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DIRECTORATE FOR EDUCATION AND SKILLS
PROGRAMME FOR TEACHING AND LEARNING INTERNATIONAL SURVEY

Governing Board

Teaching and Learning International Survey (TALIS) 2024 User Guide: Version 2

The complete document is only available in PDF format.
We are pleased to share the second draft of the Teaching and Learning International Survey (TALIS) 2024 User Guide. The final version will be published in Q2 2026 when the Teacher Knowledge Survey report is released.

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Teaching and Learning International Survey (TALIS) 2024 User Guide

Draft 2

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This integrated user guide describes the organisation, content and usage of the international public use files (PUFs) available from the OECD for all survey modules. Its development was led by Ralph Carstens, Senior Strategic Advisor for TALIS 2024.

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The development and implementation of TALIS 2024, including this user guide, was supervised by the TALIS Governing Board (TGB).

Table of contents

Tables

Figures

Abbreviations and acronyms

Abbreviation/acronym	Description	Comment
ACER	Australian Council for Educational Research	Consortium partner for core survey and Teacher Knowledge Survey
AV	Adaptation verification	
BRR	Balanced repeated replication	Used with Fay's variation in TALIS
cApStAn	cApStAn Linguistic Quality Control	Consortium partner for all TALIS components
CFA	Confirmatory factor analysis	
CFI	Comparative fit index	
ConQuest	ACER computer programme for fitting unidimensional and multidimensional item response and latent regression models	Software
CQ-S/M	Combined questionnaire short/main, for staff with leader duties	
CSV	Comma-separated value	Data file format
DIF	Differential item functioning	
DME	IEA Data Management Expert	IEA software
DPE	IEA Data Processing Expert	IEA software
EC	European Commission	
ECEC	Early childhood education and care	
ECEC IG	Early childhood education and care Informal Group	Governance board for TALIS Starting Strong
EFA	Exploratory factor analysis	
EM	Expectation maximisation	
ESE	Environmental and sustainability education	
EU	European Union	
FSD	Factor score determinacy	
FT	Field trial	
GPCM	Generalised Partial Credit Model	
GPK	General pedagogical knowledge	
ICC	Intra-class correlation coefficient	
ICCS	IEA International Civic and Citizenship Study	
ICILS	IEA International Computer and Information Literacy Study	
ID	Identification number	
IDB	International database	Data product
IDB Analyzer	IEA IDB Analyzer for SPSS, SAS and R	IEA software
IEA	International Association for the Evaluation of Educational Achievement / Foundation IEA Secretariat Netherlands	Consortium lead
IELS	OECD International Early Learning and Child Well-being Study	
IQO	International quality observer	Contracted by IEA Amsterdam

Abbreviation/acronym	Description	Comment
IRT	Item response theory	
ISC	International Study Centre	Located at IEA Hamburg, Germany
ISCED	International Standard Classification of Education	2011 edition used
ISCED level 02	Early childhood education (pre-primary education)	Part of ISCED level 0
ISCED level 1	Primary education	
ISCED level 2	Lower secondary education	
ISCED level 3	Upper secondary education	
ISO	International Organization for Standardization	
LQ	Leader questionnaire	
MAR	Missing at random	
MCAR	Missing completely at random	
MGCFA	Multiple-group confirmatory factor analysis	
MI	Multiple imputation	
ML	Maximum likelihood	
MLR	Maximum likelihood robust	
MNAR	Missing not at random	
MOS	Measure of size	
Mplus	Flexible statistical analysis software that fits an extensive variety of statistical models using one of many estimators	Software
MS	Main survey / data collection	
NA	Not applicable	
NADB	National adaptation database	
NAF	National adaptation form	
NDM	National Data Manager	
NPM	National Project Manager	
NQO	National quality observer	Contracted by national centre
NRBA	Non-response bias analysis	
NSM	National Sampling Manager	
ODC	Online data collection	
OECD	Organisation for Economic Co-operation and Development	
OTL	Opportunities to learn	
PIAAC	OECD Programme for the International Assessment of Adult Competencies	
PIRLS	IEA Progress in International Reading Literacy Study	
PISA	OECD Programme for International Student Assessment	
PQ	Principal questionnaire	
PUF	Public use file	Data product
PV	Plausible value	
P&P	Paper and pencil	
QEG	Questionnaire Expert Group	
R	Programming language for statistical computing and data visualisation	Software
RAND Europe	Research and Development Europe, not-for-profit research institute	Consortium partner for TALIS Starting Strong, part of RAND Corporation
RandA	Research and Analysis Team	Unit within IEA Hamburg

Abbreviation/acronym	Description	Comment
RMSEA	Root mean square error of approximation	
repest	OECD Stata module to run estimations with weighted replicate samples and plausible values	Software
Rrepest	OECD R library to run estimations with weighted replicate samples and plausible values	Software
RUF	Restricted use file	Data product
SAQ	Survey activities questionnaire	
SC	School co-ordinator	
S.D.	Standard deviation	
S.E.	Standard error	
SE	IEA Study Expert	IEA software
SAS	Statistical Analysis System	Software
SEM	Structural equation modelling	
SJT	Situational judgement tasks	
SOP	Survey operations procedures	
SPSS	Statistical Package for the Social Sciences	Software
SQ	Staff questionnaire	
SRMR	Standardized root mean square residual	
Stata	Statistics and Data	Software
StatCan	Statistics Canada	
TAG	Technical Advisory Group	
TALIS	Teaching and Learning International Survey	
TGB	TALIS Governing Board	
TIMSS	IEA Trends in International Mathematics and Science Study	
TKEG	Teacher Knowledge Expert Group	
TKS	Teacher Knowledge Survey	
TLF	Teacher listing form	Form produced by IEA WinW3S
TLI	Tucker-Lewis Index	
TQ	Teacher questionnaire	
TTF	Teacher tracking form	Form produced by IEA WinW3S
UNESCO-UIS	UNESCO Institute for Statistics	
U3 / Under 3	Early childhood education accommodating children under the age of three years	Operational definition in TALIS Starting Strong, not formally part of ISCED level 0, yet related to ISCED level 01
WinW3S	IEA Within-School Sampling Software	IEA software
WLSMV	Weighted least squares mean and variance adjusted	
WRMR	Weighted root mean square residual	

1 Survey components and considerations for analysis

This chapter offers an overview of TALIS 2024 and the user guide to the public use data files. It includes an introduction to the survey components' key parameters, a list of the participating countries/territories, and information on data quality. It also describes general considerations and limitations that data users need to keep in mind when analysing the data.

Overview of the integrated user guide

This user guide provides information about the Teaching and Learning International Survey (TALIS) 2024 cycle of data collection, its survey components and populations, and the public use files (PUFs) available to data users. It further sets out requirements and provides examples of analyses for data users who would like to understand and replicate estimates and analyses presented in international and national reports or conduct additional estimates or modelling of data.

TALIS 2024 was administered in a variety of countries/territories and, as an umbrella programme, covered three interconnected yet distinct survey components:

- The **TALIS 2024 core survey** focuses on ISCED level 2 teachers and principals, continuing to represent their voice by gathering information about their working conditions and learning environments, as it did in 2008, 2013 and 2018. Since 2013, two additional components have focussed on ISCED level 1 and ISCED level 3 teachers and principals.
- The **TALIS Teacher Knowledge Survey (TKS)** component, closely connected to the core survey at ISCED level 2, was introduced for the first time in the 2024 cycle.
- The Starting Strong Teaching and Learning International Survey 2024 (or, **TALIS Starting Strong**) continues to focus on early childhood staff and setting leaders as an important international, large-scale survey in early childhood education and care (ECEC). It was first implemented in 2018 and continues to cover staff and leaders at ISCED level 02 (pre-primary settings) as well as in settings for children under the age of three.

TALIS 2024 used a common set of technical standards and operational procedures for implementing the surveys simultaneously, with certain approaches adjusted as necessary to accommodate the specific design of each component. The methodological and operational similarity of the survey components is also reflected in the structure and contents of the resulting databases.

This integrated user guide describes the organisation, content and usage of the international public use files (PUFs) available from the OECD website from a practical perspective. It only provides condensed overviews of the key parameters, participating countries and territories, and an overview of the quality of samples for each component. The *TALIS 2024 Technical Report* (OECD, forthcoming[1]) provides a full account of the conceptual, methodological and operational implementation of the surveys, and it is therefore imperative that the technical report be used in conjunction with the user guide.

The three conceptual frameworks (OECD, 2025[2]; OECD, 2025[3]; OECD, 2025[4]) and the respective international reports (OECD, 2025[5]; OECD, forthcoming[6]; OECD, forthcoming[7]), along with the international questionnaires, participants' national versions of the survey instruments, and online (only) tables for the TALIS 2024 publications are considered key resources for data users. Particular attention is drawn to the readers' guide included in each of the international reports, which contains high-level descriptions of the terminology, notes, conventions and reporting standards used by the OECD. Using these publications and resources in combination will allow data users to understand and confidently replicate estimations and correctly undertake new analyses in areas of special interest.

To manage the risk of respondent reidentification and comply with data protection regulations, it is important to note that the public use files (PUFs) available to secondary data users are limited in terms of the variables included. Confidential restricted use files (RUFs) were made available exclusively to each participating national centre. Chapter 8 of the *TALIS 2024 Technical Report* (OECD, forthcoming[1]) explains these restrictions in full detail, whereas Chapter 2 lists suppressions of individual variables for specific countries/territories.

Key consideration

The restrictions put on the public use files imply that secondary data users will not be able to replicate all analyses and tabulations presented in the international reports, specifically analyses using detailed continuous variables related to age and various counts and sizes, among others. In many instances, the PUF data include derived equivalents of the original variables using grouping or other data coarsening.

The integrated user guide includes the following chapters:

- **Chapter 1** provides an overview of each survey component and its participants, followed by general considerations for analysis.
- **Chapter 2** describes the public use databases, their file and variable naming convention, the variables they contain, and the valid and missing values codes used. It also lists suppressions applied to individual variables for countries and territories that requested these.
- **Chapter 3** illustrates the two most important requirements for analysis, which are using weights to compute population estimates, and accounting for the complex sample design in the estimation of sampling errors.
- **Chapter 4** introduces the IEA IDB Analyzer, a software tool that is available free of charge and supports a variety of estimations and analyses and presents examples.
- **Chapter 5** repeats the same examples using the OECD-provided Rrepest library for R.
- **Chapter 6** [to be added in Version 2, see below] explains how to conduct analyses using the TKS scale scores for general pedagogical knowledge.
- **Chapter 7** finally provides information and formulae for the comparison of estimates within a country/territory, of sub-populations within a country/territory, of two or more countries/ territories, and of a participating country/territory estimate to an international average.
- **In addition,** the online international **codebook** for all datasets for TALIS core and TKS, as well as the links to the documentation of all **adaptations** that countries/territories applied to the international versions of questionnaires are available via the TALIS 2024 Statistical Compendium (OECD, 2025[8]). The TALIS 2024 Statistical Compendium also includes information on questionnaire adaptations for TALIS Starting Strong. Codebooks for TALIS Starting Strong 2024 international data are available alongside the public use databases.

The user guide was designed to provide a basic yet thorough introduction to the majority of descriptive and inferential analyses presented in the international reports. For illustration, it focuses on the use of the IEA IDB Analyzer in combination with SPSS and the usage of the OECD Rrepest library since both are fully compatible with Fay's variation of the balanced repeated replication (BRR) method to compute correct and design-unbiased standard errors.

The user guide, however, was not intended to include and illustrate every analytical technique appropriate or possible and, therefore, does not describe, for example, multilevel modelling. Users who wish to undertake advanced analyses not covered by this guide or those who wish to use other statistical software packages, which must account for sampling and replication weights, will find sufficient information on the database and its technical aspects to successfully configure software and statistical models.

Key consideration

Given the staggered release of reports, resources and public use data for TALIS 2024 between October 2025 and March 2026, the user guide will be released in two versions.

- This version, Version 1, released in October 2025, covers the core survey and TALIS Starting Strong, reported in October and December 2025, respectively.
- The amended Version 2 will be released in March 2026 to additionally cover the specifics of the Teacher Knowledge Survey.

The TKS-specific sections in Chapter 2, as well as Chapter 6, were intentionally left out from (this) Version 1 of the user guide.

Brief overview of the survey components

TALIS core survey (ISCED levels 2, 1 and 3)

Since 2008, TALIS is the most important international survey with a focus on the learning environments and the working conditions of teachers and principals. National analyses allow participating countries/territories to monitor and evaluate the situation in the teaching profession as well as developments over time. Cross-country/territory analyses allow participating countries/territories to identify others facing similar challenges and to learn from their policy approaches.

TALIS 2024 again focused on lower secondary education and additionally offered participating countries/territories the opportunity to survey schools and teachers from primary and upper secondary education. The conceptual framework (OECD, 2025[2]) provides the theoretical underpinnings as well as the policy-level choices for retaining, revising or adding a range of content areas to the core survey.

Key parameters

The key sampling and operational parameters applied in the TALIS 2024 core survey are listed below. Full details are included in the *TALIS 2024 Technical Report* (OECD, forthcoming[1]), especially in Chapter 4 (adaptation and translation), Chapter 5 (sample design), Chapter 8 (international databases production), Chapter 9 (weighting, participation rates and non-response bias analyses), Chapter 10 (data adjudication) and Chapter 11 (construction and validation of questionnaire scales and indices) as well as in its various annexes and online resources.

- All participating countries/territories surveyed teachers and principals in lower secondary (ISCED level 2) schools. Two additional components were offered to participating countries/territories:
  - primary teachers and principals (ISCED level 1)
  - upper secondary teachers and principals (ISCED level 3).
- A two-stage stratified cluster sample was used in almost all cases. Stratified samples of schools were drawn with probability proportional to the number of teachers (or alternative measures of size where necessary). Implicitly stratified probabilistic samples of teachers were drawn within schools.
- To allow for reliable estimation, while absorbing some degree of non-response, a nominal sample of 200 schools was to be drawn from the population of in-scope schools. The nominal sample size was set at 20 teachers within each participating school. In combination, the nominal international sample size was 4 000 teachers.

- A minimum of 75% of the sampled schools was required to participate and, additionally, a minimum of 75% of sampled teachers across all participating schools (a school was considered to be participating if at least 50% of its sampled teachers participated.) Convincing evidence of no or low non-response bias could result in a revised data adjudication.
- Two questionnaires were administered: one for teachers (TQ) and one for school principals (PQ), each requiring around 45-60 minutes to complete for the international version.
    - As a key innovation in TALIS 2024, the teacher questionnaire used a rotated design at the theme/section level. Under this design and considering analytical priorities, certain themes or questions were administered to either all teachers, two-thirds of teachers, or only one-third of teachers. This implies that no teacher answered all questions while a strictly limited set of key questions important for breakdowns and models was answered by all teachers. Data users should be aware that some data are thus *missing by design*, as most questions were not administered to all respondents.
- All questionnaires were translated into the respective languages and vetted for linguistic equivalence. Adaptations were made by national centres to adjust to local terminology, cover additional aspects or details of national interest, or remove questions deemed not applicable in their country/territory. Users are encouraged to review the documentation of national adaptations and potential limitations and/or consequences for comparability.
- Data were collected almost exclusively online. Upon country/territory request, paper-based data collection was possible.
- Northern Hemisphere countries/territories collected data from about March to May 2024. In the Southern Hemisphere, data were collected from July to October 2024, reversing the order of collection from TALIS 2018 where collection in the Southern Hemisphere occurred before the Northern Hemisphere. Collection periods were adjusted to accommodate local academic schedules or challenging conditions for school and respondent co-operation.

Participating countries/territories

Table 1.1 below lists all countries and territories participating in the core survey, jointly referred to as "participants" in TALIS 2024.[1] Given the option to include ISCED level 1 and 3 in addition to ISCED level 2, the table lists all 79 available samples.

- The participating countries in the TALIS 2024 core survey were: Albania, Australia, Austria, Azerbaijan, Bahrain, Brazil, Bulgaria, Chile, Colombia, Costa Rica, Croatia, Czechia, Denmark, Estonia, Finland, France, Hungary, Iceland, Israel, Italy, Japan, Kazakhstan, Korea, Latvia, Lithuania, Malta, Montenegro, Morocco, Netherlands, New Zealand, North Macedonia, Norway, Poland, Portugal, Romania, Saudi Arabia, Serbia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Türkiye, United Arab Emirates, United States, Uzbekistan and Viet Nam.
- The participating territories in the TALIS 2024 core survey were: Alberta (Canada), Flemish Community (Belgium), French Community (Belgium), Kosovo[2], and Shanghai (People's Republic of China).
    - While the Flemish and French Communities of Belgium participated as separate entities, co-ordination with and between the two national centres allowed for the combined reporting and data release of Belgium for ISCED levels 1 and 2. Only the Flemish Community participated in the ISCED level 3 component.
- Cyprus participated through the IEA as the international study centre (ISC) for TALIS 2024.

The table lists all 79 samples along with the country/territory name, level, numeric code, alpha-3 code, combined alpha-3-level code, the collection timeline under which the survey was carried out in 2024, and the recommended rating for both principals and teachers, unless stated separately.

Country/territory names follow the OECD nomenclature and notes. A three-letter operational country/territory code and identification numbers were derived from, but may not be identical to, the ISO 3166 definitions for country and region codes. The operational numeric code IDCNTRY is used within the data files to identify the participant for each record. For participants not listed in the ISO 3166, IEA derived new operational alphanumeric and associated numeric codes or continued codes assigned in TALIS 2018 or before. To distinguish samples within a participating country/territory, an additional variable, IDCNTPOP, combined the participating country/territory code with the level information.

Table 1.1. Participants and samples for the TALIS 2024 core survey

Participating country/territory	Level (IDPOP)	Numeric code (IDCNTRY)	Operational alpha-3 code (file names)	Operational alpha-3 code and level (IDCNTPOP)	Hemisphere	Recommended rating
Albania	ISCED 2	8	ALB	ALB2	Northern	Good
Alberta (Canada)	ISCED 2	9134	CAB	CAB2	Northern	Insufficient
Australia	ISCED 1	36	AUS	AUS1	Southern	Fair
Australia	ISCED 2	36	AUS	AUS2	Southern	Fair
Austria	ISCED 2	40	AUT	AUT2	Northern	Good
Azerbaijan	ISCED 2	31	AZE	AZE2	Northern	Good
Bahrain	ISCED 2	48	BHR	BHR2	Northern	Good
Belgium	ISCED 1	56	BEL	BEL1	Northern	Fair
Belgium	ISCED 2	56	BEL	BEL2	Northern	Fair
Flemish Comm. (Belgium)	ISCED 1	956	BFL	BFL1	Northern	Insufficient
Flemish Comm. (Belgium)	ISCED 2	956	BFL	BFL2	Northern	Fair (principals) Poor (teachers)
Flemish Comm. (Belgium)	ISCED 3	956	BFL	BFL3	Northern	Insufficient (principals) Poor (teachers)
French Comm. (Belgium)	ISCED 1	56002	BFR	BFR1	Northern	Good
French Comm. (Belgium)	ISCED 2	56002	BFR	BFR2	Northern	Good
Brazil	ISCED 1	76	BRA	BRA1	Southern	Good
Brazil	ISCED 2	76	BRA	BRA2	Southern	Good
Bulgaria	ISCED 2	100	BGR	BGR2	Northern	Good
Chile	ISCED 2	152	CHL	CHL2	Southern	Fair
Colombia	ISCED 2	170	COL	COL2	Northern	Fair
Costa Rica	ISCED 2	188	CRI	CRI2	Southern	Good
Croatia	ISCED 2	191	HRV	HRV2	Northern	Good
Croatia	ISCED 3	191	HRV	HRV3	Northern	Good
Cyprus	ISCED 2	196	CYP	CYP2	Northern	Good
Czechia	ISCED 2	203	CZE	CZE2	Northern	Good
Denmark	ISCED 2	208	DNK	DNK2	Northern	Fair
Denmark	ISCED 3	208	DNK	DNK3	Northern	Fair
Estonia	ISCED 2	233	EST	EST2	Northern	Good
Finland	ISCED 2	246	FIN	FIN2	Northern	Good
France	ISCED 1	250	FRA	FRA1	Northern	Good
France	ISCED 2	250	FRA	FRA2	Northern	Good
Hungary	ISCED 2	348	HUN	HUN2	Northern	Good
Iceland	ISCED 2	352	ISL	ISL2	Northern	Good

Participating country/territory	Level (IDPOP)	Numeric code (IDCNTRY)	Operational alpha-3 code (file names)	Operational alpha-3 code and level (IDCNTPOP)	Hemisphere	Recommended rating
Israel	ISCED 2	376	ISR	ISR2	Northern	Good
Italy	ISCED 2	380	ITA	ITA2	Northern	Good
Japan	ISCED 1	392	JPN	JPN1	Northern	Good
Japan	ISCED 2	392	JPN	JPN2	Northern	Good
Kazakhstan	ISCED 2	398	KAZ	KAZ2	Northern	Good
Korea	ISCED 1	410	KOR	KOR1	Southern	Fair
Korea	ISCED 2	410	KOR	KOR2	Southern	Fair
Kosovo[2]	ISCED 2	411	XKX	XKX2	Northern	Good
Latvia	ISCED 2	428	LVA	LVA2	Northern	Good
Lithuania	ISCED 2	440	LTU	LTU2	Northern	Good
Malta	ISCED 2	470	MLT	MLT2	Northern	Good
Montenegro	ISCED 2	499	MNE	MNE2	Northern	Good (principals) Fair (teachers)
Morocco	ISCED 1	504	MAR	MAR1	Northern	Good
Morocco	ISCED 2	504	MAR	MAR2	Northern	Good
Netherlands	ISCED 1	528	NLD	NLD1	Northern	Insufficient
Netherlands	ISCED 2	528	NLD	NLD2	Northern	Insufficient
New Zealand	ISCED 1	554	NZL	NZL1	Southern	Insufficient
New Zealand	ISCED 2	554	NZL	NZL2	Southern	Insufficient
North Macedonia	ISCED 2	807	MKD	MKD2	Northern	Good
Norway	ISCED 2	578	NOR	NOR2	Northern	Insufficient
Poland	ISCED 2	616	POL	POL2	Northern	Good
Portugal	ISCED 2	620	PRT	PRT2	Northern	Good
Portugal	ISCED 3	620	PRT	PRT3	Northern	Good
Romania	ISCED 2	9642	ROU	ROU2	Northern	Good
Saudi Arabia	ISCED 1	682	SAU	SAU1	Northern	Good
Saudi Arabia	ISCED 2	682	SAU	SAU2	Northern	Good
Saudi Arabia	ISCED 3	682	SAU	SAU3	Northern	Good
Serbia	ISCED 2	688	SRB	SRB2	Northern	Good
Shanghai (China)	ISCED 2	156001	CSH	CSH2	Northern	Good
Singapore	ISCED 2	702	SGP	SGP2	Southern	Good
Slovak Republic	ISCED 2	703	SVK	SVK2	Northern	Good
Slovenia	ISCED 1	705	SVN	SVN1	Northern	Good
Slovenia	ISCED 2	705	SVN	SVN2	Northern	Good
Slovenia	ISCED 3	705	SVN	SVN3	Northern	Good
South Africa	ISCED 2	710	ZAF	ZAF2	Southern	Good
Spain	ISCED 1	724	ESP	ESP1	Northern	Good
Spain	ISCED 2	724	ESP	ESP2	Northern	Good
Sweden	ISCED 2	752	SWE	SWE2	Northern	Good (principals) Fair (teachers)
Türkiye	ISCED 1	792	TUR	TUR1	Northern	Good
Türkiye	ISCED 2	792	TUR	TUR2	Northern	Good
Türkiye	ISCED 3	792	TUR	TUR3	Northern	Good
United Arab Emirates	ISCED 1	784	ARE	ARE1	Northern	Good
United Arab Emirates	ISCED 2	784	ARE	ARE2	Northern	Good
United Arab Emirates	ISCED 3	784	ARE	ARE3	Northern	Good
United States	ISCED 2	840	USA	USA2	Northern	Insufficient (principals) Poor (teachers)
Uzbekistan	ISCED 2	860	UZB	UZB2	Northern	Good

Participating country/territory	Level (IDPOP)	Numeric code (IDCNTRY)	Operational alpha-3 code (file names)	Operational alpha-3 code and level (IDCNTPOP)	Hemisphere	Recommended rating
Viet Nam	ISCED 2	704	VNM	VNM2	Northern	Good

Quality of samples and further limitations

Following weighting, the quality of the achieved samples was, for the most part, assessed by categorising the participation rates of teachers and principals and additionally reviewing operational documentation and quality observation records. The categorisation resulted in a rating of "good", i.e. unrestricted reporting, for the majority of participants, yet also a set of "fair" or "poor" ratings with corresponding limitations for data use given the sparsity of data, further detailed in Chapter 10 of the *TALIS 2024 Technical Report*. Despite all efforts, some samples were rated as "insufficient". Data from samples rated as "insufficient" have a higher risk of being affected by non-response bias and should be used cautiously.

Data users are strongly encouraged to review Chapter 10 on data adjudication in the *TALIS 2024 Technical Report* (OECD, forthcoming[1]). The ratings are additionally stated in Table 1.1**Error! Reference source not found.** above.

Key consideration

Following deliberations in early 2025, the TALIS Governing Board (TGB) decided to report all data with appropriate cautionary notes in the international report (OECD, 2025[5]). The countries/territories listed above are correspondingly also included in the public use files (PUFs). An additional variable, ADJRT24, was included in the datasets to transparently communicate the rating assigned during adjudication at the sample level with codes 0: Insufficient; 1: Poor; 2: Fair; 3: Good.

When interpreting the data reported, the following high-level notes should also be taken into consideration:

- Belgium (ISCED levels 2 and 3): Some sampled schools of the Flemish Community were located at the same places. The national centre advised these schools to distribute teachers between listing forms to avoid them being selected multiple times. This deviation from the procedures could not be corrected for.
- Israel (ISCED level 2): Ultra-Orthodox schools were excluded after the survey administration due to very low participation rates. They are not considered in the participation rate but contribute to the exclusion rate.
- Slovenia (ISCED levels 1 and 2): The school sample was identical for ISCED levels 1 and 2. Principals were asked to participate in both questionnaires but did not in many cases. Eleven data points for non-personal and level-independent items were copied between ISCED levels in these cases, leaving the remaining variables as item-level non-response.
- United States (ISCED level 2): The national centre managed questionnaire delivery from their own servers using a single participant setup of the IEA Study Expert platform. Following data collection, the national centre assessed disclosure risks and applied related measures based on federal requirements. No documentation was provided.

Teacher Knowledge Survey (TKS, ISCED level 2)

Key consideration – User guide Version 1

A description of the Teacher Knowledge Survey's key parameters, participating countries and quality considerations will be available in Version 2 of this user guide.

TALIS Starting Strong (ISCED level 02 and Under 3)

TALIS Starting Strong was first implemented in 2018. The second cycle of this international large-scale survey in 2024 provided indicators and policy-relevant analysis on the backgrounds, working conditions, beliefs and practices of early childhood education and care (ECEC) staff and setting leaders. The conceptual framework (OECD, 2025[3]) provides the theoretical underpinnings as well as the policy-level choices for retaining, revising or adding indicators and measures for a range of content areas.

Key parameters

The key sampling and operational parameters applied to TALIS Starting Strong 2024 are listed below. Full details are included in the *TALIS 2024 Technical Report* (OECD, forthcoming[1]), especially in Chapter 4 (adaptation and translation), Chapter 5 (sample design), Chapter 8 (international databases production), Chapter 9 (weighting, participation rates and non-response bias analyses), Chapter 10 (data adjudication), and Chapter 11 (construction and validation of scales and indices) as well as in its various annexes and online resources.

- All participating countries and territories surveyed staff and setting leaders at ISCED level 02, with the exception of New Brunswick and Quebec (Canada).
- Additionally, some countries/territories also surveyed staff and leaders working with children under the age of three years (Under 3/U3).
- A minimum sample of 180 settings was to be drawn from the population of in-scope settings with a probability proportional to size. Within the settings, probabilistic samples of staff were drawn. To allow for reliable estimation and modelling, while allowing for some degree of non-response, the minimum sample size was set at eight staff members within each selected setting. Thus, the nominal international sample was a minimum of 1 400 staff.
- A minimum of 75% of the sampled settings was required to participate, aiming for a 75% participation from sampled staff in the participating settings. A setting was considered to be participating if at least one-third of its sampled staff participated.[3] Convincing evidence of no or low non-response bias could result in data being adjudicated as sufficient even when those criteria were not fully met.
- Two main questionnaires were administered: one for staff (SQ) and one for setting leaders (LQ).
    - To accommodate the diverse typology of settings, two combined questionnaires (CQ) were developed in correspondence with a similar approach used in TALIS Starting Strong 2018. The CQ-short was administered in single-staffed settings, including home-based settings in the sample of settings for children under age 3. The CQ-main was administered in settings with multiple staff and also where leaders regularly perform staff duties. Data collected via these two instruments were eventually distributed to the corresponding variables in the leader and/or staff datasets. Variables for questions not included in the respective CQ instruments are thus missing by design for these cases.

- All questionnaires were translated into the respective languages and vetted for linguistic equivalence. Adaptations were made by national centres to adjust to local terminology, cover additional aspects or details of national interest, or remove questions deemed not applicable in their country/territory. Users are encouraged to review the documentation of national adaptations and potential limitations and/or consequences for comparability.
- Data were collected predominantly online per default, alternatively on paper, depending on the participating countries'/territories' preferences. Some countries/territories chose to administer both modes.
- Countries/territories could generally choose to administer the survey during two different periods depending on the hemisphere in which they were located, from March to May 2024 or from July to September 2024. Adherence to a school/academic schedule was not seen as critical, hence extensions or deviations from these two collection windows were granted in some cases in order to reach higher participation rates.

Participating countries/territories

A total of 16 countries and territories participated in TALIS Starting Strong, jointly referred to as "participants". Taking the two populations of interest into account, there are 22 samples available.

- The participating countries in TALIS Starting Strong were: Chile, Colombia, Denmark, Finland, Germany, Ireland, Israel, Japan, Morocco, New Zealand, Norway, Spain, Sweden and Türkiye.
- The participating territories in TALIS Starting Strong were: Flemish Community (Belgium), New Brunswick (Canada), Quebec (Canada).
- The provinces of New Brunswick and Quebec in Canada were implemented as joint participants under the auspices of a single national centre yet adjudicated separately. Given that joint reporting would not be meaningful, the provinces were reported separately with separate data products.

Table 1.2 lists all 22 samples along with the country/territory name, level, numeric code, alpha-3 code, combined alpha-3-level code, the collection timeline under which the survey was carried out in 2024 and the recommended rating for both leaders and staff, unless stated separately.

Country/territory names follow the OECD nomenclature and notes. A three-letter operational country/territory code and identification numbers were derived from, but may not be identical with, the ISO 3166 definition for country and region codes. The operational numeric code IDCNTRY is used within the data files to identify the participant for each record. For participants not listed in the ISO 3166, IEA derived new operational alphanumeric and associated numeric codes or continued codes assigned in TALIS Strating Strong 2018 or before. To distinguish samples within a participating country/territory, an additional variable, IDCNTPOP, combined the country/territory code with the level information.

Table 1.2. Participants and samples for TALIS Starting Strong 2024

Participating country/territory	Level (IDPOP)	Numeric code (IDCNTRY)	Operational alpha-3 code (file names)	Operational alpha-3 code and level 1 = Under 3 2 = ISCED 02 (IDCNTPOP)	Hemisphere	Recommended rating
Chile	ISCED 02	152	CHL	CHL2	Southern	Good (leaders) Fair (staff)
Colombia	ISCED 02	170	COL	COL2	Northern	Poor
Denmark	ISCED 02	208	DNK	DNK2	Northern	Fair
Finland	ISCED 02	246	FIN	FIN2	Northern	Good
Flemish Community (Belgium)	Under 3	956	BFL	BFL1	Northern	Insufficient

Flemish Community (Belgium)	ISCED 02	956	BFL	BFL2	Northern	Fair
Germany	Under 3	276	DEU	DEU1	Northern	Poor (leaders) Fair (staff)
Germany	ISCED 02	276	DEU	DEU2	Northern	Insufficient
Ireland	Under 3	372	IRL	IRL1	Northern	Insufficient
Ireland	ISCED 02	372	IRL	IRL2	Northern	Insufficient
Israel	Under 3	376	ISR	ISR1	Northern	Good
Israel	ISCED 02	376	ISR	ISR2	Northern	Good
Japan	ISCED 02	392	JPN	JPN2	Southern	Fair
Morocco	ISCED 02	504	MAR	MAR2	Northern	Good
New Brunswick (Canada)	Under 3	124008	CNB	CNB1	Northern	Insufficient
New Zealand	Under 3	554	NZL	NZL1	Southern	Insufficient
New Zealand	ISCED 02	554	NZL	NZL2	Southern	Insufficient
Norway	Under 3	578	NOR	NOR1	Northern	Insufficient
Norway	ISCED 02	578	NOR	NOR2	Northern	Insufficient
Quebec (Canada)	Under 3	124003	CQU	CQU1	Northern	Insufficient
Spain	ISCED 02	724	ESP	ESP2	Northern	Good
Sweden	ISCED 02	752	SWE	SWE2	Northern	Good
Türkiye	ISCED 02	792	TUR	TUR2	Northern	Good

Quality of samples and limitations

Following weighting, the quality of the achieved samples was, for the most part, assessed by categorising the participation rates of staff and setting leaders and, additionally, by reviewing operational documentation and quality observation records.

The categorisation resulted in a rating of "good", i.e. unrestricted reporting, yet also a set of "fair" and "poor" ratings with corresponding limitations for data use given the sparsity of data, further detailed in Chapter 10 of the *TALIS 2024 Technical Report* (OECD, forthcoming[1]) and including limitations for analysis. Despite all efforts, some samples were rated as "insufficient", especially for the population of settings for children under the age of three. Data from samples rated as "insufficient" have a higher risk of being affected by non-response bias and should be used cautiously.

Data users are strongly encouraged to review Chapter 10 on data adjudication in the *TALIS 2024 Technical Report* (OECD, forthcoming[1]).

Key consideration

Following deliberations in early 2025, the TALIS Starting Strong Informal Group (IG), with approval from the TALIS Governing Board (TGB), decided to report all data with appropriate cautionary notes in the international report (OECD, forthcoming[6]). The countries/territories listed above are correspondingly also included in the public use files (PUFs) with the exception of New Zealand, for which data was withdrawn for reasons of data protection. An additional variable, ADJRT24, was included to transparently communicate the rating assigned during adjudication at the sample level with codes 0: Insufficient; 1: Poor; 2: Fair; 3: Good.

When interpreting the data reported, the following high-level notes should also be taken into consideration:

- Flemish Community (Belgium) (U3): Settings without subsidy were excluded after the survey administration due to very low participation rates. They are not considered in the participation rate but contribute to the exclusion rate.

- Ireland (ISCED level 02 and U3): Replacement settings were contacted before the participation of the originally sampled setting was defined. Consequently, replacements participated although the original setting participated as well. These replacements were moved into separate strata and were treated as self-representing. They do not contribute to participation rates.
- Israel (ISCED level 02 and U3): Ultra-Orthodox settings were excluded after the survey administration due to very low participation rates. They are not considered in the participation rate but contribute to the exclusion rate.
- New Zealand (ISCED level 02): *Te Kōhanga Reo* (Māori revitalisation/"language nest") settings were excluded after the survey administration because no setting of this type participated. They are not considered in the participation rate but contribute to the exclusion rate. Due to low participation rates, a non-response adjustment was not implemented, and the estimated population size therefore remains unknown.

Considerations for analysis

TALIS 2024 and its diverse components represent an ambitious and demanding set of studies, involving complex procedures for sample design, data collection, analysis and reporting. To use the data appropriately, it is essential to understand the underlying design and characteristics of these studies. While the overall design, operations and data collection processes align with those used in major international surveys and student achievement studies in education – such as the OECD Programme for International Student Assessment (PISA) or the IEA Trends in International Mathematics and Science Study (TIMSS) – TALIS 2024 imposes additional requirements. These stem from its distinct themes and target populations, carrying important implications for data collection and analysis, as described in the remainder of this section.

Resources and general considerations

This user guide describes the organisation, content and usage of the international databases from a practical perspective. The *TALIS 2024 Technical Report* (OECD, forthcoming[1]) provides a comprehensive account of the conceptual, methodological and operational implementation of the surveys. It is imperative, therefore, that the technical report be used in conjunction with the user guide. The frameworks and international reports are additional key resources for analysis. Using these publications in combination will allow data users to understand and confidently replicate the analyses used or to correctly undertake new analyses in areas of special interest.

At a minimum, a data user carrying out secondary analysis will need to have a good understanding of the conceptual foundations of the core survey (OECD, 2025[4]), TALIS Starting Strong (OECD, 2025[3]) or the Teacher Knowledge Survey (OECD, 2025[4]), the themes addressed, the populations targeted, the samples selected, the instruments used and the production of the international database.

Additionally, users will need to make themselves familiar with the database structure and the variables they are comprised of (described in detail in Chapter 2 of this user guide). While it is not critical to be fully knowledgeable about the methods used to construct, validate and compute scale scores (for the most part, using multiple-group confirmatory factor analysis), it is imperative that data users be aware of the limitations of these models in terms of cultural invariance and for making direct comparisons between participating countries/territories. Chapter 11 of the *TALIS 2024 Technical Report* (OECD, forthcoming[1]) provides a clear documentation of the process of questionnaire scale creation, while Chapter 12 provides a description of the Item Response Theory (IRT) analysis used to create the scale of General Pedagogical Knowledge for the TKS.

