Construction of Occupational Status Scales for the Analysis of Data from the Survey on Time Use and Leisure Activities

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Abstract

The Survey on Time Use and Leisure Activities (STULA) asks questions about socio-cultural activities, daily routines, daily schedules, and health-related outcomes, as well as educational attainment, income, and occupation. In particular, a relatively detailed category is used for occupations, to the point that an occupational classification and occupational status scale can be developed based on it. For this reason, developing occupational status scales to be utilized for the analysis of data from the STULA will be useful when conducting future sociological analyses. The objective of this study was to construct occupational status scales to be used in the STULA. By using data from the Employment Status Survey conducted in 2007 and 2012, this study developed the socio-economic index (SEI) and social status index (SSI) of 53 occupations covered in the STULA.

I. Introduction

The Social Stratification and Social Mobility Surveys (SSM survey), social surveys representative of Japanese sociology, clarified the structure of inequality in Japan using detailed accounts of occupations, education, and income information. In particular, this study revealed that occupational status and educational attainment of parents and children have been associated with each other (Hara and Seiyama 2005). Furthermore, it also revealed that occupational status and education had an impact on one's attitudes and lifestyle.

The SSM occupational categories (Hara and Seiyama 2005) or the EGP classifications (Erikson, Goldthorpe, and Portocarero 1979; Ishida, Goldthorpe, and Erikson 1991) are

used as the categorical variables of the occupational statuses in Japan. However, a scale known as the occupational prestige score is mainly used for the continuous variables (Naoi 1979; Naoi and Suzuki 1977; Tsuzuki 1998) and has been used mainly in research on status attainments (Hara 2000; Imada 1999; Tominaga 1979). The occupational prestige scores are calculated from the responses of the SSM Occupational Prestige Survey. This survey poses the following query: "Here is a list of various occupations which, at times, are classified as being higher or lower in society in general. If we were, for instance, to divide these occupations into five stages in order of highest to lowest, how would these occupations be categorized? For each occupation, select one of the classifications of 'highest,' 'slightly high,' 'average,' 'slightly low,' and lowest.'" Based on the scores of "highest" = 100, "slightly high" = 75, "normal" = 50, "slightly low" = 25, and "lowest" = 0, the mean value for each occupation is calculated. Needless to say, it would be difficult to address all occupations. For this reason, the respondents were asked about 56 representative occupations, with occupations considered similar being given a similar score (for example, shop assistant = home visit and mobile sales worker = recycled resources collection and wholesale worker = 42.4), or with the mean prestige score of several occupations (for example, the score of a company executive is the mean of a director of a major company and the manager of a small-to-medium-sized enterprise [SME]) being used as the prestige score for a certain occupation (Tsuzuki 1998).

However, an occupational prestige score is not a measurement of the level of status of a certain occupation determined based on an objective characteristic such as the mean income or education level of that occupation. The score is merely created based on the information from the evaluations and impressions held by the survey participants. For this reason, there are criticisms that what the occupational prestige score measures is unknown, as well as those that state that compared to other scales, the correlations become weaker when capturing the associations related to social stratification (Featherman and Hauser 1976; Goldthorpe and Hope 1972).

Although the occupational prestige survey is conducted abroad as well (Reiss 1961; Treiman 1977), there has been an attempt to create occupational status scales using more objective information. For example, one attempt involved an occupational status score given to each occupation based on education and income using more detailed occupational classifications collected from census data (Nam and Powers 1968). Duncan (1961) measured the socio-economic index (SEI) for all occupations by using

the predicted value obtained using occupational prestige information to estimate the impact that income and educational attainment have on occupational prestige. Although it may seem that the information is not objective, given that occupational prestige scores are used, a SEI is after all obtained from the weighted average of income and educational attainment. In terms of international comparative research, an International Socio-Economic Index of Occupational Status (ISEI) has been developed based on the concept of assigning scores to each occupation that would most mediate the association between educational attainment and earnings (Ganzeboom, De Graaf, and Treiman 1992). Furthermore, there are studies that attempted to develop a scale from a cross table of occupations instead of using variables such as educational attainment and income.

For example, there is a study in which a cross table was developed using datasets on friendships and married couples in an attempt to derive an scale (Chan 2010; Lambert 2018; Prandy 1990, 2002). Prandy insists that such a scale reflects a general advantage/disadvantage. However, Chan and Goldthorpe (Chan 2010; Chan and Goldthorpe 2004, 2007) interpret it as a social status based on Weber's theory (Waters and Waters 2010; Weber 2010).[1] Also, there was an attempt at constructing a scale based on the intergenerational occupational mobility table (Kondo 2006; Rytina 1992).

There are also other such occupational status scales other than occupation prestige. There is a need to examine the social stratification structure in Japanese society using various scales, not just the occupational prestige scores. There have already been studies by Kondo (2006) and Nagamatsu et al. (2009), and the efficacy of their scales has been presented; however, there have not been many settings in which such scales were used.[2] Therefore, this study will utilize the Employment Status Survey (ESS) data that contains detailed information on occupations, educational attainment, and incomes to develop an SEI and a social status index (SSI).

