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To cite this article: Cinzia Meraviglia, Harry B.G. Ganzeboom & Deborah De Luca (2016) A new international measure of social stratification, Contemporary Social Science, 11:2-3, 125-153, DOI: 10.1080/21582041.2016.1215512

To link to this article: http://dx.doi.org/10.1080/21582041.2016.1215512

Published online: 18 Aug 2016.

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A new international measure of social stratification

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(Received 4 November 2015; accepted 18 July 2016)

In this paper we present a new international measure of social stratification, the ICAMS (International Cambridge Scale). Our aim is to bring new evidence to the hypothesis that the construct that underlies measures of social stratification as different as prestige scales, socio-economic indexes, social distance and social status scales is actually unidimensional. We evaluate the new scale according to both criterion-related and construct validity. Our analysis shows that the ICAMS is a valid indicator of social stratification, being almost as valid as International Socio-Economic Index (ISEI) in what we termed the generic, the homogamy and the social mobility models, and being better than ISEI in the cultural consumption model. The second key result is that all continuous measures we consider (ICAMS, ISEI and Standard International Occupational Prestige Scale) are indicators of the same latent dimension, which is unidimensional. This latter result is compatible with more than one explanation, hence calling for further research.

Keywords: social status; socio-economic status; prestige; social distance; occupational status

1. Introduction

Almost a century separates the very first attempts to build a continuous measure of social stratification based on occupation (Counts, 1925; Coutu, 1936) from the more recent measures (Chan, 2010; Chan & Goldthorpe, 2004; De Luca, Meraviglia, & Ganzeboom, 2012). In this time span, the concepts of occupational prestige, socio-economic status and social distance have come to identify three different traditions of social stratification research, each with its supporters. Whether these dimensions are truly different, or they are different specifications of the same underlying construct, is an issue that raised the attention of social stratification scholars as early as the mid-1940s (see e.g. Merton, 1949).

In this paper we present a new international measure of social stratification, the ICAMS (International Cambridge Scale). Our aim is not to increase the already substantial complexity of the field (effectively portrayed by Lambert & Bihagen, 2012), but instead to reduce it: while validating the new scale as a measure of social stratification, we will show that the construct that underlies measures as different as prestige scales, socio-economic indexes (SEIs) and social distance scales is unidimensional, thus reinforcing the conclusions arrived at previously by other authors (see e.g. De Luca et al., 2012; Featherman & Hauser, 1976; Featherman, Jones, & Hauser, 1975; Kahl & Davis, 1955; Kraus, Schild, & Hodge, 1978; Stevens & Featherman, 1981).

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Our aim is not merely empirical, though. By reviewing the relevant literature we show that, by the time the first stratification measures were produced in the 1920s, many relationships existed between the key concepts which today we consider as entirely distinct from one another. We thus intend to bring into light the main lines of development of stratification research in respect to our central question, namely whether social stratification is the single and unique dimension underlying all empirical continuous measures, or rather is a multi-dimensional structure which should be studied using the distinct concepts of social status, prestige, socio-economic status and social distance.

2. The building of social stratification measures: from status to prestige, and back to status

The earliest attempts to build an empirical measure of social stratification were based on social status. Counts (1925) was the first who built a ‘prestige or status scale’, as Smith (1943, p. 185) describes it; in the next 20 years, 12 scholars followed Count’s example. The dominant empirical mode of this period was that of community studies (Coleman, 1986); the samples of both occupations and respondents were rather small; interviews were often conducted without a questionnaire; direct observation of the setting of study was also common. From an empirical standpoint, the results attained by these studies ‘stubbornly resist generalization, so rooted are they in local idiosyncrasy’ (Hatt, 1950, p. 535); this feature prevented them from becoming a model for studies on a larger, nation-wide scale. From a theoretical standpoint, they are characterised by a high fluidity between the core concepts – a fluidity that presently sounds rather odd: an empirical stratification measure could be said to measure status or prestige (Smith, 1943); status hierarchies were seen as based upon prestige (Hollingshead, 1948; Warner, Meeker, & Eells, 1949; Wheeler, 1949); classes were thought to be prestige communities (Macyer & Page, 1949; Williams, 1951), or status groups (Gordon, 1951), while an occupational scale could serve as an index of social class (Blishen, 1958).

While noting that ‘probably no area of sociological interest suffers so much from the disease of overconceptualization’, Pfautz (1953, p. 392) recalls the impressive array of terms used in stratification research, listed by Merton; as for how to overcome this disorganised multiplication, Merton (1949/1968) himself invites the researchers to investigate whether the various concepts refer to different dimensions of stratification, and to find out the interrelations among them.

His advice influenced the work of many scholars after the 1940s, when the dominant mode of empirical research turned into survey research (Coleman, 1986). This second period – which lasts until our days – presents some distinctive features. First and most notably, occupation becomes the key indicator of social position. If this comes as a natural choice in the framework of functionalist sociology (see e.g. Parsons, 1940), practical reasons also played a role, given either the relative availability of empirical data on occupation, or the relative easiness of collecting such information in large-scale surveys.

The choice of occupation as the key indicator of social position is accompanied by a conceptual shift: while the early empirical attempts to build continuous measures of social position were based on social status, from the 1940s on the attention goes to prestige. As a consequence, occupational stratification (which follows from the concept of occupational prestige) is preferred over social stratification (which is inherent in the concept of social status).