More generally, there are some other important aspects to keep in mind when working with the data from a cross-sectional survey as used in TALIS 2024:

- The core survey, the Teacher Knowledge Survey and TALIS Starting Strong are non-experimental studies that collected cross-sectional data. The design of TALIS does not allow for the establishment of causal relationships between two variables. All analysis presented in the international reports should be interpreted as uncovering the presence (or absence) of statistical association, i.e. whether or not variation in one variable is systematically associated with variation in another variable. This implies that causal inferences and language of the type "condition A preceded/caused effect B", "factor A influenced outcome B", or "variable A impacted on variable B" cannot and should not be established with the data alone. The international reports refrained from making such inferences or using causal language. Data users should carefully evaluate assumptions, strong grounding in theory and directional hypothesis (Rutkowski et al., 2024[9]).
- TALIS 2024 is based exclusively on self-reports from teachers/staff and principals/leaders and, therefore, represents their opinions, perceptions, beliefs and accounts of their activities. As with any self-reported data, this information is subjective and may, therefore, differ from data collected through other means (e.g. administrative data). While self-reported data allow respondents to share their beliefs and perceptions, caution is advised when directly comparing and interpreting findings based on self-reported information across countries/territories. Social and cultural backgrounds might systematically affect how individuals respond to questions. Individuals may respond in ways that they think are viewed favourably but do not represent their true beliefs or actions. Respondents might also have to recall something that occurred a long time ago, or their interpretation of a question may not be consistent. As a result, using self-reported measures warrant caution as they can be misleading.
- TALIS 2024 was carried out in a range of participating countries and territories with diverse educational systems and sometimes further organised by jurisdiction, region or cultural contexts within the participating country/territory. Thus, the perception of questions or the terminology used might not be fully equivalent across national and sub-national boundaries.
- The majority of originally collected variables in TALIS 2024 are categorical in nature (nominal or ordered) and virtually all count variables (continuous) are not available in the public use files, rather replaced by grouped/coarsened nominal or ordinal derived variables. This implies that data users will mainly need to consider categorical, non-parametric analysis methods. Techniques for continuous variables (provided that the required assumptions hold) should only be used on the derived scales obtained through data reduction or scaling (based on factor analytical or item response theory).

Additionally, data users will need to have a good working knowledge of their preferred platform, whether this is SPSS, SAS, Stata or, more recently, R as well as adequate knowledge of descriptive and inferential statistics, such as estimating means, correlations or linear regression parameters. Appropriate theoretical knowledge will be needed to conduct advanced analyses such as logistic regressions.

Estimation requirements and available tools

For those data users who are familiar with using other large-scale international survey databases such as those produced by OECD or IEA education surveys, the analysis of TALIS 2024 data will present little difficulty after they have made themselves familiar with the conceptual foundation and the methodological, operational and analytical details of the components. For those users not accustomed to working with complex survey sample data, this user guide contains sufficient technical information to allow for design-correct basic analysis.

The two main analytical requirements that any analysis needs to account for are: 1) the use of sampling weights in computing estimates; and 2) the complex multi-stage cluster sample design that was implemented to balance the research goals and cost-efficient operations. Chapter 3 of this user guide includes a description of the weights and variance estimation techniques used in TALIS 2024, while Chapters 5 and 9 of the *TALIS 2024 Technical Report* (OECD, forthcoming[1]) provide a detailed description of the sample design and the estimation and replication weights found on the public use database, respectively.

As previously mentioned, this user guide is primarily tailored to the use of IEA IDB Analyzer, using SPSS, SAS or R, or the OECD Rrepest library using R. While SAS, Stata[4] and R have built-in or third-party support for complex survey designs using Fay-BRR, the current version of SPSS (v31 at the time of writing) does not, and hence cannot be used for design-correct estimations of statistics, parameters and their sampling errors. The SPSS Base module assumes data to come from a single-stage, simple random sample, which is not the case in TALIS 2024. The "complex samples" module for SPSS does not support the estimation of sampling error as required by TALIS.

Levels and units of analysis

TALIS 2024 defined target populations and sampled from these using multi-stage stratified cluster designs. Each school/setting is regarded as a "cluster" and all teachers/staff are nested within these. TALIS 2024 uses teachers or staff as the primary unit of analysis in the majority of outputs and tables.

Other analyses in TALIS 2024 use principals and setting leaders as the unit of analysis, independent of the teacher data. To support quality indications for this type of analysis, teacher/staff and principal/leader data were adjudicated separately since TALIS 2018 and TALIS Starting Strong 2018, including in the 2024 cycle.

Certain analyses combine teacher/staff data with disaggregated school- or setting-level variables. In this "disaggregation" case, school/setting information becomes an attribute of the teacher/staff and the information from both files can be used to answer research questions of the type: "what percentage of teachers work in schools with attribute x?"

Another possibility in working with the data is to "aggregate" teacher/staff-level information to the school/setting level and to use this information in school/setting-level analyses. In this "aggregation" scenario, data users need to be aware of the implicit shift of focus to level 2: inferences and interpretations can no longer refer to the level 1 units of teachers and staff. Ignoring this may result in an "ecological fallacy" (Robinson, 1950[10]) when aggregated information is analysed. This fallacy assumes that each individual member of a group has the average characteristics of the group at large. The pros and cons of both "disaggregating" and "aggregating" information are, for example, summarised in Chapter 3 of Snijders and Bosker (2012[11]).

Certain research questions and the hierarchical (nested) nature of the data can likely not be fully accounted for by either aggregating or disaggregating data. If a data user is interested in answering research questions that refer to or try to explain the degree of variability of a characteristic that is located within versus between schools, multilevel models (e.g. a two-level hierarchical linear model) for analysis of the TALIS 2024 data may be advisable.

However, multilevel modelling in TALIS 2024 should be approached with caution. For the core survey, the use of a rotated design in the teacher questionnaire, combined with high levels of non-response in certain countries and territories, has resulted in smaller effective sample sizes that may limit the robustness of multilevel models. For TALIS Starting Strong, multilevel modelling is generally discouraged due to the very small number of staff within settings and the substantial non-response observed in various countries and territories.

Missing data and multivariate analysis

TALIS 2024 is subject to two main types of missing data and item non-response. The first type is data missing by design, which occurs when some questions were not administered to some respondents due to the rotated teacher questionnaire design (core survey) or the combined questionnaires (TALIS Starting Strong). The second type is data missing not by design, which arises when a respondent had the option to answer a question or item but chose not to.

It is important to consider the mechanisms or causes behind the missingness (Schafer and Graham, 2002[12]). Missing completely at random (MCAR) occurs when the missingness is unrelated to the observed (collected) or unobserved data. Missing at random (MAR) occurs when the missingness depends on the collected (observed) data but not on unobserved data. When data is missing not at random (MNAR), the cause of missingness depends on the unobserved data (i.e. for reasons unknown to us) and therefore it cannot be included in the missing data model.

Many statistical techniques require data to be MAR, occasionally referred to as “ignorable” missingness because the variables which caused the missingness have also been measured and accounted for. Therefore, it is important to include these variables in the analysis or in the missing data model.

Data missing by design in TALIS 2024 can be treated as MCAR and do not affect the population estimates, except for potential smaller sample sizes and a related reduction in precision. The section below on the consequences of the rotated teacher questionnaire design discusses this in detail. Missing data given the scoping of the combined questionnaire in TALIS Starting Strong can also be seen as MCAR. However, the reduced population coverage (e.g. home-based settings that received the combined questionnaire) needs to be taken into account for inferences.

Various methods are available to handle missing data. Simple imputation methods replace a missing datapoint by a single value (e.g. mean substitution, last observation carried forward). The advanced methods involve handling missing data by multiple imputations (MI) and maximum likelihood (ML) techniques. See (Schafer and Graham, 2002[12]) for an overview. For TALIS, careful consideration should be given to whether the use of advanced missing data techniques is needed and, if applicable, identify which specific missing data techniques are appropriate.

One example where missing data techniques might be highly desirable relates to multivariate analysis, i.e. statistical techniques that simultaneously examine three or more variables with the aim of identifying the relationships between them. Often, the data collected contain missing information for certain respondents. When using multiple variables, the decision on how to handle missing data can significantly impact the results and conclusions.

In the case of complete cases analysis – often referred to as “listwise deletion” – respondents with any missing values on the variables of interest are excluded. If the missingness is completely at random, then the complete cases analyses can be considered representative of the whole, and the results of the analyses will be unbiased. However, when the excluded respondents differ from those included, the estimated parameters can be biased, compromising the credibility of conclusions.

In addition, complete cases analysis might not be useful if the proportion of cases lost to missingness is substantial. As a consequence, this approach will lead to less statistical power for hypotheses testing. Special attention should thus be paid to the number of cases included and excluded for analysis.

The TALIS 2024 data made available to users have not undergone any form of deterministic (single) or probabilistic (multiple) imputation. Rather, the choice of the imputation technique and the specific model should be tailored to the variables under consideration and the intended analysis. This responsibility rests with the data users.

Specialised statistical software available for multivariate analyses typically include methods to handle missing data, e.g. full information maximum likelihood (FIML) in structural equational modelling (SEM) using Mplus, to name just one of the numerous approaches and tools.

Consequences of rotated teacher questionnaire design (core survey)

As stated above, the core survey used a rotated questionnaire design for the teacher questionnaire. The surveys' analytical needs and reporting plans resulted in a set of questionnaire items and their allocation to the three main survey teacher questionnaire forms. The survey used three levels of analytical importance/priority to classify questions:

- **Common** questions of high priority were administered to all teachers and comprised demographic questions, questions that are important classification variables for breakdowns or control variables in regressions, or those which, by policy importance, should receive a high degree of precision and availability.
- Most questions were of **standard** priority and administered on two of the three forms.
- **Low** priority questions only appeared on one form because they were either of lower policy relevance, less likely to be analysed in conjunction with others, or where a lower level of precision was acceptable relative to response burden and collection costs if administered to all teachers.

Data for standard and low inference questions are "missing by design" and can thus be treated as MCAR. The availability of data is controlled by the survey design and is unrelated to observed or unobserved/unobservable characteristics of teachers. However, these data points are missing in the databases and limit the range of analyses that would have been possible if there was a full information matrix, as was the case in TALIS 2018 and previous TALIS cycles.

The resulting limitations were the subject of technical proposals and deliberations, and a simulation study on the effect of the rotated design on analysis was conducted. The key conclusion from the simulation study was encouraging with respect to the viability of the rotated design and indicated that a loss in precision is expected to be limited for any questions presented to two-thirds of teachers. The loss of precision and power was naturally more pronounced for questions only administered to one in three teachers. The simulation further suggested allocating questions from different sections/themes that are planned to be analysed together on the same teacher form. This was taken into consideration in the assembly of the main survey teacher questionnaire.

In summary, the rotated design has the following main consequences for data users:

- Analyses of each individual variable (common, standard or low) remain fully feasible, with respective limitations in precision.
- Analyses of each individual variable (standard and low) together with one or more common variables remains fully feasible, with limitations in precision and conditional on minimum cell size rules.[5]
- Analyses of each individual variable (standard or low) with other variables on the same form (low) or multiple forms (standard) remains feasible but is limited to one- or two-thirds of the sample depending on the respective configuration, with increased limitations in precision and potentially increased rate of suppression of estimates due to the minimum cell size rules.
- Joint analyses of multiple variables (low or standard) not appearing together on at least one form are not feasible with the core survey database directly, yet imputation techniques (such as FIML) may enable model-based analyses in these cases.

Use and interpretation of scale scores

The TALIS 2024 questionnaires include numerous items pertaining to principals'/leaders' and teachers'/staff's attitudes, perceptions and practices. Use of suitable data reduction procedures allows for the combination of responses to these items into single values. The procedure to combine item responses into a single scale score representing the latent (unobservable) construct of interest is called *scaling*. In TALIS 2024, confirmatory factor analysis (CFA) for ordinal data was used for scaling of questionnaire data. After testing and confirming a well-fitting unidimensional latent construct model, scale scores were estimated and standardised to serve as numeric values for the latent constructs.

For all scales, scale scores for each country/territory were calculated using the pooled international model parameters derived from the final CFA models, which were based on ISCED level 2 data in the case of the core survey and TKS, and ISCED level 02 data in the case of TALIS Starting Strong. Scale scores were calculated for respondents who provided at least two responses to the items included in the respective scale. There was no score imputation for non-respondents. Afterwards, the scores were standardised in such a way that the value 10 corresponds to the item mid-point value (IMV) of the response scale and the standard deviation equals to 2. The standardisation constants were obtained from the calibration sample and applied to all of the individual scores. This procedure is consistent with the procedure used in TALIS 2013. There are only a few exceptions where scale scores were not computed. The reason for not computing a scale score was a missing item from the scale for a country/territory. This happened when a country/territory did not administer an item, or because of an administration or translation error.

The scaling process for each scale was independent, and scale score standardisation was done separately. Even though the metric of different scales had the same units (similar mean and standard deviation), the scale scores are not linked between different scales. Therefore, direct mean comparisons across different scales are not meaningful.

Sometimes, the same items are part of more than one scale. This is, for example, the case for some "overall" scales that are further split into subscales. The scale results come from different unidimensional models and the "overall" scale shares items (and variation) with its subscales. Another example are scales that are created as an average of other scales. The interpretations of results from analysis where these scales are used together should take this into account as the shared variation affects the results. A full list of these scales is available in Chapter 11 of the *TALIS 2024 Technical Report* (OECD, forthcoming[1]).

Traditionally, scales in TALIS are not constructed to allow trend comparison. The scale score construction for TALIS 2024 was also not done in a way that the scale scores are comparable to previous TALIS cycles. Comparison across cycles with the data available may, under specific conditions, be possible only at the item level.

Since scale scores were constructed using common international model parameters for all countries/territories, they are statistically comparable across all respondents. Nevertheless, some caution is advised when interpreting scale results. Sometimes there is evidence that the scale composition does not work in single countries/territories and sometimes there is evidence that not the same model holds across all countries/territories. Data users should consider the evaluation and cross-country/territory comparability results available in Chapter 11 of the *TALIS 2024 Technical Report* (OECD, forthcoming[1]) to guide their decisions on the interpretability and comparability of the scale scores for specific scales and countries/territories. To facilitate this for unexperienced users, Chapter 11 contains a list of countries and scales where caution in interpretation for specific countries/territories or cross-country/territory comparability is advised.

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Notes

[1] At the time of writing, a deferred implementation round named “TALIS+” was underway in five countries/territories. TALIS+ uses the same core survey instruments and procedures, and the main data collection was scheduled for 2026. In due course, this User Guide and the public use files may be updated to include these additional participants.

[2] This designation is without prejudice to positions on status and is in line with United Nations Security Council Resolution 1244/99 and the Advisory Opinion of the International Court of Justice on Kosovo’s declaration of independence.

[3] The requirement was lowered in comparison to TALIS Starting Strong 2018, where it was set at 50%.

[4] See the *repest* Stata module (i.e. Stata ado file), which is specifically designed to be used, among others, with TALIS datasets (Avvisati and Keslair, 2024[13]).

[5] According to OECD reporting conventions, estimates need to be based on at least 30 teachers and 10 schools/principals with valid data.

2 Structure and content of the data files

This chapter describes the structure and content of the TALIS 2024 international public use data files, which comprise the core survey, the Teacher Knowledge Survey and TALIS Starting Strong. It introduces the data files, their file naming conventions and formats, and provides an overview of the records and variables contained in each of them. Additionally, it outlines how data from different administration modes are identified and how missing information is coded. The final section describes the confidentiality measures applied to the public use database.

Overview

The OECD made available for download international public use files (PUFs) for the fourth cycle of the TALIS core survey, the second cycle of TALIS Starting Strong, and, for the first time, the Teacher Knowledge Survey (TKS). Key to fully understanding and effectively using the data, this chapter describes the structure and contents of the PUFs available to secondary data users.

While Chapter 1 introduced the available samples and some key considerations for analysis, this chapter explains:

- the organisation, formats, structure and naming convention of data files and codebooks;
- the standards used for the exclusion or inclusion of records
- the survey variables and labels for each survey, classifying them in the following groups: identification, administration, questionnaire, derived indices and scales, and weight and variance estimation variables
- the valid values assigned to each variable
- the coding of missing data, detailing its various types: not administered, omitted or invalid, not reached, and logically not applicable
- the measures implemented for the public use international database to minimise the risk of re-identification of respondents, some of which were implemented universally across all participating countries/territories, others of which were implemented for individual samples on request.

Data files and codebooks

The TALIS 2024 public use files consist of a variety of data files that are arranged systematically. Each set includes combined data files that contain the data of all participating countries/territories, separately, per level of education, as well as all levels combined. The data files are further organised by the survey's populations (i.e. teachers, principals, ECEC staff and ECEC setting leaders), as well as file format.

Data files for the same type and level are structurally identical across all participating countries and territories, meaning each file consistently contains the same set of variables in the same sequence. Within the core survey and TALIS Starting Strong, data files of the same type are also structurally aligned across the surveyed ISCED levels and populations, ensuring consistency and comparability within and across surveys. The TALIS core survey files for ISCED level 1 and ISCED levels 2/3 are also structurally aligned across the target populations but can include variables relating to items or questions only used in one of these levels. This ensures consistency while accommodating for differences in the instruments used for each population.

Each file is available in four different formats: SPSS, CSV, Stata, and R.

- SPSS files include the full dictionary and metadata information, including variable names, formats (type, width and decimals), variable labels, value labels, user-defined missing values, and the assigned measurement level (nominal, ordinal or scale).
- CSV files are provided as plain text with UTF-8 encoding and include a separate data dictionary to support use. As CSV files cannot not store metadata internally, users should refer to the accompanying documentation to understand variable names, labels, value codes and missing data conventions.
- Stata files have the dictionary and metadata information, including in the variables manager, including the variable name, label, type, format, value label and value scheme for each variable.

Note that variable labels might be truncated given the limited number of characters that Stata can accommodate.

- R files include data frames with embedded metadata using the "labelled" class, where available. Variable labels and value labels are preserved and can be accessed using functions from packages such as *haven*, *labelled* or *sjlabelled*. Measurement levels and tagged missing values are represented in accordance with R conventions and documented in the accompanying materials.

TALIS core survey and TKS files and codebooks

The file names for the TALIS core survey and TKS consist of an eight-character string followed by a file extension using the following naming conventions:

- The first character of a file name indicates the population or level:
  - "A", denoting populations associated with primary education (ISCED level 1)
  - "B", denoting populations associated with lower secondary education (ISCED level 2)
  - "C", denoting populations associated with upper secondary education (ISCED level 3)
  - "T", denoting all populations combined (ISCED 1, 2, and 3)
- The second character indicates the questionnaire type that defines the content of the file. The letter "C" indicates principal/school-level data and the letter "T" teacher-level data.
- The third character defines the context or scope of the information in a file. The letter "G" stands for "general", i.e. the regular core survey population. For the TKS, the letter "K" (for "knowledge") is used.
- The fourth to sixth characters are the acronym "INT" (for "international"), since the files hold data for all available countries/territories.
- The seventh and eighth characters indicate the study and cycle. The combination "T4" is used for the fourth round of TALIS conducted in 2024. Although the TKS was administered for the first time in 2024, the same identifier "T4" is used to indicate the intertwined nature of the TKS and the core survey at ISCED level 2.
- The character file extensions used for the data files are .SAV for SPSS format, .CSV for comma-separated values (CSV) format, .DTA for Stata format and .RDS for R format files.

For example, the file name "BTGINTT4.SAV" indicates the ISCED level 2 teacher file combining data for all participating countries/territories from the fourth round of TALIS in SPSS format.

The online international codebook for all datasets for TALIS core and TKS, as well as the links to the documentation of all adaptations that countries/territories applied to the international versions of questionnaires are available via the TALIS 2024 Statistical Compendium (OECD, 2025[1]).

TALIS Starting Strong files and codebooks

The file names consist of an eight-character string followed by a file extension using the following naming conventions:

- The first character of a file name indicates the study: The letter is always "S" and refers to TALIS Starting Strong.
- The second character indicates the questionnaire type that defines the content of the file. The letter "L" indicates leader/setting data and the letter "S" indicates staff data. These files contain all leader/setting or staff populations for:
  - children under the age of three (U3)
  - pre-primary (ISCED level 02).

- The third character defines the context or scope of the information in a file. The letter is always “G” and refers to “general” questionnaire data.
- The fourth to sixth characters use the acronym “INT” (for “international”), signalling that the file holds data for all available countries/territories.
- The seventh and eighth characters indicate the study and cycle. The combination “S2” is used for this second round of TALIS Starting Strong conducted in 2024.
- The character file extensions used for the data files are .sav for SPSS format, .csv for comma-separated values (CSV) format, .dta for Stata format and .Rdata for R format files.

For example, the file name “SSGINTS2.SAV” indicates a staff file across all participating countries/territories for all relevant levels of ECEC (settings for children under age 3 and pre-primary) from the second round of the TALIS Starting Strong in SPSS format.

Codebooks for TALIS Starting Strong 2024 international data are available alongside the public use databases.

Key consideration

In TALIS Starting Strong 2024, responses collected through the separate Combined Questionnaire Main (CQ-M) and Combined Questionnaire Short (CQ-S) were distributed into the leader and staff datasets based on a pre-defined item mapping. Although administered as separate instruments to capture constructs relevant to a mixed role as a leader and staff, each case and its responses were allocated to the appropriate target dataset. There are no dedicated data files corresponding to combined questionnaires as used in the field.

For more information, see Chapter 8 of the *TALIS 2024 Technical Report* (OECD, forthcoming.

Record inclusion/exclusion

The international public use files for TALIS 2024 include all records that satisfied the pre-defined sampling standards. Data from those principals/leaders or teachers/staff who either did not participate or did not pass adjudication, for example because the within-school or within-setting participation was not sufficient, were removed from the final database.

More specifically, the following records are **included**:

- schools or settings where the principal or leader responded to the questionnaire (i.e. at least one valid response), regardless of whether sufficient numbers of teachers or staff responded
- schools or settings where the principal or leader did not respond to the questionnaire, but where at least half (50%) of the sampled teachers or one-third (33%) of staff responded
- teachers or staff in schools where at least half (50%) of all teachers or one-third (33%) of all staff responded (i.e. at least one valid response).

Consequently, the following records were **excluded** from the database:

- schools or settings where the principal or leader, respectively, did not respond and fewer than half (50%) of the teachers or one-third (33%) of staff, respectively, responded
- sampled teachers or staff reported as out of scope, not eligible, excluded or no longer at the school or setting

- sampled teachers or staff where fewer than half (50%) of all teachers or one-third (33%) of all staff in the school or setting responded
- any other records considered unreliable, of undocumented origin or otherwise in violation of accepted sampling, operational protocols or adjudication standards.

In addition, any additional data collected by countries/territories beyond the international scope to meet exclusively national requirements and interest were excluded from the international public use databases.

Key consideration

Although the sample adjudication process rated certain samples as "insufficient", data for all participating countries and territories (except New Zealand) are included in the public-use databases regardless of the sample adjudication outcomes. As explained in Chapter 1, the variable ADJRT24 expresses this sample rating to support data users during interpretation and inferences.

All TALIS 2024 adjudication rules were proposed by the International Association for the Evaluation of Educational Achievement (IEA)-led consortium and approved by the TALIS Governing Board (TGB). More information on standards and adjudication can be found in Chapter 10 of the technical report (OECD, forthcoming.

Survey variables

TALIS core survey variables

For each principal/school that participated in the survey, the following information is available:

- identification variables for the country/territory and school
- additional administrative variables
- principals' responses to the principal/school questionnaire
- indices derived from the questions in the principal/school questionnaire
- scale scores calculated for the principal/school questionnaire
- school estimation and replicate weights
- database version and the date of the release.

For each teacher who participated in the survey, the following information is available:

- identification variables for the country/territory, school and teacher
- additional administrative variables
- teachers' responses to the teacher questionnaire
- indices derived from the questions in the teacher questionnaire
- scale scores calculated for the teacher questionnaire
- teacher estimation and replicate weights
- database version and the date of the release.

These variables are explained in more detail in the following three sections.

Identification variables

The following identification variables are used to uniquely identify each record in all the data files:

- **CNTRY:** Three-digit alphanumeric code based on ISO 3166 for the respective country/territory (see Table 1.1).
- **IDCNTRY:** A two- to six-digit numeric code identifying the country/territory based on ISO 3166 (see Table 1.1).
- **IDPOP:** A code which defines the target population: 1 = ISCED level 1, 2 = ISCED level 2 and 3 = ISCED level 3.
- **IDCNTPOP:** Combined three-digit alphanumeric country code and ISCED level code.
- **IDSCHOOL:** Numeric code for each school within a country/territory (scrambled). Note that codes are only unique within a country/territory. To uniquely identify schools across countries/territories, IDSCHOOL has to be used in combination with CNTRY or IDCNTRY.

In addition, the teacher files ATG, BTG and CTG include the following:

- **IDTEACH:** Six-digit numeric identifier to identify teachers within schools. The first four digits are composed of IDSCHOOL, followed by a unique, sequentially assigned two-digit number within each school. Note that codes are only unique within a country/territory. To uniquely identify teachers across countries/territories, IDTEACH has to be used in combination with CNTRY or IDCNTRY.

Key consideration

The original identification variables IDSCHOOL and IDTEACH were randomly scrambled for the public use files and no longer match those used during the data collection. The structural link between the school and teacher levels was maintained for all participating countries/territories.

Administration variables

The data include several variables that, while not contributing directly to any analysis, provide additional information about survey administration, participation and other basic characteristics. The following variables are used for this purpose in all school- and teacher-level files:

- **ITMODE_PQ/_TQ** Questionnaire administration mode, code 1 = online and 2 = paper.
- **IDLANG_CQ/_TQ** Language of the questionnaire used by the respondent.
- **ADJRT24** Introduced in TALIS 2024, this variable indicates the data adjudication rating assigned to each sample: 0 = Insufficient; 1 = Poor; 2 = Fair and 3 = Good. This rating helps users assess the reliability and comparability of data. Users should consult Chapter 1 of this user guide and Chapter 10 of the technical report for further details (OECD, forthcoming.

Questionnaire variables

This section describes the variables collected from principals and teachers using the survey's instruments. The international questionnaires, including the respective variable names can be found on the TALIS website (OECD, 2024[3]; OECD, 2024[4]).

Variable names were assigned using a systematic naming convention. The variable names are the same across the different education levels covered by TALIS 2024:

- The first digit indicates the source of the data: T = TALIS Core Survey.

- The second digit indicates the level: C = school/principal, T = teacher
- The third digit indicates the cycle: 4 = TALIS 2024 (4th cycle)
- The fourth digit indicates the type of information: G = general
- The fifth and sixth digits represent the question number within the long format of the questionnaire.
- If needed, the seventh digit indicates the dimension of the question, i.e. if a question is divided into several items, letters indicate the items in alphabetical order.
- If questions are even further divided, e.g. in complex matrix questions, the eighth digit sequentially identifies the sub-items.

The resulting variable names are TC4G01 to TC4G53E for the school-level files and TT4G01 to TT4G84 in the teacher-level files.

Key consideration

While generally equivalent to ISCED level 2 and 3, the principal and teacher questionnaire used at ISCED level 1 included a small number of additional items and questions specifically designed to capture information related to, amongst other, aspects of transition policies and practices from early childhood to primary education. Similarly, the ISCED level 1 teacher questionnaire used a different format for the question related to the subject category of the reference target class (multiple selection rather than single choice). The user should be aware that the file layouts thus differ between ISCED level 1 and ISCED level 2/3. Information not covered by the respective instrument will appear as “not administered” in files that are merged across ISCED level 1 and 2/3.

The original information collected via the questionnaires underwent processing, inspection, cleaning and editing. The process ensured that information coded in each variable was in line with the international format, that national adaptations were reflected and mapped appropriately, that questions not internationally comparable were removed from the database and that all entries could be successfully linked between levels. Out-of-range values, questions determining the flow of the questionnaire, as well as inconsistent or implausible combinations of responses were inspected and cleaned, where necessary, in consultation with the concerned country/territory, the questionnaire experts and the OECD. To address residual inconsistencies, certain automatic edits, for example the removal of responses to percentage questions that did not total a plausible value, were imposed for all countries/territories. For further information on data capturing, processing and editing, please consult Chapters 8 of the technical report (OECD, forthcoming.

Key consideration

The information in the PUF data is in the state in which it was used for the reporting of results by the OECD. A small number of residual inconsistencies or implausible combinations of responses still exist in the data in cases where no clear rationale for deletion or editing could be developed by the consortium and the OECD. It is therefore strongly recommended that data users pay attention to the variables or combinations of variables used and review these in advance.

Indices and scales derived from the questionnaire data

Analyses in TALIS reports are based on both individual questionnaire variables as described above and on composite and derived variables created from multiple variables in the questionnaire that formed a construct and eventually an index.

Chapter 11 of the technical report (OECD, forthcoming includes comprehensive information about the scale and index construction and validation.

The principal/school files contain three types of indices. The first set is based on a simple transformation of one variable or on a combination of variables. The database includes 19 derived indices of this first type (original variable in parentheses).

- **T4PRAGEGR** Principal's Age – Grouped (TC4G02)
- **T4PHEDAT** Principal's Highest Level of Formal Education – Grouped (TC4G03)
- **T4PYEXPPS** Principal's Years of Experience at Current School – Grouped (TC4G04A)
- **T4PYEXPPT** Principal's Total Years of Work Experience – Grouped (TC4G04B)
- **T4PYEXPSM** Principal's Years of School Management Experience – Grouped (TC4G04C)
- **T4PYEXPT** Principal's Years of Teaching Experience – Grouped (TC4G04D)
- **T4PYEXPO** Principal's Years of Non-Education Work Experience – Grouped (TC4G04E)
- **T4PEMPWH** Principal's Employment Status in Terms of Working Hours – Grouped (TC4G06)
- **T4SCHLOC** School Location – Grouped (TC4G11)
- **T4NUMTCH** Number of Teachers – Categorised (TC4G14A)
- **T4STRATIO** Student–Teacher Ratio (TC4G17 / TC4G14A)
- **T4TPRATIO** Teacher–Pedagogical Support Personnel Ratio (TC4G14A / TC4G14B)
- **T4TARATIO** Teacher–Administrative or Management Personnel Ratio (TC4G14A / (TC4G14C + TC4G14D))
- **T4TTNRATIO** Teacher-New Teacher Ratio (TC4G14A / TC4G15A)
- **T4TTLRATIO** Teacher-Left Teacher Ratio (TC4G14A / TC4G15B)
- **T4TTARATIO** Teacher-Absent Teacher Ratio (TC4G14A / TC4G15C)
- **T4SCHISCN** Number of ISCED Levels Taught in the School (TC4G16A–F)
- **T4SCHPRGN** Number of Programmes (Tracks) Taught in the School (TC4G16A–F)
- **T4NUMSTUD** Number of Enrolled Students – Grouped (TC4G17)

The second set, comprising nine indices, was created using recodings of the source variables. These indices are not based on a latent variable framework.

- **T4PAUTS** School autonomy for staffing
- **T4PAUTB** School autonomy for budgeting
- **T4PAUTP** School autonomy for educational policies
- **T4PAUTI** School autonomy for instructional policies
- **T4PAUTC** School autonomy for curriculum
- **T4PAUTD** School autonomy for diversity policies
- **T4PLACP** Lack of pedagogical personnel
- **T4PLACSNP** Lack of specific needs pedagogical personnel
- **T4PLACMR** Lack of material resources

The third set of indices are factor scores computed using multiple-group confirmatory factor analysis (MGCFA).

- **T4PACADT** Academic rigor
- **T4PDELI** School delinquency and violence
- **T4PDIVBF** Diversity beliefs
- **T4PJOBSAT** Job satisfaction, overall (principal)
- **T4PJSENVT** Job satisfaction with work environment (principal)
- **T4PJSPROT** Job satisfaction with profession (principal)
- **T4PLEADS** Instructional leadership (principal)
- **T4PTLEAD** Teacher leadership (principal)
- **T4POPPART** Opportunities to participate in school decisions (principal)
- **T4PLEADESE** Leadership in environmental and sustainability education
- **T4PINBRCC** Instructional barriers to teaching climate change
- **T4PATBRCC** Attitudinal barriers to teaching climate change
- **T4PWELS** Workplace well-being and stress (principal)
- **T4PWLOAD** Workload stress (principal)

The teacher-level files also contain three types of derived variables. The first set is based on a simple transformation of one variable. The database includes 10 variables of this first type.

- **T4AGEGR** Teacher's Age – Grouped (TT4G02)
- **T4THEDAT** Teacher's Highest Level of Formal Education – Grouped (TT4G03)
- **T4TYQUAL** Year of Completion of First Teaching Qualification – Grouped (TT4G05)
- **T4TNSCH** Number of Schools Teacher Works At (TT4G10, TT4G11)
- **T4TEMPWH** Teacher's Employment Status in Terms of Working Hours – Grouped (TT4G12)
- **T4TYEXPTS** Teacher's Years of Experience at Current School – Grouped (TT4G13A)
- **T4TYEXPTT** Teacher's Total Years of Work Experience – Grouped (TT4G13B)
- **T4TYEXPE** Teacher's Years of Experience in Other Education Roles – Grouped (TT4G13C)
- **T4TYEXPO** Teacher's Years of Experience in Other Non-Education Roles – Grouped (TT4G13D)
- **T4TLANGN Multilingualism (number of languages used regularly) (TT4G29)**
- **T4TCSIZE** Target Class Size – Grouped (TT4G46)

Two additional indices were created using recodings of the source variables, again not based on a latent variable framework.

- **T4CLSINF** Classroom Infrastructure Quality (TT4G59A–F)
- **T4FASPR** Methods of Assessing Student Learning (TT4G53C–E)

The next set contains 49 scales resulting from MGCFA, analogous to the third set described for the principal-/school-level files above.

- **T4PDSUBMP** Need for professional development in subject matter and subject-specific pedagogy
- **T4PDGENP** Need for professional development in general pedagogy
- **T4PDIV** Need for professional development for teaching for diversity
- **T4PDBR** Barriers to professional development: lack of support in access
- **T4EXINF** Exchange of information and ideas among teachers

- **T4COLES** Professional collaboration in lessons among teachers
- **T4SECLS** Self-efficacy in classroom management
- **T4SEINS** Self-efficacy in instruction
- **T4SEENG** Self-efficacy in student engagement
- **T4SELF** Self-efficacy, overall
- **T4SEMUL** Self-efficacy in multicultural classrooms
- **T4GROMST** Growth mindset
- **T4SESEN** Self-efficacy in special education needs
- **T4COMSEL** Comfort with social and emotional aspects of teaching
- **T4SEDRT** Self-efficacy in using digital resources and tools
- **T4BLFDRT** Beliefs in digital resources and tools
- **T4ADVDRT** Adversity to digital resources and tools
- **T4STESE** Student engagement in environmental and sustainability education
- **T4TCHCLC** Confidence to teach about climate change
- **T4CLAIN** Clarity of instruction
- **T4COGAC** Cognitive activation
- **T4CLASM** Classroom management
- **T4DRTWCI** Use of digital resources and tools for whole class instruction
- **T4DRTIIA** Use of digital resources and tools for individualised instruction and assessment
- **T4CLSDIS** Perceived classroom disruption
- **T4ADLE** Adaptive learning
- **T4PBLE** Progression-based learning
- **T4AUTCH** Autonomy of teaching
- **T4FULFIL** Fulfilment of lesson aims (complexity of teaching)
- **T4EMPS** Empathy with students
- **T4SESDEV** Social and emotional skill development
- **T4OPPART** Opportunities to participate in school decisions
- **T4TLEAD** Teacher leadership
- **T4STUD** Teacher-student relations
- **T4RELEAD** Relational leadership
- **T4INSTLE** Instructional leadership
- **T4CLIBUL** School climate regarding bullying
- **T4STUHAR** Student harassment in school
- **T4CHFAT** Change fatigue
- **T4MOPU** Personal utility motivations to teach
- **T4MOSU** Social utility motivations to teach
- **T4WELS** Workplace well-being and stress
- **T4WLOADT** Workload stress
- **T4STBEH** Student behaviour stress
- **T4JSENVT** Job satisfaction with work environment
- **T4JSPROT** Job satisfaction with profession

- **T4JOBSAT** Job satisfaction, overall
- **T4VALP** Perceptions of value and policy influence
- **T4JOYTCH** Joy of teaching

Weighting and variance estimation variables

To calculate population estimates, the following weight variables are included in the international database:

- **SCHWGTC** Final principal weight in the principal/school files
- **TCHWGT** Final teacher weight in the teacher files
- **SCHWGTT** School weight (available in the teacher files) used for calculating the within-school teacher weight

To calculate correct variance estimates based on Balanced Repeated Replication (BRR) with Fay's adjustment, the following replicate weights are included in the international database.

- **CRWGT1** to **CRWGT100** BRR replicate weights 1-100 in the principal/school files
- **TRWGT1** to **TRWGT100** BRR replicate weights 1-100 in the teacher files

Further details about weighting and variance estimation are provided in Chapter 3 of this user guide and Chapter 9 of the technical report (OECD, forthcoming.

