the educational certificates awarded. These certificates are used as credentials for labour market entry, the marriage market etc., and are usually awarded through institutions that are officially recognised (or “accredited”) by the state. The notion of education is used in a wide sense here, covering general and academic education (“Bildung”) as well as vocational education and training (“Ausbildung”), as it is impossible to draw the line between the two in a consistent way cross-nationally.

In a somewhat wider sense, the criterion of “certification” may need to be relaxed, as in some cases non-certified education can make a difference, too (particularly in the case of uncompleted university studies, common in many countries). Classifying drop-outs is therefore an issue that should be resolved in an equal way in all countries. However, informal learning such as adult evening classes (unless leading to an important certificate which could also be acquired in the regular educational system) and skills acquired later during working life are usually excluded from educational attainment measures.

Levels and types as well as the duration of specific educational programmes and the certificates awarded depend on the institutional structure of educational systems. Therefore, there are complex differences between countries (and also within countries over time) in the characteristics of different levels of attainment. In comparative research, there are two general ways of measuring educational attainment: using years of formal education or using a standardised set of categories.²

²A different, but related concept would be that of educational achievement, referring to an individuals’ actual competencies and skills (e.g. reading, arithmetic or language skills). These are however very costly to measure in a large-scale survey. Therefore, even for other areas of sociological research, educational attainment might be the best available proxy (e.g. for the explanation of values or political involvement). With the PISA studies (OECD, 2001, 2004), academic achievement measures became popular in social stratification research. 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

1.1 Years of education

Years of education measure either actual or “theoretical” (also called “virtual”) number of years spent in the educational system, or the length of educational experience. “Virtual” years of education refer to the number of years usually required to complete a certain level of education, and are derived from categorical measures. This measure builds on the assumption that firstly “the longer someone is exposed to education, the more skills and knowledge he or she can acquire, and the more he or she is socialised, directly or indirectly” (Braun and Müller, 1997, p. 170) and secondly “all kinds of skills and knowledge are of similar value” (Braun and Müller, 1997, p. 170).

The advantage of this measure, which is used as an interval level variable, is that it can be analysed in simple linear models and provides very parsimonious results when used as a predictor or response variable (see e.g. Treiman and Yip, 1989). Using *years of education* as an interval level variable however relies on a strong assumption, namely the linearity of the relationship in question. No such assumption needs to be made for categorical measures.

What is more, the number of years of schooling or formal education only measures the element of *how much* education one has received: years of schooling thereby 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. In institutionally rather undifferentiated educational systems, like the United States, years of education are maybe a meaningful measure (see e.g. Braun and Müller, 1997), as from the end of compulsory schooling on, individuals face the decision between staying in the educational system (high school or college) for another year or entering the labour market. This is surely not the case in Europe (Gambetta, 1987; Braun and Müller, 1997): most European educational systems are highly differentiated and include different, often parallel tracks of more or less fixed duration. Different educational programmes often cover the same number of cumulative years of schooling, but are qualitatively different from each other in terms of the type of instruction, intellectual demand and value in later life. In some countries, this differentiation starts just after primary school, in others it only starts after compulsory schooling. Actual years of schooling in the European context thus can only be meaningfully interpreted in terms of the individual’s time-investment or time spent under the influence of a specific form of socialisation, but not in terms of the level of education achieved.³ In Europe, duration is only one among several other attributes of education (Gambetta, 1987, p. 6). Although it is very difficult to harmonise national categorical

discussed here either.

³It is however very useful to include years of education in surveys, as this variable can also be used for validation purposes.

variables measuring educational attainment over time and for different countries, *years of education* is not much better, as this measure is just nominally comparable by using a standard unit.

1.2 Categorical measures of educational attainment

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, namely 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, 2006 [1997], 1999; OECD, 1999).⁴ The basic idea of both international classifications of education is to provide a framework with which national classifications can be “translated” into an 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 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 cross-national measures of educational attainment largely depends on two factors:

1. Content validity, which means that the assignment of national educational programmes to international categories follows the definitions specified in the international classification framework in the same way in all countries, and
2. Construct validity, which means that educational programmes with different outcomes are assigned to different international categories. As international classifications of education typically 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

⁴When 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.

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 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,⁵ and
2. the merging of several national categories in one international one, 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.

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 education variables (NEV) they are based on. If already at the stage of data collection a simplified NEV 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. Therefore, it is important that detailed “best practice” NEVs are used in cross-national surveys, e.g. those used in national labour force surveys or censuses. It might even be necessary to use an even more differentiated NEV, as qualifications that can be aggregated in some countries may need to be differentiated in others, making it necessary to differentiate them in all countries in cross-national surveys.

⁵It 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 hardly any graduates actually proceed to university.

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. The crucial questions that need to be addressed here are therefore firstly whether the concepts of the harmonised measure are applied consistently and secondly whether a reclassification of national education categories into international categories is *equally (in-) adequate* in all countries compared (Kerckhoff et al., 2002, p. 101).

1.2.1 The CASMIN scheme of educational attainment

The CASMIN educational attainment scheme (König et al., 1988; Müller et al., 1990; Brauns and Steinmann, 1999) 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. Intermediate vocational qualification or intermediate general education plus vocational qualification
- 2b. Intermediate 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.

1.2.2 The International Standard Classification of Education

The International Standard Classification of Education 1997, (ISCED–97, UNESCO, 2006 [1997], 1999; OECD, 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 an individuals' 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 vocational programmes (*A* and *B*), and the labour market or other programmes at the same ISCED level only (*C*). These subcategories *A*, *B* and *C* are defined somewhat differently at the different levels of education (see figure 1). ISCED 5B

comprises vocational tertiary education and gives access to the labour market. ISCED 5A refers to academic and professional tertiary education, preparing for access to advanced research programmes (ISCED 6) or high-skill professional occupations. ISCED 3A and 4A are designed to provide direct access to ISCED level 5A, and ISCED 3B and 4A are designed to provide direct access to ISCED level 5B. ISCED level 4B leads to the labour market only. At ISCED level 2, 2A gives access to 3A and 3B, 2B to 3C, and 2C to the labour market only. 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”.

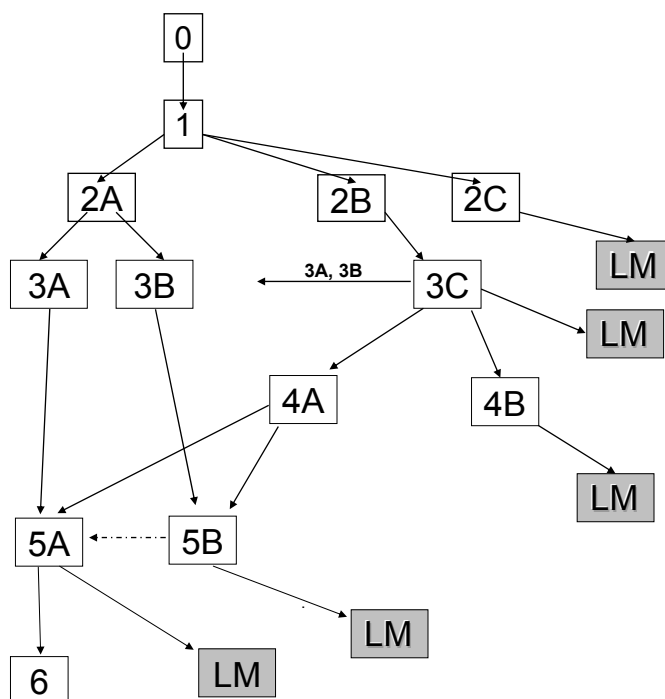


Figure 1: ISCED–97 transition pattern according to UNESCO (2006 [1997], p. 18)

- 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, only distinguishing the seven main levels (this will be referred to as “simplified ISCED–97” or “sISCED–97”).

Compared to CASMIN, one of the biggest advantages of ISCED–97 is the availability of background information. The OECD (1999) provides the most detailed documentation on ISCED–97 for all OECD countries, mapping national educational programmes to the appropriate ISCED–97 categories. These mappings are however only available from 1999 onwards; outdated qualifications are therefore not covered.

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 will prove to be very important in many European countries. In the US in turn, ISCED–76 works better. 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 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 (OECD 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 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 constructions of standard categories underestimate the associations between educational attainment and two important outcomes (occupational prestige and cognitive skill).
3. 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 offer enough categories to adequately represent the important distinctions in educational credentials.⁶

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 other countries. It is therefore vitally important to check the implementation of ISCED–97 in more recent cross-national surveys and assess its validity for a larger number of countries, using more detailed occupational attainment measures.

⁶Braun 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.

Kolsrud and Skjåk (2005) in their discussion of the harmonisation of background variables in the ESS also touch on the measure of education in the ESS. They find differences within ISCED levels between lower secondary technical and general education with respect to attitudes towards immigrants in the Netherlands. Looking into the bridging of NEVs into the ESS coding frame in three other countries, they also find inconsistent use of the two categories for tertiary education, not in line with the UNESCO's documentation of ISCED-97 (UNESCO, 2006 [1997]). The conclusions resemble those by Kerckhoff et al.: the aggregation of subcategories as a result of output harmonisation can lead to a loss of important characteristics of the data. Additionally, those implementing the reclassification might not have a common understanding of the intended comparable variable. The authors therefore suggest that "a centrally coordinated review of the national input instruments and the national bridging into the common ESS coding frames would have to be considered" (Kolsrud and Skjåk, 2005, p. 176). This paper is one step in this direction.