A second feature of this period is that empirical research was conducted on a much larger scale than previously (see e.g. Smith, 1943). The National Opinion Research Center (NORC) scale is the first study to be truly representative of the modern style of research (North & Hatt, 1947). Its importance also lies in the use that Duncan (1961) made of it. As is well known, Duncan built his SEI in order to overcome a major limitation of the NORC scale, namely that the occupations rated...
concerned less than half of the US labour force. Duncan’s SEI ‘was developed and accepted in large part because, for the first time, it provided an index of the status of all U.S. occupations’ (Hauser & Logan, 1992, p. 1692). On a conceptual level, in Duncan’s perspective prestige is the concept underlying both the NORC scale and the SEI. However, some years later Featherman et al. (1975) and Featherman and Hauser (1976) invert the concept–indicator relationship, claiming that ‘prestige scores are “error-prone” estimates of the socioeconomic attributes of occupations’ (Featherman & Hauser, 1976, p. 405), and that ‘whatever it is that prestige scores scale … it is substantively different from socioeconomic status’ (Featherman & Hauser, 1976).

The last approach to continuous measurement of social stratification we review is that of social distance scales. It was initiated by Laumann (1965, 1966, 1973) and Laumann and Guttman (1966), who argue that the existence of classes can be inferred starting from how people cluster in everyday life. In this perspective, class is not the Weberian grouping of individuals according to their market situation, since it is conceptualised as the confluence of the economic and symbolic dimensions: a class is also a status group in the Weberian sense, capable of expressing itself (also) through connubium and commensality (Weber, 1922/1978, p. 306), or through ‘associational propensities’ (Laumann & Guttman, 1966, p. 170).

This conceptualisation has been adopted by two research streams. The first one is that of the Cambridge group, who built the Cambridge Social Interaction and Stratification Scale (CAMSIS) (Prandy, 1990; Prandy and Lambert, 2003; Stewart, Prandy, & Blackburn, 1973, 1980; for a North American example see Rytina, 1992). The Cambridge group considers the social structure as emerging from the association among a given set of occupations as a stratification order in itself, which cannot be reduced to any of the existing and already explored constructs (prestige or socio-economic status) (Bottero & Prandy, 2003). This emerging social structure has a cultural as well as an economic character, thus obliterating the concept of social class as distinct from that of social status, and merging the two concepts into that of social distance (Bottero & Prandy, 2003).

Following the example of the Cambridge group, recently De Luca et al. (2012) developed a social distance measure for Italy (the CAMSIS-IT) and validated it by comparing the new scale to the International Socio-Economic Index (ISEI; Ganzeboom & Treiman, 1996), the Standard International Occupational Prestige Scale (SIOPS; Treiman, 1977) and the Italian prestige scale (SIDES05; Meraviglia, 2012a) in the framework of a status attainment model. A key finding these authors arrived at is that ‘there is no indication of a part of intergenerational status transfer that is unique to one or the other measure’ (De Luca et al., 2012, p. 48).

The second approach is that of Chan and Goldthorpe (2004), who follow Laumann (1966; 1973) in building a status scale for Britain. Unlike the Cambridge group, these authors claim that the distinction between class and status is still useful for understanding contemporary society. They conduct several tests for supporting their claim with empirical evidence, either using friendship data (Chan and Goldthorpe 2005, 2007a, 2007b, 2007c), or marriage data, as in the case of Chan (2010), and Chan, Birkelund, Aas and Wiborg (2011), who also extend the domain of research to some European and American countries.

3. Objectives

The logical conclusion of almost a century of empirical enquiry would be that – notwithstanding the fact that the key concepts (prestige, social status, socio-economic status and social distance) have distinct theoretical roots – they are not distinct on the empirical level. Actually the conclusion which De Luca et al. (2012) arrived at is the last of a series of results confirming that the dimension implied by all gradational measures of social position is unitary (Featherman & Hauser, 1976; Featherman et al., 1975; Griffiths & Lambert, 2012; Kahl & Davis, 1955;
Stevens & Featherman, 1981). Hence it might seem unnecessary to proceed further along the path of developing a new continuous measure of social stratification.

Our main rationale in doing so is that no international continuous measure based on either social distance or social status has been built yet. Actually two internationally valid measures of occupational stratification are available, namely the SIOPS (Treiman, 1977) and the ISEI (Ganzeboom & Treiman, 1996). The SIOPS is the first international measure of occupational stratification to be produced, with the aim of fostering comparative research on occupational hierarchies. As its author notes (Treiman, 1977, p. 160), despite the fact that many prestige scales were available at that time, they were incomparable, either because they were built on partial and incomplete data, or because they followed similar but never identical procedures for estimating the prestige scores of given occupations. Treiman built the SIOPS by averaging the prestige scores of about 60 national prestige scales, and anchored these scores to the ISCO-68 occupational titles. He also showed that the SIOPS scores were closely correlated to the original 60 prestige scale scores, thus validating its measure for cross-country comparisons.

Some years later the ISEI followed the SIOPS (Ganzeboom, De Graaf, Treiman, & De Leeuw, 1992), being however based on a different rationale. In fact, the ISEI extends to the international context the work done by Duncan (1961) on his SEI, at the same time giving SEI-like measures a new interpretation. As we saw, Duncan built the SEI in order to assign all occupations in the 1950 Census a prestige score, hence considering the SEI scores as proxy of the prestige scores, while Featherman et al. (1975) and Featherman and Hauser (1976) claimed that the latter were error-prone measures of the socio-economic dimension of occupations. In this vein, Ganzeboom and colleagues drop any reference to prestige and develop their new measure as the indicator of the process that translates educational credentials into income. In other terms, occupation can be seen as an intervening variable between education and income, transferring into the latter the knowledge, skills and abilities acquired through education. The authors use the data coming from the International Stratification and Mobility File (ISMF) (Ganzeboom & Treiman, 1989), relative to gainfully employed males from 31 surveys in 16 countries (Ganzeboom & Treiman, 1996), and validate their index against Treiman’s SIOPS, showing that the two scales are similar, as expected of two measures referring to the same construct; however, they are far from identical, thus reinforcing the conclusion that “prestige is better interpreted as a consequence of the dimensions used to construct occupational socio-economic status measures than as parallel to them” (Ganzeboom et al., 1992, p. 22).