Key consideration

For reasons of confidentiality, variables for explicit and implicit stratification, BRR zone and unit as well as all weighting and adjustments factors used for the computation of the final weights were removed from the public-use files. Likewise, variables used exclusively for the stratification within schools were removed.

Database version and date of creation

Two additional variables include versioning information:

- **VERSION** Release version number of the database
- **IEADATE** File creation date, formatted as YYYYMMDD

TALIS Starting Strong variables

For each ECEC setting/leader that participated in the survey, the following information is available:

- identification variables for the country/territory and ECEC setting
- additional administrative variables
- ECEC setting leaders' responses to the leader questionnaire (or one of the two combined questionnaires as the case may be)
- leader indices derived from the original questions in the leader or combined questionnaires
- scale scores
- setting estimation and replicate weights
- database version and the date of the release.

For all staff members who participated in the survey, the following information is available:

- identification variables for the country/territory, setting and staff
- additional administrative variables
- staff's responses to the staff questionnaire (or one of the two combined questionnaires as the case may be)
- staff indices derived from the original questions in the staff or combined questionnaires
- staff estimation and replicate weights
- database version and the date of the release.

Identification variables

The following identification variables are used to identify uniquely each record in the data files:

- **CNTRY** Three-digit alphanumeric code based on ISO 3166 for the respective country/territory (see Table 1.2 in Chapter 1).
- **IDCNTRY** A two-to-six digit numeric code identifying the country/territory based on ISO 3166 (see Table 1.2 in Chapter 1).
- **IDPOP** A code which defines the target population: 1 = settings for children under the age of three (U3), 2 = ISCED level 02.
- **IDCNTPOP** Combined three-digit alphanumeric code and ISCED level code.
- **IDSETTING** Numeric identification number for all setting and staff-level files. The first four-digit identifies the setting within a country/territory. Note that codes are only unique within a country/territory.

In addition, the staff files ASG and BSG include the following:

- **IDSTAFF** Six-digit numeric identifier to identify staff within ECEC settings. The first four digits are composed of IDSETTING, followed by a unique, sequentially assigned two-digit number within each setting.

Key consideration

The original identification variables IDSETTING and IDSTAFF were randomly scrambled for the public-use files and no longer match those used during the data collection. The structural link between the ECEC setting and staff levels was maintained for all countries/territories.

Administration variables

The data include several variables that, while not contributing directly to any analysis, provide additional information about survey administration, participation and other basic characteristics. The following variables are used for this purpose in the ECEC setting- and staff-level files:

- **QUESTIONNAIRETYPE** Indicates the questionnaire the respondent initially completed: 1 = Leader Questionnaire, 2 = Staff Questionnaire, 3 = Combined Questionnaire Main, 4 = Combined Questionnaire Short
- **SETTINGTYPE** Setting type: 1 = centre-based setting, 2 = home-based setting

Questionnaire variables

This section describes the variables collected from leader and staff using the survey's instruments. The international questionnaires including the respective variable names can be found on the TALIS website (OECD, 2024[6]; OECD, 2024[7]; OECD, 2024[8]).

Variable names were assigned using a systematic naming convention. Variable names are consistent across all four questionnaire types and both target populations in TALIS Starting Strong 2024 whenever the questions are identical, which applied to the majority of questions, ensuring comparability across instruments and populations.

- The first digit indicates the source of the data: S = TALIS Starting Strong
- The second digit indicates the level of the data: L = leader/setting, S = staff.
- The third digit indicates the cycle: 2 = TALIS Starting Strong 2024 (end cycle)
- The fourth digit indicates the type of information: G = general
- The fifth and sixth digits represent the question number within the questionnaire.
- If needed, the seventh digit indicates the dimension of the question, i.e. if a question is divided into several items, letters indicate the items in alphabetical order.
- If questions are even further divided, e.g. in complex matrix questions, the eighth digit sequentially identifies the sub-items.

The resulting variable names are SL2G01 to SL2G45J for the setting-level files and SS2G01 to SS2G48H for the staff-level files.

The original information collected by the questionnaires underwent processing, inspection, cleaning and editing. The process ensured that information coded in each variable was in line with the international format, that national adaptations were reflected and mapped appropriately, that questions not internationally comparable were removed from the database and that all entries could be successfully linked between levels. Out-of-range values, questions determining the flow of the questionnaire, as well as inconsistent or implausible combinations of responses were inspected and cleaned, where necessary, in consultation with the concerned country/territory, the questionnaire experts and the OECD. To address residual inconsistencies, certain automatic edits, for example the removal of responses to percentage questions that did not total a plausible value, were imposed for all countries/territories. For further information on data capturing, processing and editing, please consult Chapters 8 of the technical report (OECD, forthcoming.

Key consideration

The information in the PUF data is in the state in which it was used for the reporting of results by the OECD. A small number of residual inconsistencies or implausible combinations of responses still exist in the data in cases where no clear rationale for deletion or editing could be developed by the consortium and the OECD. Further, the interaction between complex national adaptations on the one hand and national or international questionnaire routing and assembly on the other hand may have resulted in a small amount of values (especially missing values) not coded exactly as intended. The number of such cases was considered too low for further action and believed not to influence any conclusions or interpretations. It is still strongly recommended that data users pay attention to the variables or combinations of variables used and review these in advance.

Indices and scales derived from the questionnaire data

Analyses in the TALIS Starting Strong 2024 result publications are based on both individual questionnaire variables as described above and on composite and derived variables created from multiple variables in the questionnaire that formed a construct and eventually an index. Chapter 11 of the technical report (OECD, forthcoming includes comprehensive information about the scale and index construction and validation.

The leader file contains 29 derived variables which are based on a simple transformation of one variable or on a combination of variables (original variable in parentheses).

- **S2SUMSTAFFGR** *Sum of all staff members grouped (S2SUMSTAFF)*
- **S2LSTAFFLEFT Proportion of staff who permanently left in the last 12 months (SL2G23B)**
- **S2LEXPGR** Leader experience *groups (SL2G05)*
- **S2SSIZGR** National tertiles of setting size *(SL2G25)*
- **S2LTRAIN** Early childhood, financial or human resource management or pedagogical leadership included in education or training *(SL2G04A–D)*
- **S2SPRPLNG** Proportion of children in ECEC setting whose first language is different (S2SPCTLNG)
- **S2SPRPSEN** Proportion of children in this ECEC setting with special education needs (S2SPCTSEN)
- **S2SPRPDIS** Proportion of children in this ECEC setting from socio-economically disadvantaged homes (S2SPCTDIS)
- **S2SPRPMIG** Proportion of children in this ECEC setting who are immigrants or will migrant background (S2SPCTMIG)
- **S2SPEPREF** Proportion of children in this ECEC setting who are refugees (S2SPCTREF)
- **S2SPRPMIN** Proportion of children in this ECEC setting belonging to ethnic or national minorities (S2SPCTMIN)
- **S2SNINAC** Sum of available induction/orientation activities *(SL2G29A–J)*
- **S2SNTRAC** Sum of activities to facilitate children's transitions *(SL2G35A–F)*
- **S2SNDIPOL** Sum of policies and practices related to diversity *(SL2G39A–E)*
- **SL2G28A_R** Adequate ventilation *(SL2G28A)*
- **SL2G28B_R** Adequate furniture for each child *(SL2G28B)*
- **SL2G28C_R** Indoor space allows movement *(SL2G28C)*

- **SL2G28D_R** Background noise does not interfere with interactions *(SL2G28D)*
- **SL2G28E_R** Roof, ceiling, and floor in good shape *(SL2G28E)*
- **SL2G28F_R** Children can access bathroom easily *(SL2G28F)*
- **SL2G28G_R** Outdoor space allows movement *(SL2G28G)*
- **SL2G28H_R** Outdoor space has shaded areas *(SL2G28H)*
- **SL2G26A_R** Yes, children were placed on a waiting list and later enrolled (SL2G26A)
- **SL2G26B_R** Yes, children were placed on a waiting list and are still waiting for a place (SL2G26B)
- **SL2G26C_R** Yes, but children were not placed on a waiting list (SL2G26C)
- **SL2G26D_R** No (SL2G26D)
- **SL2G26E_R** I do not have this information (SL2G26E)
- **S2LJOBSARQR** Satisfaction with work at this ECEC setting in *national quartiles* (S2LJOBSAR)
- **S2LSTRESLQR** Level of stress and impact on leaders' well-being in *national quartiles* (S2LSTRESL)

The next set of indices are scales scores computed using multiple-group confirmatory factor analysis (MGCFA).

- **S2LPDEV** Professional development needs, overall
- **S2LPDLS** Professional development needs: leadership and setting management
- **S2LPDPL** Professional development needs: pedagogy and pedagogical leadership
- **S2LNIGHBR** Neighbourhood environment
- **S2LSQSET** Structural Quality: Adequacy of setting
- **S2LEADSPL1** Leader support for staff pedagogical learning
- **S2LEADSPL2** Leader innovations in the ECEC setting
- **S2LDLEAD** Distributed leadership
- **S2LSQPRS** Barriers to Structural Quality: Adequacy of physical resources
- **S2LSQSTA** Barriers to Structural Quality: Adequacy of staffing
- **S2LSTRES** Sources of work stress, overall
- **S2LSTRESG** Sources of work stress associated with general leadership concerns
- **S2LSTRESP** Sources of work stress associated with pedagogical leadership

The staff file contains 25 derived variables which are based on a simple transformation of one variable or on a combination of variables.

- **S2SUMSTAFFTGGR Sum of staff members working with the target group *grouped* (S2SUMSTAFFTG)**
- **S2SNUMCHDTG Number of children in target group *grouped* (SS2G35)**
- **S2SPRPTGLNG Proportion of children in target group whose first language is different (SS2G35 and SS2G36A)**
- **S2SPRPTGSEN Proportion of children in target group with special education needs (SS2G35 and SS2G36B)**
- **S2SPRPTGDIS Proportion of children in target group from socio-economically disadvantaged homes (SS2G35 and SS2G36C)**
- **S2SPRPTGMIG Proportion of children in target group who are immigrants or with migrant backgrounds (SS2G35 and SS2G36D)**

- **S2SPRPTGMIN Proportion of children in target group belonging to ethnic or national minorities (SS2G35 and SS2G36E)**
- **S2SNOPD** No participation in professional development activities during the last 12 months *(SS2G15A–I)*
- **S2SNOPDSUP** No support for professional development activities during the last 12 months *(SS2G18A–H)*
- **S2SROLEGR** Staff role *grouped* (SS2G03)
- **S2SEMPGR** Staff employment status *grouped* (SS2G05)
- **S2SEXPGR** Staff work experience in total *grouped* (SS2G08B)
- **S2SISCED** Staff education groups *(SS2G11)*
- **S2SETCHD** Staff education or training to work with children (SS2G12A-F)
- **S2PDMODE** Mode of professional development in the last 12 months *(SS2G15A–I)*
- **S2STMWCHD** Percentage of time spent with direct contact with children (SS2G28A-B)
- **S2STMWOCHD** Percentage of time spent without contact with children (SS2G28A-B)
- **S2SPTMPROWN** Percentage of time spent planning or preparing play and/or learning activities on your own (SS2G28A-C)
- **S2SPTMPROTH** Percentage of time spent planning or preparing play and/or learning activities with other ECEC staff (SS2G28A-B, SS2G28D)
- **S2SPTMDOC** Percentage of time spent documenting children's development, well-being and learning (SS2G28A-B, SS2G28E)
- **S2SPTMCOL** Percentage of time spent collaborating and speaking with parents or guardians from this ECEC setting (SS2G28A-B, SS2G28F)
- **S2SPTMMGM** Percentage of time spent participating in management, staff meetings and general administrative work (SS2G28A-B, SS2G28G)
- **S2SPTMHOU** Percentage of time spent laundry, tidying-up, cleaning, shopping or food preparation tasks (SS2G28A-B, SS2G28H)
- **S2PROSARQR** Satisfaction with profession *national quartiles* (S2PROSAR)
- **S2STRESSQR** Level of stress and its impact on staff well-being *national quartiles* (S2STRESS)

The second set contains 19 scales resulting from MGCFA. The procedure to derive these scales followed the same steps as the one for the leader scales (see above).

- **S2PAAD Promoting awareness and acceptance of diversity**
- **S2SELF Self-efficacy, overall**
- **S2SELFC Self-efficacy: children's development, well-being and learning**
- **S2PROLIR Facilitating literacy development**
- **S2PRONUR Facilitating numeracy development**
- **S2PRSOC Facilitating prosocial behaviour**
- **S2CCAFL Child-centred planning**
- **S2PRINTR Facilitating play**
- **S2PREMR Facilitating emotional development**
- **S2PRLANR Facilitating language development**
- **S2PRACTR Daily adaptive pedagogical practices**
- **S2SOCIALR Behavioural support in the classroom/playroom**

- **S2COLLR Engagement in collaborative practices**
- **S2PARENR Facilitating parent/guardian engagement**
- **S2STRESC Sources of work stress: aspects specific to children's development, well-being and learning**
- **S2STRESR Sources of work stress, overall**
- **S2PDNPED Professional Development Needs: pedagogical**
- **S2PDIVR Professional Development Needs: diversity**
- **S2STRESO Sources of work stress: aspects related to capacity, resources and time**

Weighting and variance estimation variables

To calculate population estimates, the following weight variables are included in the international database:

- **LEADERWGT** Final leader weight for the leader-level files
- **STAFFWGT** Final staff weight for the staff-level files
- **SCHWGTT** Setting weight used for calculating the within-setting staff weight

To calculate correct BRR variance estimates, the following replicate weights are included in the international database.

- **LRWGT1** to **LRWGT92** BRR replicate weights 1-92 in the leader files
- **SRWGT1** to **SRWGT92** BRR replicate weights 1-92 in the staff files

Further details about weighting and variance estimation are provided in Chapter 3 of this user guide and Chapter 9 of the technical report (OECD, forthcoming.

Key consideration

For reasons of confidentiality, variables for explicit and implicit stratification, for BRR zone unit as well as all weighting and adjustments factor used for the computation of the final weights were removed from the public-use files. Likewise, variables used exclusively for the stratification within ECEC settings and staff sampling were removed.

Database version and date of creation

Two additional variables include versioning information:

- **VERSION** Release version number of the database
- **IEADATE** File creation date, formatted as YYYYMMDD

TALIS Teacher Knowledge Survey (TKS) variables

This section is under preparation.

Coding of missing data

A response to a question can be missing for several reasons. The question might have been excluded from the questionnaire, the respondent might have chosen not to respond to the question, or the question

did not apply to them. These kinds of missing data are handled differently during data processing, editing and analysis and are therefore also coded differently in the data files.

The codes used to represent each type of missing data depend on the file format.

> **Key consideration**
>
> It is strongly recommended that data users inspect variables of interest, or combinations of variables, for the extent of missing data prior to conducting analysis. Chapter 1 provides additional guidance on missing data, including issues related to both data missing by design and item-level non-response.

Not administered questions

The response to a question is coded as "not administered" in the following cases:

- Empty questionnaire: If the returned questionnaire is empty, all variables referring to that instrument are coded as "not administered" (unit non-response).
- Questions or parts not administered: A country/territory may have chosen not to administer a certain question in their national questionnaire. The variables corresponding to the question that was not administered are coded as "not administered".
- Questions not administered due to questionnaire design: in the Core Survey, each teacher only received a subset of the questions; in TALIS Starting Strong, the combined questionnaires do not include the full superset of all questions in the leader and staff questionnaires.

The following missing code was assigned after data collection:

- SPSS/CSV: "8", "98", "998", and so on (depending on the length of the variable).
- Stata: ".a"
- R: "NA(a)" (represented as a "tagged" NA using the labelled package).

Omitted questions and invalid responses

The response to a question is coded as omitted when the question was administered but not answered or when an invalid response was given. The following cases are coded as an "omitted or invalid" response:

- Non-response: The question was administered but no response was provided.
- Uninterpretable: The respondent selected more than the expected number of checkboxes (or marks in the paper administration), or gave an uninterpretable response to a question.
    - A response was initially provided but invalidated during data cleaning.

The following missing code was assigned after data collection:

- SPSS/CSV: "9", "99", "999", and so on (depending on the length of the variable).
- Stata: ".m"
- R: "NA(m)" (represented as a "tagged" NA using the labelled package).

Not reached questions (TKS – GPK only)

For scaling purposes, a special missing code was assigned "not reached" by respondents to distinguish them from omitted responses. Omitted questions are those that a respondent most likely read, but either

consciously decided not to answer or accidentally skipped. “Not reached” variables, in contrast, are the responses omitted towards the end of the instrument, possibly due to a lack of drop-off or fatigue. “Not reached” values are therefore exclusively located towards the end of the questionnaire and only apply to the items for the General Pedagogical Knowledge (GPK) assessment in the TKS files.

- SPSS/CSV: “7”, “97”, “997”, and so on (depending on the length of the variable).
- Stata: “.r”
- R: “NA(r)” (represented as a “tagged” NA using the labelled package).

Logically not applicable questions

The response to a question is coded as “logically not applicable” if the preceding filter question was answered in a way that made a response to the conditional/dependent question(s) logically impossible.

- SPSS/CSV: “6”, “96”, “996”, and so on (depending on the length of the variable).
- Stata: “.b”
- R: “NA(b)” (represented as a “tagged” NA using the labelled package).

Key consideration

Depending on the analysis desired, it is recommended that data users review the questionnaire to determine whether any of their included questions are dependent on previous responses. In such cases, population coverage may be reduced, and resulting inferences may no longer refer to the entire target population.

Confidentiality measures applied to the public-use files and other limitations

To protect the confidentiality of respondents and minimise the risk of re-identification, a number of disclosure avoidance measures were applied at the international level (i) consistently for all participating countries/territories and (ii) to specific national datasets on request. The selection of these measures was supported by assessments of the risk of re-identification, conducted separately for the Core survey and TALIS Starting Strong. National measures were defined by each country/territory in consultation with their local data protection experts and authorities.

Measure for the TKS followed those defined for the Core survey.

Additionally, the Core Survey public use files initially released in October 2025 do not include all variables collected, specifically those relating to environmental and sustainability education embargoed until the time of a planned thematic report in 2027.

TALIS Core Survey and Teacher Knowledge Survey

International-level measures

The following sets of international-level measures applied to all public-use datasets. The first set relates to sampling, tracking and administrative variables.

- Similar to TALIS 2018, the teacher unique identifier (IDTEACH) and the school unique identifier (IDSCHOOL) were randomly scrambled and thus no longer match those used during data collection. The structural link between the school and teacher level was maintained for all

countries/territories. For each country/territory, unique matching tables were created and made available only to authorised individuals in a secure way.

- Variables used exclusively for sampling, participation tracking, non-response follow-up, internal data processing, quality control or of similar interim nature without analytical potential were excluded from the public-use files. At the teacher level, this includes, but is not limited to, variables such as final participation indicators, listed gender, listed birth year, and listed subject domain. Similarly, at the school level, excluded variables include final participation indicator, the number of teachers in target grade and the number of teachers to sample.
- Variables used for stratification at school and teacher levels were removed to prevent disclosure of geographic or administrative groupings. These include explicit stratum (IDSTRATE) and implicit stratum (IDSTRATI).
- Moreover, variables used in the construction of sampling and replicate weights, such as school/teacher design weights (WGTFAC1 / WGTFAC2T), school non-response adjustment (WGTADJ1T / WGTADJ1C), teacher non-response adjustment (WGTADJ2T), teacher multiplicity adjustment (WGTADJ3T), school/teacher BRR replication zones and corresponding replication indicators (BRRCZONE, BRRCREP, BRRTZONE and BRRTREP), were also excluded due to the risk of indirectly revealing stratification structures. This includes an interim adjudication flag (INTAL24) to identify the cases to be included in the analysis, restricted and public-use files.
- In addition, data collected from teachers for quality control purposes were omitted. These include information on process and experience, such as selection to participate, time provided to complete survey as well as items addressing technical issues, confidentiality concerns, and descriptive ratings of the participation.
- Finally, event and process data indicating the sequence of system interactions, responses and time taken were only made available to the concerned country/territory and the OECD, yet not planned for release to other countries/territories and public users.

The second set of variables concerned response and derived variables to further minimise the risk of re-identification. The variables suppressed from the principal and teacher files were identified through uni- and multivariate assessments of the risk of re-identification, and are:

- School/principal level:
    - **TC4G02** Principal's age
    - **TC4G03** Principal's highest level of formal education completed
    - **TC4G04A-E** Principal's years of work experience
    - **TC4G06** Principal's current employment status (in terms of full- or part-time) as a principal
    - **TC4G11** School location
    - **TC4G14A-E** Number of staff by category
    - **TC4G15A-C** Number of teachers who began work during the last 12 months, left during the last 12 months, or absent for most recent Tuesday
    - **TC4G16A-F** ISCED levels and/or programmes taught
    - **TC4G17** Current school enrolment
- Teacher level:
    - **TT4G02** Teacher's age
    - **TT4G03** Teacher's highest level of formal education completed

- **TT4G05** Teacher's year of completion first teaching qualification
- **TT4G11** Count of other schools teacher currently working at
- **TT4G12** Teacher's employment status (in terms of full- or part-time) as a teacher at this school
- **TT4G13A-D** Teacher's years of work experience
- **TT4G29A-G** Teachers' language background
- **TT4G46** Enrolment in target class
- **TT4G81** Single most important recommendation to stakeholders or policy makers (original and resolved after country/territory review)
- **T4TLANG** Nominal list of languages used by teacher (multilingualism)
- **T4TPOLREC** Teacher's single most important recommendation to stakeholders or policy makers (resolved English version)

In most cases, derived variables capture the information in coarsened or grouped way. For more information on these derived variables, see Chapter 11 on simple indices and derived variables in the technical report (OECD, forthcoming.

Country/territory-level measures

Several country/territory-specific restrictions were placed on the data to preserve confidentiality and align with national data release policies. Additional restricted use data might be available via the participating country/territory's main contact, listed in Annex D of *Results from TALIS 2024* (OECD, 2025.

The following list states the variable name, variable label and the countries/territories which requested suppression (see Table 1.1 in Chapter 1 for operational identifiers). All suppressions were consistently applied to all applicable populations / ISCED levels.

- School/principal level
  - **IDLANG_CQ** Language of Questionnaire: NZL
  - **ITMODE_CQ** Administration mode of the Principal Questionnaire: BRA
  - **TC4G01** Principal's gender: ALB, AUS, AUT, BEL, BFL, BFR, BRA, CAB, CHL, COL, CRI, CYP, CZE, DNK, ESP, FIN, FRA, HRV, ISL, ITA, JPN, KOR, LVA, LTU, MLT, MNE, NLD, NZL, MKD, NOR, PRT, SVN, USA, VNM, XKX, ZAF (suppressed for those countries/territories that administered a country-specific gender response option)
  - **TC4G05** Principal's teaching obligation as part of work at this school: FRA, SGP, SWE
  - **TC4G07A** Elements included in formal education or training - school administration or principal training programme: SWE
  - **TC4G07B** Elements included in formal education or training - teacher training/education programme or course: SWE
  - **TC4G07C** Elements included in formal education or training - instructional leadership training or course: SWE
  - **TC4G12A** Percentage of school's total funding – government: NLD, SWE
  - **TC4G12B** Percentage of school's total funding - student fees or school charges paid by parents or guardians: NLD, SWE
  - **TC4G12C** Percentage of school's total funding - other: NLD, SWE
  - **TC4G13** Public or private school management: ISL, NZL, NLD, POL, SGP, SWE

- **TC4G18A**: Student admission factors - residence in a particular area: NLD
- **TC4G18B** Student admission factors - students' record of academic performance: NLD
- **TC4G18C** Student admission factors - recommendation of feeder schools: NLD
- **TC4G18D** Student admission factors - parents' endorsement of instructional or religious philosophy of school: NLD
- **TC4G18E** Student admission factors - student requires or is interested in a special programme: NLD
- **TC4G18F** Student admission factors - family members of current student: NLD
- **TC4G18G** Student admission factors - emergency situations: NLD
- **TC4G21A** School composition - students with difficulties understanding language of instruction: NLD, SWE
- **TC4G21B** School composition - students [first language] different from language of instruction: NLD, SWE
- **TC4G21C** School composition - students with special education needs: NLD, SWE
- **TC4G21D** School composition - students from socio-economically disadvantaged homes: NLD, SWE
- **TC4G21E** School composition - students belonging to ethnic/national minorities or Indigenous communities: NLD
- **TC4G21F** School composition - male students: NLD, NZL, SGP, SWE
- **TC4G21G** School composition - students who are immigrants or with migrant background: NLD, SWE
- **TC4G21H** School composition - students who are refugees: ISR, NLD, SWE
- **TC4G23G** School leadership - parents or guardians represented on school management team: SWE
- **T4PAGEGR** Principal age (grouped): NLD, SGP
- **T4PHEDAT** Principal's highest level of formal education completed (grouped): ISL, NLD, POL, SGP
- **T4PEMPWH** Principal's employment status in terms of working hours (grouped): ISL, NLD
- **T4SCHLOC** School location (grouped): ISL, NLD
- **T4STRATIO** Student-teacher ratio: NLD
- **T4TPRATIO** Teacher-pedagogical support personnel ratio: NLD
- **T4TARATIO** Teacher-administrative or management personnel ratio: NLD
- **T4NUMSTUD** Number of enrolled students (grouped): NLD, SGP
- **T4PYEXPPS** Principal's years of work experience at this school (grouped): NLD
- **T4PYEXPPT** Principal's years of work experience in total (grouped): NLD
- **T4PYEXPSM** Principal's years of work experience in school management (grouped): NLD
- **T4PYEXPT** Principal's years of work experience as teacher (grouped): NLD
- **T4PYEXPO** Principal's years of work experience in other non-education roles (grouped): NLD
- **T4SCHISCN** Number of ISCED levels taught in the school: NLD

    - **T4SCHPRGN** Number of programmes taught in the school: NLD
    - **T4TTNRATIO** Teacher-to new teacher ratio: NLD
    - **T4NUMTCH** Number of teachers (grouped): BEL, BFL, BFR, NLD
- Teacher level
    - **IDLANG_TQ** Language of Questionnaire: NZL
    - **ITMODE_TQ**: Administration mode of the Teacher Questionnaire: BRA
    - **TT4G01**: Teachers' gender: ALB, AUS, AUT, BEL, BFL, BFR, BRA, CAB, CHL, COL, CRI, CYP, CZE, DNK, FIN, FRA, HRV, ISL, ITA, JPN, KOR, LVA, LTU, MLT, MNE, NLD, NZL, MKD, NOR, PRT, SVN, ESP, USA, VNM, XKX, ZAF (suppressed for those countries/territories that administered a country-specific gender response option).
    - **TT4G09** Employment status (in terms of tenure) as a teacher at this school: NLD
    - **TT4G10** Current work as at another school: FRA, NLD
    - **TT4G20A** Participation in professional learning activities – courses, seminars or workshops: NLD
    - **TT4G48A** Primary subject category of target class: FRA, NLD, NOR, SGP
    - **TT4G49** Primary subject category of target class included in formal education or training: FRA, NLD
    - **T4TAGEGR** Teacher age (grouped): SGP
    - **T4THEDAT** Teacher's highest level of formal education completed (grouped): SGP
    - **T4TEMPWH** Teacher's employment status in terms of working hours (grouped): NLD
    - **T4TLANGN** Multilingualism: NLD

Limitation of the initial PUF release related to environmental and sustainability education (ESE)

In addition to the initial release of the Core Survey PUF in October 2025, a second release will include an extended set of variables focusing on environmental and sustainability education (ESE). These variables will support a thematic report on ESE, which is scheduled for publication in 2027.

The ESE variables that will be released as part of the second release in 2027, and are consequently excluded from the initial PUF release in October 2025, are:

- Principal/school level
    - **TC4G09A** Participation in professional learning - knowledge and understanding of environmental sustainability
    - **TC4G09B** Participation in professional learning - improve school's environmental sustainability practices
    - **TC4G09C** Participation in professional learning - support teachers to teach about environmental sustainability
    - **TC4G10L** Areas of professional learning needed - knowledge and understanding of environmental sustainability
    - **TC4G25B1-5** Significant responsibility for improving the school's environmental sustainability practices
    - **TC4G28E** Actions taken - improving this school's environmental sustainability practices
    - **TC4G28F** Actions taken - supporting teachers interested in teaching about climate change

  - **TC4G45A-H** Supporting education and environmental sustainability
  - **TC4G46A-J** Barriers for teaching
  - **TC4G47** Personal concern about climate change
  - **TC4G48** Personal opinion about world climate and changes
  - **T4PLEADESE** Leadership in environmental and sustainability education
  - **T4PINBRCC** Instructional barriers to teaching climate change
  - **T4PATBRCC** Attitudinal barriers to teaching climate change
- Teacher level
  - **TT4G07H** Preparedness in engaging students with environmental sustainability
  - **TT4G21P** Professional learning activities - knowledge and understanding of sustainability
  - **TT4G24P** Professional learning needs - knowledge and understanding of environmental sustainability
  - **TT4G27Q** Self-efficacy in supporting students' learning about environmental sustainability
  - **TT4G39A-G** Education and environmental sustainability activities
  - **TT4G40A-E** Education and environmental sustainability - confidence
  - **TT4G41** Statements best describing teaching about climate change
  - **TT4G42A-J** Reasons for not teaching about climate change
  - **TT4G43** Informal talk with students about climate change
  - **TT4G44** Personal concerns about climate change
  - **TT4G45** Opinion about the world's climate
  - **TT4G69I** Impact of feedback regarding methods for engaging students with environmental sustainability concepts
  - **T4STESE** Student engagement in environmental and sustainability education
  - **T4TCHCLC** Confidence to teach about climate change

TALIS Starting Strong

International-level measures

The following sets of international-level measures applied to all public-use datasets. The first set relates to sampling, tracking and administrative variables

- Similar to TALIS Starting Strong 2018, the staff unique identifier (IDSTAFF) and the ECEC setting unique identifier (IDSETTING) were scrambled and thus do not match those used during data collection. However, the structural link between the ECEC setting and the staff was maintained for all participating countries/territories, allowing files to be linked. For each participating country/territory, unique matching tables were created and made available to authorised individuals only.
- Variables used purely for the listing and stratification of the staff sample, namely birth year, gender or role, were removed. Variables used solely for the stratification of ECEC settings, i.e. explicit stratum (IDSTRATE) and implicit stratum (IDSTRATI), were also removed to avoid the risk of identifying geographic or organisational units.

- Information to track the data collection, including the language version of the instruments, the data collection mode (paper or online), and other interim information without analytical potential were suppressed consistently.
- Information used for the construction of sample and replicate weights were excluded to prevent the possible reverse identification of stratification structures. At the setting/leader level, this includes setting design weight (WGTFAC1) and setting non-response adjustment (WGTADJ1L / WGTADJ1S). At the staff level, removed variables include staff design weight (WGTFAC2S), staff non-response adjustment (WGTADJ2S), and staff multiplicity adjustment (WGTADJ3S). This includes an interim adjudication flag (INTAL24) to identify the cases to be included in the analysis, restricted and public-use files.
- Replication zone and unit variables that could lead to indirect identification of ECEC settings were further removed from the data. These include the BRR replication zone (BRRLZONE) and leader BRR replication indicator (BRRLREP) leaders, as well as the BRR replication zone (BRRSZONE) and BRR replication indicator (BRRSREP) for staff.
- In addition, data collected from a sub-sample of staff for quality control purposes were omitted. These include information on process and experience, such as selection to participate, time provided to complete survey as well as items addressing technical issues, confidentiality concerns, and descriptive ratings of the participation.
- Finally, event and process data indicating the sequence of system interactions, responses and time taken were only made available to the concerned country/territory and the OECD, yet not planned for release to other countries/territories and public users.

The second set of variables concerned response and derived variables to further minimise the risk of re-identification. The variables suppressed from the setting/leader and staff files were identified through uni- and multivariate assessments of the risk of re-identification, and are:

- Leader/setting level
    - **SL2G01** Leader's gender
    - **SL2G02** Leader's age
    - **SL2G03** Leader's highest level of formal education completed
    - **SL2G05A-D** Leader's years of work experience
    - **SL2G06A-B** Leader's Number of working hours per week
    - **SL2G07** Leader's work as at more than one setting
    - **SL2G08** Leader's count of other settings currently working at
    - **SL2G13** Setting's location
    - **SL2G15A-E** Setting's location
    - **SL2G18A-D** Setting's sources of funding
    - **SL2G19** Public or private setting management
    - **SL2G20** Setting part of a chain/franchise/network
    - **SL2G21** Setting for-profit status
    - **SL2G22A-D** Number of staff by category
    - **SL2G23A-C** Number of staff who began work during the last 12 months, left permanently during the last 12 months, temporarily absent, temporary sick leave
    - **SL2G24** Number of staff absent due to temporary sick leave
    - **SL2G25** Number of children enrolled
    - **SL2G27A-H** Number of children by category

- **SL2G43A-G** Job satisfaction
- **SL2G44C** Impact on mental health
- **SL2G44D** Impact on physical health
- **S2SUMSTAFF** Sum of all staff members
- **S2LAGEGR** Leader age (grouped)
- **S2LISCED** Leader education (grouped)
- **S2SMANPRF** Publicly- or privately-managed and for-profit status
- **S2SPCTU3** Percentage of children under the age of 3
- **S2SPCT3O** Percentage of children age 3 and older
- **S2SPCTLNG** Percentage of children whose first language is different
- **S2SPCTSEN** Percentage of children with special education needs
- **S2SPCTDIS** Percentage of children from socio-economically disadvantaged homes
- **S2SPCTMIG** Percentage of children who are immigrants or with migrant backgrounds
- **S2SPCTREF** Percentage of children who are refugees
- **S2SPCTMIN** Percentage of children belonging to ethnic/national minorities
- **SL2G18A-D_R** Setting's sources of funding (derived)/ Direct payments to <ECEC setting> by <Government> (derived)
- **S2LJOBSAR** Satisfaction with work at setting
- **S2LSTRESL** Level of stress and impact on leaders' well-being

- Staff level
  - **SS2G01** Staff's gender
  - **SS2G02** Staff's age
  - **SS2G03** Staff's role
  - **SS2G05** Staff's employment status
  - **SS2G06** Staff's current working hours
  - **SS2G07** Staff's reason to work part-time
  - **SS2G08A-C** Staff's years of work experience by category
  - **SS2G09** Staff's currently work at more than one setting
  - **SS2G10** Number of other settings working at
  - **SS2G11** Staff's highest level of formal education completed
  - **SS2G12A-F** Education or training programme prepared to work with children by ISCED level
  - **SS2G27** Staff's number of hours spent in total on tasks related to job at setting
  - **SS2G28A-H** Number of hours spent on activities related to job at setting by category
  - **SS2G34A-D** Number of staff working with the target group by category
  - **SS2G35** Number of children in target group
  - **SS2G36A-E** Number of children in target group by background
  - **SS2G37A-G** Number of children in target group by age
  - **SS2G44A-G** Job satisfaction related to leader
  - **SS2G45A-H** Job Satisfaction
  - **SS2G46C** Impact on mental health

- **SS2G46D** Impact on physical health
- **SS2G48A-H** Factors for leaving role
- **S2SUMSTAFFTG** Sum of staff members working with the target group
- **S2SAGEGR** Staff age groups
- **S2SFPTW** Working hours and reasons for part-time work
- **S2SSLEAD** Satisfaction with setting leadership
- **S2JOBSAR** Satisfaction with work at setting
- **S2PROSAR** Satisfaction with profession
- **S2STRESS** Level of stress and its impact on staff well-being

In quite a number of cases, derived variables capture the information in coarsened or grouped way. For more information on these derived variables, see Chapter 11 on simple indices and derived variables in the technical report (OECD, forthcoming.

Country/territory-level measures

Countries and territories were given the opportunity to request specific restrictions for their data to further support confidentiality and align with national data release policies.

Given the low participation rate and the consequent increased risk of re-identification as well as the fact that the data are not considered representative of the national target population, data for New Zealand (NZL) were entirely withdrawn from the public-use data.

No other country or territory requested specific measures over and beyond the general restrictions placed on the public-use data described above.

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3 Weighting and variance estimation for complex samples

The OECD Teaching and Learning International Survey (TALIS) 2024 relied on a complex sampling design. The use of survey weights is mandatory for obtaining unbiased survey estimates, data tabulation and modelling. Furthermore, it is key to accounting for the features of the sampling design when reflecting on the precision of the estimates, by reporting sampling and measurement error. In this chapter, the use of estimation and replication weights is explained, including examples.

Overview

This chapter gives a brief introduction to the use of weighting and variance estimation variables in TALIS 2024. The names and locations of these variables in the international database are described and their specific roles in the analysis of institution-level or person-level data are explained. Examples regarding the importance of using the appropriate weighting and variance estimation techniques are given. Please refer to Chapter 9 of the *TALIS 2024 Technical Report* (OECD, forthcoming[1]) for details on the computation of estimation and replicate weights.

Sampling weights

Why weights are needed

All data in the TALIS 2024 international databases are derived from random samples of schools/settings and teachers/staff. As the samples are random, the results of the survey are not only informative of the sampled units, but one can also infer properties of the entire educational community who was surveyed. To make correct inferences about educational and early childhood education and care systems, it is necessary to account for the complex structure of the sampling design implemented in TALIS (Lohr, 2019[2]).