2 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) is a biennial cross-national survey in the form of repeated cross sections. It covers the general population from age 15 upward in (currently) 27 mostly European countries.⁷ For this study, the data for the first two rounds (collected in 2002/2003 for ESS 1 and 2004/2005 for ESS 2) are analysed (data for round three will become available in early 2008).⁸ The ESS "aims to pioneer and 'prove' a standard of methodology for cross-national attitude surveys that has hitherto not been attempted anywhere in the world" (Jowell and the Central Co-ordinating Team, 2003). Its main focus are people's attitudes and underlying values, but it also contains a number of social background variables of individuals as well as their partners and parents, which makes it attractive for comparative social stratification and mobility research.

2.1 Methods

The evaluation of ISCED-97 in the ESS is performed in three steps. Firstly, it will be explained how ISCED-97 was implemented in the ESS. It can be assumed that a complex measure like ISCED-97 is not easily adopted, so

⁷These 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, the Ukraine and the United Kingdom.

⁸The actual editions of the data used are edition 6 for ESS 1 and edition 3 for ESS 2.

that the way this is done will have a big effect on the quality of the data. It is also important because this is the point where potential improvements can be managed by the ESS co-ordinators.

As a second step, content 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, 2006 [1997], 1999) and the OECD mappings (OECD, 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.

In a third step, the discriminatory power of the simplified ISCED-97 is checked using construct validation procedures. In order to establish the amount of and cross-national differences in the loss of predictive power introduced by harmonising the NEVs into the simplified 7-level ISCED-97, a strategy similar to the one used by Kerckhoff and Dylan (1999) and Braun and Müller (1997) is followed. This part again consists of three evaluations:

Firstly, the distributions of educational attainment using ISCED-97 will be analysed. Secondly, regression analyses of occupational attainment (ISEI scores, Ganzeboom, De Graaf, and Treiman, 1992) on educational attainment will be conducted in the single countries included in the ESS, comparing the results of models using three different measures of educational attainment: the NEV included in ESS⁹; the corrected simplified ISCED-97 variables *ISCED (7)* and *ISCED (6)*, and *years of education*. With the exception of *years of education*, the education variables are included in the models as dummy variables. Age and gender will be controlled for, but the results for the NEV without controls are shown as well. A comparison of adjusted R^2 s over measures of education within countries will reveal the loss of discriminatory power resulting from harmonisation. As the amount of loss might be influenced by the absolute level of association, *relative* loss is computed (the adjusted R^2 s of the regression of ISEI scores on the NEVs being set to 100 %). A comparison of these relative losses over countries will show possible differences in the adequacy of sISCED-97 and *years of education* between countries. Thirdly, national education categories will be collapsed “step by step” in order to find out where exactly the aggregation of categories is most consequential.

Building on the results of these analyses, a cross-national education classification that is more suitable for survey research in the European context will be proposed. Its explanatory power will then be compared with *years of education* and sISCED-97.

⁹If the country reported to collect the data using ISCED, the variable *edulvl* was copied into a reconstructed NEV for the respective country (Finland, Iceland, Slovenia), as was done for Turkey, as the NEV was missing.

2.2 The implementation of ISCED–97 in the ESS

The ESS includes three measures of educational attainment:

Years of education: Respondents were asked about how many years they spent in education.¹⁰ 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 education variables (NEVs): Respondents were asked about their highest level of education completed using country-specific response categories.¹¹ A few countries (Finland, Iceland and Slovenia), however, used response categories which supposedly link directly with the cross-national variable (see below) and thus did not provide a national variable. Turkey also did not provide a NEV.

Cross-nationally comparable variable (CCV): the NEVs were reclassified into the simplified ISCED–97, which was agreed upon centrally *before* fielding the survey, after some discussion (see Erikson and Jonsson, n.d.). This means that an “ex-ante output harmonisation approach” was chosen for the ESS. The reduced ISCED variable only distinguishes levels of education, but neither programme orientation nor programme destination (general/academic or vocational). 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.¹²

The CCV is therefore much less detailed 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 as used for the coding of occupations in the International Standard Classification of Occupations 1988, ISCO–88). Erikson and Jonsson (n.d.) alternatively recommended to use a less simplified version of ISCED covering ten categories, at least distinguishing general and

¹⁰Questionnaire 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]

¹¹Questionnaire item F6, variable *edlvxx* (with xx being a placeholder for the two-letter country codes): What is the highest level of education you have achieved?

¹²The 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.

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 a higher degree of differentiation, was compromised during the implementation process.

The recoding of the NEVs 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 web-site in order to support the national teams with the recoding work:¹³

- 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 (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 mappings of national categories to ISCED–97 unfortunately only from round three onwards. The quality of NEVs was also emphasised more strongly over the single rounds. It can thus be expected that the implementation of ISCED–97

¹³I 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.

in the ESS improved from round one to round two, and will improve again in round three. Generally speaking, some effort was made centrally to ensure adequate coding practice. It is unclear however how much effort and understanding the national teams in the different countries put into the recoding of the NEVs into *edulvl*, e.g. in terms of reading the documentation on ISCED–97 provided, and thus if they applied 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.

2.3 Evaluating the reliability of re-classifications

The original national response categories of the NEVs (*edlvxx*) were reproduced from the country questionnaires, as the English value labels were often too generic. 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 (2006 [1997]) and the recommendations given in the OECD’s manual on the application of ISCED–97 (OECD, 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 simplified ISCED–97 variables are coded. The most common classification errors and problems are summarised in the following paragraphs.

Problems with respect to the distinction between ISCED levels 0, 1 and 2: Firstly, in seven countries,¹⁴ either ISCED level 0 or 1 was not used. These countries only distinguish between completed compulsory education or the lowest national certificate as ISCED 2 and less than compulsory education or no certificate as ISCED 0 or 1. This is understandable, as the differentiation between ISCED 0 and ISCED 1 is insignificant (and thus inefficient) in most European countries (see also table 1 below). ISCED–97 was however developed for a wider range of countries. Here, in order to achieve comparability, ISCED 0 and 1 are distinguished post-hoc using *years of education* as a proxy variable: respondents with less than 4, 5 or 6 years of education are assigned to ISCED 0, and those with more than 4, 5 or 6 years of education to ISCED 1 (depending on the duration of primary education in the respective country, taken from OECD, 1999).

Secondly, in a number of ESS countries, primary school and lower secondary school form one institution, internationally called “basic school”,

¹⁴Namely Austria, the Czech Republic, Germany, Israel, Poland, Slovakia and Switzerland

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 Hungary, Iceland, Slovenia and Sweden basic education in the respective country was mistaken for “primary education” in terms of ISCED–97 and falsely coded as ISCED 1. Thus, completed basic education has to be re-coded to ISCED 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 OECD, 1999).

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 in some countries teacher qualifications) were falsely assigned to level 4 in a rather large number of countries (namely Austria, the Czech Republic, Denmark, Greece, Hungary (in 2004), Ireland, Israel, Italy, Slovenia, Spain, Switzerland and the UK). The reasons for this are probably that national teams wanted to distinguish these qualifications from academic higher education (ISCED 5A), even if this was not in line with the instructions. Otherwise they could have had ISCED–76 rather than sISCED–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 indeed 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 NEVs for the large majority of the countries. The distinction between ISCED 5B and 5A is so important that most countries distinguish the respective national qualifications in their NEV.

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 degrees and upward, or even all academic degrees.¹⁵ ISCED 6 however is actually “reserved for tertiary programmes which lead to the award of an advanced research qualification” (UNESCO, 2006 [1997], p. 39) and should thus only include PhDs and equivalent degrees. The reason for this mistake is probably that national teams wanted to differentiate between undergraduate/lower level tertiary and postgraduate/upper level tertiary degrees or maybe again still had ISCED–76 in mind when doing the reclassifications, where level 6 in fact referred to all post-graduate degrees.

¹⁵This happened in Austria, Belgium, the Czech Republic, Estonia, France, Hungary, Iceland, Ireland, Israel, Italy, Norway, Poland, Slovakia, Slovenia, Sweden, Switzerland, Turkey and the Ukraine.

Thus, the corrected detailed 7-level ISCED variable is only available for 13 countries.¹⁶ In order to achieve a comparable variable including all countries, a less precise sISCED-97 variable with 6 categories (*ISCED (6)*) was constructed, aggregating ISCED 5 and 6 in one category covering all tertiary education.

There are also a number of problems with the NEVs: Firstly, several countries (Austria, Denmark, Greece, Hungary, Italy, Norway, Poland, Spain, the UK) changed their national education variables in-between the two first rounds of the ESS, probably in order to improve measurement quality. Austria added one category (which however mixes up different levels of ISCED-97) and changed the labelling of response categories in the questionnaire. Denmark omitted one marginal category and also changed the questionnaire wording for the higher education responses (in such a way that qualifications are distinguished by programme duration rather than institution or certificate). Greece added a category for PhDs, Italy a category for post-secondary non-tertiary education. Hungary added two advanced vocational categories. Norway switched from register data to actually asking people for their level of education (no other country used register data in either round of the ESS). Poland omitted two categories measuring non-completed educational programmes in 2002, and added a “other” category. Spain 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 the Spanish educational system over the last 30 years. With so many response categories only for primary education, the Spanish questionnaire item now looks quite difficult though, and there is wide variation in the number of years of education in these lower categories. Moreover, the assignment of lower and advanced vocational education to *edulvl* was changed in-between rounds.¹⁷ For the UK, vocational qualifications were not covered in the questionnaire in the second round of the ESS at all, which rather looks like an accident or negligence than an attempt to improve measurement quality.