In sum, the SIOPS and the ISEI are two (alternative) internationally valid measures of the hierarchical dimension of stratification, each referring to two different concepts, that is, prestige and socio-economic status. Comparative research has made wide use of both, with a preference for ISEI. However, no equivalent measure based on either social status or social distance has been made available yet. Such a measure is both interesting per se (e.g. as we will see, to study cultural consumption cross-nationally), and as a means to validate the hypothesis concerning the existence of a single dimension underlying all internationally valid measures of stratification. Concerning the latter goal, any test relying only on two measures (namely, SIOPS and ISEI) would not rule out the possibility for a status scale to represent a different dimension of stratification.

Besides reporting on the actual building of the new international measure, our aim is threefold. Firstly, we intend to show the properties of the ICAMS as a stratification measure; secondly, we intend to empirically test whether it is a valid measure of social stratification; thirdly, relying on the empirical test we will set out (multi-trait multi-method (MTMM) factor-analytic models), we want to assess whether the latent dimension underlying all available international measures (ICAMS, ISEI and SIOPS) is unique, hence producing fresh evidence on the dimensionality of the construct underpinning all gradational measures of social stratification.
4. Data and methods

4.1. Building the ICAMS

The construction of the ICAMS followed the procedures described for building a CAMSIS scale, according to which a square table of occupational titles (either coming from husbands–wives couples, or from respondents–friends couples)\(^8\) is used for estimating the scale scores. In our case, the latter were estimated using the data on spouses’ occupation provided by six cross-section surveys of the International Social Survey Programme (ISSP) from 2001 to 2007.\(^9\)

Not all ISSP countries conducted all the six surveys; hence some countries provide more data than others. Of the total number of cases in the 40 countries considered, we selected those with a valid ISCO-88 code for both the respondent’s and his/her spouse’s occupation, as found in the deposited data. We used the information provided by both female and male respondents who reported on own and his/her partner’s occupation; more precisely, we assigned an occupation to the husbands’ group whenever the respondent was male, or he was the spouse of a female respondent, and the same was done for female respondents or partners. This procedure resulted in 109,988 couples, each spouse being assigned to an ISCO-88 occupational title.

Despite this reasonably large sample size, the husbands × wives occupational table was very sparse; hence some under-represented occupational units were grouped to neighbouring ones, whenever this was acceptable from a substantive standpoint.\(^10\) This resulted in a 193 × 193 table of occupational titles, which was the input of the RC-II Goodman’s association model (Goodman 1979; Clogg 1982; Hauser, 1984) through which the scale scores were estimated.\(^11\)

Once a scale score for each detailed occupational title (or group of titles) in our 193 × 193 table was estimated, we assigned the same score to the occupational titles we previously grouped. In the case of occupational titles that were not present in the original ISSP data sets, we assigned them the score of a neighbouring and closely related title.\(^12\) This has been done for the sake of completeness, in order to provide a score for each and every occupational title in the ISCO-88. Following the same logic, we also estimated a set of three more association models on a 9 × 9 table (ISCO-88 major groups), a 26 × 26 table (sub-major groups) and a 115 × 115 table (minor groups), hence making the ICAMS usable even in those research instances in which a detailed four-digit ISCO-88 code is not available. The complete list of ISCO-88 occupational titles and the associated ICAMS score are shown in Table A1 in the Appendix.\(^13\)

4.2. Validating the ICAMS

Two main approaches are available for testing the validity of the new international measure, namely criterion-related validity and construct validity (Zeller & Carmines, 1980).\(^14\) We evaluate the former by examining the correlations of the ICAMS with the available international measures of social stratification, that is, the ISEI and the SIOPS, while we test construct validity by means of a MTMM model (Saris & Gallhofer, 2014).

The validation of the ICAMS requires a different data basis from the one used for its construction;\(^15\) for this purpose then we use rounds 1–5 of the European Social Survey (ESS), which collects occupational information on respondent and his/her spouse, father and mother. ISCO-88 codes for respondent and spouse are provided by the national teams and are part of the main data.\(^16\) The ISCO-88 codes for fathers and mothers were recently produced by an ESS Developmental Project in the Netherlands and are publicly available from Ganzeboom (2014). Taken together, the ESS data cover over 250,000 respondents in 34 countries. We selected cases between 25 and 64 years of age (i.e. respondents in their prime working age), for which at least one occupation code was available, getting to a final sample of 163,760 observations.
The three scales (ICAMS, ISEI and SIOPS) are gender-insensitive, in that they are applied indifferently to male and female data. In our validation exercise we wanted to empirically test their validity for the two genders separately; hence, we estimated our models on subsamples of female and male data.

All occupations in our analyses were given a three- or four-digit code of ISCO-88, which were translated into ICAMS, ISEI and SIOPS scores using routines made available by Harry B. G. Ganzeboom at http://www.harryganzeboom.nl/isco88/index.htm. For the estimation of the pooled cross-national structural equation models, the data were Z-standardised within countries.

As for the modelling strategy, we analyse the behaviour of the ICAMS in the framework of a factor-analytic structural equation model, which contains four latent constructs (respondent’s, spouse’s, father’s and mother’s occupation). Other basic stratification variables are considered, in particular respondent’s, spouse’s, father’s and mother’s education, and the household income that respondents and spouses together produce and consume. It is important to note that in our models there are no causal relationships: the interest goes to how well the indicators connect to the latent variables, rather than to the causal structure that links the variables in the model.

The measuring of these indicators is straightforward. We use the three available continuous measures of social position, that is, ICAMS, ISEI and SIOPS, as indicators of each latent occupation, their scores being derived from the ISCO-88 code pertaining to each occupation. Education is measured by the potential duration of each (country-specific) qualification, which ranges from 0 (no formal education) to 23 (PhD), while household income is routinely measured by the ESS by country-specific amounts, which we cross-nationally harmonised.