The ESS was conducted more or less every three years between 1956 and 1982, and every five years from 1982 onward. It provides diverse information on the way that

1 For Weber's concept of status, also refer to Giddens (1975). On the other hand, criticisms by Hara and Seiyama (2005) and Hashimoto and Seiyama (2015), and Sørensen (2001) are worth referencing as well.

2 Although the scores developed by Kondo (2006) are effective when capturing intra-generational mobility, it still has the issue of how to interpret the scores when examining their correlation to other variables. Furthermore, there is an issue with occupations such as doctors, dental surgeons, veterinary surgeons, pharmacists, and workers in religion becoming outliers. Yoshikawa (2017) revealed how the complexity of the work correlated with long hours of work. See also Nagamatsu (2018).

residents of Japan work. For this analysis, ESS data from 2007 and 2012, which includes detailed occupational sub-classification information, will be used.

Already, Fujihara (2018) have attempted to develop a Japanese socio-economic index (JSEI) and Japanese social status index (JSSI) for 231 occupations based on the ESS. In these scales, a stronger intergenerational correlation in occupation is shown when the data is viewed using the JSEI or the JSSI, rather than the occupational prestige score. Furthermore, even when other variables are considered, it has been revealed that various cultural activities and status identifications (subjective social status) are related to the JSSI, with the validity and efficacy of the JSEI and JSSI being shown. This paper will attempt to develop socio-economic and social status indices of the occupational classifications in the Survey on Time Use and Leisure Activities (STULA) by employing the arguments and methods of Fujihara (2018). The STULA includes various items on social and cultural activities, and thus is a valuable dataset for examining the relationship between occupation and lifestyle. Fifty-three occupational classifications are used in this dataset, making it a rougher classification than those used in the Population Census, the ESS, or the SSM survey. However, it is a sufficient number of categories to assign continuous scores.

II. Construction of the SEI for the STULA

Firstly, the basic concept of the SEI will be explained. In the model by Duncan (1961), the following regressive model was proposed. For the I number of occupations in which occupational prestige was observed, the percentage of the evaluation toward occupation i in an occupational prestige survey that is excellent or good will be represented as X_{1i}, the percentage in which the income for occupation i being 3,500 dollars or more represented as X_{2i}, and the percentage of those in occupation i who have graduated from high school or higher are represented as X_{3i}.

$$X_{1i} = b_1 + b_2X_{2i} + b_3X_{3i}$$

Actually the independent variables have been age-adjusted. From this model, the coefficients for occupations in which occupational prestige was observed can

be estimated. By using this estimated intercept ($\hat{b}_1$) and coefficients ($\hat{b}_2$, $\hat{b}_3$), one can calculate the predicted value of the occupational prestige score based on income and education. The value of $\hat{X}_{1j}$, the result of predicting for J amount of occupations in which information is available on income and the percentage of those graduating from high school or higher, will serve as the SEI.

$$SEI_j = \hat{X}_{1j} = \hat{b}_1 + \hat{b}_2 X_{2j} + \hat{b}_3 X_{3j}$$

As seen here, information on the occupational prestige of various occupations, as well as the education level for several occupations, and earnings level data will be required for the creation of an SEI.

For the STULA, 53 occupational classifications will be used and no sub-classifications. However, the occupational prestige score cannot be matched to such a rough occupational classification. Therefore, the SEI will be calculated for the 231 occupations in the ESS, similar to the study by Fujihara (2018). Using weighted averages, the SEI of 53 occupational classifications will be calculated.[3]

In order to create an SEI for Japanese society, the scores obtained from the 1995 SSM occupational prestige survey will be used for the occupational prestige scores (Tsuzuki 1998). The education and earnings levels of each occupation were calculated by aggregating the data from the 2007 and 2012 ESSs. In these ESSs, the occupational classification code used in the Population Census is assigned to individual occupations, allowing information on education and income (earnings) to be obtained from the individual's work. Since the occupational classifications differ slightly in the two ESSs, the 2007 classifications will be used by being converted to those of 2012. The number of occupations used was 231, after excluding "232. Workers not classifiable by occupation."

For analysis, cases of those aged between 20 and 64 years old without education and earnings values missing were used. There were 472,611 cases in 2007 and 477,275

3 The methods used by Fujihara (2018) and those used in this study differ in the following two points. First, Fujihara (2018) matched 39 occupational prestige scores and not 45. Next, Fujihara (2018) created scores for the 2007 and 2012 datasets, respectively. After indicating the stability of the score using the correlation coefficient (r = 0.979), the two standardized scores were added and used for the analysis. Despite there being such differences, the scores in Fujihara's (2018) study and the scores developed in this study had a correlation coefficient of 0.9996, virtually matching. Refer to Fujihara (2018) for the detailed scores of the 231 occupations.

in 2012. For analysis, an aggregation was conducted by merging both datasets. When aggregating, the datasets were weighted using a weight, such as 472,611/(472,611+477,275) for 2007 and 477,275/(472,611+477,275) for 2012 (weight of weight).