Secondly, some countries (e. g. Hungary, Israel, Poland in 2002, Sweden) use specific categories like “Uncomplete higher qualification”, “not completed University” or “dropouts from ...”. These were re-coded downward so that the variable reflects the highest level 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 even into the simplified version of ISCED-97. With such sparse information, the

¹⁶Four countries, namely Belgium, Estonia, Hungary and Norway distinguished Master degrees from PhDs in the NEV.

¹⁷For 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.

correction of misclassifications, let alone refinement of the cross-nationally comparable variable, are ruled out. The most problematic case in this respect is Austria. Apart from putting all ISCED 5A qualifications into ISCED 6, coding ISCED 3A qualifications as ISCED 4 and not covering ISCED 1, in the second round of the ESS, programmes belonging to level 4A, 5B and 5A(short) are mixed up in *edulvl* 4 (while such programmes are not explicitly covered in the first round at all, although BAs might be included in *edulvl* 6). *Edlvat* thus cannot be correctly coded into sISCED-97 for either year.

Also very sparse is the information for the UK. In the second round, vocational qualifications were not covered at all, so that these data cannot be compared cross-nationally. 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 A-Levels and NVQ 3) or first and second degrees. The national team also did not follow the OECD manual in a case where the reclassification into ISCED-97 is controversial. 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 the results achieved in GCSEs (A to C and D to G) are differentiated. Concerning the reclassification into ISCED, when ISCED subcategories A, B and C are not used, one is confronted with the unpromising choice of merging GCSEs either with the *no qualification* 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 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, I thus followed the OECD manual. 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), which is however not implemented in the ESS. An alternative option which would however deviate from ISCED-97 would be to include respondents without qualifications in ISCED level 1.

Lastly, in contrast, other countries collect quite detailed information, with sometimes 15 “indigenous” categories or more (Switzerland, Luxembourg, Spain (2004)). In the case of Germany, however, it was unclear how the comparable variable *edulvl* was constructed, as no obvious mapping emerged from the cross-tabulation of *edlvde* and *edulvl*. Nevertheless, as all

source variables are available (data on educational attainment are collected with several questionnaire items like in the German microcensus), a very detailed NEV could be constructed and ISCED–97 derived from it, with somewhat deviating results from *edulvl*.

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 national categories to ISCED–97. Variable *ISCED (7)* corresponds to *edulvl*, but includes all corrections of misclassifications. 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.¹⁸

Clearly, in the first two rounds of the ESS, the reclassification of NEVs into ISCED–97 was not yet performed in an optimal way. Due to the availability of the NEVs in the ESS data sets as well as the collection of information on *years of education completed*, it was in most cases possible to spot and correct misclassifications in order to improve cross-national comparability. Sometimes the misclassifications made look like the result of a lack of knowledge about how ISCED–97 works. Then maybe a very concise summary of how ISCED–97 works could be provided to the national teams: It cannot really be expected that those deciding on the NEVs and responsible for the reclassification read all the lengthy manuals from the UNESCO and the OECD. But often it also looks as if the national teams tried to distinguish between qualifications that were not meant to be differentiated in the ESS-version of ISCED–97. This means that sISCED–97 as implemented in the ESS goes against the countries’ ideas which levels of education *have to be* kept apart. In order to alleviate this problem, some additional important distinctions should be made, most importantly between vocational and general upper secondary education (3B/C and 3A), between vocational and academic/professional tertiary education (ISCED 5B and 5A), as well as first/short/undergraduate degrees and second/long/postgraduate degrees (5A(short) and 5A(long)).

2.4 Evaluation of the effects of harmonising national educational attainment variables

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

¹⁸A detailed overview over the actual coding of ISCED–97 in the ESS (*edulvl*) and coding according to the OECD manual is given in table 6 in the appendix.

2.4.1 Distributions of ISCED categories

Table 1 shows the distributions 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 sISCED–97 in the first two rounds of the ESS, %

country	ESS round	sISCED–97 levels							valid cases
		0	1	2	3	4	5&6	6	
Belgium	1	0.9	6.3	16	38.9		37.8	1.5	868
	2	0.4	5.3	13.9	42.1		38.3	1.3	843
Czech Republic	1		0.1	5.1	78.9		15.9		614
	2	0	0.1	6.3	79.7		13.9		1391
Denmark*	1	0.1	0.2	15	48.6	2.5	33.5	1.0	878
	2	0.2	0.1	10.6	36.9		52.1	1.2	831
Estonia	2		0.4	7.4	45.3	8.8	38.2	0.3	990
Finland	1	0.2	8.9	16.5	38.9		35.5	1.1	1047
	2	0.2	6.9	11.5	39.6		41.8	2.3	1070
France	1	1.6	8.5	11.4	43.9		34.5		708
	2	1.3	6.7	13.1	44.8		34		926
Germany	1	0	0.3	5.8	51.7	6.1	36.1	1.6	1443
	2	0	0.4	6.6	48.4	5.7	38.9	1.3	1367
Greece*	1	3.5	20.7	19.5	33.9		22.5		1049
	2	2.4	22.1	17	32.9		25.6	0	1002
Hungary*	1	0.4	1.6	15.7	62.6		19.7	0.7	695
	2	0	0.1	8.7	52	8	31.2	1.3	678
Iceland	2	0.7	1	21.3	40.1		36.9		287
Ireland	1	1.8	12.4	21.7	24.2		39.8		1000
	2	2.5	10	19.6	28		39.9		1056
Israel	1	0.4	0.9	11.9	34.5		52.4		1111
Italy*	1	1.1	10.6	35.5	40.6		12.3		620
	2	0.1	6.4	32	42.5	1.1	17.9		1452
Luxembourg	1		11.4	17.4	41.1	2.8	27.3	1.0	529
	2	2.5	10.3	21.3	37	5	23.9	1.1	757
Netherlands	1	0.4	2	28.9	31.3	8.2	29.2	0.5	1048
	2	0.1	3.9	25.1	29	8.1	33.9	1	906
Norway*	1	0.7	2.3	5.8	52.1	2.7	36.3	0.8	1196
	2	0.3	2.6	12.7	30	9	45.5	1.2	1050
Poland*	1	0.1	0.4	13.1	62.3	6.2	18		891
	2	0	0.3	10.8	65.8	6.2	16.9		780
Portugal	1	2.7	52.8	15.3	16.2		13	0.6	718
	2	1.9	50.6	16.3	17.1		14.1	0.8	906
Slovakia	2	0.3	0.8	6.4	73.6	3.4	15.5		715
Slovenia	1	0	2	16.4	58.7		22.9		603
	2	0.3	1.8	11.3	63.8		22.9		621
Spain*	1	6	14	21.2	22.3	11	25.4	0.9	739
	2	4	22.8	18.9	13.4	10.3	30.7	0.9	825

Continued on the next page

Table 1: Distributions of sISCED–97 in the first two rounds of the ESS, %
(*continued*)

country	ESS round	sISCED–97 levels							valid cases
		0	1	2	3	4	5&6	6	
Sweden	1	0.1	7	32.5	30.3		30.1		1152
	2	0.1	6	31.6	30.9		31.4		1122
Switzerland	1	0.2	0.2	8.7	54.4		36.6		1069
	2	0.1	1.1	6.9	55.2		36.6		1149
Turkey	2	8.5	45.4	11.8	21.5		12.8		550
Ukraine	2	0	0.2	3.4	27	47.2	22.2		821
United Kingdom	1	0	0.2	17.6	39.3		42.9	1.4	1014
average		1.4	8.2	15.5	42.3	8.5	29.7	1.1	
min		0.1	0.1	3.4	13.4	1.1	12.3	0.3	
max		8.5	52.8	35.5	79.7	47.2	52.4	2.3	

Note: ESS 2002/2003, 2004/2005, own calculations. Respondents aged 25-69 and in the labour force. *: NEV 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 countries where the NEV was changed. Particularly for Denmark, Hungary, Norway and maybe also Spain, comparability over time is possibly not given. The changes in the Polish, Italian and Greek questionnaires were obviously less consequential. But even in those countries where the NEV was not changed at all in-between the two rounds, there are some substantial differences in the ISCED distributions between ESS 1 and ESS 2 (e. g. in Luxembourg and Slovenia; both countries with rather small samples). 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 NEVs into ISCED–97 was made identical in both rounds during the process of content 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 0 and 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 sISCED–97 category. This makes clear that sISCED–97 in this reduced form does not reflect the diversity of national credentials, and will probably 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 Czech Republic, Germany, Hungary, Norway (2002), Poland, Slovakia, Slovenia and Switzerland, close to or more than 50% of the population are classified as ISCED level 3. In Denmark (2004), Israel,

Ireland, Norway (2004) and the UK, more than 40 % are classified as ISCED level 5 (or 5/6, where 5 and 6 could not be distinguished). It is however also a problem at ISCED level 1 in Portugal and Turkey, and at ISCED level 4 in UA (which looks strange anyway, as ISCED 4 is usually not a major category). Obviously distinguishing general and vocational programmes at level 3 and academic/professional and vocational programmes at level 5 would not only make the recoding of NEVs to CCV easier for national teams, but it would also give a more adequate picture of educational distributions cross-nationally.