The idea behind this model is that the behaviour of the various measures of social stratification (namely, ICAMS, ISEI and SIOPS) should not only be studied by looking at the correlations between them (as in criterion-related validity), but also in the context of a nomological network (Carmines & Zeller, 1979; Cronbach & Meehl, 1955), in which the occupational variables are considered in their meaningful relationship with other relevant variables (or, better, constructs) such as education and income.

If we consider our model in the perspective of MTMM models (Saris & Andrews, 1991; Saris & Gallhofer, 2014; Scherpenzeel & Saris, 1997), the three continuous measures (ICAMS, ISEI and SIOPS) are methods that measure the same trait (the occupation of the four incumbents we consider). In Figure 1 we show the basic structure of this factor-analytic model; for the sake of clarity, Figure 1 portrays only two occupations (traits) and two indicators (methods); however, its representation can be easily generalised to n-traits and m-methods.

Assuming that each occupation has a ‘true’ score which reflects its positioning along the stratification continuum, the coefficients of our interest (namely, the factor loadings a and b in Figure 1) measure the degree to which each indicator reflects the ‘true’ position of an occupation (OCC1 in Figure 1) along the continuum of stratification. Given the specification of the model, the coefficients a and b also indicate the amount of information that the different measures share.

The coefficients d and e denote error terms, and represent the systematic variance that the indicators (i.e. the three scales) share across constructs (i.e. occupations). Our expectation is that these coefficients are irrelevant, since they can be interpreted either as systematic measurement error or bias, or – more problematically – as a sign of systematic deviation from the hypothesis of the three scales being indicators of the same underlying construct. We estimated all coefficients with structural equation modelling, for which we employed LISREL 8.8.

Three different models belonging to the family we described were estimated. In what we called the generic model, all four occupations are used, that is, we have four latent constructs...
referring to the occupations of the respondent’s and his/her spouse’s, father’s and mother’s; in the *homogamy* model, only the occupations of the respondent and his/her spouse are used, while in the *social mobility* model we concentrate on the relationship between both parents’ occupation and respondent’s occupation. This strategy is intended to evaluate construct validity on different grounds, in order to test the stability of our results.

As for fit measures, given the size of our sample (over 160,000 observations), our design is heavily overpowered, hence the usual model evaluation measures through significance testing make no sense. Nonetheless all our models fit the observed data with a Root Mean Square Error of Approximation (RMSEA) below 0.05, which means that the models reproduce fairly well the structure of our data.

Still in the attempt to test the validity of the new scale on many different grounds, we conduct a second validation exercise in the domain of social stratification and culture consumption. We follow Chan and Goldthorpe (2007a), who argued that social status is particularly relevant for the determination of status goods, such as the participation in high culture.

For this second exercise we used the 2007 ISSP module, thus breaching the rule that data used for the building of a scale should preferably not be used for its validation. However, ISSP 2007 provides a unique opportunity to test the Chan-Goldthorpe hypothesis in a large-scale, cross-national framework, since the ISSP 2007 year module was collected in 33 countries worldwide, ranging from Australia to the UK, Chile and Turkey.

After selection on the dependent variable (i.e. culture consumption), prime working age (25–64 years) and the presence of a valid occupation code for respondent or spouse, we obtain a sample of 34,114 observations. Like in the ESS, occupations are coded with ISCO-88. We use both the occupation of respondent and his/her spouse, on the substantial argument that both are associated with culture consumption (which is very much a household activity). On an empirical standpoint, including spouse’s occupation allows us to create a MTMM design, as we already did in our previous validation exercise.

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Figure 1. The MTMM validation model.

Note: OCC1, OCC2, Latent constructs; Occ11 … occ22, observed indicators; AUX, aux, auxiliary variables.
The ISSP 2007 module contains five indicators of cultural consumption (Table 1), which we summarised in an index. Book reading, going to the movies, attending cultural events and listening to music are obvious and frequently used indicators of culture consumption. To these we added the item on the internet/PC use, as another mode of information processing; it scales consistently with the previous four items and strengthens the reliability of the resulting index. The factor loadings and reliabilities (if item deleted) showed in Table 1 confirm the goodness of this choice. The overall reliability (0.605) is not very high; however, this is not problematic, since it refers to the dependent variable – cultural consumption – in our MTMM model: in fact, random measurement error becomes part of the residual term of the equation and does not affect the relative size of the structural coefficients. Besides the occupation of the spouses, the variables in this model are the cultural participation index, logged household income and respondent’s education.

5. Results
The first step in the validation of the ICAMS concerns criterion validity, which we investigated by means of the correlations between the new measure and the existing ones, plus two additional criterion variables (respondent’s education and his/her household income). For this task we use the ESS data.

As Table 2 (panel a) shows, ICAMS shows a closer correlation to ISEI than to SIOPS ($r = .90$ and $r = .86$, respectively). Nonetheless both scales appear to be very closely related to ICAMS, with only two clearly identifiable outliers, namely group 1221 (production and operations department managers in agriculture, hunting, forestry and fishing) and group 1227 (production and operations department managers in business services). In both cases, ICAMS assigns to these groups a lower score than either ISEI or SIOPS, meaning that their status is lower when measured on a social status scale than when evaluated on either a prestige or a socio-economic scale.

The new scale also correlates very well with two additional criterion variables, namely respondent’s education and household income; actually the correlation coefficient between ICAMS and years of education is the highest ($r = .60$) among the three measures of stratification (for ISEI $r = .58$; for SIOPS, $r = .56$).