Details about the general TALIS sampling design are reported in Chapter 5 of the *TALIS 2024 Technical Report* (OECD, forthcoming[1]). Details about national implementation can be found in Annex D of the *TALIS 2024 Technical Report*.

The main features of all TALIS 2024 components, including the TALIS Starting Strong component, are similar. The sampling design called for different selection probabilities for sampling schools/settings and teachers/staff within selected schools/settings. Sampling weights reflect and compensate for the disproportional selection probabilities among the schools/settings and teachers/staff. If any sampling unit had a small selection probability, this was compensated for with a large weight, and vice versa. Given that some sampled schools/settings and teachers/staff refused or were unable to participate in the survey, it was necessary to adjust the sampling weights to compensate for the sample size loss. Thus, the sampling weights were multiplied by non-response adjustments. The final (estimation) weights are the product of weight factors and adjustment factors.

Details about weighting and adjustment are reported in Chapter 9 of the *TALIS 2024 Technical Report*.

Selecting the appropriate weight variable

Each core survey database (of ISCED level 2, ISCED level 1, ISCED level 3 or TKS) comes with the appropriate set of weights:

- For school-level analyses (schools, principals), SCHWGTC, found on the ACG/BCG/CCG-type files, must be used.
- For teacher-level analyses, TCHWGT, found on the ATG/BTG/CTG/BTK-type files, must be used.

Similarly, each TALIS Starting Strong database (of ISCED level 02 or U3) comes with the appropriate set of weights:

- For setting-level analyses (settings, leaders), LEADERWGT, found on the ALG/BLG-type files, must be used.
- For staff-level analyses, STAFFWGT, found on the ASG/BSG-type files, must be used.

If researchers plan to analyse data from more than one level of the sampling design, they must carefully choose the correct weight:

- Analysing combined teacher/staff-level data and school/setting-level data is straightforward with the IEA IDB Analyzer (IEA, 2025[3]). The software can be used to easily add (disaggregate) school/setting data to the teacher/staff data. This way, for example, school/setting information becomes an attribute of the teacher/staff, and the user can analyse information from both files. For example, the research question could be of this type: “What percentage of teachers/staff work in schools/settings with a particular attribute?”. TCHWGT/STAFFWGT must be used for this type of data analysis. The use of SCHWGTC/LEADERWGT is inappropriate in this case and the IEA IDB Analyzer automatically drops this weight from any merged file.
- If teacher/staff-level information is regarded as an attribute of the school/setting (e.g. “What percentage of schools/settings employ teachers/staff with a particular characteristic?”), this cannot be handled with the IEA IDB Analyzer. The researcher must use other software, such as SPSS, R or Stata, first to average or categorise the teacher/staff-level data and then to merge the aggregated data onto the school/setting data file. When statements are made about institutions that have aggregated teacher/staff-level information attached, SCHWGTC/ LEADERWGT must be used.

Multi-level analysis

Working with aggregated or disaggregated data poses some methodological problems – for details, see Snijders and Bosker (1999[4]). It is possible to perform multi-level analysis with specialised software packages (e.g. HLM, Mplus or R). For this type of analysis, users must compute the appropriate weights themselves. While the procedure outlined here may be applicable in a general sense, it is important to note that specific packages or software may require distinct sets of weights. Users are advised to consult the respective manuals for these packages or software to ensure the accurate application of weights.

At level 1 (teacher/staff level), data users should apply a "within-school/setting teacher/staff weight" by dividing the teacher final weight by the school weight included in the teacher/staff dataset.

For the core survey: $\frac{TCHWGT}{SCHWGTT}$

For TALIS Starting Strong: $\frac{STAFFWGT}{SCHWGTT}$

At level 2 (school/setting level), the user should use the variable SCHWGTT in the teacher/staff dataset. Users should ensure that the software used for multi-level analysis normalises the weights, i.e. makes the sum of weights equal to the sample size. Users should not use the variables SCHWGTC or LEADERWGT from the school/setting files, as non-response adjustments made to these data may make these values slightly different from the correct ones.

Finally, note that there is no unique way of using estimation weights in multi-level analysis, as this depends on how the estimation model is set up to examine the relationship of interest. Mang et al. (2021[5]) provide an in-depth discussion about the use of estimation weights in multi-level regression models.

Whether or not multi-level analysis is adequate to use depends on the sample sizes within schools/settings. As TALIS Starting Strong used smaller numbers of staff within settings, multi-level analysis is not recommended for this component.

Example of analysing data with and without weights

Failing to use weights in data analysis can lead to incorrect and severely biased results. The following example illustrates the importance of using weights in research with TALIS 2024 data.

A researcher may be interested in the average number of students per school (variable TC4G17 in the BCG files). Using unweighted data (e.g. in SPSS or MS Excel), the researcher computed the mean and its standard error. For comparison, means and standard errors using weights are also given in Table 3.1.

Table 3.1. Unweighted and weighted results for mean number of students (ISCED level 2)

Country/territory	Unweighted mean	Unweighted s.e. (mean)	Weighted mean	Weighted s.e. (mean), not accounting for design
Austria	441	18.3	294	6.2
Chile	812	28.5	504	5.5
Kazakhstan	1 063	52.7	577	8.2
Morocco	831	27.1	560	6.9
Poland	456	18.5	255	1.8

Note: s.e. (mean) stands for the estimated sampling error of the estimated mean.
Source: TALIS 2024 Database.

It is obvious that the unweighted means are considerably higher than the weighted means. The difference between the unweighted and the weighted results can be explained by the sampling design, in which the proportion of large schools/settings in the sample is usually higher than in the total population. The sampling weights compensate for that disproportional school/setting sample allocation, and not using weights leads to an incorrect and biased population estimate.

In addition, the difference between the unweighted and weighted estimates of the sampling error is remarkable: the ratios of unweighted to weighted range from 3 (Austria) to 10 (Poland). This is because using the weights (e.g. switching “data/weight cases…” on in SPSS or using “=sumproduct” of the weight variable and variable of interest in MS Excel) pushes the software to use the sum of weights (possibly, several thousand) as the sample size rather than the actual ~200 schools/settings (the nominal sample size in TALIS). Those software programmes can be used to compute weighted estimates but not their weighted design-based estimate of sampling error.

This inflation in sample sizes is not a feature of TALIS 2024 but more generally a failure of basic software to recognise and account for complex sampling design and clustering. This will occur with any survey relying on a complex sampling design.

Variance estimation

Why variance estimation is needed

Since all estimates, statements and inferences in TALIS 2024 are based on sample data, they can only be stated with a degree of uncertainty. With all research that is performed using the data, the precision of the population estimates should be reported.

Because of the complex sampling design used, it is not possible to calculate standard errors or to easily perform significance tests with software packages that are unable to handle complex surveys out of the box (such as SPSS). While these programmes implicitly assume that the data are derived from simple random samples, the principal/leader and teacher/staff data come from a multi-stage stratified cluster sample (each school/setting being regarded as a “cluster” of teachers/staff). Any method for estimating sampling variance must take this design into account.

The international database contains variables that allow for using a variance estimation method called "balanced repeated replication" (BRR), more specifically Fay's variation of BRR (Lohr, 2019[2]; Judkins, 1990[6]; Fay, 1989[7]), with a Fay factor of 0.5.

These variables are referred to as "BRR weights". The BRR technique has been implemented in the IEA IDB Analyzer software; this method of variance estimation is also recognised by other software packages, including some specific R packages (notably the OECD's Rrepest), the SAS "PROC SURVEY" family of procedures, or the "svy" or "*repest*" commands of Stata. For details about the BRR technique and how replicate weights were computed, please refer to Chapter 9 of the *TALIS 2024 Technical Report* and Chapter 2 of this user guide for the weight variables included in the international database.

Selecting the appropriate variance estimation variables

The following replicate weights are included in the TALIS 2024 international databases. The BRR replicate weights were computed once for every participating educational system and made part of the data files:

- For school-level analyses in the core survey, 100 school replicate weights were added to the ACG/BCG/CCG files, labelled CRWGT1 to CRWGT100; for teacher-level analyses, 100 teacher replicate weights were added to the ATG/BTG/CTG/BTK files, labelled TRWGT1 to TRWGT100.
- For analysing TALIS Starting Strong data, the ALG/BLG setting-level files contain replicate weights labelled LRWGT1 to LRWGT92; the ASG/BSG staff-level files contain replicate weights labelled SRWGT1 to SRWGT92.

Since the replicate weights are already on the files, the "zone" and "replicate" indicators that users of other large-scale surveys may be expecting are not required in the case of TALIS and have been removed to further limit the risk of re-identification.

When creating a dataset combining school/setting-level information and teacher/staff-level information, the IEA IDB Analyzer will select the correct set of final and replicate weights (i.e. TCHWGT and TRWGT1 to TRWGT100 or STAFFWGT and SRWGT1 to SRWGT92).

If other software is used for analysis, it is advisable first to combine the school/setting-level and teacher/staff-level data with the IEA IDB Analyzer or custom scripts to ensure the correct weights are used.

Estimating the sampling error

Let θ be the population parameter of interest. Let t^* be the full-sample estimate for θ obtained by using the final weight and let $t_g, g = 1, \ldots, G$ be the G replicate estimates of the same parameter of interest obtained by using the BRR weights described in the previous section. For TALIS, the Fay factor is set at $k = 0.5$.

Then, Fay's BRR estimate of the sampling variance of t^* is given by:

$$\hat{V}_{FAY}(t^*) = \frac{1}{(1-k)^2} \sum_{g=1}^{G} \left(t_g - t^*\right)^2$$

The standard error $se(t^*)$ is the square root of the BRR-Fay sampling variance.

$$se(t^*) = \sqrt{\hat{V}_{FAY}(t^*)}$$

The number of replicates G is 100 for schools and teachers (in ISCED level 2, ISCED level 1, ISCED level 3 and TKS) and 92 for settings and staff (in ISCED level 02 and U3). See Chapter 9 of the *TALIS 2024 Technical Report* (OECD, forthcoming[1]) for details on the creation of replicates.

Obtaining confidence intervals

If t^* is one of the statistics described above and $se(t^*)$ is the standard error of t^*, then confidence intervals about t^* can easily be obtained by computing the following boundaries:

$$lower = t^* - t_{\frac{\alpha}{2};df} se(t^*)$$

$$upper = t^* + t_{\frac{\alpha}{2};df} se(t^*)$$

where $1-\alpha$ is the pre-set confidence level (e.g. for $\alpha = 0.05, 1-\alpha = 0.95$), $t_{\frac{\alpha}{2};df}$ is the $1-\frac{\alpha}{2}$ percentile of the student distribution with df degrees of freedom.

In most applications, df will be large enough to allow the use of the standard normal deviate $z_{1-\frac{\alpha}{2}}$ (e.g. for $\alpha = 0.05$, $1 - z_{\frac{\alpha}{2}} = 1.96$); however, when estimating from small sample counts or for small domains, users should verify how many replicates contribute to the computation of $se(t^*)$ to confirm the number of degrees of freedom.

Example for variance estimation

Table 3.1 showed the effect of using the estimation weight but not accounting for the design when estimating the sampling error. Not using the appropriate BRR replicate variables in data analysis will lead to incorrect estimates of sampling precision. The following example illustrates the importance of using the BRR technique in research and analysis using TALIS 2024 data. In this example, problems occur when the statistical analysis package SPSS is used for data analysis. The IEA IDB Analyzer was specifically designed to overcome these problems.

Using the earlier example, a researcher may use SPSS directly and thereby ignore the complex sample design and clustering effects. This researcher would find that the (weighted) average is the same whether the design is accounted for or not; however, the estimated sampling errors would be severely underestimated (see Table 3.2, comparing the results of Table 3.1 with the correct results calculated with the IEA IDB Analyzer).

Table 3.2. Unweighted, weighted (ignoring design) and BRR results for mean number of students (ISCED level 2)

Country/territory	Unweighted mean	Unweighted s.e. (mean)	Weighted, ignoring design mean	Weighted, ignoring design s.e. (mean)	Weighted, accounting for design mean	Weighted, accounting for design s.e. (mean)
Austria	441	18.3	294	6.2	294	6.2
Chile	812	28.5	504	5.5	504	10.9
Kazakhstan	1 063	52.7	577	8.2	577	20.7
Morocco	831	27.1	560	6.9	560	25.3
Poland	456	18.5	255	1.8	255	5.6

Note: s.e. (mean) stands for the estimated sampling error of the estimated mean.
Source: TALIS 2024 Database.

This type of difference between the estimated sampling errors can be explained by the fact that schools/settings did not all have the same likelihood of being selected and thus that their weights were very different.

A similar argument can be made for teachers/staff. Moreover, teachers/staff selected from the same school/setting are more likely to give similar answers to a given question than teachers/staff from different schools/settings. This effect is not considered by SPSS directly, but it is by the IEA IDB Analyzer and other specialised software.

Statistical software packages for estimation in complex sample designs

In addition to the IEA IDB Analyzer used as the central resource in Chapter 4 of this user guide and the OECD's Rrepest package in Chapter 5, a range of software packages are available to handle complex survey designs and, in particular, the BRR replication method implemented in TALIS 2024 along with other replication methods such as Jackknife or Bootstrapping.

The OECD provides the package *Rrepest* (Avvisati, Ilizaliturri and Keslair, 2025[8]) for the analyses of their surveys. Other useful R packages include *survey*, *RALSA*, *instvy* and *EdSurvey*.

Commercial packages that include support for the weights and the replication method used in TALIS 2024, among others, are SAS 9.42 and later editions, and Stata 13 and later editions.

It should be noted that the commercially available SPSS Complex Samples add-on currently only supports Taylor expansion but not the replication technique required for the analysis of TALIS data.

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4 Analysing TALIS 2024 data using the IEA IDB Analyzer

This chapter describes analyses of OECD Teaching and Learning International Survey (TALIS) 2024 data using the IEA (International Association for the Evaluation of Educational Achievement) IDB (International Database) Analyzer software. The analysis includes examples from the TALIS 2024 core survey and the Teacher Knowledge Survey (TKS) but is applicable to all three TALIS 2024 components: core survey, TALIS Starting Strong and TKS. The IEA IDB Analyzer takes into account the TALIS 2024 design by using replication techniques. Example analyses include the estimation of percentages, means and percentiles as well as correlations and regression coefficients. Where applicable, the example analyses show how to replicate results from selected tables used for the report, *Results from TALIS 2024*.

Overview

This chapter describes the use of the IEA International Database (IDB) Analyzer software (IEA, 2025[1]) to analyse TALIS 2024 data. Example analyses will illustrate the utility of the IEA IDB Analyzer from a technical perspective and compute a variety of statistics, including percentages, means, regression coefficients, correlations and percentiles and their corresponding standard errors (using balanced repeated replication [BRR])[1] utilising the TALIS 2024 international data files.[2] The examples further replicate some of the results included in the TALIS 2024 international report (OECD, 2025[2]). Even if the analyses and principles in this chapter describe analyses using TALIS 2024 data from the core survey, these analyses and principles also apply to analyses of TALIS Starting Strong and the TKS. For use and interpretation of questionnaire scale scores, please see Chapters 1 and 11 of the *TALIS 2024 Technical Report* (OECD, forthcoming[3]).

The IEA IDB Analyzer

The IEA IDB Analyzer is a stand-alone software originally developed by the IEA for use in the IEA's large-scale surveys: Trends in International Mathematics and Science Study (TIMSS) and Progress in International Reading Literacy Study (PIRLS). It operates in conjunction with IBM SPSS (IBM Corp., 2020[4]), SAS (SAS Institute Inc., 2012[5]), and R (R Core Team, 2022[6]), and enables users to combine individual SPSS, SAS or R data files from large-scale assessments and conduct analyses using SPSS, SAS or R without writing their own syntax. The IEA IDB Analyzer generates SPSS, SAS or R syntax that correctly takes into account the study design and sampling weights in computing statistics and their standard errors.

In addition, the IEA IDB Analyzer can correctly handle plausible values (multiple imputations) for calculating estimates of achievement in surveys such as TIMSS, PIRLS and PISA (the OECD's Programme for International Student Assessment) and their corresponding standard errors by combining both sampling and imputation variance components. In TALIS, plausible values have been used in the TKS but their analysis is described in a separate chapter (see Chapter 7).

The examples used in this chapter concentrate on the use of SPSS as a computational engine. Working with the user interface of the IEA IDB Analyzer is similar, and for most of the work even identical, for all options: SPSS, SAS or R. The examples included in this user guide are merely illustrations of the possible analyses that can be conducted using the IEA IDB Analyzer.

The Merge and Analysis Modules

The IEA IDB Analyzer version 5 (IEA, 2025[1]) has one common interface with two main modules: 1) the Merge Module and 2) the Analysis Module, both operating in the same application window:

- The Merge Module is used to create analysis datasets by combining data files of different types and from different participating countries/territories and by selecting subsets of variables for analysis.
- The Analysis Module provides procedures for computing various statistics and their standard errors for variables of interest. These procedures can be applied for a country/territory participating in the study and for specific subgroups within a participating country/territory.

A third module introduced with Version 5.0 is used to convert SPSS system files to R data files. This module is activated only when the user selects R as the statistical software of choice. All modules can be accessed using the Windows Start menu (Start → IEA → IEA IDB Analyzer).

Support for the IEA IDB Analyzer can be obtained by contacting the software unit at IEA Hamburg at: idb-analyzer@iea-hamburg.de.

System requirements

The IEA IDB Analyzer will work on most PC computers using the most recent versions of the Microsoft Windows operating system, with Windows 11 as the recommended version at the time of writing. Users will also need SPSS, SAS or R (version 4.2.0 or above) and RStudio installed on the PC to execute the code created by the IEA IDB Analyzer.

The IEA IDB Analyzer installation requires the .NET Framework version NET 4.7.2 or above. If you intend to install the IDB Analyzer on a machine with Windows 8 or earlier, please make sure you have installed the .NET Framework on your system. The .NET Framework can be obtained from the following website: https://dotnet.microsoft.com/en-us/download/dotnet-framework.

- The review of Excel form output requires Microsoft Excel 2003 or later.

Download, licensing and usage in the context of TALIS 2024

As part of the contract for the implementation of TALIS 2024 between the OECD and the IEA, the IEA IDB Analyzer is available to users of the TALIS international database from IEA's website at: http://www.iea.nl/data-tools.

The IEA IDB Analyzer is licensed free of charge, not sold, to analysts for use only in accordance with the terms of the accompanying licensing agreement, which is included in the set-up and needs to be confirmed during installation. Users do not have ownership (intellectual or otherwise) of the software itself or its components, including, especially, the SPSS and SAS macros and R code, and are only authorised to use these: 1) in combination with the IEA IDB Analyzer; and 2) for secondary analysis of TALIS 2024 and other OECD or IEA datasets.

This software is provided "as is", without any kind of warranty for the results from analyses.

The licence granted to users expires at the end of each calendar year, at which point the user again must download and reinstall the most recent version of the software from the IEA's website. Users will be automatically notified as soon as a new version has been published.

At the IEA webpage, video tutorials are available to guide users through analyses with the IEA IDB Analyzer; see https://www.iea.nl/research-services/training#spy-para-200.

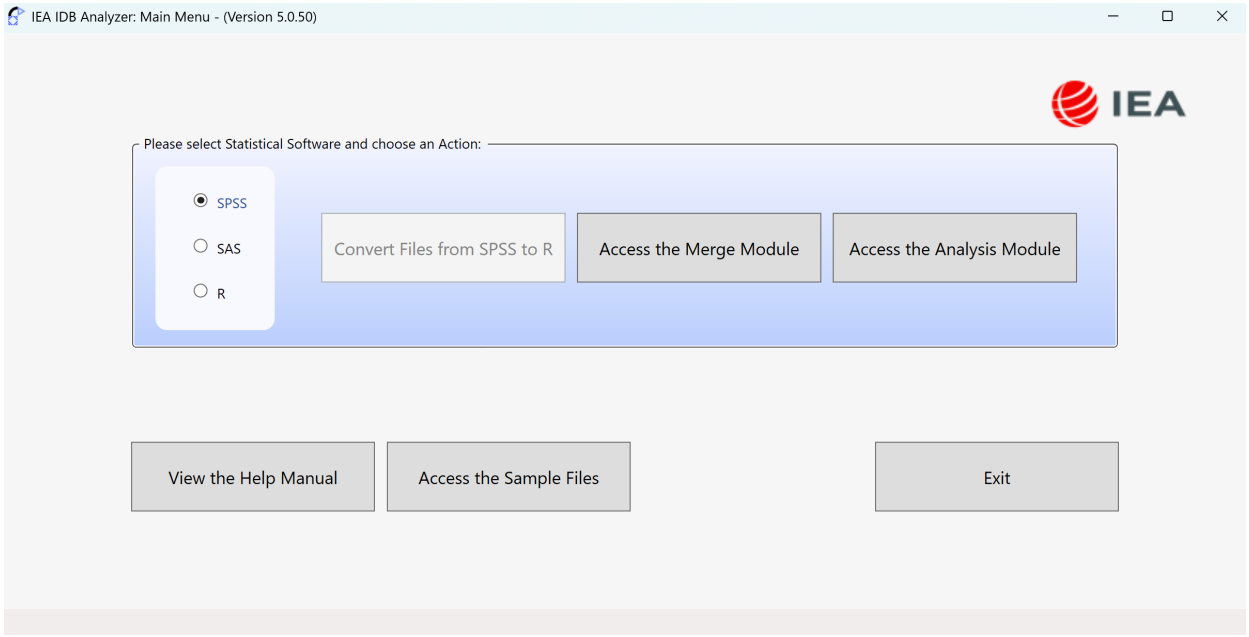
Merging files with the IEA IDB Analyzer

Data from TALIS 2024 are distributed separately by component, levels (in the case of the core survey these are ISCED 1, 2 and 3; in the case of TALIS Starting Strong these are ISCED level 02 and U3; while the TKS includes only ISCED level 2) and file types (see endnote 2). The Merge Module of the IEA IDB Analyzer allows the user to combine data from different countries/territories into a single dataset for analysis within each component. It also facilitates the combination of data from different sources (namely, school and teacher files in the case of the core survey or staff and centre files in the case of TALIS Starting Strong) into a single SPSS, SAS or R dataset. When running the Merge Module, the IEA IDB Analyzer creates SPSS, SAS or R code that can be used later without the need of the IEA IDB Analyzer itself. The data files created using the Merge Module can be analysed with the Analysis Module of the IEA IDB Analyzer.

The software does not support merging data from different ISCED levels. These have to be combined using SPSS, SAS or R into single SPSS, SAS or R datasets. An example is provided at the end of this chapter.

The examples in this chapter employ ISCED 2 data from Chile, Spain and Türkiye. The international datasets already combine all the countries/territories into a single international dataset. They are available separately by module, respondent group and ISCED level (if applicable). If you would like to merge school with teacher data or staff with center data, you have to first download the data and save it on your local drive (C:\TALIS\Data). IDB Analyzer recognised the file names of the files available in the folder. The steps below show the procedure to merge the international SPSS data from ISCED level 2 from teachers and principals.

Figure 4.1. IEA IDB Analyzer Main Menu



1. Open the IEA IDB Analyzer from the Windows Start menu (Start → IEA → IEA IDB Analyzer). You will see the application window of the IEA IDB Analyzer with its Main Menu, as shown in Figure 4.1.

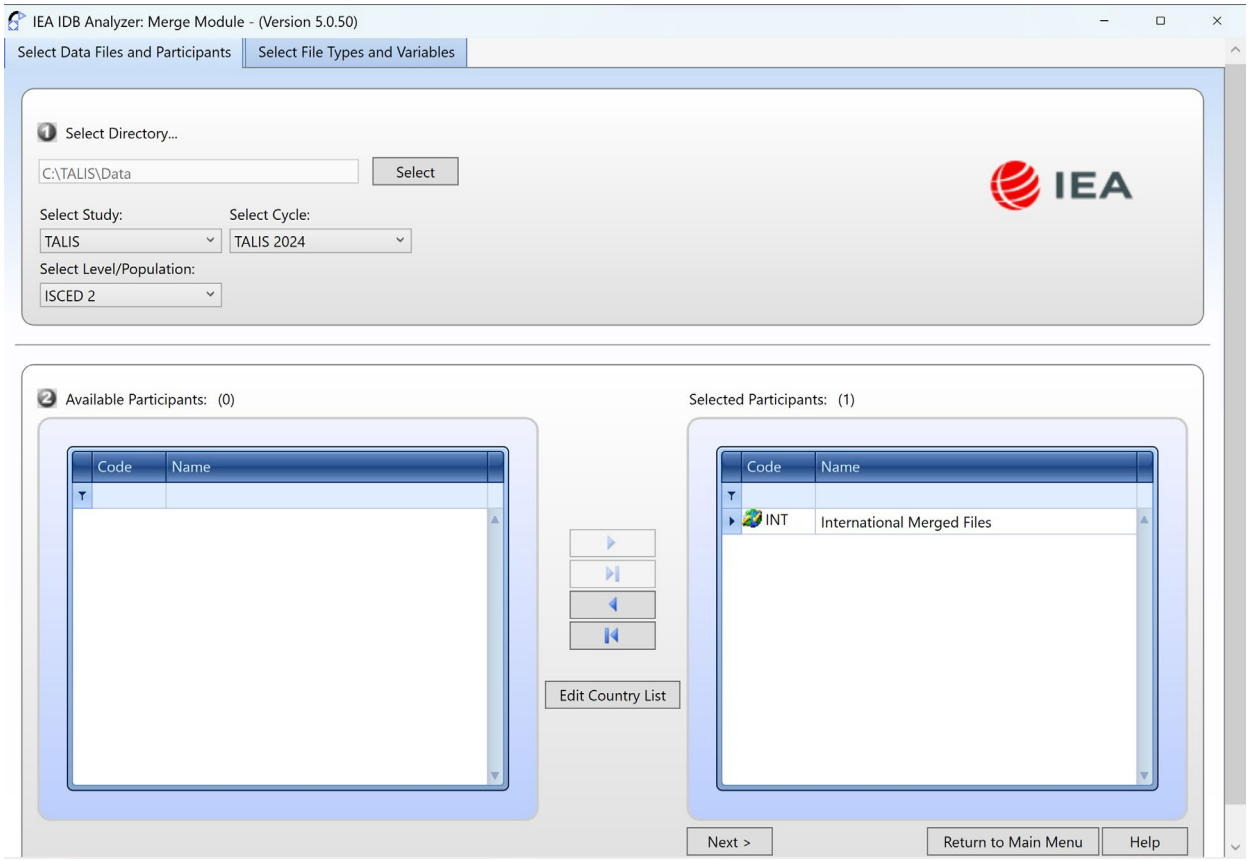
Choose **Access the Merge Module**. This will open the second window of the Merge Module, as shown in Figure 4.2.

Press the **Select** button next to the ①Select Directory… field, browse to the folder where the TALIS IDB data files in SPSS format are located. In the example in Figure 4.2, all SPSS data files are located in the "C:\TALIS\Data" folder. The programme automatically recognises and completes the Select Study, Select Year and Select Level/Population fields and lists all participating countries/territories available in this folder as possible candidates for merging. If the folder contains data from more than one supported study and from more than one year, the IEA IDB Analyzer will prompt users to select files from the desired study and year for analyses. If there are data for more than one ISCED level or population (as in this case), the desired ISCED level has to be manually selected from the drop-down menu under Select Level/Population. Select ISCED 2 from this drop-down menu.

Select the country/territory of interest from the ②Available Participants list and use the arrow buttons to include them in the list of Selected Participants. To select multiple

countries/territories, hold the CTRL key of the keyboard when selecting the countries/territories. In the case of TALIS 2024, you will only see the international dataset (INT), so you move it to the Selected Participants panel (Figure 4.2).

Figure 4.2. Merge Module: Selecting participants



Press the **Next >** button to proceed. The software will open the second window of the Merge Module, as shown in Figure 4.3, to select the file types and the variables to be included in the merged data file.

Select the file type for merging by checking the appropriate box to the upper left of the window at the ③Select File Types… section. For the example used, check the box next to Teacher Background.

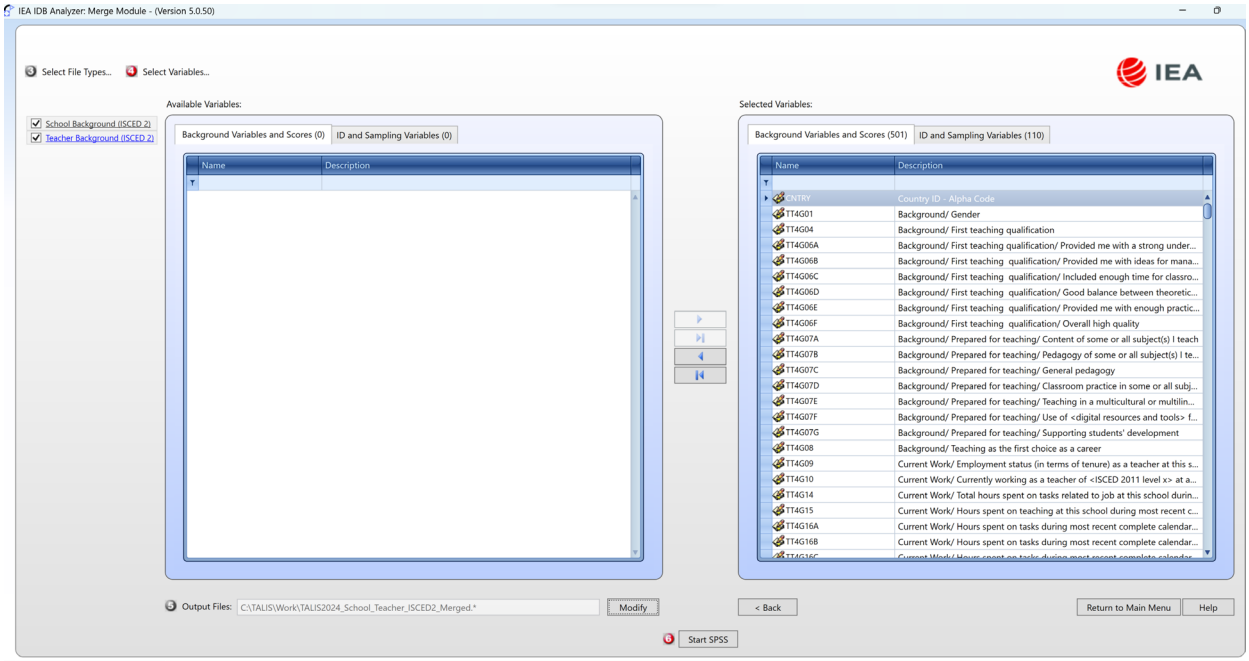
Select the variables to be included in the merged file from the list of Available Variables in the left panel. Clicking the “play to end” button (arrow pointing to the right followed by vertical line) will select all variables, as in the example shown in Figure 4.3. Note that the IEA IDB Analyzer automatically selects the identification and sampling variables that are required for any analysis.

Repeat Steps 6 and 7 to include the variables of the school questionnaire in the merged file. Check the box next to School Background at the upper left of the window and select the variables to be included in the merged file from the list of Available Variables in the left panel by clicking on the “play to end” button.

NOTE: When selecting variables from multiple file types, add the variables you wish to appear in the list of Selected Variables immediately after ticking the checkbox for the corresponding file type. Otherwise, the list of Selected Variables may not contain variables from all file types.

You can check which variables are currently selected to be included in the merged file by clicking on the Teacher Background or School Background text in the upper left corner of the window. Make sure the checkboxes remain checked.

Figure 4.3. Merge Module: Selecting file types and variables



Specify the desired name of the merged data file and the folder where it will be stored in the ⑤Output Files field by clicking the **Modify** button. In addition to the merged data file, the IEA IDB Analyzer will create an SPSS syntax file (*.SPS) of the same name and in the same folder. This syntax file contains the code necessary for executing the merge. In the example in Figure 4.4 , the output file is named “TALIS2024_School_Teacher_ ISCED2_Merged.sps” in the work folder “C:\TALIS\Work”. The resulting merged SPSS file after executing the syntax will be named “TALIS2024_School_Teacher_ ISCED2_Merged.sps”. This file will be stored in the same folder as specified for the syntax file. The merged data file will contain school and teacher data with the variables shown in the Selected Variables panel to the right for the selected participants (in our case it contains all the countries/territories).

NOTE: The IEA IDB Analyzer accepts only alphanumeric (A-Z, a-z, 0-9) characters and underscores (“_”) in the filename.

Click on the **Start SPSS** button to create the SPSS syntax file. SPSS will automatically start (if not already running) and the SPSS syntax opens automatically in a separate window containing the code ready for execution. The IEA IDB Analyzer prompts the user if it is about to overwrite an existing file in the specified folder. The syntax file must be executed by opening the **Run** menu of SPSS and clicking on the **All** option.

NOTE: The resulting SPSS merged data file will be created in the specified location with the specified name but will not open automatically. During the merge process, temporary files are created in the same location (file names starting with “tmp”). These can be deleted after the merged file has been created.

If you are interested in using only specific countries/territories in your analysis it is recommended to extract these from the merged dataset. For the examples in this chapter, we

will use the data from Chile, Spain and Türkiye, the SPSS syntax is presented in Figure 4.4. If you want to extract other countries/territories, you can modify the presented SPSS syntax.

Figure 4.4. SPSS syntax to extract the three selected countries from the combined international dataset

```
GET FILE = "C:\TALIS\Work\TALIS2024_School_Teacher_ISCED2_Merged.sav".
SELECT IF (CNTRY='CHL' OR CNTRY='ESP' OR CNTRY='TUR').
EXECUTE.
SAVE OUTFILE=
"C:\TALIS\Work\TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav"
/COMPRESSED.
```

Key consideration

The resulting SPSS output file should be checked for possible warnings or errors. If they appear, this may indicate that the merge process was not performed properly, and the resulting merged data file might not be structured as expected.

Merging data across ISCED levels

Some participating countries/territories chose to conduct the TALIS 2024 core survey not only in ISCED level 2 (the core population of the survey) but also in ISCED level 1 and/or 3. The IEA IDB Analyzer Merge Module is capable of merging data from different respondents (i.e. teachers and principals) and different participating countries/territories, but not from different ISCED levels. Such merging can be done in two steps, using the Merge Module and plain SPSS or SAS. The steps below provide an example of how to merge data from teacher and principals across ISCED levels 1, 2 and 3 with SPSS. In the example we use data from Türkiye that was extracted from the combined international datasets. For the extraction you can modify the syntax presented in Figure 4.4. The combined and extracted datasets for Türkiye for all three ISCED levels were saved in the folder “C:\TALIS\Work”.

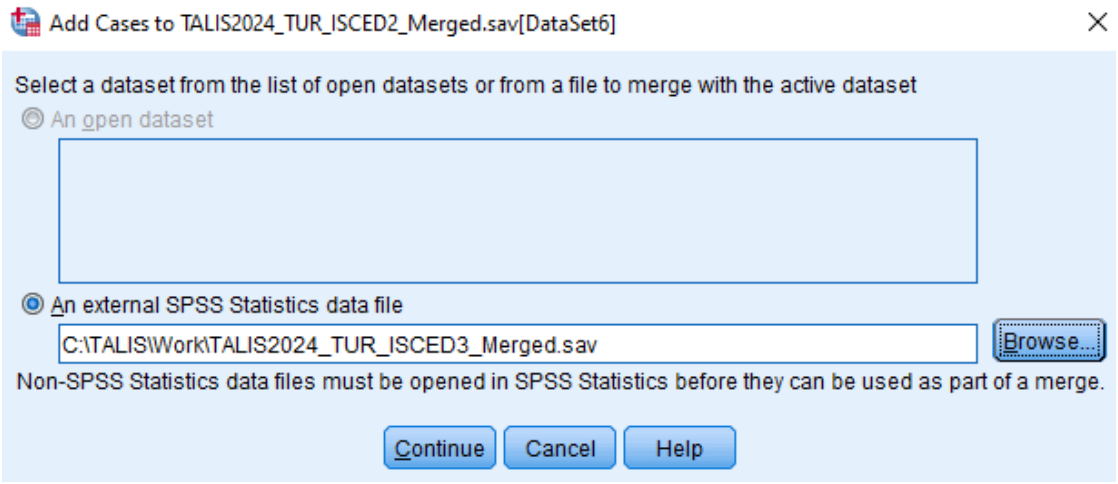
1. Merge the ISCED 1 teacher and principal data using the international datasets following the same steps from the previous section and selecting all school and teacher variables. Merge data for ISCED levels 2 as well as ISCED level 3 accordingly. This results in three merged data files – one for each ISCED level – with the same file types (teacher and principal data files) and variables. Because of the design of the questionnaires, not all of the questions and items were administered across all ISCED levels. For example, there are some specific items administered only to ISCED 1-level teachers. You can now extract the data from Türkiye (see the syntax in Figure 4.4) and save the datasets as “TALIS2024_TUR_ISCED1_Merged.sav”, “TALIS2024_TUR_ISCED2_Merged.sav” and “TALIS2024_ TUR_ISCED3_Merged.sav”.

Open the merged file “TALIS2024_TUR_ISCED2_Merged.sav” in SPSS.

From the Data menu, choose the Merge files option and select Add Cases.