2.4.2 Predictive power of sISCED–97

In this section, fit measures of several regression models will be compared within countries in order to answer the question of how much predictive power is lost by reclassifying NEVs into sISCED–97 (ISCED (7) and ISCED (6)), and how the NEVs compare with *years of education*. These losses will be presented in a standardised way, so that they can be compared over countries.

Table 2 shows the R^2 s from regressing ISEI scores on education as measured by the NEVs, sISCED–97 in two levels of detail (with 7 and 6 categories), and years of education for each of the 27 countries included in the ESS. Let's first have a look at the results with reference to the NEV (columns R^2 s NEV, with and without controls for age and gender), 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 reliability and discriminatory power. Relatively low R^2 s using the NEV 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 NEV. Although the NEVs are the most appropriate measures for educational attainment available in the ESS, the NEVs must be assumed to produce still rather conservative estimates for those countries where the NEV is not sufficiently detailed.

The number of categories of the NEV (column *n of cat's*) can be used to proxy the quality of the national measure. Of course less detailed measures are not necessarily bad (see e. g. Slovenia and Greece), and detailed measures not necessarily good. This is best shown by looking at the changes of the NEVs for Denmark and Spain: Denmark used one category less in 2004, but the discriminatory power of the NEV improved (probably because the wording of the response categories was improved), whereas in Spain, discriminatory power substantially decreased despite the addition of three categories. Maybe the new categories in the Spanish questionnaire were too difficult to

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

country	ESS round	n of cat's	valid cases	adj. R^2 no controls	NEV with controls	sISCED (7) / (6)	y.o.e. controls for age & gender	
Austria*	1	5	1178	21.6	21.8	—	—	98.6
	2	6	975	33.7	33.9	—	—	80.5
Belgium	1	11	840	40.9	41.4	89.4	89.6	61.4
	2	11	828	40.9	43.4	90.6	89.2	47.2
Czech Republic	1	11	598	46.9	46.7	—	67.2	73.0
	2	11	1248	51.1	51.1	—	69.1	80.8
Denmark*	1	10	853	32.1	32.4	83.0	77.8	92.0
	2	9	815	39.7	41.9	81.1	80.4	63.5
Estonia	2	13	957	32.8	33.5	82.4	82.4	93.4
Finland	1	6	1034	33.7	34.8	100.0	94.8	95.4
	2	6	1048	35.3	37.6	100.0	91.8	96.8
France	1	11	683	40.4	43.5	—	79.8	78.6
	2	11	902	39.2	42.4	—	86.3	78.3
Germany	1	20	1398	44.8	45.7	58.4	49.7	72.4
	2	20	1346	43.7	43.9	60.4	55.8	72.0
Greece*	1	7	1002	56.4	56.4	—	94.9	76.4
	2	7	970	45.6	46.1	92.0	92.0	82.9
Hungary*	1	11	678	52.8	54.6	82.2	81.9	77.3
	2	14	664	56.5	56.8	74.6	74.6	65.1
Iceland	2	6	273	27.2	27.4	—	67.2	86.5
Ireland	1	7	967	37.5	38.1	—	85.0	72.4
	2	7	1029	35.4	36.7	—	82.8	64.6
Israel	1	14	1044	35.3	35.3	—	74.8	88.1
Italy*	1	7	568	43.8	46.0	—	94.8	97.6
	2	8		43.4	44.8	—	94.9	84.8
Luxembourg	1	18	499	48.7	49.6	78.4	78.6	68.8
	2	19	756	55.2	55.6	81.1	78.2	56.3
Netherlands	1	13	1018	36.4	36.7	88.3	88.0	60.8
	2	13	889	36.5	36.5	87.4	86.3	61.4
Norway*	1	9	1027	31.3	31.6	91.8	89.2	91.8
	2	8	1029	31.8	32.4	86.7	80.9	84.9
Poland*	1	11	871	56.3	56.6	—	80.6	92.4
	2	9	765	46.7	46.6	—	85.8	88.4
Portugal	1	8	692	42.4	44.0	96.8	96.8	94.8
	2	8	860	45.0	46.7	97.6	97.6	94.6
Slovakia	2	8	677	42.1	42.3	—	79.7	62.9
Slovenia	1	7	587	52.3	52.8	—	86.7	82.8
	2	7	534	60.4	61.3	—	82.9	72.8
Spain*	1	14	703	48.2	50.0	92.0	90.6	73.6
	2	17	718	39.5	40.1	88.3	86.5	76.1
Sweden	1	12	1129	36.8	38.4	—	85.4	84.9
	2	12	1100	40.8	42.8	—	88.6	85.7

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

country	ESS round	n of cat's	valid cases	adj. R^2 NEV no controls	NEV with controls	sISCED (7) / (6)	y.o.e.	
Switzerland	1	15	1024	33.5	33.4	–	83.2	58.4
	2	15	1125	33.1	33.1	–	67.7	58.0
Turkey	2	6	489	45.4	46.5	–	100.2	87.3
Ukraine	2	7	791	45.6	45.8	–	99.1	74.7
United Kingdom*	1	8	991	31.4	31.7	81.1	78.5	74.8
	2	5	824	31.2	31.2	–	–	58.3
average/total			38843	41.9	42.7	85.4	83.3	77.1
min		5	273	21.6	21.8	58.4	49.7	47.2
max		20	1398	60.4	61.3	100.0	100.2	98.6

Note: ESS 2002/2003, 2004/2005, own calculations. Respondents aged 25-69 and in the labour force. * NC changed in-between rounds; – variable not available. Adjusted R^2 of sISCED and years of education relative to R^2 of NEV.

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 NEV. Particularly worrying are the NEVs for Austria, Finland, Ireland, Iceland, Turkey, the Ukraine and the UK (2004)—all being no more or even less detailed than the intended seven-level ISCED variable, showing rather low associations with ISEI-scores and possibly (or in the case of Austria: surely) not well representing the full range of educational qualifications in the respective countries. For Italy, Portugal, Slovakia and the UK (2002) it does not look much better, as only eight national categories are distinguished. The R^2 s with respect to the NEV in all these countries will possibly be underestimated. There is indeed a correlation of 0.2 between the R^2 s resulting from regressing ISEI scores on the NEVs, 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, Israel, the Netherlands and (maybe surprisingly) Switzerland, it rather looks as if educational attainment is really less important than in most other countries, as the respective NEVs are relatively detailed (13 to 15 categories), and still the R^2 s from regressing ISEI on educational attainment are comparably low. The highest R^2 s in turn are estimated for the Czech Republic, Greece, Hungary, Luxembourg, Poland and Slovenia. Apart from Greece and Slovenia, the NEVs in these countries distinguish at least 11 categories. Either the Greek and Slovenian NEVs work really well (e.g. because their educational qualifications are less diverse),

or the actual association between educational attainment and occupational status is even higher than estimated here. For those countries that changed their NEV between rounds, there is a clear improvement for Austria, Denmark and Hungary, whereas in Poland and Spain, the NEV got actually substantially worse. The changes are not substantial for Italy and Norway, and for Greece, the rather big change in association cannot be explained by the change of the classification.

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 NEV. In Austria, where as shown above (p. 19), the NEV is particularly bad, *years of education* comes pretty close, as does in Finland, Portugal and Italy (2002)—all countries with rather undifferentiated NEVs. More importantly, there are large differences between countries in the appropriateness of *years of education* as compared to the NEV. The difference between the explanatory power of *years of education* and NEVs is largest in Belgium, Luxembourg, the Netherlands, Slovakia and Switzerland, with *years of education* having only around 60 % of the explanatory power of the respective NEV. These are all countries where the NEV is rather detailed and where vocational education, which is not reflected in *years of education*, plays a crucial role in social stratification processes. There is also a substantial degree of association ($r = -0.47$) between the number of categories of the NEV and the predictive power of *years of education* relative to the NEV: 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 (where available) or six categories. Firstly, harmonising the national education variables even into sISCED-97 leads to a visible deterioration of predictive power in all countries. This effect is strongest for the Czech Republic, Germany and Switzerland (2004), where ISCED (6) explains more than 30 % less variation in ISEI scores than the NEVs. The predictive power of ISCED (6) is also rather low for Denmark, Estonia, France, Hungary, Israel, Luxembourg, Norway (2004), Poland (2002) and Slovakia. As the distribution of ISCED-97 shows (see table 1), in the Czech Republic, Germany (2002), Hungary, Poland and Switzerland, more than 50 % of the respondents are classified as ISCED level 3, and in a number of countries, this is between 40 and 50 %. The loss of explanatory power is weakest in Finland, Greece, Italy, Portugal, Spain (2002), Turkey and the Ukraine. In all these countries but Spain this could be attributed to the rather crude NEVs with only six or seven categories, which means that harmonisation does hardly entail any collapsing of categories. For Spain, this interpretation is implausible, as the national measure consists of 14 (2002) and 17 (2004) categories and predicts ISEI rather well. The association between the number of categories in the NEV and relative predictive power of ISCED (6) is -0.28 . 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” NEVs in some countries are appropriate or already abstractions from an actually much more diverse reality. Even so, the rank-correlation between the R^2 s from NEV and ISCED (6) is 0.82, which is rather too low for a valid comparable measure. It 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.