An interesting finding is that ICAMS shows higher correlations with the criterion variables in the non-manual range than in the manual one. As we see in Table 2 (panels b and c), the correlation between ICAMS and ISEI for non-manual occupations is 0.76, while it is 0.63 for manual ones; likewise, the correlation between ICAMS and SIOPS drops from 0.77 for non-manual jobs to 0.43 for manual ones. The reason behind this finding can be found in the different standing of some occupational groups. Among the non-manual ones, nursing and midwifery associate

<table>
<thead>
<tr>
<th>How often do you …</th>
<th>$\lambda$</th>
<th>$\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>V7 Go to the movies</td>
<td>0.705</td>
<td>0.519</td>
</tr>
<tr>
<td>V9 Read books</td>
<td>0.616</td>
<td>0.554</td>
</tr>
<tr>
<td>V10 Attend cultural events such as concerts, live theatre and exhibitions</td>
<td>0.695</td>
<td>0.513</td>
</tr>
<tr>
<td>V14 Listen to music</td>
<td>0.396</td>
<td>0.626</td>
</tr>
<tr>
<td>V18 Spend time on the internet/PC</td>
<td>0.665</td>
<td>0.532</td>
</tr>
<tr>
<td>Overall</td>
<td>0.605</td>
<td>0.605</td>
</tr>
</tbody>
</table>

Note: Items standardised within countries using percentile scores. Original answers range between (1) Daily and (5) Never. $\lambda$: component loading. $\alpha$: Cronbach’s reliability coefficient (if items deleted).
professionals and teaching associate professionals (respectively, groups 3200 and 3300 in the ISCO-88) enjoy a higher standing on the ICAMS than on the SIOPS or the ISEI. As a proof that these occupations are (at least partly) responsible for the poor correlation of the criterion variable with the ICAMS, we computed these correlations without groups 3200 and 3300; as we see in Table 3, the correlation coefficients get higher when computed leaving these two groups out.

The opposite is true in the case of some (relatively infrequent) occupations of ISCO-88 group 6100 (charcoal burners, fishery workers, hunters and trappers), which score higher on the ISEI, a bit lower on the SIOPS and still lower on the ICAMS (with an average score of respectively 27.67, 22.47 and 18.64). In this case too we conducted a test by leaving out the occupational group we believe responsible for the low correlation between ICAMS and the criterion variables;

<table>
<thead>
<tr>
<th></th>
<th>ICAMS</th>
<th>ISEI</th>
<th>SIOPS</th>
<th>Years of education</th>
<th>(Log)Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Non-manual occupations without groups 3200 and 3400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICAMS</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISEI</td>
<td>0.79</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIOPS</td>
<td>0.81</td>
<td>0.84</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of education</td>
<td>0.50</td>
<td>0.48</td>
<td>0.48</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>(Log)Income</td>
<td>0.17</td>
<td>0.19</td>
<td>0.18</td>
<td>0.22</td>
<td>1.00</td>
</tr>
<tr>
<td>(b) Manual occupations without occupational units 6142, 6152, 6253, 6154</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICAMS</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISEI</td>
<td>0.63</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIOPS</td>
<td>0.47</td>
<td>0.50</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of education</td>
<td>0.28</td>
<td>0.20</td>
<td>0.13</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>(Log)Income</td>
<td>0.13</td>
<td>0.10</td>
<td>0.09</td>
<td>0.14</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Table 2. Pearson’s correlation coefficients between respondent’s ICAMS and the criterion variables (ESS rounds 1–5).
panel b of Table 3 shows that some improvement is achieved by excluding four occupational units of ISCO-88 major group 6 (skilled agricultural and fishery workers).

Moving a step forward in the validation of our scale, we now turn to consider the results of the first MTMM design. Table 4 shows the estimated measurement coefficients for the two genders separately and together as for the generic model, the homogamy model and the social mobility model. The correlations between the latent variables with one another and the five auxiliary variables from the general model are also shown – just to convey the fact that these are strong validation criteria (see the Appendix, Table A2).

The results of all three models are highly consistent, showing that ICAMS is almost as valid a measure of the hierarchical dimension of stratification as ISEI. In the case of male data, ISEI is the most valid measure (factor loading of 0.96), followed by ICAMS (0.94) and SIOPS (0.92). In women’s case, ISEI also scores better (0.96), while ICAMS and SIOPS are equally valid (factor loadings of, respectively, 0.94, 0.96 and 0.93/0.94).

These coefficients are very high and show that the three measures share a significant amount of information. Nevertheless, they also suggest that any correlation involving occupation would be attenuated by 4% (ISEI), 6% (ICAMS) or 6–8% (SIOPS in women’s and men’s case, respectively), should one prefer one indicator over another.

Due to the large sample size and the constraints built into the model, the residual correlation for the method effects (coefficients d and e in Figure 1) are statistically significant, but – as expected – substantively negligible: both in the case of ICAMS and ISEI, they are always below 0.007, and for SIOPS they are 0.013–0.015. These small numbers denote the systematic variance which is not reproduced by the model, hence indicating the unique variance component.

<p>| Table 4. Parameters of the MTMM factor-analytic validation model on occupations (standardised coefficients, t-values and residual correlations) (ESS rounds 1–5, men and women). |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th></th>
<th>Measurement loading</th>
<th>Residual correlation</th>
<th>Measurement loading</th>
<th>Residual correlation</th>
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<tr>
<td><strong>Generic model</strong></td>
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<td>ICAMS</td>
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<td>0.937</td>
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<td></td>
<td>(579.1)</td>
<td>(33.7)</td>
<td>(629.4)</td>
<td>(31.1)</td>
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<tr>
<td>ISEI</td>
<td>0.959</td>
<td>0.006</td>
<td>0.965</td>
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</tr>
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<td></td>
<td>(607.5)</td>
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</tr>
<tr>
<td>SIOPS</td>
<td>0.913</td>
<td>0.015</td>
<td>0.929</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>(549.8)</td>
<td>(63.4)</td>
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<td>(61.7)</td>
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<tr>
<td><strong>Homogamy model</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ICAMS</td>
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<td>0.940</td>
<td>0.008</td>
</tr>
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<td>(432.8)</td>
<td>(13.2)</td>
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<td>(451.0)</td>
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<td></td>
<td>(406.7)</td>
<td>(21.8)</td>
<td>(452.9)</td>
<td>(27.5)</td>
</tr>
<tr>
<td><strong>Social mobility model</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
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<td>(35.0)</td>
<td>(571.5)</td>
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<td>ISEI</td>
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<td>(567.6)</td>
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</tr>
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<td>(504.4)</td>
<td>(63.5)</td>
<td>(552.9)</td>
<td>(55.2)</td>
</tr>
</tbody>
</table>

Note: Auxiliary variables in the model: respondent’s, spouse’s, father’s and mother’s education, household income. All models fit the data with an RMSEA < 0.034 or lower.
which would point at the existence of other latent dimensions, apart from that identified by the model. Given their very small (though significant) value, this hypothesis is ruled out.