The prestige scores of 56 occupations asked about in the occupation prestige survey were matched with the occupational classifications used in the Population Census. The number of occupations that were matched was 40. Some occupations could not be matched as they were included in the following 16 occupations: director of a major company, salesperson for a major company, manager of an SME, flight attendant (air stewardess), machine assembler for a major corporation, civil engineering/construction site supervisor, section chief of an SME, high government official, machine assembler of an SME, bread manufacturer, banker, Diet member, section chief of a municipal office, section chief of a major company, office worker of an SME, and food can factory worker.

In the occupational prestige survey, there are occupations that are made up of different company sizes and job positions, such as the director of a major company, manager of an SME, civil engineering/construction site supervisor, section chief of an SME, section chief of a municipal office, and section chief of a major company, but there exists no occupational classification used in the Population Census that corresponds to these. Furthermore, there are classifications that are a combination of company size and specific occupations, such as salesperson for a major company, machine assembler for a major corporation, machine assembler for an SME, and office worker for an SME. However, there are also no occupational classifications used within the Population Census to which these correspond. In the ESS, the number of employees in the entire company is asked, including their place of employment and job type. By combining these pieces of information with occupational classifications, one can make some sort of arrangement concerning the organization's size. However, there is no information on the job position (excluding positions such as director and executive).

In order to utilize the prestige score information for these occupations, the positions of high government official, Diet member, and section chief of a municipal office were assigned a mean value of "1. Management government officials"; the positions of director of a major company and manager of an SME were assigned a mean value of "2. Officers of companies and organizations"; the section chief of a major company and section chief of an SME were assigned a mean value of "4. Other administrative and managerial workers"; bread manufacturer and food can factory worker were assigned a mean value

of "155. Food manufacturing workers"; and machine assembler for a major company and machine assembler for an SME were assigned a mean value of "162. General-purpose, manufacturing, and business-use mechanical apparatus assembly workers." In other words, the prestige scores for 5 occupational categories were developed using 11 occupational prestige scores asked about in the occupational prestige survey.

However, given that no information on salespeople for SMEs and office workers for major companies was available, such prestige scores were not used for those positions. Furthermore, this prestige score was not used for civil engineering/construction site supervisor because there were no corresponding occupational categories. Bankers were not used because I could not determine whether they were bank bookkeepers or deposit counter clerks under "74. Accountancy clerks," bank lending clerks under "76. Production-related clerical workers," or bank sales representatives under "96. Finance and insurance sales workers." Concerning flight attendants (air stewardess), although they are included in "114. Food and drink service workers/personal assistance workers," they are believed to greatly differ from restaurant waiters, café waitresses, Japanese inn waitresses, doormen, cabaret waiters, caterers, ferry passenger agents, *ryokan* clerks, counter clerks (waiters), customer service representatives (*ryokan*/hotel), floor staff (restaurants), and hall staff (restaurants). Ultimately, the 45 occupational prestige scores were able to be matched with the occupational classifications used in the Population Census.

In the U.S. studies that have been conducted in recent years, each occupation was evaluated in the nine rungs of 1 (Bottom) 2, 3, 4, 5 (Middle), 6, 7, 8, and 9 (Top), with scores converted to a range between 0 and 100 using the conversion method of (rung − 1) × 12.5. The mean value was then used as the occupational prestige score (Hauser and Warren 1997; Hout, Smith, and Marsden 2015; Nakao and Treas 1994). However, when developing an SEI, the percentage in which the evaluation score becomes 5 (Middle) or higher is calculated and used instead of the occupational prestige score. This is similar to the method used by Duncan (1961), which used the percentage of respondents rated as "excellent" or "good." Furthermore, some sort of threshold was set for the education and earnings levels of occupations (these were referred to as "occupational education" and "occupational earnings," respectively), with the percentages that exceeded such thresholds being used. Instead of using the percentages of dependent and independent variables as they were, the logit and started logit transformations were used (Hauser