To summarise, it is pretty clear that important distinctions between educational attainment categories in many countries are not well captured by sISCED–97. In a number of countries, *years of education* explains more variation in ISEI-scores than sISCED–97 relative to the NEV; in other countries however it is the other way round. There is large variation over countries in terms of the adequateness of sISCED–97 and *years of education*. Although the measurement quality of the NEVs is often unclear, it *is* clear that neither is a satisfying measure for educational attainment, which is most visible for countries with very detailed NEVs. 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 essential in these countries. This was already suspected by just looking at the distributions of sISCED–97 in the different countries (see table 1). Thus, not only from the point of view of implementation and applicability by national teams, but also from the point of view of discriminatory power, the implementation of ISCED–97 in the ESS needs serious improvement.

2.4.3 Step-by-step collapsing of adjacent categories

As a next step, national educational categories that are supposed to be merged into one category in ISCED–97 are collapsed one after the other, for each single country. As an example, how much of the adjusted R^2 from predicting ISEI scores by educational attainment in Germany is lost when “Abitur” and “Fachhochschulreife” (both ISCED 3A) are collapsed? How much is lost by aggregating all qualifications at ISCED 3A and 3B (“Abitur”, “Fachhochschulreife” and “berufliche Ausbildung”) into ISCED level 3? Using this procedure, more detailed results on how loss of predictive power comes about can be achieved. Additionally, it is tested if some distinctions are necessary, namely between ISCED level 0 and 1, and between ISCED level 5A (long) and 6. The results of such numerous regression analyses are not easily presented in a concise way though. Therefore only a summary of the results is given. Losses are given relative terms only, with the adjusted

R^2 s of regressing ISEI scores on the NEVs without controls (see table 2, column five) being used as the benchmark.

How important is the differentiation between ISCED level 0 and 1? With respect to aggregating everything which is less than compulsory education, there are hardly any concerns for European countries. In all countries but Portugal, where the loss of R^2 is also only around 2% in relative terms, this distinction is irrelevant, as the numbers of cases with less than primary or only primary education are very low or indeed often zero. For social stratification in Europe today, if somebody finished primary education or not (given no compulsory school certificate) is rather unimportant: ISCED 0 and 1 as final levels of educational attainment are both terribly low.

Aggregating different educational qualifications within ISCED level 2 can only be tested for those countries where lower secondary education is or was tracked in some way (by school types or final certificates) and where the NEV reflects this.¹⁹ In most of these countries, the effect of aggregating different qualifications at ISCED level 2 is negligible; effects are 1% or less in Belgium, Germany, Estonia, Spain, Hungary (2002) and Luxembourg. Only in the Netherlands and Sweden there is some loss of predictive power when collapsing different ISCED 2-qualifications (NL: 6.6% for ESS 1 and 2.4% for ESS 2; SE: 1.6 and 2.0% respectively). For Sweden, the different qualifications at ISCED 2 refer to different historical periods, and the loss of explanatory power is reduced when age is controlled for. For the Netherlands, there might be a substantial gap between lower secondary vocational and general education. It is therefore arguable if qualifications at ISCED level 2 should be differentiated according to programme orientation (2(G) for general and 2(V) for vocational qualifications) or programme destination.

Usually one would argue that drop-outs from ISCED level 3 should also be classified as ISCED 2, but ISCED-97 does actually not include any formal guidelines on classifying drop-outs. A few countries collected information on incomplete qualifications, so that here we can test what happens if these are classified “downward”: For France, putting ‘Brevet’ (2A) and drop-outs from ‘CAP’ and ‘BEP’ (incomplete 3C) together decreases explanatory power by 2.5% in ESS 1: the occupational status of upper secondary vocational drop-outs is considerably lower. They should thus rather be coded as ISCED 2C. In contrast, ‘non diplômés jusqu’à la fin 3ème, 2nde, 1ère filière générale’ (incomplete 3A), which would be coded as ISCED 2B, can be summarised with ‘Brevet’ without any substantial loss of predictive power despite a lower average ISEI-score. For Hungary (2004), aggregating lower secondary (2A) with incomplete upper secondary (incomplete 3A) leads to 2% loss of explanatory power - but here, in contrast to France, drop-outs have higher ISEI-scores than lower secondary graduates. They should therefore be classi-

¹⁹The Swiss, Austrian and British NEVs e.g. do not differentiate between the different lower secondary school tracks/certificates offered, which is regrettable

fied 3C rather than 2A or 2B. These examples show that maybe there should not be any general rule for classifying drop-outs, as the social meaning and consequences of incomplete qualifications vary significantly over countries. Documentation on this issue would then be very important though.

For ISCED level 3, it is very clear that a distinction between different qualifications has to be made. This already became clear when just looking at the distribution of ISCED (6) (see table 1, page 21). The detailed step-by-step analyses support this result: aggregating the different qualifications at ISCED level 3 into one category decreases the predictive power of educational attainment with respect to ISEI scores substantially (i.e. by more than 4 % compared to the NEV) in Austria, Belgium (2004), the Czech Republic, Estonia, France, Hungary, Luxembourg, the Netherlands (2004), Poland, Slovenia and Slovakia (no such test was possible for Finland, Greece, Ireland, Iceland, Italy, Portugal, Turkey, the Ukraine and the UK, due to lack of detail of the NEVs). The differences in the amount of loss of explanatory power are enormous, reaching up to 31 % for the Czech Republic, 21 % for Slovakia and around 15 % for Luxembourg, Poland and Slovenia. This suggests that the labour market returns to different forms of upper secondary education vary substantially between countries. For Germany, Israel and Sweden, only adding incomplete tertiary education (university drop-outs) to upper secondary qualifications leads to problems, so that this should be avoided. Again, a simple ‘downgrading-approach’ does not work well.

ISCED 4 is hardly used by the ESS countries, so that there are no issues with collapsing different qualifications *within* that level (remains the issue of possible under-coverage though). However it was also tested if the few ISCED 4 qualifications used in the ESS can be merged with similar qualifications at ISCED level 3 or 5.²⁰ This worked pretty well in most cases, as these qualifications are either equivalent with ISCED 3A, or they mean that somebody completed 3A and 3B or 3C successively, which might also come close to qualifications at ISCED level 5B. In Luxembourg, ‘Brevet de maîtrise artisanale’ (4B) can be collapsed with 5B, which makes sense, as ‘Meister’ in Germany is equivalent and already classified as 5B. In Norway, 5B is empty, but 4C (e.g. ‘teknisk fagskole’) is functionally equivalent with 5B in other countries again. The same applies to Poland, ISCED 4B (pomaturalne, policealne). For Germany, 4A (‘Abitur’ plus apprenticeship/vocational school) could be aggregated with 3A (‘Abitur’) without losing predictive power or comparability (other countries offer vocational qualifications including a university access certificate, which are also classified as ISCED 3A). The same applies to the second cycle of vocational education in Spain, ‘Nadstavbové štúdium’ in Slovakia and maybe ‘specializzazione post-diploma’ in Italy.

²⁰As there are usually only few respondents in this category, these results are rather tentative.

Only in Estonia collapsing 3A with 4A does not work very well: The reason is that all upper secondary qualifications in Estonia are ISCED 3A, but vocational upper secondary is significantly less valuable than vocational education *after* upper secondary (4A) and professional upper secondary education. As 3B and 3C are empty in Estonia, for survey research I would suggest coding vocational upper secondary as 3B rather than 3A. Then 3A and 4A can be aggregated with hardly any loss of predictive power.

With respect to ISCED level 5, the results are again very clear: lower and higher as well as vocational and academic tertiary qualifications should not be mixed up in one category. Aggregating all ISCED 5 categories substantially decreases the predictive power of educational attainment with respect to ISEI-scores in most countries where this could be tested: there are more than 4% loss in Belgium, Switzerland, Germany, Denmark, Estonia, Spain, Finland, Hungary (2004), Ireland, Israel, Norway and the UK. Variation is again high, with the largest losses occurring in Germany (27-31%), Denmark (17-20%), Switzerland (2004, 17%) and the UK (2002, 16%).²¹ This is due to the big difference in labour market value between qualifications from short vocational tertiary programmes and those from long academic or professional university programmes.