The second exercise in our validation strategy compares the three scales in the framework of a cultural consumption model. Table 5 shows the results of the MTMM model in which the scales are indicators of the underlying occupational status, as illustrated in Figure 1. Our results show that ICAMS is the most valid measure, when the explanation of cultural consumption behaviour is concerned: the factor loadings for ICAMS are 0.99, in case we consider the two genders either separately or together, while ISEI and SIOPS perform better, respectively, on male and female data. This points at the superiority of the new measure over the existing ones. As in previous models, residual correlations between each measure across occupations (which may mean that the three measures do not refer to the same latent construct) are negligible in size, especially in the case of ICAMS.

In sum, from a substantive standpoint we can say that, in relation to culture consumption, the effect of occupation is best captured by a social status measure like the ICAMS, which confirms the hypothesis formulated by Chan and Goldthorpe (2007a).

### Table 5

<table>
<thead>
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<th>Measurement loading</th>
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<td>Residual correlation</td>
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<td>0.990</td>
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<td>(184.7)</td>
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<tr>
<td>ISEI</td>
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<td>(216.9)</td>
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<td>0.018</td>
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<td></td>
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<td>(22.7)</td>
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<td>(158.8)</td>
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<tr>
<td></td>
<td>(13.8)</td>
<td>(17.7)</td>
</tr>
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</table>

Note: Auxiliary variables in the model: cultural participation index, respondent’s education, household income. All models fit the data with RMSEA < 0.056 or better.

6. Conclusion and discussion

The building of continuous measures of social stratification is an exercise which started back in the 1920s. Since then, as we recalled, many measures have been built, leaving the stratification scholar with the puzzle of what exactly they measure (Lambert & Bihagen, 2012), and whether they refer to the same underlying construct (Merton, 1949).

In this paper we intended to address the second issue. Our first step was the building of an international continuous measure of social stratification, the ICAMS, based on the work of Laumann and Guttman (1966) and on that of the Cambridge group (Bottero & Prandy, 2003; Prandy, 1990). Such a measure, we believe, fills a gap in stratification research, which developed over the years an international measure of prestige (SIOPS; Treiman, 1977) and an international measure of socio-economic status (ISEI; Ganzeboom & Treiman, 1996), while leaving the conceptual domain of social distance and social status without internationally valid measures.

Our second step consisted in the validation of the new measure. This step had multiple objectives. Firstly, we intended to show the properties of the ICAMS as a stratification measure; secondly, we wanted to empirically test whether it is a valid measure of social stratification; thirdly, relying on the empirical test we set out (MTMM factor-analytic models), we wanted to assess
whether the latent dimension underlying all available continuous measures (ICAMS, ISEI and SIOPS) was unique.

The answers to these three questions are easily summarised. Firstly, we find that the ICAMS correlates very well with the criterion variables (Table 2, panel a), following the behaviour of the other two already-established international measures, namely ISEI and SIOPS. Secondly, as Tables 4 and 5 show, the ICAMS is a valid indicator of social stratification, being almost as valid as ISEI in what we termed the generic, the homogamy and the social mobility models, and being better than ISEI in the cultural consumption model. Lastly, as these same validation models suggest, there is no indication of multiple dimensions underlying the three measures or, otherwise said and despite the different conceptual underpinnings upon which the various scales rest, the latent construct implied by all of them is unidimensional.

We regard the latter result as particularly noteworthy. On one side, it confirms previous evidence attained by stratification scholars (see Section 2); on the other side, though, it leaves open the first of the two puzzle we mentioned earlier, namely that of what exactly all continuous measures measure.

Actually, the outcome concerning the uniqueness of the latent construct underlying all continuous measures of social position could have at least three meanings. First, on a conceptual level, it could point at the fact that the boundaries between the four conceptual areas, as we described them (prestige, social status, socio-economic status and social distance), are indeed rather blurry, just as they were at the beginning of the empirical endeavours to produce a continuous measure of social position (see Section 2). Second, however, and in line with other recent findings (e.g. Lambert & Bihagen, 2012), it could also point at the weakness of the connection between the theoretical underpinnings and the empirical outcomes of the four research traditions in designing continuous measures of social stratification, since none of the measures we considered shows clear and strong connections with the theory which they are supposed to embody. As a third alternative explanation, all continuous measures of social position could highly correlate to one another because they have been built on the same piece of information, namely occupation, thus resulting in a methodological artefact.

In order to solve this puzzle, further research is needed. The first alternative explanation would imply that the vast body of empirical research produced good evidence that the relevant concepts are less sharply defined than expected. The burden then would be on theory, which should incorporate this evidence and find meaningful and sound connections between the various concepts.26 The second explanation would entail a thorough check of the relationships between our theories and the way in which they are empirically tested. Finally, the last explanation could be tested by building a measure not directly derived from occupation,27 also considering that already Hatt (1950) noted that occupation is just one of the many social structures an individual is embedded in. In case the non-occupational measure correlated well with the existing occupation-based ones, then the conclusions concerning the unidimensionality of the latent construct would be confirmed. Otherwise, a new path of research would open for attaining a better understanding of the nature of the available measures of social stratification, and for finding new operational definitions of the hierarchical dimension of social stratification.