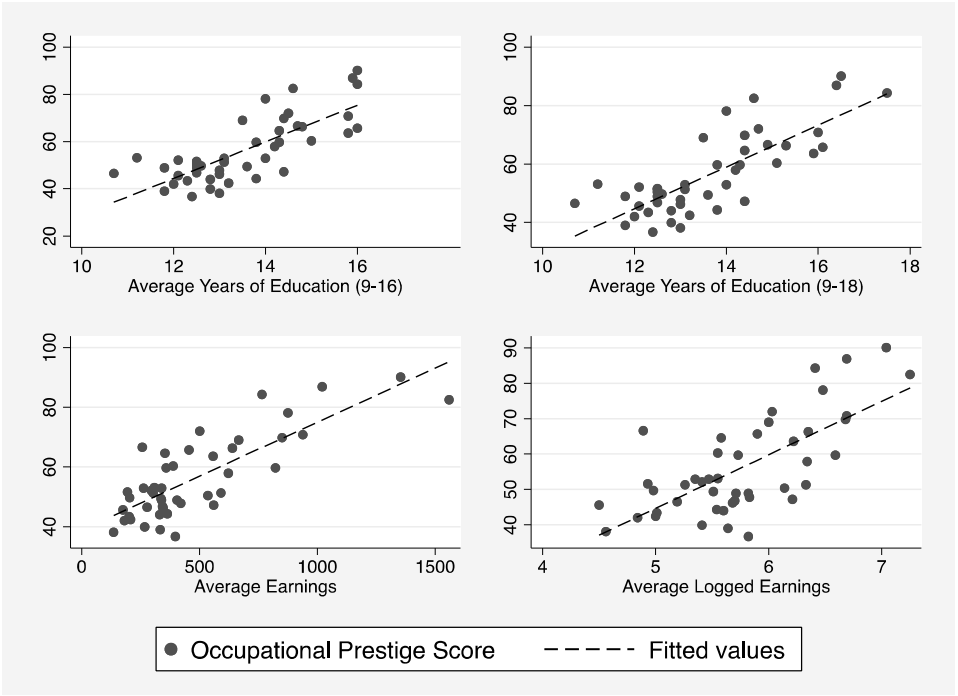
and Warren 1997).

There are several possible combinations of the type of thresholds set and the conversions that were used. However, this paper will use the prestige score value. This is because occupational prestige survey data has currently not been disclosed.[4] Nakao and Treas (1994) also conducted examinations using actual occupational prestige scores instead of percentages. The results, however, have been reported as being almost the same.

Furthermore, the average years of education were used for the occupational education level. Although the graduate school advancement rate on the whole is not high in Japan, there are a few occupations with high prestige in which advancing to graduate school is presumed, such as university professors and researchers. If we were to consider those who have attended a graduate school to have 18 years of education, for example, the average years of education of a university professor would be 17.5 years, which would be the longest period for an occupation. Compared to other occupations whose occupational prestige score has been obtained, this is much longer than the professions with the next highest number of years in education, which are doctors (16.5 years; however, 16 years has been assigned even for those whose highest academic level is university graduation if they are doctors) and pharmacists (approx. 16.1 years). For this reason, university professors can be treated as outliers. In order to prevent an effect from this outlier, those who had advanced to graduate school were assigned 16 years of education, the same as those who had graduated from a university (Figure 1).

Similarly, having a skewed distribution for the average earnings was also an issue. Aircraft pilots are one example. Occupational prestige was measured for aircraft pilots, with the occupational prestige score being quite high at 82.5, with half of the pilots exceeding fifteen million JPY in terms of their annual income. Therefore, as shown in the lower-left diagram in Figure 1, the correlation between average earnings and occupational prestige score became nonlinear. In order to minimize the impact from such an outlier as much as possible, the mean logarithmic transformed earnings were used for the earnings level of the occupation. The lower right diagram in Figure 1 is a scatter plot of the mean logarithmic transformed earnings versus occupational prestige score. In this instance, no major outlier existed.

4　As of May 24, 2017.



Note: Graphs were developed based on the aggregation of the average years of education and average earnings from 45 occupations from the Employment Status Survey.

Figure 1: Scatter plot of occupational prestige score versus average years of education and arerage earnings (n=45)

In order to control the impact of age, the residuals calculated by regressing the age and the square of the age were obtained for years of education and earnings, respectively, and these mean values were aggregated by occupations (age-adjusted education and earnings). Table 1 shows the results of a regression analysis conducted by having the occupational prestige score as the dependent variable and the average years of education (between 9 and 16 years) and the average earnings (already logarithmically transformed) as independent variables. Model 1 shows the result when the age had not been adjusted for the independent variable, and Model 2 is when the age had been adjusted. The results only illustrate the standardized regression coefficients. The results show that the impact of years of education is stronger than earnings for the occupational prestige score. Furthermore, approximately 70% of the variation in the occupational prestige score could be explained by the average educational and earnings levels.

Needless to say, there is the possibility that the standardized regression coefficient will be larger for earnings than education depending on what kind of variable

Table 1　Regressive analysis conducted with the occupational prestige score as the dependent variable

	Model 1	Model 2
Education	0.541***	0.564***
Earnings	0.385***	0.367***
N	45	45
R-squared	0.689	0.697

Note: Standardized beta coefficients. *** $p < 0.01$

transformations are used. The results will differ greatly depending on which occupational prestige score is used.