Even summarising different qualifications within ISCED 5A or 5B, e.g. ‘short’ or ‘first’ (say BA) and ‘long’ or ‘second’ (say MA) or lower and upper tier qualifications had implications in some of the few countries where this could be tested. In Germany, summarising technical college diploma (‘Fachhochschulabschluss’) and university degree leads to some loss of predictive power (2-3%). In Hungary, this is even worse with losses of up to 10% in 2004 when aggregating college (főiskolai) and university (egyetemi) diplomas. In Italy, aggregating ‘diploma universitario’ and ‘laurea’ entails a loss of 2% in 2004. In Spain, university is covered in a very differentiated way: short and long polytechnic and short and long academic studies (four categories). Successive collapsing of these categories shows that first degrees should be differentiated from long ones rather than polytechnic from academic ones: Collapsing according to duration, there is practically no loss in predictive power; collapsing according to polytechnic and academic leads to losses of 7% (2002) and 12% (2004).²² Putting them all in one category 5A consequently leads to losses in predictive power of up to 12% again. In Denmark, short and long non-degree qualifications do differ in terms of their labour market value (2-3% loss); however, the higher one does not reach the level of university degrees (unfortunately BAs and MAs were not distinguished in the NEV). In Norway, collapsing degrees with four years

²¹In those countries where categories 5 (long) and 6 were combined in the NEV, collapsing this category with other ISCED 5 qualifications leads to large losses in explanatory power, too.

²²This also makes sense as the latter distinction would reflect fields of study rather than level of education, which should not overlap.

duration or less with longer ones decreases the R^2 in the prediction of ISEI scores by 8 % (2002) and 14 % (2004) compared to the model using the NEV.

Finally, is it worth keeping a separate ISCED level only for doctorates? Whenever there were national categories for long academic university studies (5A(long)) and PhDs, aggregating the two had hardly any effects. However, summarising PhDs with 5A generally (thus undergraduate and postgraduate degrees) leads to a loss of predictive power in quite a few countries (Switzerland, Germany, Hungary, Iceland, Italy, Luxembourg (2004) and Norway). Therefore, if low and high university degrees are differentiated as suggested in the previous paragraph, doctorates can be added to the ‘high’ category (but, at the stage of data collection and in the NEVs, it is recommended to cover them separately).

3 A European Survey Version of ISCED–97

The design of ISCED–97 with seven levels of education suggests that the biggest differences in education are found between these levels. As the previous analyses have shown, this would be a misjudgement: The seven main ISCED–97 levels do not reflect important differences between qualifications on the one hand, and do distinguish between qualification which are hardly relevant in the European context nowadays, on the other hand. 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 are classified in this category (see table 1), although looking at the national variables, their qualifications differ substantially. The simplified ISCED–97 is thus neither efficient nor sufficiently distinctive.

ISCED–97 provides for this by being inherently multidimensional (see section 1.2.2); a detailed version of ISCED–97 is however hardly ever used in surveys, probably because of the complexity of the classification framework.²³ At ISCED level 3, it would be indispensable to distinguish programmes giving access to academic higher education from programmes that prepare for the labour market or more advanced vocational training. Similarly, it would be very important to distinguish academic/professional and vocational programmes at the tertiary level, thus differentiating ISCED 5B from 5A. By also distinguishing university degrees like Bachelor (BA) and

²³In 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.

Master (MA) and equivalents within 5A one could even go further, differentiating 5A (short) and 5A (long).²⁴

In order to improve the comparability and distinctiveness of the comparable measure of educational attainment in the ESS and other cross-national surveys, I would like to propose a differently simplified version of ISCED-97: The European Survey Version of ISCED-97, ES-ISCED. ES-ISCED is a simplification of ISCED-97 for classifying levels of educational attainment for use in European and possibly other developed countries, which tries to overcome some of sISCED-97's shortcomings. It builds on the concepts and national mappings of ISCED-97 as set out by the UNESCO (2006 [1997]), but also incorporates some of the crucial ideas behind the CASMIN scheme (König et al., 1988; Müller et al., 1990).

The differences between ISCED-97 and ES-ISCED are as follows: Firstly, whereas ISCED-97 categorises educational programmes, ES-ISCED is more specifically designed for the measurement of individuals' educational attainment. The basic unit of classification is therefore not an educational programme, but an educational qualification, usually in the form of a certificate or diploma (i. e. the formal outcome of successfully completing an educational programme).²⁵ Secondly, for actual surveys, the full ISCED-97 is inefficient and too complex to be implemented in all its detail. The common practice is to simply collapse all sub-categories within the seven main levels of ISCED-97, which is neither a substantively meaningful nor statistically efficient strategy. In contrast, ES-ISCED offers a more efficient simplification of ISCED-97 by collapsing certain (sub-)categories of the classification, but not others, so that important distinctions are maintained, whereas irrelevant ones are dropped. The main simplifications are as follows:

- ISCED-97 levels 0 and 1 (less than primary and primary education) are summarised in one category (ES-ISCED I), which covers respondents without any educational certificates or only primary education completed.
- The distinctions within ISCED levels 2 and 3 (into A, B, and C as well as vocational and general) are simplified to a dichotomy: IIb and IIIb indicate qualifications which do not lead to more general/academic education, whereas IIa and IIIa indicate qualifications that are usually

²⁴In fact many countries make these distinctions in their NEVs, so that for the ESS 2002/03 and 2004/05, a more detailed version of ISCED-97 be achieved by more detailed recoding for the current data. This would however mean losing those countries that did not differentiate these qualifications, where some changes of the NEVs should be made in future rounds of the ESS.

²⁵What is to be classified is thus not the last educational programme attended, but the highest level of education actually completed. There are few exceptions to this, when non-completion of a programme forms a substantial additional skill over the last fully completed programme (mainly having attended several years of university without graduating).

part of the academic path which is supposed to finally lead to university. IIa and IIIa and are thus the more selective and demanding programmes, whereas IIb and IIIb do rather prepare for the labour market or further vocational training.

- ISCED level 4, which is somewhat vague, is absorbed into the adjacent levels: ISCED 4A is equivalent to 3A anyway, and ISCED 4B and 4C are firstly rare and secondly functionally equivalent with what is classified as ISCED 5B in other countries. Therefore 4B, 4C and 5B are summarised in a new category IV, labelled “advanced vocational education”.
- ISCED level 6 is so small that it is not efficient to reserve an extra category for it (unless there is an explicit interest in respondents with PhDs, which however requires a rather large sample size). It is much more worthwhile to distinguish between lower and higher level university qualifications instead, where lower ones comprise first/undergraduate degrees and higher ones are postgraduate degrees oriented towards the professions and academic research and include ISCED level 6.

The categories of ES–ISCED are then defined in the following way:

- I** No qualification or only primary education. (If there is no certificate whatsoever awarded at the end of compulsory schooling, this category covers respondents with less than compulsory education.) This category corresponds with ISCED levels 0 and 1 or CASMIN category 1a, which are very small in most European countries today (for parental education and immigrants, the distinction between less than primary education and at least primary education might however be more important).
- II** Lower secondary qualification: certificates awarded (usually) at the end of compulsory education. This corresponds to ISCED level 2 and CASMIN categories 1b and 2b. Two subcategories can be differentiated here (although not in all countries), which do only partly correspond to the differentiations given by ISCED:
 - IIb** Qualifications that would usually lead to vocational education or even directly to the labour market. This is a level of educational attainment that does not give access to IIIa, and thus marks the end of general education for most. It corresponds to ISCED 2B and 2C, but also 2A if this qualification gives access to ISCED 3B rather than 3A. The corresponding category in CASMIN is 1b. This can be either the lowest possible qualification (e.g. *Hauptschulabschluss* in Germany; *GCSE grades D-G*

in the UK), which is maybe already vocationally oriented (e.g. *lager beroepsonderwijs* in Belgium and the Netherlands). It also contains very low levels of vocational education after compulsory education (programmes of 1 year duration or less, which would be classified 3C in ISCED–97).

IIa A qualification that does at least theoretically give access to IIIa, i. e. general/academic upper secondary education. This is a transitional qualification within secondary education in many countries (*Mittlere Reife* in Germany, *GCSE grade A-C* in the UK, *Brevet* in France) etc. It is 2A in ISCED–97 and 2b in CASMIN. Drop-outs of general upper secondary education that are not expected to finish upper secondary education any more are classified here, too.

If a country has several qualifications that theoretically give access to ISCED 3A and no qualification at 2B or 2C, the one with the lower prospects should be coded IIb. The same applies if there are several qualifications at 2B or 2C, and none at IIa, so that the one with the higher prospects would then be coded IIa.

III Upper secondary education completed. This largely corresponds to ISCED level 3 and CASMIN categories 1c, 2a and 2c.

IIIb Qualifications that do not grant direct access to university education (but maybe to higher vocational education). These usually cover basic vocational education (e.g. Apprenticeships in dual system countries, NVQ levels 1 and 2 in the UK, BEP and CAP in France), but in some countries there are also general programmes without maturity examination at the end (e.g. the Czech Republic and Israel). In ISCED–97, such qualifications are classified ISCED 3C of at least two years duration or 3B. Pre-vocational one-year programmes at ISCED level 3C should be excluded (they belong to IIb). The corresponding CASMIN-categories are (roughly) 1c and 2a.

IIIa University access qualifications, covering the classical university entrance certificates (maturity, A-Levels, Abitur, Baccalauréat, VWO-diploma etc.), which are without exception 3A general in ISCED–97; “alternative route” qualifications that although formally giving access to universities, this is in practice either restricted to certain institutions or improbable (e.g. Fachhochschulreife in Germany, HAVO in the Netherlands, bac pro in France, GNVQ advanced level in the UK, vocational Matura in the Czech Republic and some other countries), which are either 3A vocational in ISCED–97 or 3A general, but in the latter case one

year shorter than the full academic path to 3A. If someone completes upper secondary vocational education after IIIa, which is only common in a few countries, this is still coded as IIIa. The corresponding CASMIN category is 2c.