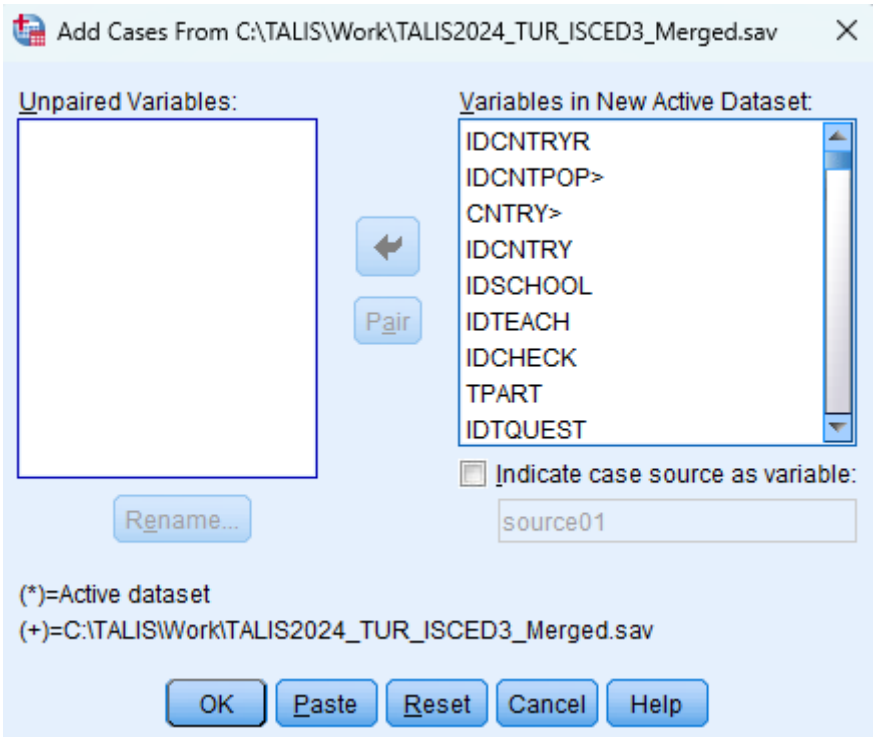
In the dialog box that appears, click on **Browse**…. Navigate to the folder containing all the separate ISCED levels merged files and choose “TALIS2024_TUR_ISCED3_Merged.sav”. Then click on **Continue**. These steps are shown in Figure 4.5.

Figure 4.5. Choosing a file from which to add cases to the active file "TALIS2024_ISCED2_Merged.sav"



After clicking on the button Continue, another dialog box will appear as shown in Figure 4.6. It provides the option to choose the variables to be included in the merged file. In the example, all variables show up in the Variables in New Active Dataset section and, consequently, all variables will go into the merged file in the file. Leave all other settings unchanged as well. In case there are some variables left on the left panel under **Unpaired Variables**, select all of them and move them to the right panel.

Figure 4.6. Choosing variables in the file merging ISCED 2 and 3 data



Clicking **OK** will merge the data from ISCED 2 to the ISCED 3 file.

Repeat Steps 3 to 6 to add the cases from the ISCED level 1 data file "TALIS2024_TUR_ISCED1_Merged.sav".

Save the resulting file containing the data from all three ISCED levels with a new file name – "C:\TALIS\Work\TALIS2024_TUR_ISCEDs_Merged.sav". An example of an analysis using this file is presented at the end of this chapter.

All the steps above can be completed by running the SPSS syntax presented in Figure 4.7.

Figure 4.7. SPSS syntax to merge the three datasets

```
GET FILE = "C:\TALIS\Work\TALIS2024_TUR_ISCED2_Merged.sav".

ADD FILES /FILE=*
  /FILE="C:\TALIS\Work\TALIS2024_TUR_ISCED3_Merged.sav".
EXECUTE.

ADD FILES /FILE=*
  /FILE="C:\TALIS\Work\TALIS2024_ TUR_ISCED1_Merged.sav".
EXECUTE.

SAVE OUTFILE = "C:\TALIS\Work\TALIS2024_TUR_ISCEDs_Merged.sav".
```

Key consideration

Please note that there might be variables only included in one of the ISCED levels. However, to perform the merge, the data files for each of the ISCED levels must contain exactly the same countries/territories and exactly the same variables. Any resulting SPSS output file should be checked for possible warnings or errors. If such appear, this may indicate that the merge process was not performed properly, and the resulting merged data file might not be structured as expected.

Performing analyses with the IEA IDB Analyzer

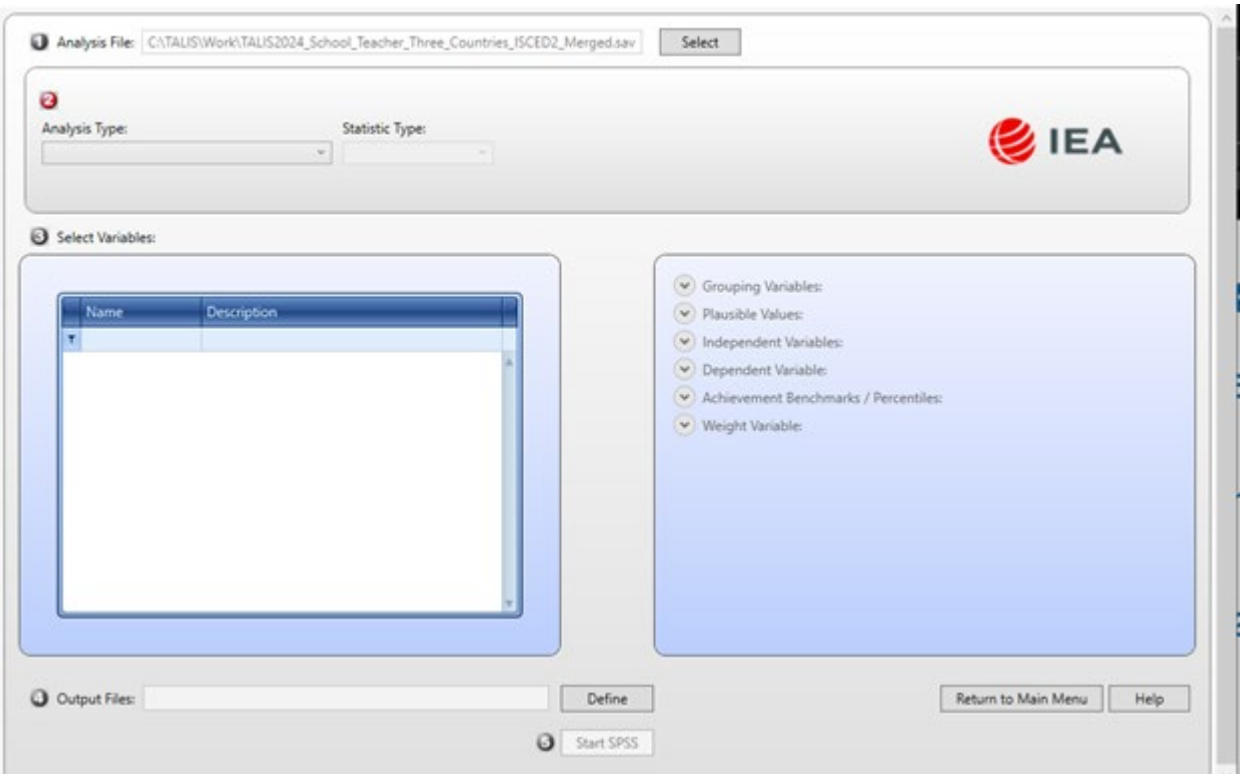
This section describes a few analysis types available within the IEA IDB Analyzer to compute specific statistics with their correct standard errors, taking into account the sampling design and other analysis issues related with the data. By using the IEA IDB Analyzer with TALIS 2024 data, sampling weights are always used for analysis and standard errors are correctly computed using the required BRR method.

Supported analysis types and required parameters

The Analysis Module of the IEA IDB Analyzer can be used to analyse the data, regardless of whether these have been pre-processed with the Merge Module. It can create code for several analysis procedures. Upon startup, the IEA IDB Analysis Module automatically selects the file merged in the previous step as the analysis file or the last file used for analysis.

If the Merge Module of the IEA IDB Analyzer is still open, the analyst can go back by clicking the **Return to Main Menu** button and from there clicking on the **Analysis Module** button (Figure 4.1.). The Analysis Module loads, as shown in Figure 4.8.

Figure 4.8. IEA IDB Analyzer – Analysis Module



Depending on the type of analysis chosen, the interface of the Analysis Module of the IEA IDB Analyzer changes dynamically and shows different fields where different parameters must be defined.

First, the **Analysis Type** and **Statistic Type** must be defined with the parameters that apply to each option:

Analysis Type depends on the data source contained in the chosen **Analysis File**:

- If the file contains only teacher data from a single ISCED level, then **TALIS 2024 Single Level/Population** (Using Teacher Weights) must be selected.
- If the file contains only school level data from a single ISCED level, then **TALIS 2024 Single Level/Population (Using School Weights)** must be selected.
- If the file contains merged teacher and school data from a single ISCED level, then **TALIS 2024 Single Level/Population (Using Teacher Weights)** must be selected and the interpretation of the analysis results has to refer to teachers teaching in schools with certain characteristics.
- If the file contains teacher data only but from different ISCED levels, then **TALIS 2024 Multiple Level/Population (Using Teacher Weights)** must be selected.
- If the file contains school data only but from different ISCED levels, then **TALIS 2024 Multiple Level/Population (Using School Weights)** must be selected.
- If the file contains both teacher and school data from different ISCED levels, then **TALIS 2024 Multiple Level/Population (Using Teacher Weights)** must be selected, and the interpretation of the analysis results has to refer to teachers teaching in schools with certain characteristics.
- **NOTE**: If you select to analyse data from different ISCED levels, the IEA IDB Analyzer automatically adds the variable IDCNTPOP as a grouping variable to the analysis, separating each combination of country/territory and ISCED level, so that results are provided separately for each ISCED level within each country/territory.

Statistic Type:

- **Percentages only**: Computes the percentages of participants within specified subgroups and the appropriate BRR standard errors for those percentages.
- **Percentages and Means**: Computes the percentages of participants within specified subgroups and their mean and standard deviation on the continuous variable selected. Also computes the appropriate BRR standard errors for those percentages, means and standard deviations. The percentage of missing responses is included in the output. In addition, it performs the computation of *t*-test statistics of group mean and percent differences considering sample dependency.
- **Percentiles**: Calculates the score points that separate a given percentage of the distribution of a variable by subgroups defined by the grouping variables with BRR standard errors.
- **Correlations (Pearson)**: Calculates Pearson correlation coefficients between selected analysis variables and their BRR standard errors.
- **Correlations (Spearman)**: Calculates Spearman Rank-Order correlation coefficients between selected analysis variables and their BRR standard errors.
- **Linear Regression**: Computes a simple or multiple linear regression between a dependent variable and a set of independent variables. Can apply dummy and effect coding to test for differences across groups. Computes the regression coefficients and their corresponding BRR standard errors.
- **Logistic Regression**: Computes logistic regression coefficients for selected variables predicting a dependent dichotomous variable by selected subgroups. It has the option of dummy or contrast coding of included categorial variables. Under the SAS version, it can run multinomial logistic regressions. This statistic type is not available for the SPSS or the R version.

There are some settings that apply to various types of the available statistic types:

- **Number of Decimals:** Defines the number of decimals in the SPSS output. This applies to all statistic types.
- **Missing Data Option:** Defines how the cases with missing data in multivariate analysis shall be treated: “Listwise” or “Pairwise”. When choosing “Pairwise”, all available data are used in the analysis; when choosing “Listwise”, only cases with complete data are used in the analysis. Applies to **Linear Regression** and **Correlation** statistic types.
- **Show Graphs:** Defines whether or not line, bar and cluster bar charts shall be displayed in the SPSS output. Applies only to **Percentages only, Percentages and Means,** and **Percentiles** statistic types.

After defining the **Analysis Type** and **Statistic Type** and their corresponding parameters at the top of the screen, the variables and their parameters must be defined on the right side of the screen.

- **Grouping Variable(s):** This is the list of variables that are to be used to define the subgroups. The list can consist of one or more variables. By default, the IEA IDB Analyzer always includes IDCNTRY as the first grouping variable and there should always be at least this one grouping variable. If the file contains data from multiple ISCED levels, IDCNTPOP (Country Alpha Code and ISCED Level) is a second default grouping variable selected automatically.

  Subgroups are created and reported using the order of the variables as they appear in this list. For example, if teacher gender is added as a second grouping variable (in addition to the country/territory identifier IDCNTRY) to a Percentages only analysis, the results will provide percentages per teacher gender in each country/territory included in the analysis. If, in addition, the teacher’s highest level of education is added as a third grouping variable to a Percentages only analysis, the results will provide percentages per education level, separate for each gender in each country/territory included in the analysis.

If the option **Exclude Missing from Analysis** is checked, only cases that have non-missing values in the grouping variables will be used in the analysis. Note that this box needs to remain checked when reproducing results from the international report (OECD, 2025[2]).

The grouping variable is available and required for all analysis types.

- **Separate Tables by:** This is the list of classification variables used to generate separate tables with results. When omitted, it will generate tables using only the grouping variables. This option is accessible for **Percentages only** and **Percentages and Means** statistic types.
- **Analysis Variable(s):** This is the list of variables for which the statistics are to be computed. Researchers may select more than one analysis variable. This variable type is available and required for **Percentages and Means**, **Correlations (Pearson)**, **Correlations (Spearman)** and **Percentiles** statistic types.
- **Independent Variables:** This is the list of analysis variables used as predictors in a regression model. The independent variables can be classified as categorical or continuous. Variables classified as categorical will be either dummy or effect contrast coded. Variables classified as continuous will be entered in the equation without further recoding. You can enter any combination of categorical or continuous variables. This applies only to **Linear Regression** and **Logistic Regression** statistic type.
- **Dependent Variable:** This is the dependent variable to be predicted by the list of independent variables in **Linear Regression** and **Logistic Regression** statistic type. Only one dependent variable can be listed for regression analysis. This variable type is available and required for **Linear Regression** and **Logistic Regression** analysis.
- **Percentiles:** These are the percentiles that will be calculated from the distribution of values for the variables. These need to be sorted in increasing order, separated by spaces and written with no decimals.
- **Weight Variable:** The estimation weight that will be used in the analysis. Please note that the weight is selected automatically from the IEA IDB Analyzer and depends on the data file types used. If you use files containing only school data, then the SCHWGT will be selected. If you use files containing only teacher data, then the TCHWGT will be selected. If you use files that contain both school and teacher data, TCHWGT will be selected by the IEA IDB Analyzer. In this case, the results should be interpreted as (for example) “Percentage of teachers in school with characteristic A” without making any direct inferences for the schools themselves. Also, in this case, the analyst should be careful with any missing data on the school level, which can sometimes lead to difficulties with the analysis and interpretation of the results.

The examples presented in this section use the SPSS data file merged in the previous step (“C:\TALIS\Work\TALIS24_School_Teacher_Three_Countries_ISCED2_Merged.sav”) as shown in the section titled “Merging files with the IEA IDB Analyzer”, which contains the merged ISCED level 2 school and teacher data files for the three participating countries, Chile, Spain and Türkiye.

Computing percentages (only) and their standard errors

To compute percentages of variables with their BRR standard errors using the file merged in the previous step (see section titled “Merging files with the IEA IDB Analyzer”), analysts will need to select **TALIS 2024 Single Level/Population (Using Teacher Weights)** as the **Analysis Type** and **Percentages only** as the **Statistic Type**. This can compute the percentages within specified subgroups and will also compute the appropriate BRR standard errors for those. If the **Show Graphs** option is checked, a clustered bar chart will be produced, displaying the percentages of respondents per category of the grouping variable(s).

Analysis at teacher-level

The example of a percentages analysis at the teacher-level investigates the percentages and their BRR standard errors for teachers' age grouped (Figure 4.9). The example uses the statistic type **Percentages only**.

The first step in the analysis is to identify the variables of interest in the appropriate data files. Variable T4TAGEGR contains the information on teacher age, provided directly by the teacher that was categorised for the public use file – see the TALIS 2024 Teacher Questionnaire (OECD, 2024[7]), Question 1, p. 6.

To help the data user, all questionnaires can be found on the TALIS website (OECD, 2024[7]; OECD, 2024[8]; OECD, 2024[9]; OECD, 2024[10]; OECD, 2024[11]; OECD, 2024[12]; OECD, 2024[13]) and include the respective variable names as they appear in the files of the international database. As some participating countries/territories had to adapt certain questions according to cultural or national contexts, it is important to ensure that there were no adaptations that lead to deviations in meaning compared to the international version. This can be checked by reviewing the national adaptations of the questionnaires available on the TALIS website (OECD, 2025[14]). (The national adaptations for TALIS Starting Strong are forthcoming).

Figure 4.9. Table 1.3 (teacher age grouped) for the example of teacher-level analysis

	ISCED level	Percentage of teachers					
		Under age 30		Age 30 to 49		Age 50 and above	
		%	S.E.	%	S.E.	%	S.E.
Chile	2	14.4	(1.1)	62.3	(1.6)	23.3	(1.5)
Spain	2	7.9	(0.5)	56.8	(0.9)	35.3	(1.0)
Türkiye	2	14.9	(1.1)	77.1	(1.1)	8.0	(0.6)
OECD average-27	2	10.2	(0.1)	53.2	(0.2)	36.5	(0.2)
EU total-22	2	7.3	(0.2)	52.6	(0.3)	40.1	(0.4)
TALIS average-49	2	11.2	(0.1)	56.6	(0.2)	32.2	(0.2)

The analyses to replicate the percentage of teachers in certain age groups in 2024 in Table 1.3 are conducted with the IEA IDB Analyzer Analysis Module, using **Percentages only** as the **Statistic Type** (Figure 4.9).

Teachers' age in the table is reported in three categories (under 30 years, 30-49 years, and 50 and above). To replicate these results, variable T4TAGEGR needs to be recoded, so that categories two (30-39 years) and three (40-49 years) become collapsed to just one category (30-49 years) and categories four (50-59) and five (60 or above) to a single category (50 or above) as well. The SPSS syntax shown in Figure 4.10 can be used to recode the data accordingly.

Figure 4.10. SPSS syntax to recode the information on teachers' age groups

```
GET FILE =
"C:\TALIS\Work\TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav".

RECODE T4TAGEGR (1 = 1) (2 THRU 3 = 2) (4 THRU 5 = 3)
(ELSE = COPY) INTO TAGEGRrec.
VARIABLE LABELS TAGEGRrec "Recoded TAGEGR - Teacher Age Groups".
VALUE LABELS TAGEGRrec
1 "Under 30"
2 "30-49"
3 "50 or above".
MISSING VALUES TAGEGRrec (7 8 9).

EXECUTE.

SAVE OUTFILE =
"C:\TALIS\Work\TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav".
```

To compute percentages of variables with their BRR standard errors using the file merged in the previous step (see section titled "Merging files with the IEA IDB Analyzer"), analysts will need to select **TALIS 2024 Single Level/Population (Using Teacher Weights)** as the **Analysis Type** and **Percentages only** as the **Statistic Type**. This can compute the percentages within specified subgroups and computes the appropriate BRR standard errors for those. If the **Show Graphs** option is checked, a clustered bar chart will be produced, displaying the percentages of respondents per category of the grouping variable(s).

We compute the percentage of teachers within each age group in 2024 (variable TAGEGRrec). The weighting variable TCHWGT is used and the standard errors are computed based on 100 BRR weights.

The steps in the IEA IDB Analyzer are as follows:

1. Open the **Analysis Module** of the IEA IDB Analyzer.
2. Select the data file called "TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav" that was merged in the previous step as the **Analysis File**. Note that the IEA IDB Analyzer Analysis Module automatically selects the last file that was used in the previous action.
3. As the **Analysis Type**, select **TALIS 2024 Single Level/Population (Using Teacher Weights)** and as **Statistic Type** choose **Percentages only**. Note that by default the programme excludes missing values on the grouping variable from the analysis. This can be deactivated by removing the tick from the checkbox **Exclude Missing from Analysis**. If the analysts need to change the default number of decimals (2), they can do it from the **Number of Decimals** drop-down menu.
4. In the next step, analysts need to define the grouping variable(s). As **Grouping Variable,** the software selects variable IDCNTRY by default. For this example analysis, analysts need to select the **Grouping Variables** field and then add TAGEGRrec as a second grouping variable. To do this, select the variable from the variable list on the left-hand side of the window and press the right arrow button belonging to the section of the grouping variable. This moves the variable TAGEGRrec from the variable list on the left-hand side into the field for the grouping variables on the right-hand side. Since there are a lot of variables in the merged data file, you can search for the one of interest using the search box located above the variable list on the left-hand side of the screen either by name or description (variable label).
5. The **Weight Variable** (TCHWGT) is automatically included in the analysis by the software. Additionally, the BRR teacher replicate weights (TRWGT1-100) are included automatically in the computations as well, although they do not show in the IEA IDB Analyzer user interface.

6. Specify the name and folder for the output files in the **Output Files** field by clicking on the **Define** button (which alters to **Modify** once you have defined a name), browsing to the desired folder and typing the desired name. The example will use “Table1_3” as the file name. Please note that the space and dots in the filename were replaced by “_” as the IEA IDB Analyzer only accepts characters A-Z, a-z, 0-9, # or _ in the filename.
7. Press the **Start SPSS** button to create the SPSS syntax file. This automatically starts SPSS and opens the SPSS syntax file in an SPSS syntax window. The SPSS syntax needs to be executed manually by opening the **Run** menu in SPSS and selecting the **All** option. If applicable, the IEA IDB Analyzer prompts the user to confirm overwriting already existing files.
8. The IEA IDB Analyzer uses the name and folder specified in Step 6 to create the following **output files**:
    a. SPSS syntax file that contains the code for performing the analysis (file extension .sps); and after executing this syntax:
    b. SPSS output file with the results (file extension .spv);
    c. file with the results (file extensions .sav for SPSS, .csv and .xlsx for Excel);
    d. file with results for testing for differences within countries/territories (file suffix “_by_ TAGEGRREC _Sig”; with the extensions .sav for SPSS and .csv and .xlsx for Excel);
    e. file with results for testing for differences between countries/territories (file suffix “_by_ TAGEGRREC _Sig2”; with the extensions .sav for SPSS and .csv and .xlsx for Excel).

Figure 4.11 shows the corresponding set-up of the IEA IDB Analyzer. Variables IDCNTRY and TAGEGRrec have been selected as **Grouping Variables**. As **Weight Variable**, the IEA IDB Analyzer automatically selects the variable TCHWGT.

Figure 4.11. Analysis Module set-up for example of percentages analysis for Table 1.3 (teacher age grouped)

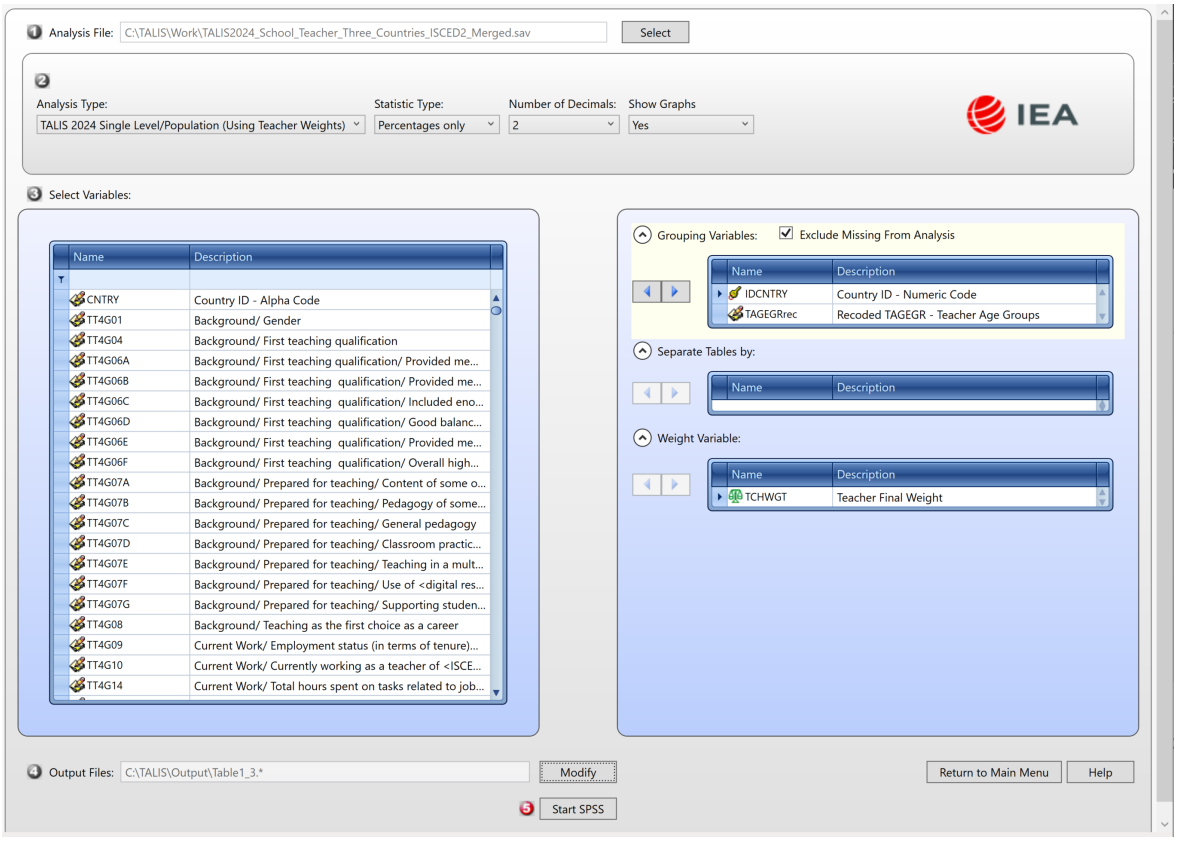


Figure 4.12 presents the SPSS output when running the analysis above.

Figure 4.12. SPSS output for example of percentages analysis for Table 1.3 (teacher age grouped)

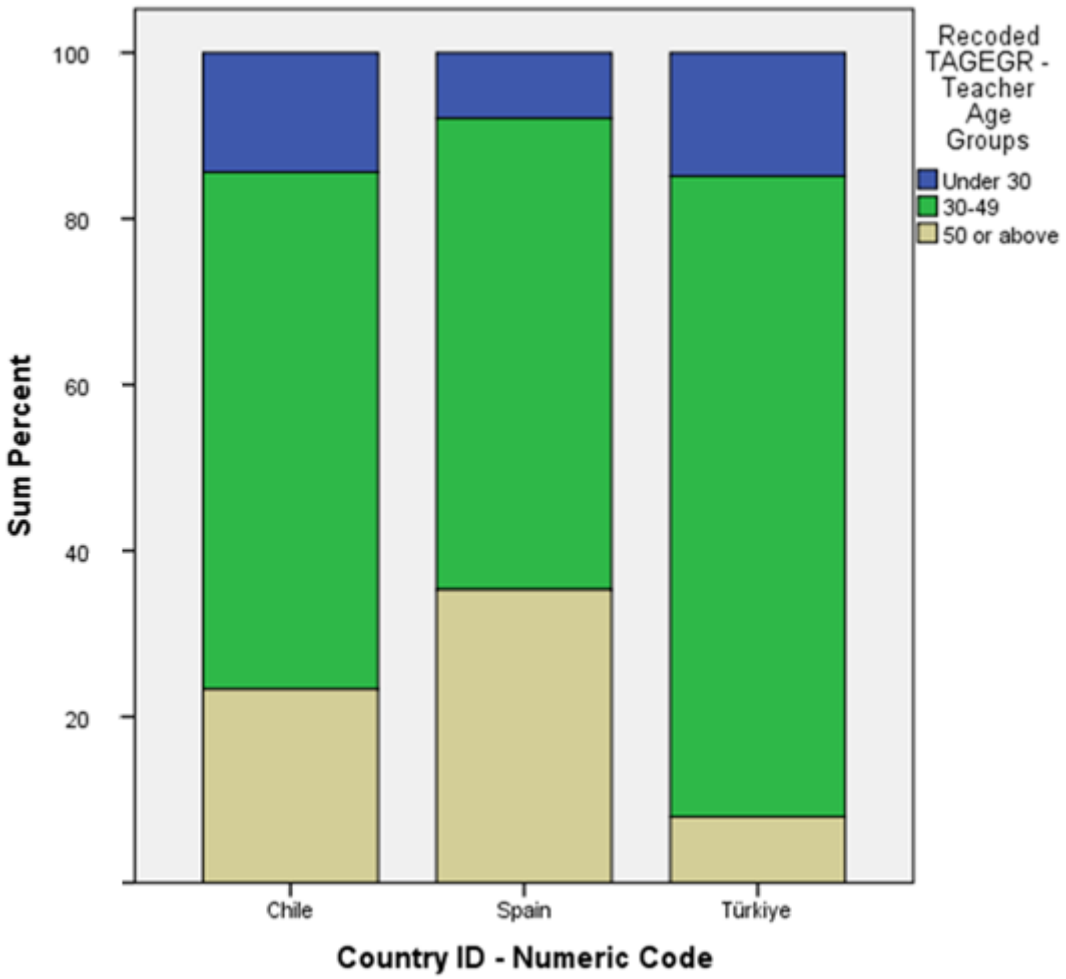
Percentages by (IDCNTRY TAGEGRREC)

Country ID - Numeric Code	Recoded TAGEGR - Teacher Age Groups	N of Cases	Sum of TCHWGT	Sum of TCHWGT (s.e.)	Percent	Percent (s.e.)
Chile	Under 30	332	8541	748,62	14,38	1,14
	30-49	1458	36990	1288,29	62,29	1,61
	50 or above	509	13851	994,43	23,32	1,51
Spain	Under 30	696	15605	961,19	7,91	,47
	30-49	5125	112077	2040,55	56,78	,87
	50 or above	3216	69713	2118,47	35,32	,97
Türkiye	Under 30	595	43285	3311,21	14,88	1,13
	30-49	3875	224555	4329,96	77,18	1,12
	50 or above	449	23095	1733,89	7,94	,58
Table Average	Under 30	.	.	.	12,39	,56
	30-49	.	.	.	65,42	,71
	50 or above	.	.	.	22,19	,63

The countries/territories are identified in the first column. The second column describes the categories of TAGEGRrec being reported. In this example, each country/territory's results are presented in three lines, one for each category of the variable TAGEGRrec (Under 30, 30-49 and 50 or above). The third column reports the number of valid cases and the fourth and fifth the sum of weights of the sampled teachers in the respective category and its standard error. The last two columns display the percentage of teachers in each category and the associated BRR standard error. Note that the SPSS output has a different number of decimals (hence different rounding) for the percentages and their BRR standard errors than the Table 1.3 of the TALIS 2024 report (OECD, 2025[2]). The analyst can use the Excel output file saved in the work folder with the same results for further processing and adjust the number of decimals there.

The SPSS output also contains graphs presenting the percentage of teachers in each age group. The graph from the Percentages only analysis is presented in Figure 4.13. The resulting estimates are also available in Excel and SPSS data format. These files are saved directly in the folder specified in the **Output Files**.

Figure 4.13. Graphical output from the Percentages only analysis



Analysis at school-level

As an example of school-level analysis, we will replicate the teacher results presented in the previous section for principals.

As with the previous analysis, the first step is to identify the variables relevant to the analysis in the appropriate files. In TALIS 2024, the information on the age of principals has been collected via a variable asking the principals to write their actual age (TC4G02) – see Question 2 in the principal questionnaire p.6 (OECD, 2024[8]; OECD, 2024[9])– at the time the survey was administered. For the public release of the TALIS 2024 data, this information has been recoded to a categorical variable (T4PAGEGR) providing information on the age group to which the principal belonged. Hence, we can replicate the distribution of principals in the different age groups in a country/territory.

For the analysis, we need to extract data from the international school data file for the selected countries (see Figure 4.4 for the example using teacher data). The weight variable that will be used is the school weight (SCHWGT). In this example, the extracted data will be saved to a file called "TALIS2024_School_Three_Countries.sav". The identification and weighting variables are automatically selected by the IEA IDB Analyzer.

We would like to report principals' ages in three categories (under 40 years, 40-59 years, 60 and above). To replicate these results, the variable T4PAGEGR needs to be recoded, so that categories two (40-49 years) and three (50-59 years) become collapsed to just one category (40-59 years). The SPSS syntax shown in Figure 4.14 can be used to recode the data accordingly:

Figure 4.14. SPSS syntax to recode the information on principals' age groups

```
GET FILE = " C:\TALIS\Work\TALIS2024_School_Three_Countries_ISCED2.sav".

RECODE T4PAGEGR (1 = 1) (2 THRU 3 = 2) (4 = 3)
(ELSE = COPY) INTO PRAGEGRrec.
VARIABLE LABELS PRAGEGRrec "Recoded PRAGEGR - Principal Age Groups".
VALUE LABELS PRAGEGRrec
1 "Under 40"
2 "40-59"
3 "60 and above".
MISSING VALUES PRAGEGRrec (7 8 9).

EXECUTE.

SAVE OUTFILE = " C:\TALIS\Work\TALIS2024_School_Three_Countries_ISCED2.sav".
```

Figure 4.15 shows the set-up for the analysis to replicate the percentages of principals in the three different age groups. The statistic type is **Percentages only**, the first grouping variable is IDCNTRY (selected by default). The analyst has to add the recoded variable on the principals' age group (PRAGEGRrec) as the second grouping variable. The **Weight Variable** SCHWGT is selected by the IEA IDB Analyzer automatically because the data file contains school-level data only. The output is displayed in Figure 4.16.

Figure 4.15. Analysis module for school-level analysis (principals' age groups)

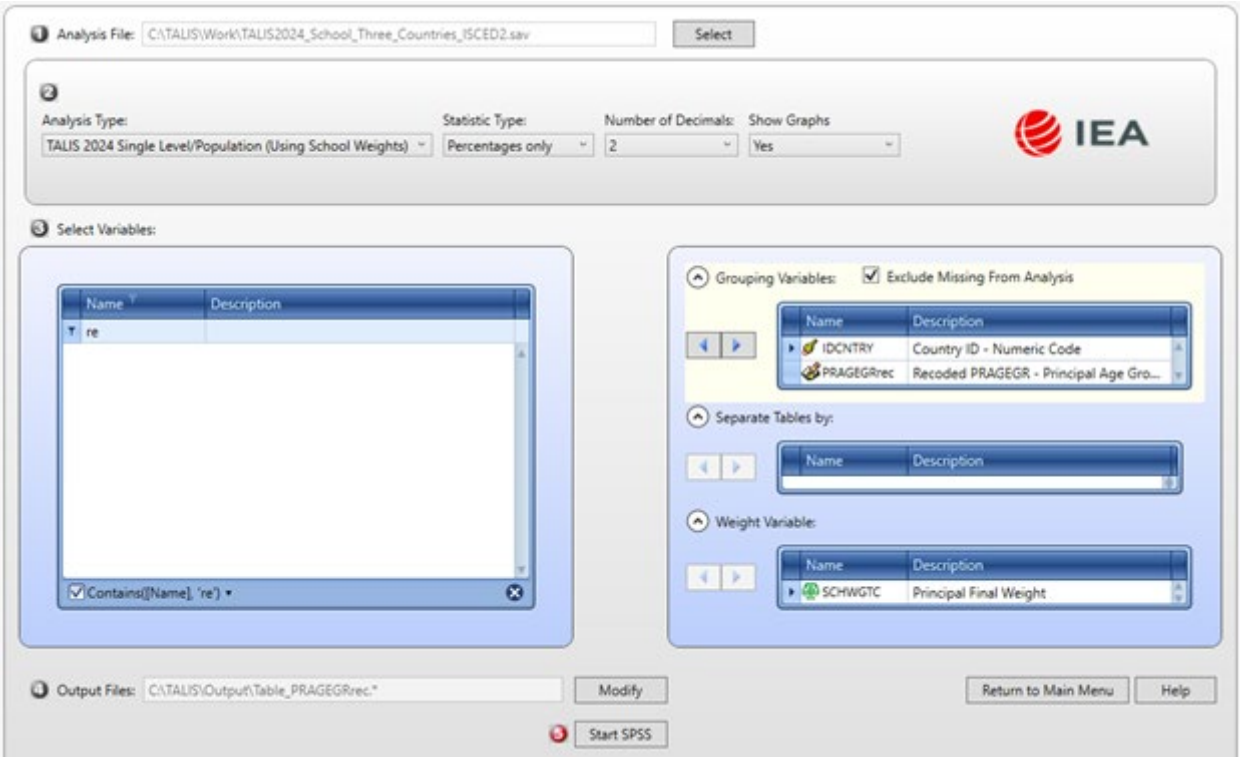


Figure 4.16. SPSS output for example of school-level analysis (principals' age groups)

Percentages by (IDCNTRY PRAGEGRREC)

Country ID - Numeric Code	Recoded PRAGEGR - Principal Age Groups	N of Cases	Sum of SCHWGTC	Sum of SCHWGTC (s.e.)	Percent	Percent (s.e.)
Chile	Under 40	35	567	132,52	9,93	2,32
	40-59	218	3710	215,01	64,95	3,70
	60 and above	106	1435	186,55	25,12	3,27
Spain	Under 40	12	182	113,48	2,54	1,59
	40-59	422	6085	223,62	85,21	3,05
	60 and above	59	875	193,86	12,25	2,67
Türkiye	Under 40	56	5253	488,89	32,06	2,84
	40-59	155	10465	513,81	63,87	3,00
	60 and above	12	666	232,84	4,07	1,43
Table Average	Under 40	.	.	.	14,85	1,33
	40-59	.	.	.	71,34	1,88
	60 and above	.	.	.	13,81	1,49

The first two columns in the SPSS output show the categories of the grouping variables – country/territory and the different age groups. The third, fourth and fifth columns show the number of cases in the sample, the population estimates and their standard errors for each combination of country/territory and age group. The last two columns show the estimated percentages of principals per age group defined by the grouping variables – IDCNTRY and PRAGEGRrec. Note that these percentages and their standard errors are rounded to two decimal points. To see more, the analyst can open the Excel output that was saved in the working directory and adjust the number of decimals as needed.