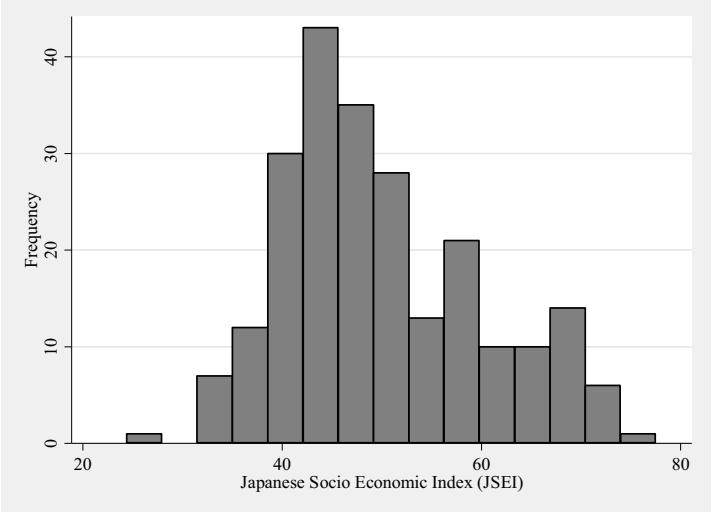
The prediction equation of Model 1 is as follows. Here, substitute "Education" for the average years of education in the formula, and "Earnings" for the mean logarithmic earning:

$$\mathrm{SEI}_i = -64.94292 + 5.443317 \times \mathrm{Education}_i + 8.242918 \times \mathrm{Earnings}_i$$

The prediction equation of Model 2 is as follows. Here, substitute "Education" for age-adjusted average years of education in the formula, and "Earnings" for the age-adjusted average logarithmic earnings:

$$\mathrm{SEI}_i = 52.89794 + 5.795472 \times \mathrm{Education}_i + 8.132933 \times \mathrm{Earnings}_i$$

The correlation between the SEIs estimated in Models 1 and 2 was extremely high at 0.994. Therefore, the SEI developed from Model 2 will be used in the following. After calculating the prediction value, the SEI was converted so that the mean would be 50 and the standard deviation 10. Figure 2 shows the distribution of the SEI. Using the weighted average of the SEI for the 231 occupations, the SEIs for the 53 occupational classifications were calculated.



Note: Mean=50, *sd*=10

Figure 2 Japanese Socio-Economic Index (n=231)

III. Construction of the SSI for the STULA

When it comes to social status, there is an issue with how to measure it, more so than with the SEI. This paper will employ a similar method used by Chan and Goldthorpe (Chan 2010; Chan and Goldthorpe 2004, 2007), which were based on Max Weber's theory. This involves a statistical method that clarifies the spatial allocation and distance between occupations concerning data related to social relationships, such as datasets on friendships and married couples. This will be used to measure social status.[5]

As mentioned previously, the STULA utilizes 53 occupational classifications. First, the 231 occupations used in the ESS were categorized into 53 classifications used in the STULA. Thereafter, a 53 × 53 cross table was created using a married couple dataset in order to produce scores by calculating the distance between occupations using a suitable analysis method.

The model that was used for the analysis was the association model (Clogg and Shihadeh 1994; Wong 2010). The wife's occupation was represented as i (i=1,2,⋯,53) and

5 This is different to what is generally referred to as "social status (*Shakaiteki Chii*)" in Japanese stratification research (e.g., Yasuda 1971).

the husband's occupation as j (j=1,2,⋯,53). If the expected frequency in the cell (i,j) of the model was represented as F_{ij}, the association model was as follows:

$$\log F_{ij} = \lambda + \lambda_i^W + \lambda_j^H + \delta_{ij} + \varphi\mu_i v_j \text{ for all } i = j,\ \mu_i = v_j$$

Here, λ represents the parameters of the grand mean, λ_i^W is the marginal effect of the wife's occupation, λ_j^H is the marginal effect of the husband's profession, δ_{ij} is the effect of the diagonal cell, φ is the effect indicating the strength of the association (the *intrinsic* association parameter), μ_i is the wife's occupation score, and v_j is the husband's score. Here, the scores for occupations are interpreted as a social status. Although the assignment of plus/minus directions was arbitrary, a conversion was conducted so that occupations with high educational and income levels had higher scores, based on the premise that social status is associated with the height of educational and income levels. Although it was possible to estimate the wives' and husbands' scores separately, the objective was to calculate scores for occupations that could be commonly used between the two genders. Furthermore, if the scores between the husband and wife were different, an outlier would occur on occupations in which the gender's ratio was extreme. For this reason, estimations were made with the restriction of making the wife's and husband's scores the same for occupation i.[6] Although the correlation between the two occupations became 0.700 if the outlier was included, the score became 0.823 if the scores of the three occupations were excluded ("23: Domestic support service workers," "27: Food and drink preparatory workers," and "42: Railway drivers"). The correlation between the scores for the 53 occupations derived from the SSI of 231 occupations developed by Fujihara (2018) and the scores developed using this paper's method was extremely high at 0.967. The SSI was also converted so that the mean would be 50 and the standard deviation 10.