In a number of countries, more fine-grained categories at level III could be devised, splitting up IIIb and IIIa into two sub-categories each. IIIb could be differentiated into lower and higher levels of vocational education (e. g. CAP and BEP in France, Apprenticeships after Hauptschul- or Realschulabschluss in Germany, NVQ 1 and NVQ 2 in the UK, different levels of MBO in the Netherlands). IIIa could be differentiated into general and vocational university entrance qualifications.

IV Post-secondary, non-university education: These are advanced vocational programmes (higher technicians, master craftsmen, short HBO in the Netherlands, HOKT in Belgium, HNC and HND in the UK). In ISCED-97, such programmes are classified as 4B or 5B (depending on having the status of higher education in the respective country). As the distinction between what is considered tertiary or not in different countries is rather arbitrary, and as most countries have either 4B or 5B programmes, but usually not both, it was decided in this case to collapse programmes across ISCED levels. In CASMIN, these qualifications are largely included in category 3a.

V University education (ISCED 5A and 6; CASMIN 3b) is divided into two main levels:

V1 Lower level university education, comprising firstly short or first university degrees of 3 years duration in most countries, usually at the Bachelor's or equivalent level (Licence in France, three-year Laurea in Italy etc.). In countries where the Bachelor is a very recent qualification, non-finished university studies can be classified here (e.g. Vordiplom, Zwischenprüfung, that is so-called intermediate examinations in Germany). Secondly, there are qualifications from institutions which are not full universities, i.e. do not award PhDs, but are nevertheless assigned to ISCED 5A in ISCED-97 (Fachhochschulabschluss in Germany, Austria and Switzerland, long HBO degrees in the Netherlands, HOLT in Belgium etc., colleges of higher education, advanced technical colleges). Such institutions do not exist in all countries, but all countries have either academic BAs *or* lower tier universities. Long technical degrees should be classified as V2, if they are not too different from other qualifications at level V2, and if there are

sufficiently different other qualifications at level V1 (e.g. short technical degrees).²⁶

- V2** This category contains higher (postgraduate) qualifications at universities, covering long university studies, i.e. Master’s level and equivalents (at least 4 years of study at a university altogether) as well as other post-graduate qualifications and the PhD/doctorate. In ISCED, this is levels 5A (long) and 6.

The optimal number of categories of ES–ISCED is thus 8, which is just one more than the simplified ISCED–97 levels, with an increased richness of information. The sub-categories (IIIb(V), IIIb(G), IIIa(V), IIIa(G), V1(A), V1(P), V2(A), V2(P) and V2(PhD)) do not need to be reflected in the data to be analysed, although for evaluation purposes, ease of data collection and more specific research questions, it is always useful to distinguish them in the NEVs. It is however vital that the distinction between a and b-qualifications is made at level III and between 1 and 2 at level V. It might be possible to collapse categories IIa and IIb and thus save one category, as the distinction did not show to be important in the majority of countries where this could be tested (the Netherlands were actually the only exception to this).

Table 3 shows this less reduced version of ISCED–97 which would have considerably more discriminatory power than sISCED–97, but at the same time not be overly demanding for the national teams to be implemented.

Using current ESS data, ES-ISCED can only be computed for 13 countries. For these 13 countries, the same construct validation analyses were performed as for sISCED–97 above (see section 2.4.2). The results are shown in tables 4 and 5. The NEVs of the other countries lack some differentiation necessary for the construction of ES–ISCED, usually within ISCED level 3 or 5, as this differentiation was not required for the construction of sISCED–97. The missing countries are mainly those where vocational education is less institutionalised and thus not “traditionally” covered in the NEV. Comparability can therefore not be taken for granted.

ES-ISCED is much more evenly distributed than sISCED–97 (see table 4). Category IIb is empty in many countries and not ideally coded in others, as the NEVs often did not distinguish between different tracks at the lower secondary level. Looking at categories IIIb and IIIa, it seems that in some countries it is much more usual than in others to complete upper secondary education with a university entrance qualification but *not* continue to university any more. In some countries, IIa and IIIa are much more “transitional” qualifications than in others (e.g. in Germany). However, there are still some countries where large proportions of respondents

²⁶Polytechnic colleges were incorporated in the regular university sector in the UK in 1992. However most students get BAs at such institutions; therefore misclassification is probably insignificant. Maybe it would be possible to distinguish “old” and “new” universities in the phase of data collection.

Table 3: ES-ISCED coding scheme

ES-ISCED	ISCED-97	G/V/A/P dur. (yrs)	(yrs) description
I	0,1	G	no formal qualification or only primary education
IIb	2B, 2C, 3C<2yrs, incIIIb	G/V	lower secondary/compulsory schooling completed, lower track/vocational qualification not leading to general upper secondary education, sometimes already including some vocational education
IIa	2A, incIIIa	G	lower secondary/compulsory schooling completed, upper track/general qualification leading to general upper secondary
IIIb	3B, 3C \geq 2yrs	V	upper secondary education with (initial) vocational qualification without university access certificate (apprenticeships, vocational schools...)
	3B, 3C \geq 2yrs	G	general upper secondary education without university access (rare)
IIIa	3A	V/G	upper secondary "alternative" route education with (maybe restricted) university access or less probable actual enrolment; vocational/technical traditional academic upper secondary education with full university access certificate
	4A	V+G	... plus initial vocational programme (or the other way round)
IV	5B, 4B, 4C	V	post-secondary/advanced vocational non-university education (master craftsmen, higher technicians, foremen, absoltorium ...)
V1	5As	A	short university/college education (academic BA)
	5As/m	P	lower tier university/college education (professional BA, Fachhochschule)
V2	5A1	A	long academic higher education (academic MA) and more, but <PhD
	5A1	P	long professional/technical higher education (professional MA) and more
	6	A	PhD, doctorate

accumulate in few categories. IIIb is for example very common in Germany and Switzerland. Substantial changes over the two rounds of the ESS also remain for Denmark and Spain.

Table 4: Distribution of educational attainment measured by ES-ISCED, %

country	ESS round	ES-ISCED categories							
		I	IIb	IIa	IIIb	IIIa	IV	V1	V2
Belgium	1	7.3	8.9	7.1	11.6	27.3	19.2	5.8	12.8
	2	5.7	8.1	5.8	12.5	29.7	20.4	5.8	12.1
Czech Republic	1	0.1		5.1	41.2	37.6	3	1.6	11.4
	2	0.1		6.3	40	39.7	2.7	2.3	8.9
Denmark*	1	0.3		15	44.4	4.2	13.8	12.8	9.5
	2	0.4		10.6	33	4	16	22.6	13.5
Estonia	2	0.4	0.5	6.9	16.8	37.3	13.5	22.5	2.1
Germany	1	0.8	4.4	0.8	47.4	6.8	16.3	8.8	14.7
	2	0.7	5.4	0.9	43.1	7.1	16.6	11.8	14.5
Hungary*	2			5.6	29.4	31.5	3.8	15.8	13.8
Israel	1	0.4	8.6	4.1	13.8	14.2	21	22.6	15.2
Luxembourg	1	20	2.2	5	24.6	17.9	7.8	6.8	15.5
	2	23	7.5	2.7	22.9	15.1	10.6	6.3	12
Poland*	1	0.5		13.1	32	28.5	6.2	4.7	15
	2	0.3		10.8	35.6	30.2	6.2	3.4	13.6
Slovakia	2	0.6		7	33.1	43.8		2.4	13.1
Slovenia	1	1.8		16.6	25.7	33	7.6	14.3	1
	2	1.8		11.6	28.8	34.9	6.8	14.5	1.6
Spain*	1	12		28.2	8.3	25.8	0.8	10.5	14.8
	2	7.8		37.8	3.9	19.8	1.2	11.4	18.1
Switzerland	1	0.4	2.1	8.7	43.3	9	15	8.1	13.5
	2	1.2	2	6.9	47.4	5.9	15.5	10.7	10.5
average		4.1	5.0	9.8	29.0	22.9	10.7	10.3	11.7

How does ES-ISCED compare with *years of education* and sISCED-97 with respect to predictive power in occupational attainment models? For all countries included in this analysis, ES-ISCED is superior to *years of education* as well as sISCED-97 (see table 5). The differences are quite remarkable, particularly having in mind that ES-ISCED only uses one category more than ISCED (7) (and if IIa and IIb are collapsed, the explanatory power stays basically the same in the countries included here). The explanatory power of ES-ISCED is indeed very close or even identical with the explanatory power of the NEVs. As the ES-ISCED categories are more differentiated at the most common levels of education in Europe, namely upper secondary and tertiary levels, not only explanatory power but also

comparability should be better for ES–ISCED than sISCED–97. However, as the NEVs in many countries were insufficient for coding into ES–ISCED, there is no evidence yet on how well ES–ISCED would work in the excluded countries. This would either have to be done with higher quality national data sets, or improved NEVs in a future cross-national survey.