Acknowledgements
The first author wishes to thank Maria Luisa Bianco, head of the former Department of Social Research of the University of Eastern Piedmont at Alessandria (Italy) during the years in which the empirical work reported on in this paper was carried out. The authors also wish to thank the audience of the Social Stratification Research Seminars in Utrecht (2010) and Cambridge (2013), and that of the RC28 Spring Meetings in Haifa (2010), Essex (2011), Hong Kong (2013) and Trento (2014) for helpful comments and suggestions on previous versions of the paper.
Notes
1. We intentionally leave social class out of this picture, since we consider a logical priority to examine whether all continuous measures of social stratification index the same latent construct, and only afterwards to consider whether this single construct is empirically distinct from measures of social class.
2. Hall and Caradog Jones (1950) recall that Stevenson built the first occupational classification based on prestige for the 1911 Census in England and Wales; however, it was more a class scheme than an occupational hierarchy as we know it nowadays (I. Upper and middle class; II. Intermediate; III. Skilled workmen; IV. Intermediate; V. Unskilled workmen).
4. Two exceptions to this rule are the study of Lehman and Witty (1931), whose sample of 26,878 students stands out, and of Smith (1943), who asked its respondents to rate a hundred occupations.
5. The list comprises
   status, rank, situs, socio-economic status, locum, stratum, station, standing (for naming a generic social position); upper-, middle-, lower-class, parvenu, arrivés, declassés, aristocracy (for specific social positions); prestige-hierarchy, economic-, political-, social-hierarchy (for stratification structures); wealth, power, prestige, achievement, ascription, style of life, status honor, authority (for attributes of positions); the exercising of power, control, influence, exclusion, domination, subordination, discrimination, coercion, manipulation (for the operation of the position).
   (Merton, 1949/1968, p. 472)
6. Some authors take a rather cautious stance; for example, Hatt agrees that occupation can be an ‘index of [social] position … in spite of its inability to describe in detail the relevant areas of esteem and multi-structural position’ (1950, p. 534).
7. Actually Weber himself did not draw as sharp boundaries between class and status groups as we may think: ‘status may rest on class position of a distinct or ambiguous kind. However, it is not solely determined by it … Conversely, status may influence, if not completely determine, a class position without being identical with it’ (Weber, 1922/1978, p. 306).
8. Some controversy has been raised about the type of data used for building social distance or social status scales, as for whether they come from data concerning friends, or the spouse. In our view, the solution to the controversy comes from going back to Weber’s definition of status, which he portrays as entailing restrictions on the pattern of social intercourses as part of the style of life that defines a status group. Weber explicitly mentions two of these patterns, that is, conviviality and connubium, the first referring to the type of persons we eat with, and the second referring to the choice of a partner (Weber 1922/1978, p. 306). As a consequence, it seems that either considering friendship or conjugal association patterns, and as long as these patterns are both governed by status considerations, as Weber suggests, we ought to get the same (or a closely matching) picture.
9. Details of the procedure for the estimation of the scale scores can be found at the following web address: http://www.camsis.stir.ac.uk/overview.html. The original ISSP data files are available from Gesis (www.gesis.org) through the Zacat platform (http://zacat.gesis.org/webview/index.jsp?object=http://zacat.gesis.org/objfStudy/ZA3680).
10. For example, furriers and related workers (code 7434) had 3 cases for husbands and 17 for wives, and were joined to textile, leather and related pattern-makers and cutters (code 7435).
11. In our RC-II models, estimated through the software IEM (Vermunt, 1997), row and column scores were constrained to be equal. On a substantive ground, this means that it makes no difference whether it is a man or a woman who holds an occupation.
12. For example, charcoal burners and related workers (code 6142) were not present in the original data set; hence they were given the score of 26.16, which has been estimated for the neighbouring group of forestry workers and loggers (code 6141).
13. The Spss syntax for attributing the ICAMS scores to the ISCO-88 codes is available at the following address: http://www.camsis.stir.ac.uk/versions.html.
14. A third type of validity considered by Zeller and Carmines is content validity, that is, ‘the extent to which a set of items taps the content of some domain of interest’ (1980, p. 78). However, the authors note that ‘there is no agreed-upon criteria for establishing whether, in fact, a measure has attained content validity’ (1980, p. 79).
15. Were we to use the same data set on which the scale was built, a good or better performance of the ICAMS against the ISEI and the SIOPS could indeed be due to overfitting to the data used for building it, thus undermining any conclusion.


17. Actually, the ISEI is estimated on male data, while the SIOPS is built on evaluation of occupational titles; hence only the SIOPS is truly independent from gender, as far as the evaluation of female-segregated occupations does not influence the rater’s judgment.

18. Standardisation ensures that all coefficients refer to the same metric and are comparable to one another; within-country standardisation removes potential confounding effects of marginal distributions on coefficients in a pooled analysis (i.e. insofar as these are captured by means and standard deviations).

19. We prefer this measure over the International Standard Level of Education (ISLED), recently developed by Schröder and Ganzeboom (2014) and Schröder (2014), as the ISLED was developed on these same ESS data we use here. Nonetheless, our duration metric is strongly associated with ISLED (r = 0.94).

20. We used the following transformation: \( \ln(HHinc) = \ln(HHinc/mean_i(HHinc)) \), in which \( HHinc \) is the income variable in its original country-specific unit, and \( mean_i(HHinc) \) is its mean for country \( i \) and round \( j \). Hence \( \ln(HHinc) \) measures the log-scale deviation of each income amount from its country-by-round specific mean.