IV. Characteristics of the scales

Next, the characteristics of the SEI and SSI were clarified. Refer to the appendix for

6　Outliers will disappear if data from the Population Census that includes many more cases is used, allowing for the possibility that a detailed examination of gender differences can be conducted.

the corresponding relation and the scores for the occupational sub-classifications of the 53 occupations.[7]

Occupations whose SEI was within the top 10 places, from highest to lowest, were as follows: 1) management government officials; 6) researchers; 9) legal workers; 5) teachers; 10) management, finance, and insurance specialists; 2) officers of companies and organizations; 3) other administrative and managerial workers (managerial workers who are not officers of companies and organizations or categorized in other classifications); 4) engineers; 22) sales workers; and 7) health care workers. Occupations whose SSI was located within the top 10 were as follows: 9) legal workers; 5) teachers; 6) researchers; 10) management, finance, and insurance specialists; 12) other specialist professions (librarians and curators, private tutors (for music), private tutors (for dance, acting, directing, and performance), private tutors (for sports), private tutors (for study), private tutors (not classified elsewhere), sports professionals, communication equipment operators, and specialist professionals not classified elsewhere); 1) management government officials, 2) officers of companies and organizations, 11) workers in religion, authors, journalists, editors, artists, designers, photographers, film operators, musicians, and stage designers; 14) accountancy clerks; and 30) other service workers (travel and tourist guides, left luggage handlers, commodity hire workers, advertisers, undertakers, crematorium workers, and service workers not classified elsewhere). The 6 occupational categories 1) management government officials; 2) officers of companies and organizations; 5) teachers; 6) researchers; 9) legal workers; and 10) management, finance, and insurance specialists were included in the top 10 in both indices.

Occupations that were included in the top 10 occupations with the highest SEI but not in the top 10 occupations with the highest SSI were 3) other administrative and managerial workers (19th place in terms of their social index), 4) engineers (12th place), 22) sales workers (16th place), and 7) health care workers (15th place). Conversely, occupations whose SSI was within the top 10 but whose SEI was not, were 12) other specialist professions (17th place in terms of their SEI); 11) workers in religion, authors, journalists, editors, artists, designers, photographers, film operators, musicians, and stage designers (11th place); 14) accountancy clerks (20th place); and 30) other service workers (31st place).

Figure 1 is a scatter plot of SEI versus SSI. They both fundamentally show a similar

7 Refer to the Statistic Bureau, Ministry of Internal Affairs and Communications (Statistic Bureau 2010) for details on the occupations.

trend since they measured the occupational ranking in Japanese society, with the correlation between the two variables being high at 0.830. However, when examining the graph using the SSI, one can see that 11) workers in religion, authors, journalists, editors, artists, designers, photographers, film operators, musicians, and stage designers and 12) other specialist professions have relatively high scores. Then. examining the graph using the SEI shows that 3) other administrative and managerial workers and 22) sales workers have relatively high scores. Although there are some exceptional cases, occupations related to culture, education, or service have a relatively high SSI score, while occupations related to finance/management or to operation and driving have a relatively high SEI score.

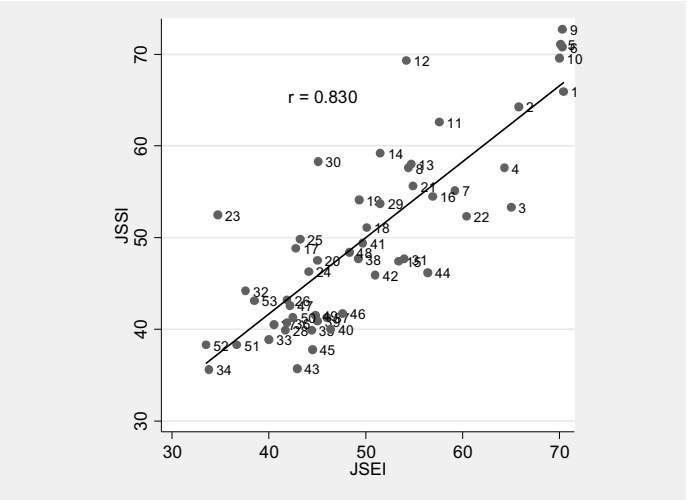


Figure 3: Correlation between socio-economic index and social status index (n=53)

V. Future tasks

The occupational prestige score was used in the development of the SEI, following Duncan's (1961) method. However, the issue here became which occupational prestige to utilize. Instead of developing a scale that could be used in international comparisons, such as the ISEI by Ganzeboom et al. (1992), using a method by Wong (2010) it became possible to develop an SEI that reflected the characteristics of occupations in the country being studied. This involved applying an association model to the cross

table of occupation (231 classifications) × education (4 classifications) × earnings (4 classifications), using the score derived to construct an occupational status scale. This method clearly ranks the occupations within the target country by using official statistical data such as the ESS, without having to use occupational prestige information. Furthermore, this method makes comparisons based on occupational prestige scores to examine, for example, how the rankings of agriculture and teachers differ depending on the country.

The construction of an SEI and SSI to be used in the STULA was attempted in this paper. However, the construction of scores that could be used with the SSM Occupational classification and other classifications is required. Although there are plans to report on this in another paper, but the basic analysis method will be the same. Refer to the author's homepage https://sites.google.com/site/shofujihara/occupational-scales for updates on SEI and SSI for Japanese society.