Analysis with combined teacher- and school-level data

This example of a teacher-level analysis including variables from both teacher- and school-level investigates the percentage of teachers who "agree" or "strongly agree" that bullying among students is a problem at their school, by school location. For this example, the merged teacher and principal data file "TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav" will be used. The statistic type is, again, **Percentages only**.

As with the previous analysis, the first step is to identify the variable relevant to the analysis in the appropriate files. The variables are teacher agreement to bullying among students being a problem at their school (TT4G70E) – see the teacher questionnaire, Question TQ 74 (OECD, 2024, p. 44[7]) – and the school location as reported by principals (TC4G11) – see principal questionnaire, Question PQ 12 (OECD, 2024, p. 8[9]).

Since we want to investigate the percentage of teachers agreeing that bullying is a problem at their school, by school location, we need to combine data from both school and teacher files. We use the school-level variable "disaggregated" to the teacher level as a grouping variable. Consequently, the weight variable that will be used is the teacher weight (TCHWGT). In such cases, the interpretation of the results should be as "percentage of teachers in schools with characteristic A" without making any direct inferences for the schools themselves.

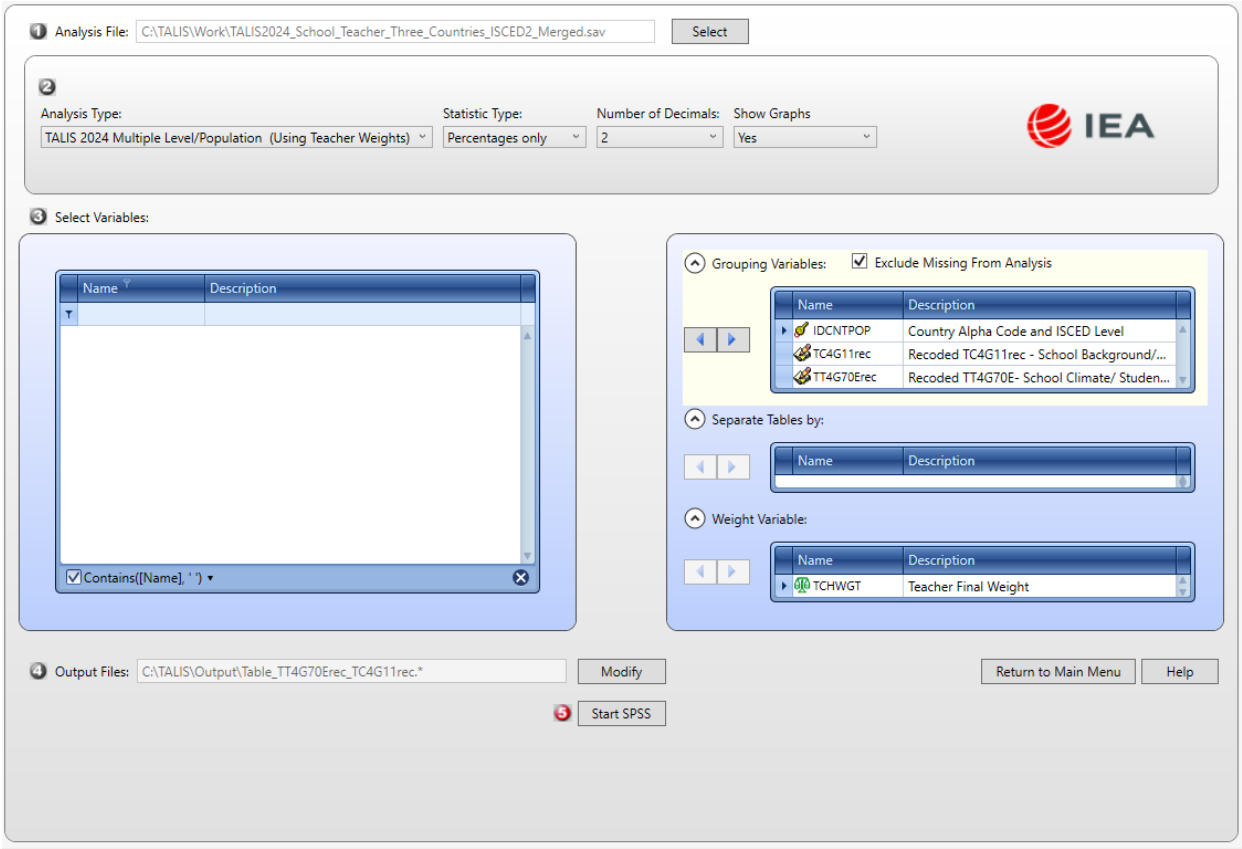
First, we need to recode the teacher variable in a way that we combine response options "agree" and "strongly agree". We would like to collapse response categories for the school location as well. The syntax to use is presented in Figure 4.17.

Figure 4.17. SPSS syntax to recode the information on the share of teachers who agree that bullying is a problem at their schools for the example analysis

```
GET FILE =
"C:\TALIS\Work\TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav".

RECODE TT4G70E (1 THRU 2 = 1) (3 THRU 4 = 2)
(ELSE = COPY) INTO TT4G70Erec.
VARIABLE LABELS TT4G70Erec "Recoded TT4G70E- School Climate/ Student bullying/
Bullying among students is a problem at this school".
VALUE LABELS TT4G70Erec
1 "Strongly disagree or disagree"
2 "Agree or strongly agree".

RECODE TC4G11 (1 = 1)(2 THRU 3 = 2)(4 THRU 5 = 3)
(ELSE = COPY) INTO TC4G11rec.
VARIABLE LABELS TC4G11rec "Recoded TC4G11rec - School Background/ School location
description".
VALUE LABELS TC4G11rec
1 "Rural area or village"
2 "Town"
3 "City".

MISSING VALUES TT4G70Erec TC4G11rec(8 9).

EXECUTE.

SAVE OUTFILE =
"C:\TALIS\Work\TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav".
```

Conducting the analyses with the IEA IDB Analyzer Analysis Module is the next step. Figure 4.18. shows the set-up for this analysis. The statistic type is **Percentages only**, the first grouping variable is IDCNTRY (selected by default). The analyst must add both variables, the recoded TC4G11rec andTT4G70Erec, as the second and third grouping variables. Please note that the order affects how the table is produced. In this case, as we are interested to see how the agreement changes by school location, variable TC4G11rec has to appear before variable TT4G70Erec on the list of grouping variables. The **Weight Variable**, TCHWGT, is selected by the IEA IDB Analyzer automatically because when merging teacher- and school-level data with the IEA IDB Analyzer, school-level data is disaggregated to the teacher level and the resulting merged file consists of records on teacher level. A print-out of the output is displayed in Figure 4.19.

Figure 4.18. Analysis module for the example of analysis based on combined teacher- and school data



The first three columns in the SPSS output in Figure 4.19 show the categories of the grouping variables – country/territory, the recoded response categories for school location, and the two different categories for agreement. The fourth, fifth and sixth columns show the number of cases in the sample, sum of weights and their standard error. The last two columns show the estimated percentages of teachers per group defined by the grouping variables – IDCNTRY, TC4G11rec and TT4G70Erec.

Figure 4.19. SPSS output for example of teacher- and school-level analysis (bullying among students is a problem by school location)

Percentages by (IDCNTPOP TC4G11REC TT4G70EREC)

Country Alpha Code and ISCED Level	Recoded TC4G11rec - School Background/ School location description	Recoded TT4G70E- School Climate/ Student bullying/ Bullying among students is a problem at this school	N of Cases	Sum of TCHWGT	Sum of TCHWGT (s.e.)	Percent	Percent (s.e.)
Chile	Rural area or village	Strongly disagree or disagree	29	2326	667,69	73,44	8,09
		Agree or strongly agree	15	841	308,20	26,56	8,09
	Town	Strongly disagree or disagree	239	8098	1034,54	67,62	4,02
		Agree or strongly agree	159	3877	689,14	32,38	4,02
	City	Strongly disagree or disagree	589	12934	1260,15	60,66	2,89
		Agree or strongly agree	408	8386	809,25	39,34	2,89
Spain	Rural area or village	Strongly disagree or disagree	241	4755	1316,62	80,10	2,79
		Agree or strongly agree	51	1181	193,88	19,90	2,79
	Town	Strongly disagree or disagree	2650	58705	2940,08	75,29	1,47
		Agree or strongly agree	899	19270	1472,80	24,71	1,47
	City	Strongly disagree or disagree	1411	30670	2826,90	80,11	1,82
		Agree or strongly agree	374	7617	916,92	19,89	1,82
Türkiye	Rural area or village	Strongly disagree or disagree	83	12121	1927,68	51,42	4,65
		Agree or strongly agree	91	11450	2051,71	48,58	4,65
	Town	Strongly disagree or disagree	446	27221	3238,09	47,04	2,72
		Agree or strongly agree	478	30649	3611,41	52,96	2,72
	City	Strongly disagree or disagree	961	50273	3449,11	48,23	1,79
		Agree or strongly agree	1091	53964	3334,53	51,77	1,79
Table Average	Rural area or village	Strongly disagree or disagree	.	.	.	68,32	3,25
		Agree or strongly agree	.	.	.	31,68	3,25
	Town	Strongly disagree or disagree	.	.	.	63,32	1,69
		Agree or strongly agree	.	.	.	36,68	1,69
	City	Strongly disagree or disagree	.	.	.	63,00	1,28
		Agree or strongly agree	.	.	.	37,00	1,28

Computing percentages and means and their standard errors

To compute means of continuous variables with their corresponding BRR standard errors, data users will need to select **Percentages and Means** as the statistic type. This statistic type computes the percentages of teachers (or principals) within specified subgroups and their mean and standard deviation on the continuous variable selected. This analysis type also computes the appropriate BRR standard errors for these percentages, means and standard deviations.

The example of this teacher-level analysis investigates the teachers' mean years of work experience as a teacher in total and the corresponding BRR standard error. The results of this analysis are presented in Table 1.9 (Figure 4.20). This example can be replicated using the statistic type **Percentages and Means**.

The first step in the analysis is to identify the variables of interest in the appropriate data files. Variable TT4G13B contains the information on teachers' years of work experience as a teacher, provided by the teacher – see teacher questionnaire, Question 17, p. 13 (OECD, 2024[7]).

Figure 4.20. Table 1.9 of the TALIS 2024 results for the example of teacher-level analysis

	ISCED level	Years of teaching experience[1]				Percentage of teachers, by years of experience as a teacher[1]					
		Average		Standard deviation		Less than or equal to 5 years		6 to 20 years		More than 20 years	
		Mean	S.E.	S.D.	S.E.	%	S.E.	%	S.E.	%	S.E.
Chile	2	13.9	(0.3)	10.0	(0.3)	20.2	(1.3)	59.2	(1.8)	20.6	(1.4)
Spain	2	15.3	(0.2)	10.3	(0.1)	23.3	(0.7)	45.5	(0.8)	31.2	(1.1)
Türkiye	2	13.4	(0.3)	7.8	(0.1)	17.7	(1.2)	63.5	(1.3)	18.8	(1.0)
OECD average-27	2	17.3	(0.1)	10.6	(0.0)	17.9	(0.2)	45.1	(0.2)	37.0	(0.2)
EU total-22	2	18.1	(0.1)	10.6	(0.0)	15.8	(0.2)	43.0	(0.3)	41.2	(0.4)
TALIS average-49	2	16.7	(0.0)	10.3	(0.0)	18.3	(0.1)	47.0	(0.2)	34.7	(0.2)

The type of statistic this time is **Percentages and Means**. IDCNTRY is the only grouping variable and TT4G13B is the analysis variable, for which its mean and BRR standard error will be estimated. Variable TT4G13B is not available in the public use file but its categorised version is. T4TYEXPTT is the number of years of work experience, regardless of whether they are full-time or part-time, that teachers reported to have as a teacher in total, categorised into less than or equal to 5 years; 6 to 10 years; 11 to 20 years; and more than 20 years.

To reproduce the second part of the table, the variable T4TYEXPTT needs to be recoded into three categories. The syntax is displayed in Figure 4.21.

Figure 4.21. SPSS syntax to recode the information on teachers' work experience

```
GET FILE =
"C:\TALIS\Work\TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav".

RECODE T4TYEXPTT (1 = 1) (2 THRU 3 = 2) (4 = 3)
(ELSE = COPY) INTO T4TYEXPTTrec.
VARIABLE LABELS T4TYEXPTTrec "Recoded T4TYEXPTT - Teacher Work Experience".
VALUE LABELS T4TYEXPTTrec
1 "Less than or equal to 5 years"
2 "6-20 years"
3 "More than 20 years".
MISSING VALUES T4TYEXPTTrec (7 8 9).

EXECUTE.

SAVE OUTFILE =
"C:\TALIS\Work\TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav".
```

For the purpose of this example, we will use the unpublished variable TT4G13B. The particular results can only be reproduced by analysts with access to the restricted dataset.

The steps in the IEA IDB Analyzer are as follows:

1. Open the **Analysis Module** of the IEA IDB Analyzer.

Select the **Analysis File** called "TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav" that was merged in a previous step (in case it is not selected automatically by the IEA IDB Analyzer).

As the **Analysis Type**, select **TALIS 2024 Single Level/Population (Using Teacher Weights)** and as **Statistic Type**, choose **Percentages and Means**. The programme will exclude, by default, cases with missing grouping variables from the analysis. This can be changed by unchecking the option **Exclude Missing from Analysis**.

In the next steps, the variables need to be defined:

f. As **Grouping Variables,** the software always selects the variable IDCNTRY by default. Depending on the purpose of the analysis, the analyst can add more grouping variables. Note that subgroups are created and reported in the order of the variables as they appear in this list. In this case, no additional grouping variable needs to be added.

g. Next, the **Analysis Variables** need to be defined. To activate this section, click somewhere on this field. For this example, select variable TT4G13B from the list of available variables and move it to the analysis variables field by pressing the right arrow button in this section. Note that for this statistic type, more than one analysis variable can be selected.

Since this is an example for analysis at the teacher level, TCHWGT is used as the **Weight Variable**. It is selected by default by the IEA IDB Analyzer because there are both school and teacher data in the merged file. Whenever the IEA IDB Analyzer detects teacher-level variables in a merged file, it will select the teacher weights. If we were to analyse school variables which are in a merged file containing teacher data, the teacher weights would be used and the results should be interpreted as (for example) “percentage of teachers in school with characteristic A” without any direct inferences for the schools themselves. Additionally, the teacher replicate weights (TRWGT1-100) are selected automatically by the software.

Specify the name and folder of the output files in the **Output Files** field. To follow the example, use “Table1_9” as the file name.

Press the **Start SPSS** button to create the SPSS syntax file and open it in an SPSS syntax window. The syntax file needs to be executed by opening the **Run** menu in SPSS and selecting the **All** option. If applicable, the IEA IDB Analyzer will produce a prompt to confirm overwriting already existing files.

The IEA IDB Analyzer uses the name and folder specified in Step 6 to create three output files:

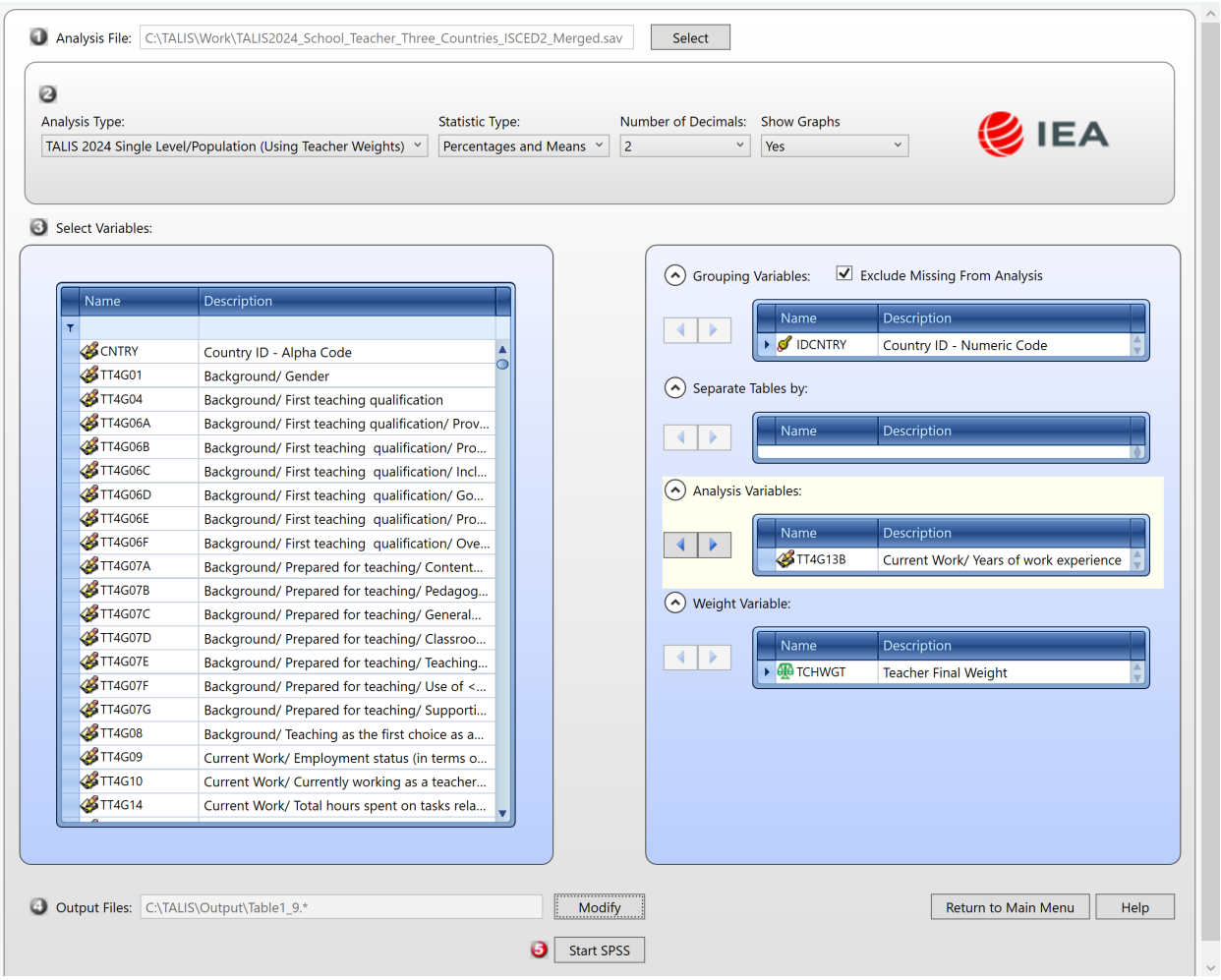
h. an SPSS syntax file that contains the code for performing the analysis;

i. an SPSS data file with the results;

j. an Excel file with these same results.

The IEA IDB Analyzer settings are displayed in Figure 4.22.

Figure 4.22. Analysis Module for example of teacher-level analysis Table 1.9 (years of experience as a teacher)



A print-out of the SPSS output is presented in Figure 4.23.

Figure 4.23. SPSS output for example of teacher-level analysis for Table 1.9 (years of experience as a teacher)

Average for TT4G13B by (IDCNTRY)

Country ID - Numeric Code	N of Cases	Sum of TCHWGT	Sum of TCHWGT (s.e.)	Percent	Percent (s.e.)	TT4G13B (Mean)	TT4G13B (s.e.)	Std.Dev.	Std.Dev. (s.e.)	Percent Missing
Chile	2252	58175.16	1548.93	10.74	.27	13.85	.31	10.06	.26	2.71
Spain	8926	195173.26	2240.50	36.03	.33	15.16	.24	10.31	.12	1.83
Türkiye	4886	288306.45	3688.21	53.23	.41	13.35	.26	7.81	.12	1.21
Table Average	.	.	.	33.33	.20	14.12	.16	9.39	.10	.

The participating countries/territories are identified in the first column. The second column reports the number of valid cases and the third and the fourth report the sum of weights of the sampled teachers and its standard error. The fifth and sixth columns report the estimated percentages of teachers as per participating country/territory and their standard errors. The seventh and the eighth columns display the average amount of work experience as a teacher in years per country/territory and their standard errors. The ninth and tenth columns report the standard deviations of the averages and their standard errors, and the last column presents the percentage of missing values for the analysis variable per country/territory.

Again, note that the SPSS output has a different number of decimals (hence different rounding) for the percentages and their BRR standard errors than Table 1.9. The analyst can open the Excel output file saved in the work folder and change them.

Computing percentiles of a continuous variable and their standard errors

The **Percentiles** statistic type computes the score points that separate a given proportion of the distribution of scores by subgroups defined by the grouping variable(s). This statistic type also computes the BRR standard errors of the computed percentiles. To compute percentiles of the distribution of a continuous variable and their BRR standard errors, the **Percentiles** statistic type has to be selected.

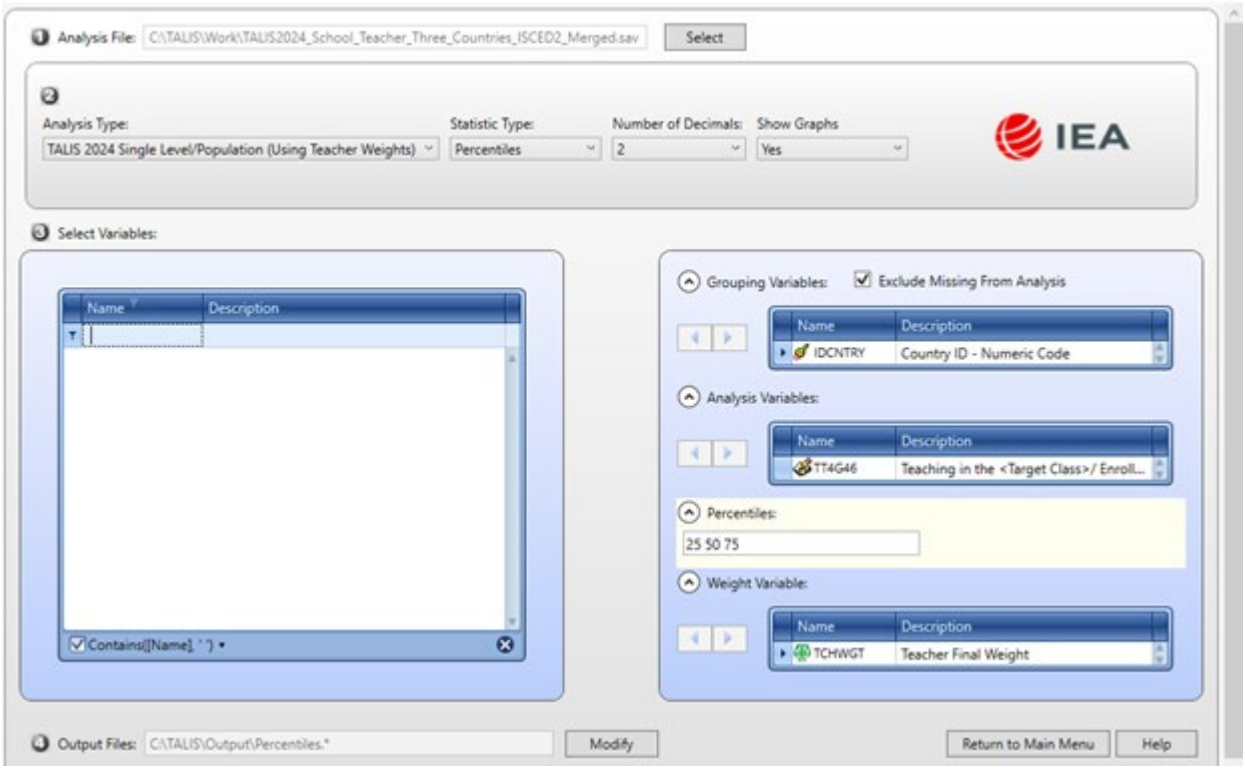
The following example will compute the 25th, 50th and 75th percentiles of students enrolled in teachers' target class (variable TT4G46) – see Question 2 in the teacher questionnaire, p. 6 (OECD, 2024[7]) – and the BRR standard errors associated with each of the percentiles. The particular results can only be reproduced by analysts with access to the restricted dataset. The analysis will be run per country/territory (IDCNTRY will be the only grouping variable). The data will be read from the data file "TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav", the weighting variable will be TCHWGT, and the standard errors will be computed using the 100 BRR teacher replicate weights.

1. Open the **Analysis Module** of the IEA IDB Analyzer.
2. Select the **Analysis File** called "TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav" that was merged in a previous step if it is not already automatically pre-selected by the IEA IDB Analyzer.
3. As the type of analysis, select **TALIS 2024 Single Level/Population (Using Teacher Weights)** and, as type of statistic, choose **Percentiles**.
4. In the next steps, the variables need to be defined:
    a. As **Grouping Variables,** the software always selects the variable IDCNTRY by default. This is the only grouping variable used for this analysis. Nevertheless, depending on the purpose of the analysis, the analyst can add more grouping variables by marking them in the list of available variables and moving them into the list of grouping variables using the right arrow button next to the list. Note that subgroups are created and reported using the order of the variables as they appear in this list.
    b. Next, the **Analysis variables** have to be defined. To activate this section, click somewhere on this field. This time, select the variable TT4G46 from the list of available variables and move it to the analysis variables field by pressing the right arrow button in this section. Note that if you select more than one analysis variable, you will get separate percentiles for each of these variables. You have to enter the desired percentiles in the field "**Percentiles**" separated by a space. Enter "25 50 75" into the blank field.
5. Since this is an example for analysis on the teacher level, TCHWGT is used as the **Weight Variable**. It is selected by default by the IEA IDB Analyzer because the merged file contains teacher data and school data disaggregated to the teacher level. Additionally, the teacher replicate weights (TRWGT1-100) are defined automatically by the software.
6. Specify the name and folder of the output files in the Output Files field. The folder "C:\TALIS\work\" is pre-selected. Use this folder and "Percentiles" as the file name to follow the example presented here.
7. Press the **Start SPSS** button to create the SPSS syntax file and open it in an SPSS syntax window. The syntax file will be executed by opening the **Run** menu in SPSS and selecting the **All** option. If necessary, the IEA IDB Analyzer will produce a prompt to confirm overwriting

already existing files. Figure 4.24. shows the IEA IDB Analyzer Analysis Module window with all necessary settings for this analysis.

8. The IEA IDB Analyzer uses the selected name and folder specified in Step 6 to create the following output files:
    a. SPSS syntax file that contains the code for running the analysis (.sps);
    b. SPSS output file that contains descriptive results and the percentile results (.spv);
    c. file with the results (file extensions .sav for SPSS, .csv and .xlsx for Excel);
    d. file with results for testing for differences between countries/territories for each of their percentile values (file suffix "_Sig"; with the extensions .sav for SPSS and .csv and .xlsx for Excel);
    e. file with results for testing for differences between pairs of countries/territories for pairs of percentile values (file suffix "_Gap"; with the extensions .sav for SPSS and .csv and .xlsx for Excel);
    f. file with results for testing for differences between pairs or percentile values for countries/territories (file suffix "_Gap2"; with the extensions .sav for SPSS and .csv and .xlsx for Excel).

Figure 4.24. Analysis Module – computing percentiles



A print-out of the SPSS output containing the results is presented in Figure 4.25. and shows the estimated 25th, 50th and 75th percentiles of the number of students enrolled in teachers' target class and the respective standard errors.

Figure 4.25. SPSS output for example of percentiles analysis

Percentiles for TT4G46 by IDCNTRY

Country ID - Numeric Code	N of Cases	Sum of TCHWGT	p25	p25_se	p50	p50_se	p75	p75_se
Chile	1450	37310	26.00	1.11	34.00	1.65	40.00	.20
Spain	5791	125315	20.00	.87	24.00	.69	28.00	.53
Türkiye	3232	189920	20.00	.35	25.00	.20	30.00	.45
Table Average	.	.	22.00	.49	27.67	.60	32.67	.24

As we can see from the output in Figure 4.25, in Chile the 25th percentile equals 26, the 50th equals 34, and the 75th equals 40 students in class. The corresponding BRR standard errors are 1.11, 1.65, and 0.20. The output also contains weighted and unweighted descriptive statistics for the analysis variable (TT4G46).

Computing correlations and their standard errors

The statistic type **Correlations (Pearson)** is used to calculate the Pearson product-moment correlation coefficient between selected analysis variables. Another available option is to use **Correlations (Spearman)**. The Spearman rank-order correlation coefficient is intended to be used when both analysis variables are ordinal. If you use this analysis type, please make sure that all variables you include are ordinal. If they are not, you should use the Correlations (Pearson) option instead. The IEA IDB Analyzer can accept more than two analysis variables and will compute the correlation coefficient between each pair. This example will use just two variables.

This example will estimate the correlation between job satisfaction (T4JSPROT) with profession and teacher autonomy (T4AUTCH) scales.

The steps in the IEA IDB Analyzer are as follows:

1. Open the **Analysis Module** of the IEA IDB Analyzer.

Select the **Analysis File** called "TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav" that was merged in previous steps.

As the **Analysis Type**, select **TALIS 2024 Single Level/Population (Using Teacher Weights)** and, as **Statistic Type**, select **Correlations (Pearson).** The **Missing Data** option can remain as **Listwise** (default).

In the next steps, all variables need to be defined:

k. As **Grouping Variable**, the software always selects the variable IDCNTRY by default. No other variable needs to be added as a grouping variable for this example.

l. Next, select the analysis variables. To activate this section, click somewhere on the field **Analysis Variables**. Select the variables T4JSPROT and T4AUTCH from the list of available variables on the left side and move them to the analysis variables window by pressing the right arrow button in this section.

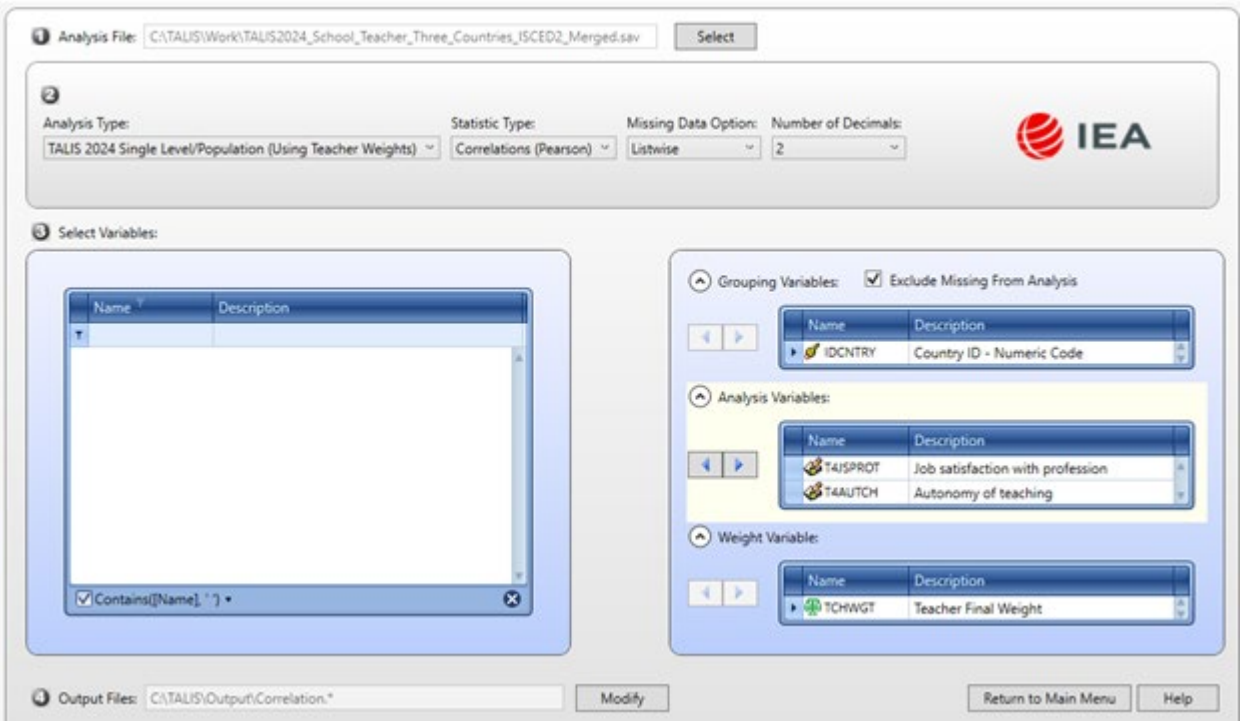
2. The **Weight Variable** is automatically selected by the software. As this is an example for analysis at the teacher level, the weight TCHWGT is selected by default. Additionally, the BRR teacher replicate weights SRWGT1-100 are automatically set by the IEA IDB Analyzer and will be used to compute the correct estimates of the BRR standard error of the correlation coefficient.

Specify the name and folder of the output files in the **Output Files** field; in this case, we name the output files "Correlation".

3. Press the **Start** SPSS button to create the SPSS syntax file and open it in an SPSS syntax window. The syntax file will be executed by opening the **Run** menu in SPSS and selecting the **All** option. If applicable, the IEA IDB Analyzer will produce a prompt to confirm overwriting already existing files.
4. The IEA IDB Analyzer uses the selected name and folder specified in Step 6 to create the following output files:
    m. SPSS syntax file that contains the code for performing the analysis (.sps);
    n. SPSS output file that contains descriptive statistics and the correlation results (.spv);
    o. file with descriptive results of all the included variables by country/territory (file suffix "_Desc"; with the extensions .sav for SPSS and .csv and .xlsx for Excel);
    p. file with all the correlation coefficients by country/territory (file suffix "_Corr"; with the extensions .sav for SPSS and .csv and .xlsx for Excel).

Figure 4.26 shows the set-up screen with the selections made for computing the correlations between the two selected variables. Figure 4.27 shows the results from the analysis.

Figure 4.26. Analysis Module – computing correlations



The SPSS output in Figure 4.27 displays, for each country/territory, the correlation coefficients for each possible combination of variables (in this case, just one). The intersection of columns and rows in this table can be used to find the correlation coefficient and its BRR standard error.

Figure 4.27. SPSS output for example of correlation analysis

Correlation Coefficients (PEARSON)

IDCNTRY	Variable	Correlation with T4JSPROT	Correlation with T4JSPROT (s.e.)	Correlation with T4AUTCH	Correlation with T4AUTCH (s.e.)
Chile	T4JSPROT	1.00	.00	.17	.04
	T4AUTCH	.17	.04	1.00	.00
Spain	T4JSPROT	1.00	.00	.23	.02
	T4AUTCH	.23	.02	1.00	.00
Türkiye	T4JSPROT	1.00	.00	.22	.02
	T4AUTCH	.22	.02	1.00	.00
Table Average	T4JSPROT	1.00	.00	.21	.02
	T4AUTCH	.21	.02	1.00	.00

The results displayed in Figure 4.27 show that the correlation between the two variables in the analysis for Chile is 0.17 with a standard error of 0.04, for Spain it is 0.23 with a standard error of 0.02, and for Türkiye it is 0.22 with a standard error of 0.02. To find out if these coefficients are significantly different from 0, you need to divide the correlation coefficient by its standard error. In the case of Chile, this is 0.1677 divided by 0.0420 which equals 3.9928. This value exceeds the 1.96 and we can conclude that this regression coefficient is statistically significantly different from zero (assuming a 95% confidence level).

Computing linear regression coefficients and their standard errors

The statistic type **Linear Regression** is used to perform single or multiple linear regression between a dependent (or "to be explained") variable and one or more independent ("explanatory") variables. The statistic type **Linear Regression** also has the option to compute regression coefficients with dummy or contrast coding of a categorical independent variable. The available options using the IEA IDB Analyzer in conjunction with SPSS are **Effect Coding** and **Dummy Coding**. The analyst does not need to recode the variables used for effect or dummy coding in advance. The IEA IDB Analyzer will create the dummy- or effect-coded variables for each category of the independent variable automatically.

The following examples show step by step how to perform such analyses to estimate linear regression coefficients and their BRR standard errors. Note that the IEA IDB Analyzer provides convenient tools for estimating coefficients and sampling errors reflecting the sample design only and that analysts need to verify any assumptions about the data's characteristics, distributions and the like beforehand (for example, normality, outliers, multicollinearity or heteroscedasticity).

Linear regression with continuous independent variables

This example demonstrates the use of multiple linear regression with continuous independent or predictor variables, which computes the regression coefficients and their corresponding BRR standard errors.

In this example, we will test the relationship between teachers' job satisfaction with profession (variable T4JSPROT) as a dependent variable and teacher autonomy (variable T4AUTCH) as an independent variable. We compute the regression coefficients and their BRR standard errors. In this example, the file containing combined teacher and school data

("TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav") is used for the analysis and the teacher weight applied. The standard errors are computed based on 100 BRR teacher replicate weights.