21. The coefficients \( c12 \) and \( c \) measure the true score correlation between the two latent occupations and the auxiliary variables; however, they are not under our focus here. We report on a highly constrained version of the model, in which all coefficients of the type \( a \) and \( b \) are constrained between occupations and all coefficients of the type \( d \) and \( e \) are constrained between scales. The model as displayed in Figure 1 is not identified all by itself, when restricted to two occupations with two indicators. However, it becomes identified if we include more covariates, either in the form of more occupations or in the form of auxiliary variables. We can then estimate the model either by alternating two indicators for each occupation at a time, or taking all three indicators simultaneously into account. We can also vary the estimation of the model by the subset of occupations involved.

22. In this analysis we complement the educational duration measure with an indicator of educational qualification, as measured by the variable degree in the ISSP 2007 original data file.

23. For reasons we gave elsewhere (see De Luca et al., 2012), we interpret the ICAMS as a status scale, while CAMSIS-like scales are usually interpreted as social distance scales (see for example Bottero & Prandy, 2003). In light of the results of our previous work, and of those we are going to present in this paper, the sharp distinction between the four conceptual areas we described in Section 2 (social status, prestige, social distance and socio-economic status) loses most of its relevance (see the Conclusion section in this paper).

24. All coefficients come from a model with three simultaneous indicators for the occupations, but the results would not be appreciably different, had the indicators been used on a pairwise basis.

25. We also note that, when two occupations are involved, these attenuations cumulate. For example, in men’s case, the correlation between respondent’s and spouse’s occupation would drop from 0.41*0.96*0.96 = 0.38 in the case of ISEI, to 0.41*0.94*0.94 = 0.36 in the case of ICAMS, to 0.41*0.92*0.92 = 0.35 in that of SIOPS.

26. An attempt in this direction is that of Meraviglia (2012b).

27. As an example, see the scale built by Chapin (1933), cited in Guttman (1942, p. 362).

Notes on contributors

Cinzia Meraviglia is associate professor at the University of Milan (Italy), where she teaches Social Research Methodology (BA), Inequalities and social mobility (BA), and Research Methods in Social and Political Sciences (PhD). Her research interests are in the field of social stratification, and concern particularly the measuring of social position, the trend over time of inequality of educational opportunity, and the role of mothers in the status and educational attainment processes. She also served as principal investigator of the ISSP in Italy from 2008 to 2011. Recent publications (in English) include ‘Class, status and education: The influence of parental resources on IEO in Europe, 1893–1987’ (with Maarten L. Buis, International Review of Social Research, 2015).

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References
educational achievement. Together with Donald J. Treiman, he is the primary author of the International Socio-Economic Index of occupational status [ISEI] and his most often cited work refers to the construction of this index. Recently, together with Heike Schröder, he has proposed the International Standard Level of Education [ISLED] as a parallel instrument for comparative research. Among his other recent contributions is in-depth analysis of Turkish migration to Western Europe, from a country-of-origin perspective.

Deborah De Luca is research fellow at University of Milan, where she collaborates with the courses of Sociology (BA) and Comparative Social Systems (BA). Her main research interests are inequalities in the labour market, social stratification, effects of the recent economic crisis and quantitative methods. Together with Cinzia Meraviglia and Harry B.G. Ganzeboom, she is the author of *Measures and dimensions of occupational stratification. The case of a relational scale for Italy*, in P. Lambert, R. Connelly, R. Blackburn e V. Gayle (eds), *Social stratification: trends and process* (Ashgate, 2012).

**ORCiD**

Cinzia Meraviglia http://orcid.org/0000-0001-8222-585X

**References**


## Appendix

Table A1. The ICAMS scores for the ISCO-88 occupational titles.

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<th>ISCO-88 label</th>
<th>ICAMS score</th>
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<td>1000</td>
<td>MAJOR GROUP 1 LEGISLATORS, SENIOR OFFICIALS AND MANAGERS</td>
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<td>LEGISLATORS AND SENIOR OFFICIALS</td>
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<td>SENIOR GOVERNMENT OFFICIALS</td>
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</tr>
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<td>1130</td>
<td>TRADITIONAL CHIEFS AND HEADS OF VILLAGES</td>
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</tr>
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<td>1140</td>
<td>SENIOR OFFICIALS OF SPECIAL-INTEREST ORGANISATIONS</td>
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</tr>
<tr>
<td>1141</td>
<td>Senior officials of political-party organisations</td>
<td>64.05</td>
</tr>
<tr>
<td>1142</td>
<td>Senior officials of employers’, workers’ and other economic-interest organisations</td>
<td>64.05</td>
</tr>
<tr>
<td>1143</td>
<td>Senior officials of humanitarian and other special-interest organisations</td>
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<td>1200</td>
<td>CORPORATE MANAGERS</td>
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<td>DIRECTORS AND CHIEF EXECUTIVES</td>
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<tr>
<td>1210</td>
<td>Directors and chief executives</td>
<td>66.87</td>
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<tr>
<td>1220</td>
<td>PRODUCTION AND OPERATIONS DEPARTMENT MANAGERS</td>
<td>62.86</td>
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<td>Production and operations department managers in agriculture, hunting, forestry and fishing</td>
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</tr>
<tr>
<td>1222</td>
<td>Production and operations department managers in manufacturing</td>
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<tr>
<td>1223</td>
<td>Production and operations department managers in construction</td>
<td>60.13</td>
</tr>
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<td>1224</td>
<td>Production and operations department managers in wholesale and retail trade</td>
<td>58.52</td>
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<td>1225</td>
<td>Production and operations department managers in restaurants and hotels</td>
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</tr>
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<td>Production and operations department managers in transport, storage and communications</td>
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<td>Production and operations department managers in business services</td>
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<td>Production and operations department managers in personal care, cleaning and related services</td>
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<td>Production and operations department managers not elsewhere classified</td>
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<td>General managers in agriculture, hunting, forestry/ and fishing</td>
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Table A2. Latent correlations between the latent variables with one another, and with the auxiliary variables (generic MTMM model, women and men).

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