Table 5: R^2 s from regressing ISEI scores on ES–ISCED compared to *years of education* and sISCED-97 (controlling for age and gender)

country	ESS round	R^2 s NEV	sISCED–97 (7)	sISCED–97 (6)	years of education	ES-ISCED
Belgium	1	41.4	89.4	89.6	61.4	99.8
	2	43.4	90.6	89.2	47.2	98.6
Czech Republic	1	46.7	–	67.2	73.0	95.5
	2	51.1	–	69.1	80.8	94.7
Denmark*	1	32.4	83.0	77.8	92.0	98.8
	2	41.9	81.1	80.4	63.5	100.2
Estonia	2	33.5	82.4	82.4	93.4	98.8
Germany	1	45.7	58.4	49.7	72.4	97.2
	2	43.9	60.4	55.8	72.0	98.6
Hungary*	2	56.8	74.6	74.6	65.1	99.1
Israel	1	35.3	–	74.8	88.1	100.0
Luxembourg	1	49.6	78.4	78.6	68.8	96.0
	2	55.6	81.1	78.2	56.3	94.1
Poland*	1	56.6	–	80.6	92.4	99.5
	2	46.6	–	85.8	88.4	100.0
Slovakia	2	42.3	–	79.7	62.9	99.8
Slovenia	1	52.8	–	86.7	82.8	100.0
	2	61.3	–	82.9	72.8	100.0
Spain*	1	50.0	92.0	90.6	73.6	99.6
	2	40.1	88.3	86.5	76.1	100.2
Switzerland	1	33.4	–	83.2	58.4	96.4
	2	33.1	–	67.7	58.0	96.4
average/total		45.2	80.0	77.8	72.7	98.3

4 Conclusions and recommendations

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): sISCED-97 generates different results from the NEVs, and the deviations produced differ over countries. The results presented here are based on a larger number of countries, evaluate the more recent version of ISCED from 1997 instead of the old 1976 version, and use a more detailed measure of occupational attainment.

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, mostly vocational and general. In order to make such distinctions possible (or even standard), it would be necessary to ask some national teams for a higher level of detail of the NEV (particularly asking for a distinction between vocational and general/academic programmes at levels 3 and 5, and also distinguishing short/lower level and long/higher level 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 lower secondary vocational education (e.g. in order to differentiate between those with GCSEs A to C and D to G grades in the UK, or between "Hauptschulabschluss" and "Mittlere Reife" in Germany). Incorporating these ideas or even using the European Survey version of ISCED-97 proposed above would presumably improve cross-national comparability and discriminatory power of the educational attainment measure in the ESS a lot.

A further step for evaluating ISCED-97 and ES-ISCED would be to do similar analyses as those conducted above with other dependent variables, e.g. social class, values such as authoritarianism/liberalism and social attitudes like anti-immigrant prejudice, all of which are known to be related to educational attainment.

References

- BRAUN, M. and MÜLLER, W. (1997). Measurement of Education in Comparative Research. *Comparative Social Research*, **16**, 163–201.
- BRAUNS, H. and STEINMANN, S. (1999). Educational Reform in France, West-Germany, the United Kingdom and Hungary. Updating the CASMIN Educational Classification. *ZUMA Nachrichten*, **44** (23), 7–44, URL http://www.gesis.org/Publikationen/Zeitschriften/ZUMA_Nachrichten/documents/pdfs/44/zn44_5brauns.pdf. Accessed 10/09/2007.
- ERIKSON, R. and JONSSON, J. O. (n.d.). How to ascertain the socio-structural position of the individual in society. Chapter 2 in the European Social Survey Questionnaire Development Report (p. 12–81), with comments by Kirstine Kolsrud, Knut Kalgraf-Skjåk, Ron Lesthaeghe and Ineke Stoop, URL http://naticent02.uuhost.uu.net/questionnaire/questionnaire_development/chapter_02.doc. Accessed 24/04/2007.
- GAMBETTA, D. (1987). *Were they pushed or did they jump? Individual decision mechanisms in education*. Studies in rationality and social change, Cambridge: Cambridge University Press.
- GANZEBOOM, H. B., DE GRAAF, P. M., and TREIMAN, D. J. (1992). A Standard International Socio-Economic Index of Occupational Status. *Social Science Research*, **21** (1), 1–56.
- JOWELL, R. and THE CENTRAL CO-ORDINATING TEAM (2003). *European Social Survey 2002/2003*. Tech. rep., Centre for Comparative Social Surveys, City University, London, URL <http://www.europeansocialsurvey.org>. Accessed 13/04/2007.
- JOWELL, R. and THE CENTRAL CO-ORDINATING TEAM (2005). *European Social Survey 2004/2005*. Technical report, Centre for Comparative Social Surveys, City University, London, URL <http://www.europeansocialsurvey.org>. Accessed 13/04/2007.
- KERCKHOFF, A. C. and DYLAN, M. (1999). Problems with International Measures of Education. *Journal of Socio-Economics*, **28** (6), 759–75.
- KERCKHOFF, A. C., EZELL, E. D., and BROWN, J. S. (2002). Toward an Improved Measure of Educational Attainment in Social Stratification Research. *Social Science Research*, **31** (1), 99–123.
- KOLSRUD, K. and SKJÅK, K. K. (2005). Harmonising Background Variables in the European Social Survey. In J. H. P. HOFFMEYER-ZLOTNIK and

- J. A. HARKNESS (Eds.) *Methodological aspects in cross-national research, ZUMA Nachrichten Spezial*, vol. 11, (163–182), Mannheim: ZUMA.
- KÖNIG, W., LÜTTINGER, P., and MÜLLER, W. (1988). Eine vergleichende Analyse der Entwicklung und Struktur von Bildungssystemen. Methodologische Grundlagen und Konstruktion einer vergleichenden Bildungsskala. *CASMIN Working Paper*, **12**.
- MÜLLER, W. (1996). Class Inequalities in Educational Outcomes: Sweden in Comparative Perspective. In R. ERIKSON and J. O. JONSSON (Eds.) *Can Education Be Equalized? The Swedish Case in Comparative Perspective*, (145–182), Boulder (CO), Oxford: Westview.
- MÜLLER, W., LÜTTINGER, P., KÖNIG, W., and KARLE, W. (1990). Class and Education in Industrial Nations. In M. HALLER (Ed.) *Class structure in Europe. New Findings from East-West Comparisons of Social Structure and Mobility*, Armonk (NY), London: M.E. Sharpe.
- NORWEGIAN SOCIAL SCIENCE DATA SERVICES (2004). Education – ESS coding frame, modified ISCED-1997. Personal Communication.
- OECD (1999). *Classifying educational programmes. Manual for ISCED-97 implementation in OECD countries*. Organisation for Economic Co-operation and Development, Paris, first edn., URL <http://www.oecd.org/dataoecd/41/42/1841854.pdf>. Accessed 25/05/2006.
- OECD (2001). *Knowledge and skills for life: first results from the OECD Programme for International Student Assessment (PISA) 2000*. OECD, Paris, URL <http://www.pisa.oecd.org/dataoecd/44/53/33691596.pdf>. Accessed 08/04/2007.
- OECD (2004). *Learning for tomorrow's world: first results from PISA 2003*. OECD, Paris, URL <http://www.pisa.oecd.org/dataoecd/1/60/34002216.pdf>. Accessed 08/04/2007.
- OECD AND STATISTICS CANADA (1995). *Literacy, Economy and Society: Results of the First International Adult Literacy Survey*. Paris: OECD and Statistics Canada.
- ROSENFELD, R. A., VAN BUREN, M. E., and KALLEBERG, A. L. (1998). Gender differences in supervisory authority: Variation among advanced industrialized democracies. *Social Science Research*, **27** (1), 23–49.
- SHAVIT, Y. and BLOSSFELD, H.-P. (Eds.) (1993). *Persistent inequality: changing educational attainment in thirteen countries*. Social inequality series, Boulder (CO), Oxford: Westview.

- SHAVIT, Y. and MÜLLER, W. (Eds.) (1998). *From school to work: a comparative study of educational qualifications and occupational destinations*. Oxford: Clarendon Press.
- SMITS, J., ULTEE, W., and LAMMERS, J. (1998). Educational homogamy in 65 countries: An explanation of differences in openness using country-level explanatory variables. *American Sociological Review*, **63** (2), 264–285.
- TREIMAN, D. J. (1977). *Occupational prestige in comparative perspective*. Quantitative studies in social relations, New York, London: Academic Press.
- TREIMAN, D. J. and YIP, K.-B. (1989). Educational and Occupational Attainment in 21 Countries. In M. L. KOHN (Ed.) *Cross-national research in sociology*, (373–394), Newbury Park: Sage.
- UNESCO (1999). *Operational Manual for ISCED 1997 (International Standard Classification of Education)*. Paris: UNESCO, first edn.
- UNESCO (2006 [1997]). *International standard classification of education: ISCED 1997 (re-edition)*. Montreal: UNESCO Institute for Statistics, URL http://www.uis.unesco.org/TEMPLATE/pdf/isced/ISCED_A.pdf. Accessed 26/04/2007. A slightly modified version was also published in Hoffmeyer-Zlotnik, J. and Wolf, C. (Eds.) (2003). *Advances in Cross-National Comparison*. Kluwer Academic/Plenum, New York.

A Appendix

Table 6: Reclassification of NEVs to ISCED–97 and ES–ISCED

See extra Excel file “NationalVarsIntoISCED.xls” (available on request).