Unfortunately, the ESSs conducted before 2007 do not disclose the detailed occupational classifications, making it impossible to develop an SEI. However, in regard to the SSI, it is possible to use information on the occupations of husbands and wives from the Population Census from various points in order to compare the past social status with that of the present. A much easier method would be to use only the educational level of the occupation (occupational education) and treat it as an SSI. Although there has not been sufficient examination of the interpreation of such an index, it is believed to be a powerful variable when examining intergenerational mobility (Hauser and Warren 1997).

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Appendix

	Occupational title (54 categories)	Occupational title (232 categories)	SEI	SSI
1	Management government officials	Management government officials	70.4	65.9
2	Officers of companies and organizations	Company officers, officers of other corporations, organizations	65.8	64.3
3	Other administrative and managerial workers	Administrative and managerial workers of corporations and organizations, administrative and managerial workers not classified elsewhere	65.0	53.3
4	Engineers	Agriculture, forestry, fishery and food engineers, electrical, electronic, telecommunications engineers (except communication network engineers), machinery engineers, transportation equipment engineers, metal engineers, chemical engineers, architectural engineers, civil engineers and surveyors, system consultants and designers, software creators, other data processing and communication engineers, other engineers	64.3	57.6
5	Teachers	Kindergarten teachers, elementary school teachers, junior high school teachers, senior high school teachers, special needs education school teachers, university professors, other teachers	70.1	71.1
6	Researchers	Natural science researchers, humanities, social science, and other researchers	70.3	70.8
7	Health care workers	Doctors, dental surgeons, veterinary surgeons, pharmacists, public health nurses, midwives, nurses (including assistant nurses), diagnostic radiographers, clinical laboratory technicians, physiotherapists, occupational therapists, certified orthoptists, speech therapists, dental hygienists, dental technicians, nutritionists, masseurs, chiropractors, acupuncturists, moxacauterists and judo-orthopedists, other health care workers	59.2	55.1
8	Social welfare specialist professionals	Childcare workers, other social welfare specialist professionals	54.4	57.6
9	Legal workers	Judges, public prosecutors and attorneys, patent attorneys and judicial scriveners, other legal workers	70.3	72.7
10	Management, finance, and insurance specialists	Certified public accountants, licensed tax accountants, certified social insurance and labor consultant, other management, finance, and insurance professionals	70.0	69.6

	Occupational title (54 categories)	Occupational title (232 categories)	SEI	SSI
11	Workers in religion, authors, journalists, editors, artists, designers, photographers, film operators, musicians, stage designers	Workers in religion, authors, journalists, editors, artists, designers, photographers, film operators, musicians, stage designers	57.6	62.6
12	Other specialist professionals	Librarians and curators, private tutors (for music), private tutors (for dance, actor, direction, performance), private tutors (for sports), private tutors (for study), private tutors (not classified elsewhere), sports professionals, communication equipment operators, specialist professionals not classified elsewhere	54.2	69.3
13	General clerical workers	General affairs and human affairs workers, reception and guidance clerical workers, telephone receptionists, comprehensive clerical workers, other general clerical workers	54.7	58.0
14	Accountancy clerks	Accountancy clerks	51.5	59.2
15	Production-related clerical workers	Production-related clerical workers	53.4	47.4
16	Sales clerks	Sales clerks	56.9	54.5
17	Outdoor service workers	Money collectors, investigators, other outdoor service workers	42.8	48.8
18	Transport and post clerical workers	Transport clerical workers, post clerical workers	50.1	51.1
19	Office appliance operators	Personal computer operators, data entry device operators, other office appliance operators	49.3	54.1
20	Merchandise sales workers	Retailers, retail manager, wholesalers, wholesale manager, shop assistants, home visit and mobile sales workers, recycled resources collection and wholesale workers, goods purchase canvassers	45.0	47.5
21	Quasi-sales workers	Real estate agents and dealers, insurance agents and brokers, other quasi-sales workers	54.9	55.6
22	Sales workers	Medicine sales workers, machinery, communication and system sales workers, finance and insurance sales workers, real estate sales workers, other sales workers	60.4	52.3
23	Domestic support service workers	Housekeepers, home helpers, other domestic support service workers	34.7	52.5
24	Care service workers	Care workers (medical and welfare facilities, etc.), home visiting care workers	44.1	46.3