Both variables that are used in this analysis are complex scales. T4JSPROT and T4AUTCH were created from separate statements from the teacher questionnaire. These scales were constructed using confirmatory factor analysis (CFA) assuming an underlying latent trait. Information on how the scale variables in TALIS 2024 were derived can be found in Chapter 11 of the *TALIS 2024 Technical Report* (OECD, forthcoming[3]). For the purpose here, it is important to know that indicators were standardised on an international metric (i.e. using equally weighted samples from each country/territory) and rescaled to have a scale midpoint of 10 and standard deviation of 2.

The steps in the IEA IDB Analyzer are as follows:

1. Open the **Analysis Module** of the IEA IDB Analyzer.

Select the data file "TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav" that was produced earlier.

As type of the analysis, select **TALIS 2024 Single Level/Population (Using Teacher Weights)** and, as statistic type, choose **Linear Regression**. Leave the Missing Data Option as Listwise.

In the next steps, all variables need to be defined:

q. As **Grouping Variable**, the software always selects the variable IDCNTRY by default. No other variable needs to be added for this example.

r. Next, the independent variables need to be defined. To activate this section, click next to the **Continuous Variables** area in the **Independent Variables** field. Select the variable T4AUTCH from the **Select Variables** list and use the right arrow button in this section to place it in the list of **Continuous Variables** on the right.

s. Activate the **Dependent Variable** section by clicking into that area. Select the variable T4JSPROT from the variable list and move it to the dependent variable field by pressing the right arrow button in this section.

t. The **Weight Variable** is automatically selected by the software. As the file contains teacher and school data merged to teacher level, the teacher weight TCHWGT is selected automatically. Additionally, the appropriate teacher replicate weights (TRWGT1-100) will be used in the analysis.

Specify the name and folder of the output files in the **Output Files** field. The folder "C:\TALIS\work\" is pre-selected. Use this folder and "LinearRegression" as the file name to follow the example presented here.

Press the **Start SPSS** button to create the SPSS syntax file and open it in an SPSS syntax window. The syntax file will be executed by opening the **Run** menu in SPSS and selecting the **All** option. If applicable, the IEA IDB Analyzer will show a prompt to confirm overwriting already existing files. All of the settings should look like the ones in Figure 4.28.

The IEA IDB Analyzer uses the name and folder specified in Step 5 to create the following output files:

u. SPSS syntax file that contains the code for performing the analysis (.sps);

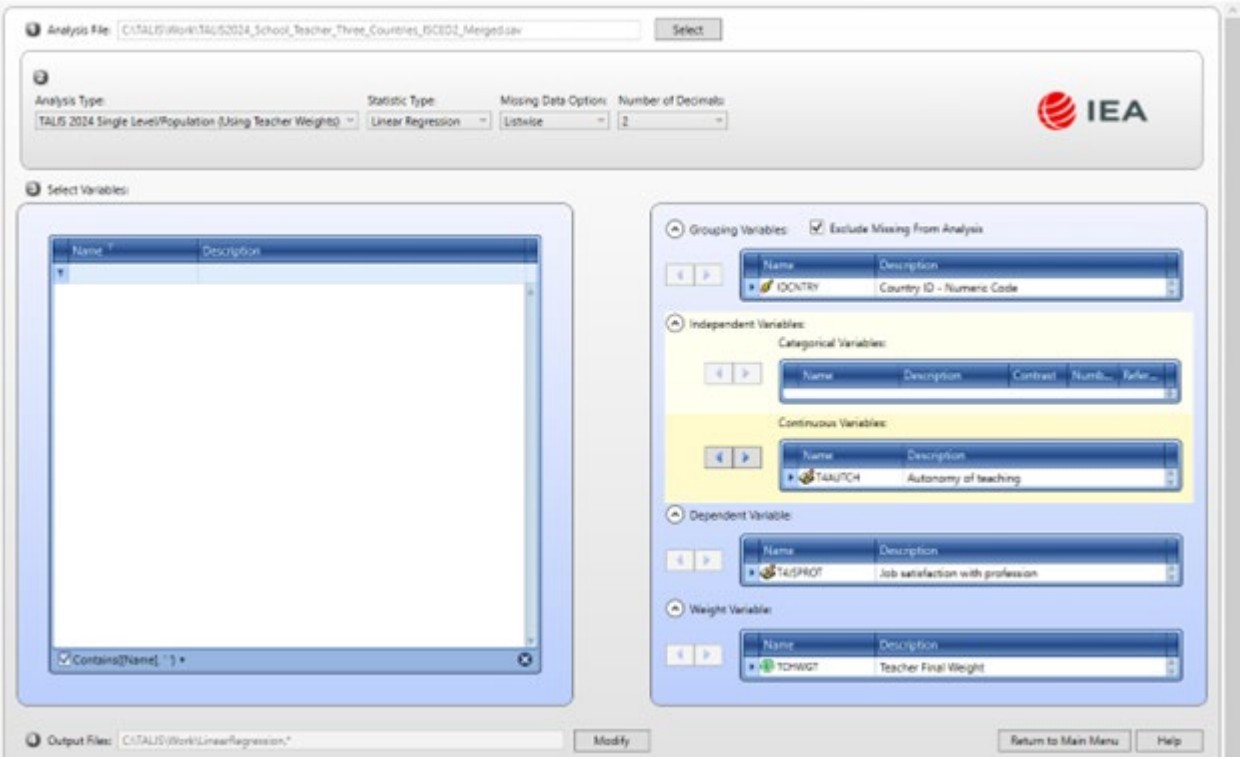
v. SPSS output file that contains descriptive results and the regression results (.spv);

w. file with descriptive results of all the included variables by country/territory (file suffix "_Desc"; with the extensions .sav for SPSS and .csv and .xlsx for Excel);

x. file with all the regression coefficients by country/territory (file suffix "_Coef"; with the extensions .sav for SPSS and .csv and .xlsx for Excel);

y. file with model statistics by country/territory (file suffix "_Model"; with the extensions .sav for SPSS and .csv and .xlsx for Excel).

Figure 4.28. Analysis Module – computing linear regression



The output contains unweighted and weighted descriptive statistics for all variables in the equation, model statistics for all the countries/territories (R^2 and adjusted R^2 with the respective standard errors), and regression coefficients. A print-out of the results is presented in Figure 4.29, showing the regression coefficients from a linear regression in each country/territory for the three countries included in the example data file.

Figure 4.29. SPSS regression coefficients output for example of linear regression analysis

Regression Coefficients

IDCNTRY	EqVar	Regression Coefficient	Regression Coefficient (s.e.)	Regression Coefficient (t-value)	Stndrdzd. Coefficient	Stndrdzd. Coefficient (s.e.)	Stndrdzd. Coefficient (t-value)
Chile	(CONSTANT)	9.99	.54	18.36	.	.	.
	T4AUTCH	.18	.04	4.00	.17	.04	3.99
Spain	(CONSTANT)	9.97	.22	45.65	.	.	.
	T4AUTCH	.24	.02	13.67	.23	.02	13.27
Türkiye	(CONSTANT)	8.72	.28	30.74	.	.	.
	T4AUTCH	.26	.02	11.21	.22	.02	11.60
Table Average	(CONSTANT)	9.56	.22	44.03	.	.	.
	T4AUTCH	.22	.02	12.76	.21	.02	12.54

By using these variables in the model, the intercept (or regression "constant") is the estimated teacher job satisfaction with profession when all predictor variables take the value of zero. The regression coefficients

for all predictors are the estimated change in the teacher job satisfaction for each unit change in the predictor variables. The output also contains the BRR standard errors of the regression coefficients and the *t*-test values that can be used to determine whether these coefficients are statistically significant.

The results are displayed in Figure 4.29. As usual, the countries/territories are identified in the first column, and the second column indicates the intercept (CONSTANT) or the regression coefficient being reported. The third column reports the unstandardised regression coefficients for the variables indicated in the second column. The fourth column is the standard error of the regression coefficient. The fifth column reports the value of the *t*-statistic for the corresponding regression coefficient. The IEA IDB Analyzer also computes standardised regression coefficients (not available for the intercept/constant) that are displayed in the sixth column with the corresponding standard error and *t*-value in the last two columns. The standardised coefficients pertain to dependent and independent variables that are standardised to have a mean of zero and standard deviation of one. When only one predictor variable is included in the model, the standardised regression coefficient corresponds to the Pearsons correlation coefficient.

The SPSS output model statistics are shown in Figure 4.30. The R^2 coefficients indicate the percentage of variance in the dependent variable that the independent variables explain together. In Spain and Türkiye, 5% of variance in the scale T4JSPROT is explained by T4AUTCH. The output also provides the adjusted R^2 for the model in each country/territory. The adjusted R^2 considers the number of regressors and the sample size.

Figure 4.30. SPSS model statistics output for example of linear regression analysis

Model Statistics

IDCNTRY	R-Square	R-Square (s.e.)	Adjusted R-Square	Adjusted R-Square (s.e.)
Chile	.03	.01	.03	.01
Spain	.05	.01	.05	.01
Türkiye	.05	.01	.05	.01
Table Average	.04	.01	.04	.01

Key consideration

Note that this section presented a fairly simple example of regression analysis using a limited number of predictor variables for the sake of clarity. The TALIS 2024 international report (OECD, 2025[2]) has used a variety of regression analyses, each with a larger number of dummy-coded or normalised predictor variables. The legends of the figures with results of regression analyses provide information on the variables used.

Linear regression with dummy-coded independent categorical variables

This example shows how to compute simple linear regression with dummy coding of the independent variable. The example uses the same variables as the previous one with effect coding. The difference is in the coding method that leads to a different way of computing the regression coefficients, hence the interpretation of the results differs.

The IEA IDB Analyzer automatically takes care of the dummy coding so that the analyst does not have to recode the data in advance. The example again estimates the effect of teacher autonomy (T4AUTCH) and teacher age (T4TAGEGRrec) on teachers' job satisfaction with profession (T4JSPROT).

The steps in the IEA IDB Analyzer are as follows:

1. Open the **Analysis Module** of the IEA IDB Analyzer.

Select the **Analysis File** called "TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav" that was merged in a previous step. The IEA IDB Analyzer's Analysis Module automatically selects the last file used, either in the Merge Module or in the Analysis Module.

As **Analysis Type**, select **TALIS 2024 Single Level/Population (Using Teacher Weights)** and as **Statistic Type** select **Linear Regression**. The **Missing Data** option can remain as **Listwise** (default).

In the next step, define the categorical independent variable. Select the **Categorical Variables** area of the **Independent Variables** field and add T4TAGEGRrec to the corresponding field. To do this, select the variable from the variable list on the left side of the window and press the right arrow button belonging to the **Independent Variable** section. To select the continuous independent variable, repeat the above steps and move T4AUTCH to the **Continuous Variables** field.

In the **Contrast** column, select **Dummy Coding** from the drop-down menu. Because the independent variable has three mutually exclusive categories, change the default to "3" for the **Number of Categories**. Choose a **Reference Category**. For this example, teachers under the age of 30 years (response category 1) are chosen as the **Reference Category**. When a dummy-coded variable is used in a regression, the intercept or constant is the mean of the reference group (first category, coded 0), and the slope or regression coefficient is the difference between the mean of the reference group (coded 0) and the group identified (coded 1) with the dummy-coded variable. Since the regression coefficients are presented with a standard error and a *t*-value, these can also be used to test whether a difference between means is statistically significant.

Next, the dependent variable has to be defined. Click on the **Dependent Variable** field and from the list of available variables on the left-hand side select T4JSPROT and move it to the right using the right arrow button.

The **Weight Variable** (TCHWGT) is automatically defined by the software. Additionally, the teacher replicate weights (TRWGT1-100) are included automatically in the computations as well, although the analysts will not see them on the application's interface.

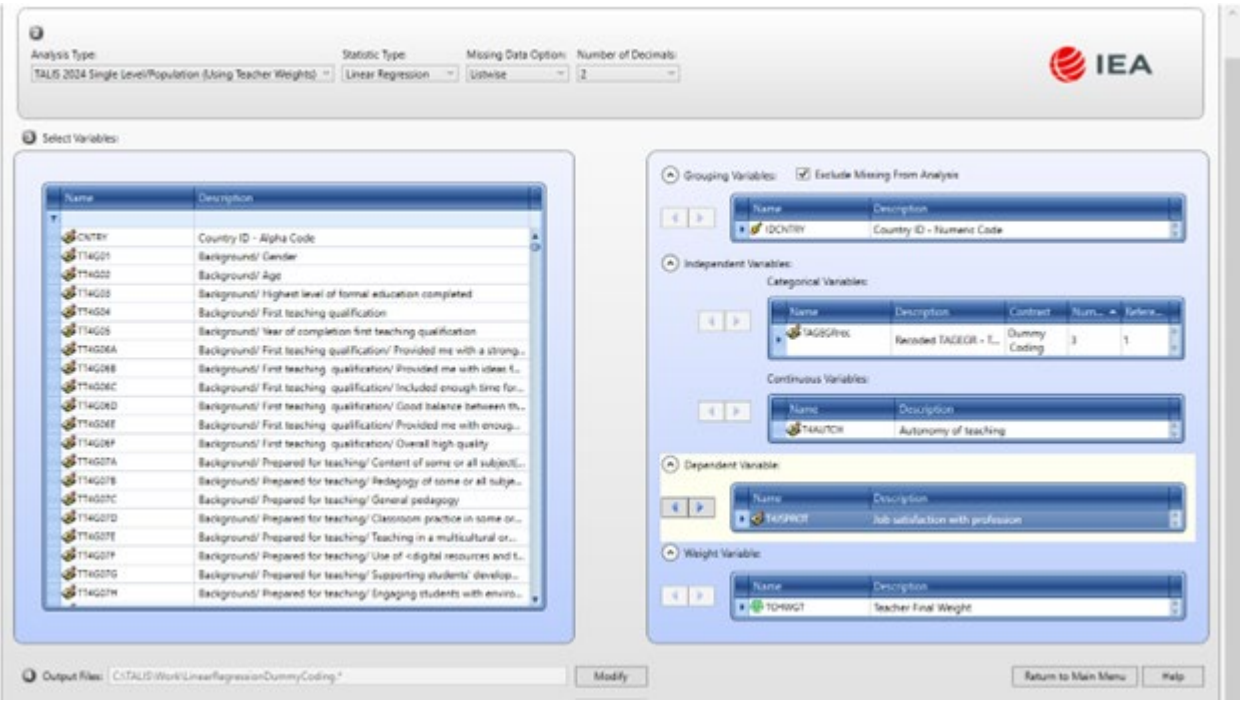
Specify the name and folder for the output files in the **Output Files** field by clicking on the **Define** button (which alters to **Modify** once you define the name), browsing to the desired folder, and typing the desired name. In this example, the file name "LinearRegressionDummyCoding" is used.

Press the **Start SPSS** button to create the SPSS syntax file and open it in an SPSS syntax window. The syntax file will be executed by opening the **Run** menu in SPSS and selecting the **All** option. If applicable, the IEA IDB Analyzer will show a prompt to confirm overwriting already existing files. The final IEA IDB Analyzer settings should look like those in Figure 4.31.

The IEA IDB Analyzer uses the name and folder specified in Step 8 to create the following output files:

a. SPSS syntax file that contains the code for performing the analysis (.sps);
b. SPSS output file that contains descriptive results and the regression results (.spv);
c. file with descriptive results of all the included variables by country/territory (file suffix "_Desc"; with the extensions .sav for SPSS and .csv and .xlsx for Excel);
d. file with all the regression coefficients by country/territory (file suffix "_Coef"; with the extensions .sav for SPSS and .csv and .xlsx for Excel);
e. file with model statistics by country/territory (file suffix "_Model"; with the extensions .sav for SPSS and .csv and .xlsx for Excel).

Figure 4.31. Analysis Module – computing regression with dummy coding of independent variables



The output contains a summary of the dummy-coded variables, unweighted and weighted descriptive statistics for all variables in the equation, model fit statistics (R^2), descriptive statistics and the regression coefficients for all variables. A print-out of the results showing the regression coefficients from a regression in each country/territory is presented in Figure 4.32.

Figure 4.32. SPSS regression coefficients output for example of linear regression with dummy-coded variable

Regression Coefficients

IDCNTRY	EqVar	Regression Coefficient	Regression Coefficient (s.e.)	Regression Coefficient (t-value)	Stndrdzd. Coefficient	Stndrdzd. Coefficient (s.e.)	Stndrdzd. Coefficient (t-value)
Chile	(CONSTANT)	9.89	.61	16.20	.	.	.
	T4AUTCH	.17	.05	3.65	.16	.04	3.63
	T4TAGEGR_D2	.01	.21	.04	.00	.05	.04
	T4TAGEGR_D3	.75	.29	2.61	.15	.06	2.56
Spain	(CONSTANT)	10.35	.25	41.90	.	.	.
	T4AUTCH	.24	.02	13.65	.23	.02	13.42
	T4TAGEGR_D2	-.35	.13	-2.68	-.09	.03	-2.69
	T4TAGEGR_D3	-.57	.14	-4.07	-.14	.03	-4.07
Türkiye	(CONSTANT)	8.86	.28	31.82	.	.	.
	T4AUTCH	.26	.02	11.28	.22	.02	11.68
	T4TAGEGR_D2	-.17	.14	-1.21	-.03	.03	-1.21
	T4TAGEGR_D3	-.03	.18	-.14	.00	.02	-.14
Table Average	(CONSTANT)	9.70	.24	40.69	.	.	.
	T4AUTCH	.22	.02	12.18	.20	.02	11.91
	T4TAGEGR_D2	-.17	.10	-1.80	-.04	.02	-1.87
	T4TAGEGR_D3	.05	.12	.44	.00	.02	.13

The intercept (or regression “constant”) of the variable T4JSPROT in the first line is the estimated mean of teacher job satisfaction with profession when the scale teacher autonomy has a value of zero and the age group is under 30 years (reference category). In Chile, the estimate for these teachers equals 9.89, in Spain it is 10.35, and in Türkiye it is 8.86. The corresponding BRR standard errors are 0.61, 0.25 and 0.28, respectively.

In the row T4AUTCH, the unstandardised coefficient tells us that a 1-unit increase in the scale value of T4AUTCH is associated with a 0.17-unit increase of the scale T4JSPROT, if we control for age groups (or if age groups are held constant) in Chile. The rows TAGEGRREC_D2 correspond to the estimates for the second dummy-coded category of the variable TAGEGRREC – teachers reported their age being between 30 and 49. Their regression coefficients correspond to the mean job satisfaction with profession difference between teachers aged 30 to 49 and teachers under 30, if we control for the teacher autonomy.

In Chile and Spain, we find significant differences between teachers of age 50 or above compared to teachers under 30 for job satisfaction with profession considering teacher autonomy, assuming a 95% confidence level. The absolute *t*-test value in these two countries (Chile 2.56 and Spain 4.07) is larger than 1.96 (using a standard normal distribution to determine the critical value for the *t*-statistic). In Chile, older teachers (50 or above) report more job satisfaction with profession when controlling for teacher autonomy than younger teachers (under 30). In Spain, older teachers (50 or above) report less job satisfaction with profession when controlling for teacher autonomy than younger teachers (under 30). In Türkiye, however, there is no significant difference. The output also provides standardised regression coefficients, their BRR standard errors and *t*-test statistics.

The output also contains the model statistic as presented in Figure 4.33.

Figure 4.33. SPSS model statistics output for example of regression with dummy-coded variable

Model Statistics

IDCNTRY	R-Square	R-Square (s.e.)	Adjusted R-Square	Adjusted R-Square (s.e.)
Chile	.05	.02	.05	.02
Spain	.06	.01	.06	.01
Türkiye	.05	.01	.05	.01
Table Average	.05	.01	.05	.01

In Spain, the model explains about 6% of the variance; in Chile and Türkiye it explains about 5%. The output also provides the adjusted R^2 for the model in each country/territory.

Linear regression with effect-coded independent categorical variables

This example shows how to compute simple linear regression with effect coding of the independent variable. The IEA IDB Analyzer automatically takes care of the effect coding so that the analyst does not have to recode the data in advance. This example estimates the effect of teacher autonomy (T4AUTCH) and teacher age (T4TAGEGRrec) on teachers' job satisfaction with profession (T4JSPROT). More specifically, the analysis will test for the difference between the grand mean of teachers' job satisfaction with profession for teachers by age group, controlling for teacher autonomy.

The steps in the IEA IDB Analyzer are as follows:

1. Open the **Analysis Module** of the IEA IDB Analyzer.

Select the **Analysis File** named "TALIS2024_School_Teacher_Three_Countries_ISCED2_Merged.sav" that was merged in a previous step. The IEA IDB Analyzer's Analysis Module automatically selects the last file used, either in the Merge Module or in the Analysis Module.

As **Analysis Type**, select **TALIS 2024 Single Level/Population (Using Teacher Weights)** and as **Statistic Type**, select **Linear Regression**. The **Missing Data Option** can remain as **Listwise** (default).

In the next step, define the independent variables. To define the categorical independent variable, select the **Categorical Variables** area of the **Independent Variables** field and add T4TAGEGRrec to the corresponding field. To do this, select the variable from the variable list on the left-hand side of the window and press the right arrow button belonging to the **Independent Variables** section. To select the continuous independent variable, repeat the above steps and move T4AUTCH to the **Continuous Variables** field.

In the **Contrast** column for the categorical variable, select **Effect Coding** from the drop-down menu. Because the independent variable has two mutually exclusive categories, change to 3 for the **Number of Categories**. The minimum (and default) number of categories is 2. Choose a **Reference Category**. When effect-coded variables are used in regression, regression

coefficients will be computed for all but the reference category. The coefficient for the reference category will be the sum of the coefficients for all the categories multiplied by minus 1. You can access the variable details (including value labels), if you right-click on the T4TAGEGRrec variable and then select “Details”.

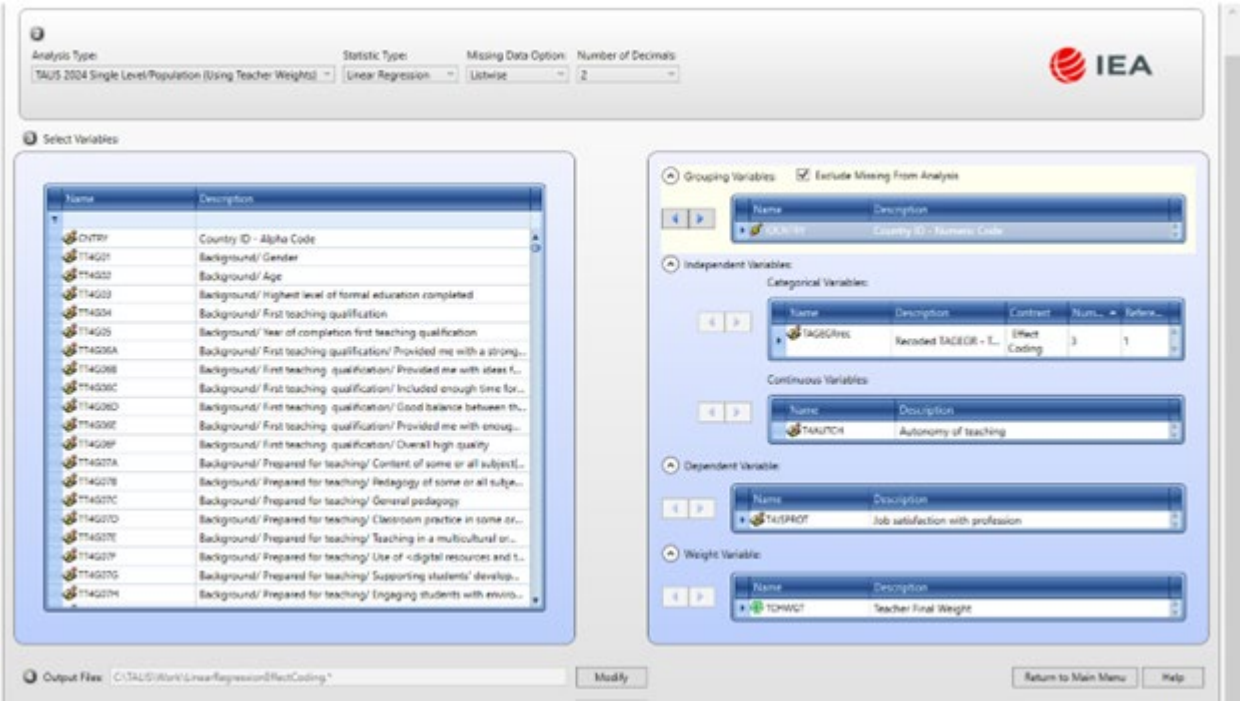
Next, the dependent variable has to be defined. Click on the **Dependent Variable** field and from the list of available variables on the left-hand side, select T4JSPROT and move it to the right using the right arrow button.

The **Weight Variable** (TCHWGT) is automatically selected by the software. Additionally, the teacher replicate weights (TRWGT1-100) are included automatically in the computations as well, although they are not displayed in the application’s interface.

Specify the name and folder for the output files in the **Output Files** field by clicking on the **Define** button (which alters to **Modify** once you define the name), browsing to the desired folder and typing the desired name. In this example, the file name “LinearRegressionEffectCoding” is used.

2. Press the **Start SPSS** button to create the SPSS syntax file and open it in an SPSS syntax window. The syntax file will be executed by opening the **Run** menu in SPSS and selecting the **All** option. If applicable, the IEA IDB Analyzer will show a prompt to confirm overwriting already existing files. The final IEA IDB Analyzer settings should look like those in Figure 4.34.
3. The IEA IDB Analyzer uses the name and folder specified in Step 8 to create the following output files:
    z. SPSS syntax file that contains the code for performing the analysis (.sps);
    aa. SPSS output file that contains descriptive results and the regression results (.spv);
    bb. file with descriptive results of all the included variables by country/territory (file suffix “_Desc”; with the extensions .sav for SPSS and .csv and .xlsx for Excel);
    cc. file with all the regression coefficients by country/territory (file suffix “_Coef”; with the extensions .sav for SPSS and .csv and .xlsx for Excel);
    dd. file with model statistics by country/territory (file suffix “_Model”; with the extensions .sav for SPSS and .csv and .xlsx for Excel).

Figure 4.34. Analysis Module – computing regression with effect coding of independent variables



The output contains a summary of the contrast-coded variables, unweighted and weighted descriptive statistics for all variables in the equation, model fit statistics (R^2), descriptive statistics and the regression coefficients for all variables. A print-out of the results showing the regression coefficients from a regression in each country/territory, is presented in Figure 4.35.

Figure 4.35. SPSS regression coefficients output for example of linear regression with effect-coded variable

Regression Coefficients

IDCNTRY	EqVar	Regression Coefficient	Regression Coefficient (s.e.)	Regression Coefficient (t-value)	Stndrdzd. Coefficient	Stndrdzd. Coefficient (s.e.)	Stndrdzd. Coefficient (t-value)
Chile	(CONSTANT)	10.14	.59	17.07	.	.	.
	T4AUTCH	.17	.05	3.65	.16	.04	3.63
	TAGEGRREC_E2	-.25	.12	-1.96	-.08	.04	-1.95
	TAGEGRREC_E3	.50	.17	2.96	.14	.05	2.93
Spain	(CONSTANT)	10.04	.22	45.18	.	.	.
	T4AUTCH	.24	.02	13.65	.23	.02	13.42
	TAGEGRREC_E2	-.05	.06	-.86	-.02	.02	-.87
	TAGEGRREC_E3	-.26	.06	-4.26	-.08	.02	-4.26
Türkiye	(CONSTANT)	8.79	.28	31.31	.	.	.
	T4AUTCH	.26	.02	11.28	.22	.02	11.68
	TAGEGRREC_E2	-.11	.07	-1.58	-.04	.02	-1.58
	TAGEGRREC_E3	.04	.09	.42	.01	.02	.42
Table Average	(CONSTANT)	9.66	.23	41.76	.	.	.
	T4AUTCH	.22	.02	12.18	.20	.02	11.91
	TAGEGRREC_E2	-.13	.05	-2.62	-.05	.02	-2.61
	TAGEGRREC_E3	.09	.07	1.38	.02	.02	1.27

Effect-coded variables are created by assigning -1, 0 or +1 to cases according to their group membership. In our case of effect coding the variable T4TAGEGRrec, which has 3 categories (1 for “Under 30”, 2 for “30-49”, and 3 for “50 or above”), and we specified 1 as the reference category, we get the variables T4TAGEGRREC_E2 (coded 1 for “30-49”, zero for “50 or above” and -1 for “Under 30”) and T4TAGEGRREC _E3 (coded zero for “30-49” coded 1 for “50 or above” and -1 for “Under 30”). Note that “Under 30” is coded -1 in both effect-coded variables.

The intercept (or regression “constant”) of the variable T4JSPROT in the first line is the estimated grand mean of teacher job satisfaction with profession, regardless of the age group they belong to, in each participating country/territory, controlling for teacher autonomy. In Chile, the grand mean equals 10.14, in Spain it equals 10.04, and in Türkiye it equals 8.79. The corresponding BRR standard errors are 0.59, 0.22 and 0.28, respectively.

The row T4TAGEGRREC_E2 corresponds to the estimates for the first effect-coded category of the variable T4TAGEGRrec. Their regression coefficients represent the difference between teachers in the age group “30-49” and the grand mean of all teachers. As can be seen in Figure 4.35, in Chile the coefficient is -0.25, in Spain it is -0.05, and for Türkiye it is -0.13. The corresponding BRR standard errors are 0.12, 0.06 and 0.07. The output also contains the *t*-test values for every estimate. In Chile, Spain and Türkiye, we find no significant differences with the grand mean for the teachers in the age group of “30-49”, assuming a 95% confidence level. The absolute *t*-test value in these cases (1.95, 0.87 and 1.58) is smaller than 1.96 (using a standard normal distribution to determine the critical value for the *t*-statistic). The output also provides standardised regression coefficients, their BRR standard errors and *t*-test statistics.

The output also contains model statistics that are presented in Figure 4.36.

Figure 4.36. SPSS model statistics output for example of linear regression with effect-coded variable

Model Statistics

IDCNTRY	R-Square	R-Square (s.e.)	Adjusted R-Square	Adjusted R-Square (s.e.)
Chile	.05	.02	.05	.02
Spain	.06	.01	.06	.01
Türkiye	.05	.01	.05	.01
Table Average	.05	.01	.05	.01

In Spain, the model explains about 6% of the variance, in Chile and Türkiye it explains about 5%. The output also provides the adjusted R^2 for the model in each country/territory.

The results of both, the dummy-coding option and the effect-coding option, yield similar results. The difference lies with the interpretation of the numbers. With the effect-coding option, groups of certain characteristics are compared to the overall mean of all groups, whereas with the dummy-coding option, a group of a certain characteristic is directly compared to one or more groups of different characteristics.

Performing analyses with data merged across ISCED levels

As mentioned at the beginning of this chapter, some participating countries/territories choose to conduct TALIS not only in ISCED 2 (the target population of the study) but also in ISCED levels 1 and 3. The data can be analysed together using the IEA IDB Analyzer. The data from the different ISCED levels have to be merged first, as presented in the Merging data across ISCED levels section. This section presents an example analysis using this merged file. This example computes the average number of students enrolled in teachers' target class (TT4G46) for different ISCED levels for Türkiye. The statistic type will be **Percentages and Means**.

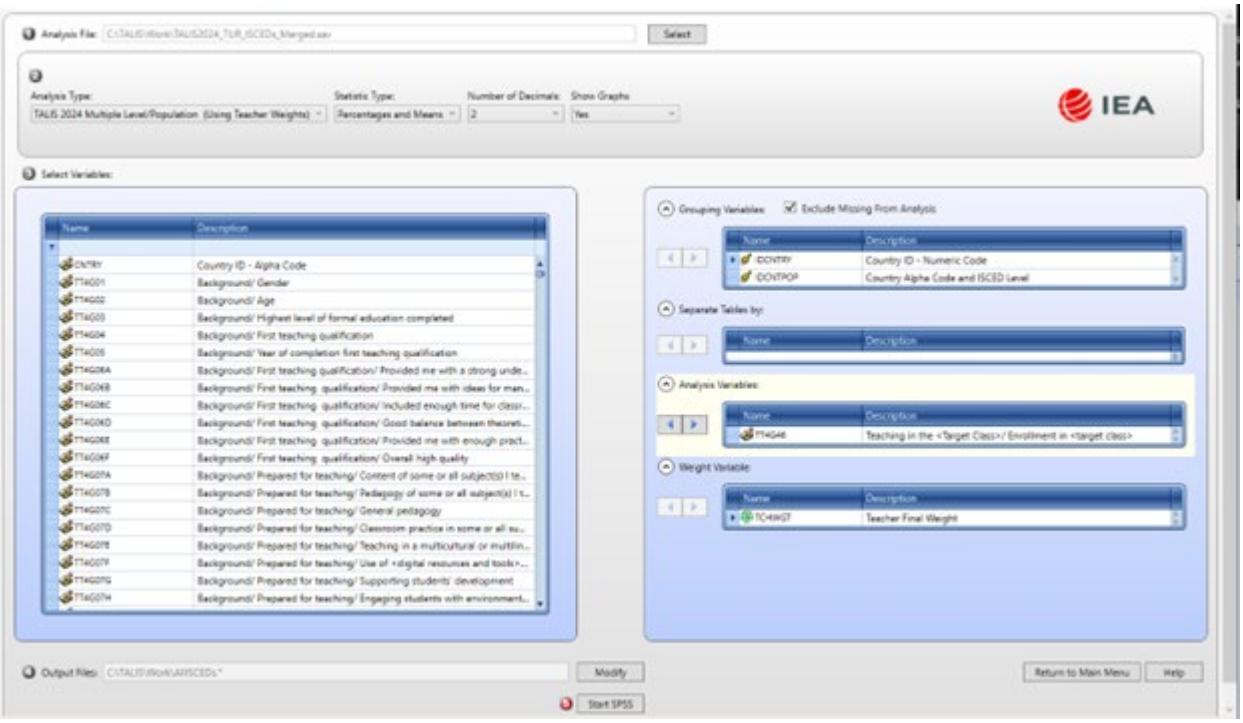
The steps in the IEA IDB Analyzer are as follows:

1. Open the **Analysis Module** of the IEA IDB Analyzer.
2. Select the **Analysis File** named "TALIS2024_TUR_ISCEDs_Merged.sav". In the Merging data across ISCED levels section, it was shown how to create this data file using the **Merge Module** of the IEA IDB Analyzer and SPSS.
3. As **Analysis Type**, select **TALIS 2024 Multiple Level/Population (Using Teacher Weights)** and as **Statistic Type**, select **Percentages and Means**.
4. Note that, by default, the programme will exclude missing values on the analysis variable. This can be changed by unchecking the checkbox **Exclude Missing from Analysis**. The **Number of Decimals** displayed in the output files can be selected from the drop-down menu.
5. As for the analyses with single level data, the IEA IDB Analyzer always selects IDCNTRY as a **Grouping Variable**, by default. This time, since the file comprises data from more than one ISCED level, it will also add the variable IDCNTPOP, which indicates the different ISCED levels

in each country/territory. This variable, as well as IDCNTRY, cannot be removed. It always has to be included in the analysis of data from multiple ISCED levels.

6. Next, the analysis variable needs to be selected. In this example, the variable is TT4G46. Click on the **Analysis Variables** field to activate it. Then select TT4G46 from the list of available variables on the left side of the screen and move it to the right using the right arrow button.
7. The **Weight Variable** (TCHWGT) is automatically defined by the software. Additionally, the BRR teacher replicate weights (TRWGT1-100) are included automatically in the computations as well, although the analysts will not see them on the application's interface.
8. Specify the name and folder for the output files in the **Output Files** field by clicking on the **Define** button (which alters to **Modify** once you define the name), browsing to the desired folder, and typing the desired name. In this example, the file name "AllISCEDs" is used.
9. Press the **Start SPSS** button to create the SPSS syntax file and open it in an SPSS syntax window. The syntax file will be executed by opening the **Run** menu in SPSS and selecting the **All** option. If applicable, the IEA IDB Analyzer will show a prompt to confirm overwriting already existing files. The final IEA IDB Analyzer settings should look like in Figure 4.37. The IEA IDB Analyzer uses the name and folder specified in Step 8 to create the following output files:
    a. SPSS syntax file that contains the code for performing the analysis (.sps);
    b. SPSS output file that contains descriptive statistics and the table of interest (.spv);
    c. file with the results of all the included variables by country/territory (with the extensions .sav for SPSS and .csv and .xlsx for Excel).

Figure 4.37. Analysis Module – computing percentages and means per ISCED level



A print-out of the output is displayed in Figure 4.38.