	Occupational title (54 categories)	Occupational title (232 categories)	SEI	SSI
25	Healthcare service workers	Care assistants, other healthcare service workers	43.2	49.8
26	Domestic hygiene service workers	Hairdressers, beauticians, cosmetic service workers (except beauticians), bath workers, launderers and fullers	41.9	43.2
27	Food and drink preparatory workers	Cooks, bartenders	40.5	40.5
28	Customer service workers	Restaurateurs, restaurant managers, japanese inn owners and managers, food and drink service and personal assistance workers, customer entertainment workers, service workers in places of entertainment, etc.	41.7	39.9
29	Residential facilities, office buildings and other management personnel	Condominiums, apartment buildings, lodging houses, hostel and dormitory management personnel, office building management personnel, car park management personnel	51.5	53.7
30	Other service workers	Travel and tourist guides, left luggage handlers, commodity hire workers, advertisers, undertakers, crematorium workers, service workers not classified elsewhere	45.1	58.3
31	Public security workers	Self-defense officials, police officers and maritime safety officials, prison guards and other judicial police staff, firefighters, security staff, other public security workers not classified elsewhere	54.0	47.7
32	Agriculture workers	Crop farming workers, livestock farm workers, landscape gardeners, nursery workers, other agricultural workers	37.6	44.2
33	Forestry workers	Forest nursery workers, tree-felling, logging, and collecting workers, other forestry workers	40.0	38.9
34	Fishery workers	Fishery workers, ships' captains, navigation officers, chief engineers, engineers (fishing boats), seaweed and shellfish harvesting workers, aquaculture workers, other fishery workers	33.8	35.6
35	Product manufacturing and processing workers (metal products)	Pig-iron forging, steelmaking, non-ferrous metal smelting workers, cast metal manufacturing and forging workers, metal machine tools workers, metal press workers, ironworkers, boilermakers, sheet metal workers, metal sculpture and plating workers, metal welding and fusion cutting workers, other product manufacturing and processing workers (metal products)	44.4	39.9

	Occupational title (54 categories)	Occupational title (232 categories)	SEI	SSI
36	Product manufacturing and processing workers (except metal products)	Chemical product manufacturing workers, ceramic, earth, and stone product manufacturing workers, food manufacturing workers, beverage and cigarette manufacturing workers, spinning, weaving, apparel, and fiber product manufacturing workers, wooden and paper product manufacturing workers, printing and bookbinding workers, rubber, plastic product manufacturing workers, other product manufacturing and processing workers (except metal products)	41.9	40.7
37	Machine assembly workers	General-purpose, manufacturing, and business-use mechanical apparatus assembly workers, electro-mechanical apparatus assembly workers, automobile assembly workers, transportation machinery assembly workers (except automobiles) 166, weighing and measuring appliance, photo-optic mechanical apparatus assembly workers	46.0	41.3
38	Machine maintenance and repair workers	General-purpose, manufacturing, and business-use mechanical apparatus maintenance and repair workers, electro-mechanical apparatus maintenance and repair workers, automobile maintenance and repair workers, transportation machinery maintenance and repair workers (except automobiles), weighing and measuring appliance, photo-optic mechanical apparatus maintenance and repair workers	49.2	47.7
39	Product inspection workers	Metal product inspection workers, chemical product inspection workers, ceramic, earth, and stone product inspection workers, food inspection workers, beverage and cigarette inspection workers, spinning, weaving, apparel, and fiber product inspection workers, wooden and paper product inspection workers, printing and bookbinding inspection workers, rubber, plastic product inspection workers, other product inspection workers	45.0	40.9
40	Machine inspection workers	General-purpose, manufacturing, and business-use mechanical apparatus inspection workers, electro-mechanical apparatus inspection workers, automobile inspection workers, transportation machinery inspection workers (except automobiles), weighing and measuring appliance, photo-optic mechanical apparatus inspection workers	46.4	40.0

	Occupational title (54 categories)	Occupational title (232 categories)	SEI	SSI
41	Manufacturing-related and quasi-manufacturing workers	Painters, paint and signboard production workers, manufacturing-related workers (except painters, paint･signboard production), quasi-manufacturing workers	49.7	49.4
42	Railway drivers	Railway drivers	51.0	45.9
43	Motor vehicle drivers	Motor vehicle drivers	42.9	35.7
44	Ship and aircraft operators	Ship captains, navigation officers, navigators (except fishing boats) and pilots, ships' chief engineers, engineers (except fishing boats), aircraft pilots	56.4	46.2
45	Other transport workers	Conductors, deckhands, dual purpose crew and ships stokers, transport workers not classified elsewhere	44.5	37.8
46	Stationary and construction machinery operators	Power plant and substation workers, boiler operators, crane, winch operators, construction, well-drilling machinery operators, other stationary and construction machinery operators	47.6	41.7
47	Construction and civil engineering workers	Molding box carpenters, scaffolding workers (tobishoku), steel reinforcement workers, carpenters, block and tile laying workers, roofing workers, plasterers, tatami workers, pipe laying workers, civil engineering workers, railway line construction workers, other construction and civil engineering workers	42.2	42.6
48	Electric construction workers	Line hanging and laying workers, telecommunication equipment construction workers, other electric construction workers	48.3	48.4
49	Mine workers	Gravel, sand and clay quarrying workers, other mine workers	44.8	41.5
50	Carrying workers	Mail and telegram collection and delivery workers, onboard and quayside cargo handlers, land-based cargo handling and carrying workers, warehouse workers, delivery workers, packing workers	42.5	41.3
51	Cleaning workers	Building cleaning workers, waste treatment workers, house cleaning workers, other cleaning workers	36.7	38.3
52	Packaging workers	Packaging workers	33.5	38.3
53	Other carrying, cleaning, packaging, and related workers	Other carrying, cleaning, packaging, and related workers	38.5	43.1
54	Workers not classifiable by occupation	Workers not classifiable by occupation	—	—