Figure 4.38. SPSS output for example of Percentages and Means analysis per ISCED level

Average for TT4G46 by (IDCNTRY IDCNTPOP)

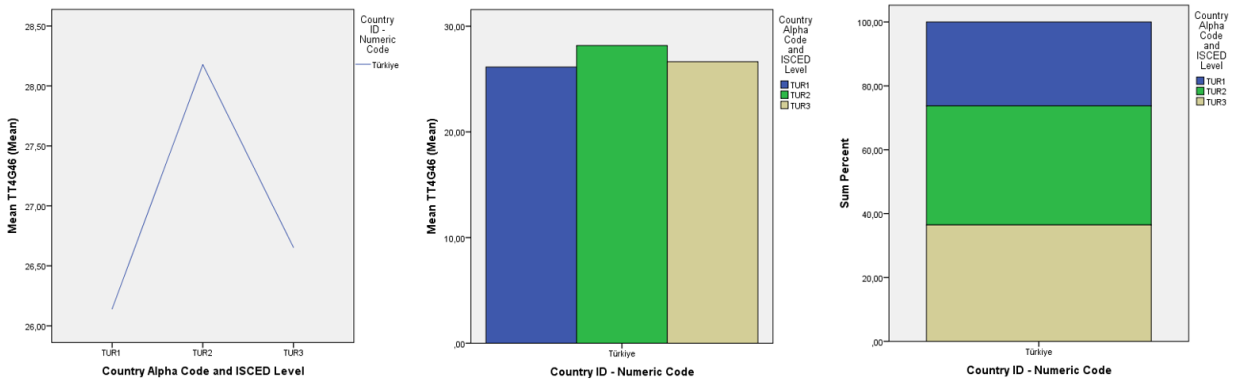
Country ID - Numeric Code	Country Alpha Code and ISCED Level	N of Cases	Sum of TCHWGT	Sum of TCHWGT (s.e.)	Percent	Percent (s.e.)	TT4G46 (Mean)	TT4G46 (s.e.)	Std.Dev.	Std.Dev. (s.e.)	Percent Missing
Türkiye	TUR1	2658	133950.51	2263.41	26.28	.38	26.14	.59	16.23	2.90	34.97
	TUR2	3232	189919.98	2295.51	37.26	.40	28.18	.71	26.78	2.94	34.92
	TUR3	3244	185884.84	3082.08	36.47	.42	26.65	.77	28.41	3.23	35.43
Table Average	TUR1	.	.	.	26.28	.38	26.14	.59	16.23	2.90	.
	TUR2	.	.	.	37.26	.40	28.18	.71	26.78	2.94	.
	TUR3	.	.	.	36.47	.42	26.65	.77	28.41	3.23	.

The first two columns in the output list the categories for the two grouping variables – IDCNTRY and IDCNTPOP. These are the country/territory names and the combination of the three-letter country/territory name abbreviation (TUR = Türkiye) and populations (1 = ISCED 1, 2 = ISCED 2 and 3 = ISCED 3). The next three columns present the number of valid cases in the sample, their population estimates and the standard errors of the population estimates. The next four columns show the percentages per groups defined by the grouping variables (IDCNTRY, IDCNTPOP), their standard errors, the means of the analysis variable TT4G46 (enrolment in the target class) per group and their standard errors. The next two columns display the standard deviations associated with the means and their standard errors. The last column shows the percentage of missing values for the analysis variable TT4G46. The largest amount of missing values is present in ISCED 3 teachers (35.43%).

The output displayed in Figure 4.38 shows that the average enrolment in target class as reported by teachers in Türkiye is 26.14 in ISCED level 1, 28.18 in ISCED level 2, and 26.65 in ISCED level 3, with standard errors of 0.59, 0.71 and 0.77 respectively.

The SPSS syntax created by the IEA IDB Analyzer also produces line, bar and stacked bar charts. These are presented in Figure 4.39.

Figure 4.39. Graphics from the output of the percentages and means analysis per ISCED level



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Notes

[1] For details about the BRR method for estimating the standard errors, please refer to Chapter 9 of the *TALIS 2024 Technical Report* (OECD, forthcoming[3]) and Chapter 2 of this document for variables related to BRR.

[2] TALIS 2024 datasets are publicly available for download from the official OECD TALIS website: https://www.oecd.org/en/data/datasets/talis-2024-database.

5 Analysing the TALIS 2024 data using Rrepest

This chapter provides an overview of the R package “Rrepest”, which is used to generate statistical estimates for the Teaching and Learning International Survey (TALIS) 2024 data. Rrepest incorporates the survey design of TALIS 2024 at both the teacher and school levels by using replicated weights. The chapter presents a series of examples with increasing levels of complexity to illustrate potential use cases. The chapter concludes by replicating tables in the *Results from TALIS 2024* publication.

Introduction

This chapter describes the use of the R package named “Rrepest” for analysing the TALIS 2024 data. Rrepest, which was developed by the Organisation for Economic Co-operation and Development (OECD), was used to generate statistical estimates for the international report, *Results from TALIS 2024: The State of Higher Education* (OECD, 2025[1]).

First, a brief overview of the Rrepest package is presented. Then, the chapter provides examples on how to compute a variety of statistics, including percentages, means, percentiles, correlations and regression coefficients, and their corresponding standard errors. The chapter concludes by replicating a results table from the TALIS 2024 international report.

This chapter does not intend to provide a general introduction to R and it is also not exhaustive in presenting all the functionalities of Rrepest. For more detailed information on Rrepest, see the reference manual (Ilizaliturri, Avvisati and Keslair, 2025[2]), which can also be accessed through the Comprehensive R Archive Network (CRAN) (Ilizaliturri, Avvisati and Keslair, 2023[3]).

Rrepest

Rrepest estimates statistics using replicate weights (Balanced Repeated Replication (BRR) weights, Jackknife replicate weights, etc.), thus accounting for complex survey designs in the estimation of sampling variances. It is designed specifically to be used with the datasets produced by the OECD, some of which include the Programme for the International Assessment of Adult Competencies (PIAAC), the Programme for International Student Assessment (PISA) and the Teaching and Learning International Survey (TALIS) datasets, but works for any educational large-scale assessment and survey that uses replicated weights. It also allows for analyses with multiply-imputed variables (plausible values); where plausible values (PVs) are used, the average estimator across plausible values is reported and the imputation error is added to the variance estimator.

The syntax of the function and its main arguments are illustrated below.

Syntax

Rrepest(**data**,

svy,

est,

by = NULL,

over = NULL,

test = FALSE,

flag = FALSE,

average = NULL,

coverage = FALSE,

invert_tests = FALSE,

save_arg = FALSE,

cores = NULL,

…)

Arguments

data: (data frame) Data to analyse.

svy: (string) Declares the survey settings. It must be equal to one of the following: ALL, IALS, ICCS, ICILS, IELS, PBTS, PIAAC, PIRLS, PISA, PISAOOS, PISA2015, SSES, SSES2023, TALISSCH, TALISTCH, TALISEC_LEADER, TALISEC_STAFF, TIMSS.

- By entering "SVY", it is possible to set custom survey parameters for the name of the total and replicated weights, number of plausible values and variance factor constant.

est: (est function) Specifies the estimates of interest. It has three arguments: statistics type, target variable and regressor (optional) in case of a linear regression. The statistical functions available are the following:

- **mean / means**: Arithmetic mean
  Example: est("mean", "x_variable")
- **meanpct / meanspct**: Arithmetic mean multiplied by 100, useful for dummy variables
  Example: est("meanpct", "dummy_variable")
- **var**: Variance
  Example: est("var", "x_variable")
- **sd / std**: Standard deviation
  Example: est("sd", "x_variable")
- **quant**: Quantile
  Example: est(c("quant", 0.5), "x_variable")
- **iqr**: Interquartile range (distance between quantiles)
  Example: est(c("iqr", 0.25, 0.75), "x_variable")
- **corr**: Correlation of numeric columns (at least two input variables)
  Example: est("corr", c("x1", "x2", "x3"))
- **cov**: Covariance of numeric columns (at least two input variables)
  Example: est("cov", c("x1", "x2", "x3"))
- **freq**: Frequencies of categorical columns
  Example: est("freq", "categoric_variable")
- **lm**: Linear regression, returns coefficients and R^2
  Example: est("lm", "y_variable", "x_variable")
- **log**: Logistic regression, returns coefficients
  Example: est("log", "y_variable", "x_variable")
- **odr**: Odds ratios from logistic regression coefficients
  Example: est("odr", "y_variable", "x_variable")

by: (string vector) Produces separate estimates by levels of the variable(s) specified and displays them in the rows of the results.

over: (string vector) Requests that estimates be obtained separately for each level of the categorical variable(s) specified by the string vector and be shown on the columns of the results.

test: (bool) If TRUE: Computes the difference between estimates obtained for the first and last values of the "over" variable(s) in alphabetical order. It is useful to test for differences between dependent samples (e.g. female-male).

flag: (bool) If TRUE: Replaces estimation results that are based on fewer observations than required for reporting with NaN. When used with the TALISSCH survey settings, it checks whether each estimation result is based on at least 10 schools. When used with the TALISTCH survey settings, it checks whether each estimation result is based on at least 30 observations and 10 schools.

average: (grp function) Computes an arithmetic average (or weighted average) of specified values in the identifying column of the results (e.g. country column) of all numerical results. It has four arguments:

- ***group.name***: (string) Name of the group to be displayed.
- ***column***: (string) Identifying column used for computing the average.
- ***cases***: (string vector) Values in the identifying column to be included in the average.
- ***full_weight***: (bool) If TRUE, the average of the group will be weighted average by the first weight in the survey specifications.

coverage: (bool/numeric) If TRUE: shows column next to se. Numeric: Shows NaN if bellow the set coverage.

invert_tests: (bool) Invert test columns from Rrepest test = TRUE by name on "b." and "se." in the column name and by sign (*-1) on "b."

save_arg: (bool) If TRUE: returns a named list with the estimation data frame and all arguments used in Rrepest.

cores: (numeric) If NULL: Will recruit max-1 cores when doing PVs. Otherwise, will recruit the specified number of cores for PVs.

…: Other optional parameters including:

- ***n.pvs***: Customises the number of plausible values used in the estimation (e.g. n.pvs = 5)
- ***cm.weights***: Customises the weight names used in the estimation (e.g. cm.weights = c("finw",paste0("repw",1:22)))
- ***var.factor***: Customises the variance factor used in the estimation (e.g. var.factor = 1/(0.5^2) for BBR-replicated weights).

Installation of R, RStudio, and Rrepest

To use Rrepest, both R and RStudio are required. These are free and can be downloaded from the Posit website (Posit, 2025[4]).

Rrepest is available through the Rrepest: An Analyzer of International Large Scale Assessments in Education (Ilizaliturri, Avvisati and Keslair, 2023[3]) and can be installed in RStudio using the following line of code: ***install.packages("Rrepest")***

This command installs Rrepest along with all necessary dependencies.

Output

Rrepest enables users to display statistical results in the format required for OECD reporting: a data frame of point estimates, each immediately followed by their corresponding standard errors, broken down by education system (country/territory) and ISCED level.

In the resulting data frames, columns containing point estimates have their column names beginning with "**b**", and those beginning with "**se**" contain standard errors for the preceding point estimate.

Each column name for point estimates and standard errors follows a consistent naming structure of three components separated by periods:

the letters "**b**" or "**se**" indicate if the column is a point estimate or a standard error, respectively

the name of the performed statistical measure (e.g. **mean**, **meanpct**, **sd**, **corr**)

the variable name (e.g. **tt4g14**).

For example, **b.mean.tt4g14** would represent the point estimate of the mean for the variable tt4g14, while **se.mean.tt4g14** would the standard error of the mean for the variable tt4g14.

Performing analyses with Rrepest

To illustrate how Rrepest can be used to produce point estimates and standard errors, the following examples replicate key analyses used throughout the TALIS 2024 international report (OECD, 2025[1]). The examples use ISCED level 2 data for Chile, Spain and Türkiye, except for the final example, which includes all ISCED levels as an additional breakdown.

All R code examples are available at https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#performing-analyses-with-rrepest, which mirrors the structure and sequence of this document. For each type of analysis, a direct link is provided to the corresponding code segment, allowing readers to access the exact implementation with ease.

In addition, an R Markdown document, containing both the code and its rendered output, has been prepared and formatted to reflect how it appears within RStudio. Each example in this document follows the same structure: it begins by demonstrating how to generate estimates using Rrepest, followed by a snippet of the resulting data frame, and concludes with the names of the generated variables to illustrate the naming conventions for point estimates and standard errors.

As a first step, the necessary R packages and dataset for TALIS 2024 must be loaded into R, and all column names should be converted to lowercase for typing convenience.

Figure 5.1. Libraries and data loading

```
# Libraries
library(tidyverse)
```

```
## ── Attaching core tidyverse packages ──────────────────────── tidyverse 2.0.0 ──
## ✓ dplyr     1.1.4     ✓ readr     2.1.5
## ✓ forcats   1.0.0     ✓ stringr   1.5.1
## ✓ ggplot2   4.0.0     ✓ tibble    3.2.1
## ✓ lubridate 1.9.3     ✓ tidyr     1.3.1
## ✓ purrr     1.0.2
## ── Conflicts ────────────────────────────────────────── tidyverse_conflicts() ──
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag()    masks stats::lag()
## ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(Rrepest)
library(labelled)

# Loading teachers and principals data for TALIS 2024
df.t24 <- readRDS(file = "V:\\TALIS\\sources\\2024\\R\\RUF\\ttgintt4.rds") # Replace the path to the data file
df.p24 <- readRDS(file = "V:\\TALIS\\sources\\2024\\R\\RUF\\tcgintt4.rds") # Replace the path to the data file

# Set lowercase columns for tipying convinience
names(df.t24) <- tolower(names(df.t24))
names(df.p24) <- tolower(names(df.p24))

# Changing names of final and BRR school weights
names(df.p24)[names(df.p24) == "schwgtc"] <- "schwgt"
names(df.p24)[names(df.p24) %>% startsWith("crwgt")] <- paste0("s",substr(names(df.p24)[names(df.p24) %>% startsWith("crwg
t")],2,10))

# Filter by Chile, Spain, and Türkiye
df.t24 <- df.t24 %>% filter(cntry %in% c("CHL","ESP","TUR"))
df.p24 <- df.p24 %>% filter(cntry %in% c("CHL","ESP","TUR"))

# Merging data sets
df.m24 <- left_join(df.t24, df.p24,
                    by = c("idcntpop","cntry","idcntry","idschool","idpop"))
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#performing-analyses-with-rrepest.

Computing percentages and their standard errors

This section features examples for computing percentages and their corresponding standard errors for analyses at the teacher level, school level and combined (i.e. teacher and school levels).

Analysis at the teacher level

The example of a percentage analysis at the teacher level examines the proportions and their balanced repeated replication (BRR) standard errors for teachers' age groups (using the teacher-level variable *tt4g02*).

Figure 5.2. Percentages and standard errors at the teacher-level

```
# Categorizing three teachers' age groups
df.t24 <- df.t24 %>% mutate(tagegr_3 = case_when(
  tt4g02 %in% 0:29 ~ "1_under_age_30",
  tt4g02 %in% 30:49 ~ "2_age_30_49",
  tt4g02 %in% 50:120 ~ "3_age_50_above",
  TRUE ~ NA # Any other values as NA
))

# Rrepest estimation
df_res <- Rrepest::Rrepest(
  data = df.t24 %>% filter(idpop == 2), # ISCED Level 2
  svy = "TALISTCH", # Teacher-level survey design
  est = est(statistic = "freq",
            target = "tagegr_3"),
  by = "idcntry"
)

# Showing three columns of results data frame
df_res %>% select(1:3)
```

```
## # A tibble: 3 x 3
##   idcntry b.tagegr_3.1_under_age_30 se.tagegr_3.1_under_age_30
##   <chr>                       <dbl>                       <dbl>
## 1 Chile                       14.4                        1.14
## 2 Spain                        7.91                       0.474
## 3 Türkiye                     14.9                        1.13
```

```
# Names of resulting variables
names(df_res)
```

```
## [1] "idcntry"                    "b.tagegr_3.1_under_age_30"
## [3] "se.tagegr_3.1_under_age_30" "b.tagegr_3.2_age_30_49"
## [5] "se.tagegr_3.2_age_30_49"    "b.tagegr_3.3_age_50_above"
## [7] "se.tagegr_3.3_age_50_above"
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#analysis-at-the-teacher-level.

Analysis at the school level

The example of a percentage analysis at the school level computes the proportions and their BRR standard errors for the percentage of principals under 40, 40–59, and 60 and above (using the school-level variable *pragegr*).

Figure 5.3. Percentages and standard errors at the school-level

```
# Categorizing three teachers' age groups
df.p24 <- df.p24 %>% mutate(pragegr_3 = case_when(
  tc4g02 %in% 0:39 ~ "1_under_age_40",
  tc4g02 %in% 40:59 ~ "2_age_40_59",
  tc4g02 %in% 60:120 ~ "3_age_60_above",
  TRUE ~ NA # Any other values as NA
))

# Rrepest estimation
df_res <- Rrepest::Rrepest(
  data = df.p24 %>% filter(idpop == 2), # ISCED Level 2
  svy = "TALISSCH", # School-level survey design
  est = est(statistic = "freq",
            target = "pragegr_3"),
  by = "idcntry"
)

# Showing three columns of results data frame
df_res %>% select(1:3)
```

```
## # A tibble: 3 x 3
##   idcntry b.pragegr_3.1_under_age_40 se.pragegr_3.1_under_age_40
##   <chr>                        <dbl>                        <dbl>
## 1 Chile                         9.93                         2.32
## 2 Spain                         2.54                         1.59
## 3 Türkiye                      32.1                          2.84
```

```
# Names of resulting variables
names(df_res)
```

```
## [1] "idcntry"                    "b.pragegr_3.1_under_age_40"
## [3] "se.pragegr_3.1_under_age_40" "b.pragegr_3.2_age_40_59"
## [5] "se.pragegr_3.2_age_40_59"    "b.pragegr_3.3_age_60_above"
## [7] "se.pragegr_3.3_age_60_above"
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#analysis-at-the-school-level.

Analysis with combined teacher and school level data

The example of a teacher-level analysis, incorporating variables from both the teacher and school levels, examines the percentage of teachers who “agree” or “strongly agree” that bullying among students is a problem at their school (and their BRR standard errors), disaggregated by school location (using the teacher-level variable *tt4g70e* and the school-level variable *tc4g11*).

Figure 5.4. Percentages and standard errors with combined teacher and school-level data

```
# Dummy variable for the percentage of teachers who "agree"/"strongly agree" that bullying among students is a problem
df.m24 <- df.m24 %>%
  mutate(d_tt4g70eagree = case_when(
    tt4g70e %in% c(3,4) ~ 1, # 3 and 4 for "agree"/"strongly agree"
    tt4g70e %in% c(1,2) ~ 0,# 1 and 2 for "strongly disagree"/"disagree"
    is_tagged_na(tt4g70e, "a") ~ tagged_na("a"), # NA(a) "Not administered"
    is_tagged_na(tt4g70e, "m") ~ tagged_na("m") # NA(m) "Omitted or invalid"
  ))

# Categorizing into Rural area, Town, and City
df.m24 <- df.m24 %>%
  mutate(schloc_3 = case_when(
    tc4g11 %in% 1 ~ "1_Rural",
    tc4g11 %in% 2:3 ~ "2_Town",
    tc4g11 %in% 4:5 ~ "3_City"
  ))

# Rrepest estimation
df_res <- Rrepest::Rrepest(
  data = df.m24 %>% filter(idpop == 2), # ISCED Level 2
  svy = "TALISTCH", # Teacher-level survey design
  est = est(statistic = "meanpct",
            target = "d_tt4g70eagree"), # Dummy variable
  by = "idcntry",
  over = "schloc_3"
)

# Showing two columns from results data frame
df_res %>% select(1:2)
```

```
## # A tibble: 3 x 2
##   idcntry b.meanpct.d_tt4g70eagree..1_Rural
##   <chr>                               <dbl>
## 1 Chile                                26.6
## 2 Spain                                19.9
## 3 Türkiye                              48.6
```

```
# Names of resulting variables
names(df_res)
```

```
## [1] "idcntry"                          "b.meanpct.d_tt4g70eagree..1_Rural"
## [3] "se.meanpct.d_tt4g70eagree..1_Rural" "b.meanpct.d_tt4g70eagree..2_Town"
## [5] "se.meanpct.d_tt4g70eagree..2_Town"  "b.meanpct.d_tt4g70eagree..3_City"
## [7] "se.meanpct.d_tt4g70eagree..3_City"
```

Note: Example code accompanying this analysis is available in the project repository https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#analysis-with-combined-teacher--and-school-level-data.

Computing percentages, means and their standard errors

See below an example to compute means with associated standard errors.

This example demonstrates how to compute the percentage of teachers by years of teaching experience (and their BRR standard error), using the teacher-level variable *tt4g13b*.

Figure 5.5. Computing percentages

```
# Rrepest estimation
df_res <- Rrepest::Rrepest(
  data = df.t24 %>% filter(idpop == 2), # ISCED Level 2
  svy = "TALISTCH", # Teacher-Level survey design
  est = est(statistic = "freq",
            target = "tt4g13b"),
  by = "idcntry"
)

# Results data frame arranged in increasing order by years of experience
# Get values of tt4g13b in increasing order
values_order <- count(df.t24, tt4g13b) %>%
  filter(!is.na(tt4g13b)) %>% # Get non NA values
  pull(tt4g13b) %>% as.vector() %>%
  rev() # Reverse order to relocate results


# Relocating values according to values_order
for(value_i in values_order){
  df_res <- df_res %>%
    relocate(ends_with(paste0(".",value_i))) # Relocate ".value_i" ending to the begging of the data frame
}

# Relocating idcntry
df_res <- df_res %>% relocate(idcntry)

# Showing five columns from results data frame
df_res %>% select(1:5)
```

```
## # A tibble: 3 x 5
##   idcntry b.tt4g13b.0 se.tt4g13b.0 b.tt4g13b.1 se.tt4g13b.1
##   <chr>         <dbl>        <dbl>       <dbl>        <dbl>
## 1 Chile         0.483        0.205        4.02        0.782
## 2 Spain         0.743        0.157        3.00        0.238
## 3 Türkiye       0.356        0.110        3.18        0.491
```

```
# Names of resulting variables
names(df_res)
```

Note: Example code accompanying this analysis is available in the project repository https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#computing-percentages-means-and-their-standard-errors.

Using the same example, demonstrates how to compute the mean of teachers' years of teaching experience (and their BRR standard error), using the teacher-level variable *tt4g13b*.

Figure 5.6. Computing means, and their standard errors

```
# Rrepest estimation
df_res <- Rrepest::Rrepest(
  data = df.t24 %>% filter(idpop == 2), # ISCED Level 2
  svy = "TALISTCH", # Teacher-level survey design
  est = est(statistic = c("mean","sd"),
            target = "tt4g13b"),
  by = "idcntry"
)

# Showing results data frame
df_res
```

```
## # A tibble: 3 x 5
##   idcntry b.mean.tt4g13b se.mean.tt4g13b b.sd.tt4g13b se.sd.tt4g13b
##   <chr>            <dbl>           <dbl>        <dbl>         <dbl>
## 1 Chile             13.9           0.309         10.1          0.258
## 2 Spain             15.2           0.243         10.3          0.119
## 3 Türkiye           13.3           0.263          7.81         0.125
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#computing-percentages-means-and-their-standard-errors.

Computing percentiles of a continuous variable and their standard errors

The following example shows how to compute the 25th, 50th and 75th percentiles of students enrolled in teachers' target class (using the teacher-level variable *tt4g46*) and the BRR standard errors associated with each of the percentiles.

Figure 5.7. Computing percentiles of a continuous variable and their standard errors

```
# Rrepest estimation
df_res <- Rrepest::Rrepest(
  data = df.t24 %>% filter(idpop == 2), # ISCED Level 2
  svy = "TALISTCH", # Teacher-level survey design
  est = est(statistic = c("quant",0.25,"quant",0.5,"quant",0.75),
            target = "tt4g46"),
  by = "idcntry"
)

# Showing three columns from results data frame
df_res %>% select(1:3)
```

```
## # A tibble: 3 x 3
##   idcntry b.quant025.tt4g46 se.quant025.tt4g46
##   <chr>               <dbl>              <dbl>
## 1 Chile                  26              1.11
## 2 Spain                  20              0.872
## 3 Türkiye                20              0.346
```

```
# Names of resulting variables
names(df_res)
```

```
## [1] "idcntry"           "b.quant025.tt4g46"  "se.quant025.tt4g46"
## [4] "b.quant05.tt4g46"  "se.quant05.tt4g46"  "b.quant075.tt4g46"
## [7] "se.quant075.tt4g46"
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#computing-percentiles-of-a-continuous-variable-and-their-standard-errors.

Computing correlations and their standard errors

See below an example to compute the correlation coefficients and their associated standard errors, using the teacher-level variables of the scale of job satisfaction (*t4jsprot*) and autonomy of teaching (*t4autch*):

Figure 5.8. Computing correlations and their standard errors

```
# Rrepest estimation
df_res <- Rrepest::Rrepest(
  data = df.t24 %>% filter(idpop == 2), # ISCED Level 2
  svy = "TALISTCH", # Teacher-level survey design
  est = est(statistic = c("corr"),
            target = c("t4jsprot","t4autch")),
  by = "idcntry"
)

# Showing results data frame
df_res
```

```
## # A tibble: 3 x 3
##   idcntry b.corr.t4jsprot_t4autch se.corr.t4jsprot_t4autch
##   <chr>                     <dbl>                    <dbl>
## 1 Chile                     0.168                   0.0420
## 2 Spain                     0.227                   0.0171
## 3 Türkiye                   0.224                   0.0193
```

```
# Names of resulting variables
names(df_res)
```

```
## [1] "idcntry"                 "b.corr.t4jsprot_t4autch"
## [3] "se.corr.t4jsprot_t4autch"
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#computing-correlations-and-their-standard-errors.

Computing linear regression coefficients and their standard errors

This section covers examples for estimating linear regression coefficients and their standard errors for different types of independent variables (i.e. continuous versus categorical) and different approaches to code categorical variables (i.e. dummy versus effect-coded).

Linear regression with continuous independent variable

The following example demonstrates the use of multiple linear regression with continuous independent variables by regressing the scale of job satisfaction with profession (*t4jsprot*) on the scale of autonomy of teaching (*t4autch*).

Figure 5.9. Linear regression with a continuous independent variable

```
# Rrepest estimation
df_res <- Rrepest::Rrepest(
  data = df.t24 %>% filter(idpop == 2), # ISCED Level 2
  svy = "TALISTCH", # Teacher-level survey design
  est = est(statistic = c("lm"),
            target = "t4jsprot",
            regressor = "t4autch"),
  by = "idcntry"
)

# Showing three columns of results data frame
df_res %>% select(c(1,4,5))
```

```
## # A tibble: 3 x 3
##   idcntry b.reg_t4jsprot.t4autch se.reg_t4jsprot.t4autch
##   <chr>                   <dbl>                   <dbl>
## 1 Chile                   0.176                  0.0441
## 2 Spain                   0.238                  0.0174
## 3 Türkiye                 0.259                  0.0231
```

```
# Names of resulting variables
names(df_res)
```

```
## [1] "idcntry"                   "b.reg_t4jsprot.intercept"
## [3] "se.reg_t4jsprot.intercept" "b.reg_t4jsprot.t4autch"
## [5] "se.reg_t4jsprot.t4autch"   "b.reg_t4jsprot.rsqr"
## [7] "se.reg_t4jsprot.rsqr"
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#linear-regression-with-continuous-independent-variable.

Linear regression with dummy-coded independent categorical variable

The following example shows how to compute simple linear regression with dummy coding of the independent variable by regressing the scale of job satisfaction with profession (*t4jsprot*) on the scale of autonomy of teaching (*t4autch*) and teachers under 30 years of age (*d_tagegrunder30*).

Figure 5.10. Linear regression with dummy coded independent categorical variable

```
# Dummy coding of tagegr_3 for teachers between 20 and 49 y/o
df.t24 <- df.t24 %>%
  mutate(d_tage3049 = case_when(
    tagegr_3 == "2_age_30_49" ~ 1, # Value for "2_age_30_49" as 1
    tagegr_3 %in% c("1_under_age_30", "3_age_50_above") ~ 0, # Other case as 0
    is_tagged_na(tt4g02, "a") ~ tagged_na("a"), # Tagged NA corresponding to the category "Not administered"
    is_tagged_na(tt4g02, "m") ~ tagged_na("m") # Tagged NA corresponding to the category "Omitted or invalid"
  ))

# Dummy coding of tagegr_3 for teachers aged 50 and above
df.t24 <- df.t24 %>%
  mutate(d_tage50 = case_when(
    tagegr_3 == "3_age_50_above" ~ 1, # Value for "3_age_50_above" as 1
    tagegr_3 %in% c("1_under_age_30", "2_age_30_49") ~ 0, # Other case as 0
    is_tagged_na(tt4g02, "a") ~ tagged_na("a"), # Tagged NA corresponding to the category "Not administered"
    is_tagged_na(tt4g02, "m") ~ tagged_na("m") # Tagged NA corresponding to the category "Omitted or invalid"
  ))


# Rrepest estimation
df_res <- Rrepest::Rrepest(
  data = df.t24 %>% filter(idpop == 2), # ISCED Level 2
  svy = "TALISTCH", # Teacher-level survey design
  est = est(statistic = c("lm"),
            target = "t4jsprot",
            regressor = c("t4autch","d_tage3049","d_tage50")),
  by = "idcntry"
)

# Showing three columns of results data frame
df_show <- df_res %>% select(1,4,6,8)
# Changing names for view
names(df_show) <- c("idcntry","b.t4autch","b.d_tage3049","b.d_tage50")
df_show
```

```
## # A tibble: 3 x 4
##   idcntry b.t4autch b.d_tage3049 b.d_tage50
##   <chr>       <dbl>        <dbl>      <dbl>
## 1 Chile       0.170      0.00926     0.754
## 2 Spain       0.240     -0.355      -0.565
## 3 Türkiye     0.258     -0.170      -0.0258
```

```
# Names of original resulting variables
names(df_res)
```

```
##  [1] "idcntry"                    "b.reg_t4jsprot.intercept"
##  [3] "se.reg_t4jsprot.intercept"  "b.reg_t4jsprot.t4autch"
##  [5] "se.reg_t4jsprot.t4autch"    "b.reg_t4jsprot.d_tage3049"
##  [7] "se.reg_t4jsprot.d_tage3049" "b.reg_t4jsprot.d_tage50"
##  [9] "se.reg_t4jsprot.d_tage50"   "b.reg_t4jsprot.rsqr"
## [11] "se.reg_t4jsprot.rsqr"
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#linear-regression-with-dummy-coded-independent-categorical-variable.

Linear regression with effect-coded independent categorical variable

The example below shows how to compute simple linear regression with effect coding of the independent variable by regressing the scale of job satisfaction with profession (*t4jsprot*) on the scale of autonomy of teaching (*t4autch*) and teachers under 30 years of age (*e_tagegrunder30*).

Figure 5.11. Linear regression with effect coded independent categorical variable

```
# Effect coding of tagegr_3 for teachers between 20 and 49 y/o
df.t24 <- df.t24 %>%
  mutate(e_tage3049 = case_when(
    tagegr_3 == "1_under_age_30" ~ -1, # Value for "1_under_age_30" as -1 (reference)
    tagegr_3 == "2_age_30_49" ~ 1, # Value for "2_age_30_49" as 1
    tagegr_3 == "3_age_50_above" ~ 0, # Other case as 0
    is_tagged_na(tt4g02, "a") ~ tagged_na("a"), # Tagged NA corresponding to the category "Not administered"
    is_tagged_na(tt4g02, "m") ~ tagged_na("m") # Tagged NA corresponding to the category "Omitted or invalid"
  ))

# Effect coding of tagegr_3 for teachers aged 50 and above
df.t24 <- df.t24 %>%
  mutate(e_tage50 = case_when(
    tagegr_3 == "1_under_age_30" ~ -1, # Value for "1_under_age_30" as -1 (reference)
    tagegr_3 == "2_age_30_49" ~ 0, # Other case as 0
    tagegr_3 == "3_age_50_above" ~ 1, # Value for "3_age_50_above" as 1
    is_tagged_na(tt4g02, "a") ~ tagged_na("a"), # Tagged NA corresponding to the category "Not administered"
    is_tagged_na(tt4g02, "m") ~ tagged_na("m") # Tagged NA corresponding to the category "Omitted or invalid"
  ))


# Rrepest estimation
df_res <- Rrepest::Rrepest(
  data = df.t24 %>% filter(idpop == 2), # ISCED Level 2
  svy = "TALISTCH", # Teacher-level survey design
  est = est(statistic = c("lm"),
            target = "t4jsprot",
            regressor = c("t4autch","e_tage3049","e_tage50")),
  by = "idcntry"
)

# Showing three columns of results data frame
df_show <- df_res %>% select(1,4,6,8)
# Changing names for view
names(df_show) <- c("idcntry","b.t4autch","b.e_tage3049","b.e_tage50")
df_show
```

```
## # A tibble: 3 x 4
##   idcntry b.t4autch b.e_tage3049 b.e_tage50
##   <chr>       <dbl>        <dbl>      <dbl>
## 1 Chile       0.170      -0.245      0.499
## 2 Spain       0.240      -0.0479    -0.259
## 3 Türkiye     0.258      -0.105      0.0396
```

```
# Names of resulting variables
names(df_res)
```

```
##  [1] "idcntry"                   "b.reg_t4jsprot.intercept"
##  [3] "se.reg_t4jsprot.intercept" "b.reg_t4jsprot.t4autch"
##  [5] "se.reg_t4jsprot.t4autch"   "b.reg_t4jsprot.e_tage3049"
##  [7] "se.reg_t4jsprot.e_tage3049" "b.reg_t4jsprot.e_tage50"
##  [9] "se.reg_t4jsprot.e_tage50"  "b.reg_t4jsprot.rsqr"
## [11] "se.reg_t4jsprot.rsqr"
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#linear-regression-with-effect-coded-independent-categorical-variable.

Performing analysis with data merged across ISCED levels

See below an example conducting analysis across various ISCED levels, by estimating the average number of students enrolled in teachers' target class (teacher-level variable *tt4g46*) for different ISCED levels:

Figure 5.12. Performing analysis with data merged across ISCED levels

```
# Rrepest estimation
df_res <- Rrepest::Rrepest(
  data = df.m24,
  svy = "TALISTCH", # Teacher-level survey design
  est = est(statistic = c("mean"),
            target = "tt4g46"),
  by = c("idcntry","idpop")
)

# Showing results for Türkiye
df_res %>% filter(idcntry == "Türkiye")
```

```
## # A tibble: 3 x 4
##   idcntry idpop   b.mean.tt4g46 se.mean.tt4g46
##   <chr>   <chr>           <dbl>          <dbl>
## 1 Türkiye ISCED 1          26.1          0.585
## 2 Türkiye ISCED 2          28.2          0.711
## 3 Türkiye ISCED 3          26.7          0.773
```

```
# Names of resulting variables
names(df_res)
```

```
## [1] "idcntry"        "idpop"          "b.mean.tt4g46"  "se.mean.tt4g46"
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#performing-analysis-with-data-merged-across-isced-levels.

Replicating TALIS 2024 tables

Tables in the TALIS 2024 initial report present estimates by ISCED Levels 1, 2, and 3, and include differences between ISCED Levels 2 and 1 as well as between ISCED Levels 2 and 3. The following example illustrates such a table featuring the mean and standard deviation of teachers' age as well as the percentage of teachers under 30, from 30 to 49 years of age, and 50 and above (using variable tt4g02).

First, Rrepest is used to compute estimates by ISCED level in the following code:

Figure 5.13. Table Rrepest Estimates

```
# Estimation columns

# Mean & SD
res_mean_sd <-
  Rrepest::Rrepest(data = df.t24,
                   svy = "TALISTCH",
                   est = est(c("mean","sd"), "tt4g02"),
                   by = c("cntry","idpop"))

# Create dummies of age groups from previously created varible "tagegr_3"
library(fastDummies)
df.t24 <- dummy_cols(.data = df.t24, select_columns = "tagegr_3")

# Age groups meanpct
res_age_groups <-
  Rrepest::Rrepest(data = df.t24,
                   svy = "TALISTCH",
                   est = est("meanpct",
                             c("tagegr_3_1_under_age_30",
                               "tagegr_3_2_age_30_49",
                               "tagegr_3_3_age_50_above")),
                   by = c("cntry","idpop")
                   )

# Join both data frames
res <- full_join(res_mean_sd, res_age_groups,
                                by = c("cntry","idpop"))

# Divide results by isced level
res_isc1 <- res %>% filter(idpop == "ISCED 1")
res_isc2 <- res %>% filter(idpop == "ISCED 2")
res_isc3 <- res %>% filter(idpop == "ISCED 3")
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#table-rrepest-estimates.

Tables in the TALIS 2024 initial report include comparisons between ISCED Levels 2 and 1, as well as between ISCED Levels 2 and 3. Since these differences are based on independent populations, the standard errors must be calculated accordingly. Rrepest provides a function (*paired_indep_diff*) to estimate both the point estimate of the difference and its corresponding standard error. The following example code illustrates how these independent differences are estimated.

Figure 5.14. Table ISCED differences

```
# Join tables to ISCED 1 and 3 remove averages
# ISCED 1
df_1n2 <- left_join(res_isc1, res_isc2, by = "cntry", suffix = c("_isc1", "_isc2")) %>%
  select(-starts_with("idpop_"))

# ISCED 3
df_3n2 <- left_join(res_isc3, res_isc2, by = "cntry" ,suffix = c("_isc3", "_isc2")) %>%
  select(-starts_with("idpop_"))

# Common names of estimates from Rrepest
est_cols_rrepest <- res %>%
  select(-(1:2)) %>%
  select(starts_with("b.")) %>%
  names() %>%
  substring(first = 3)

# Add difference variables onto data frame
# ISCED 1
# Iterate through all estimation columns
df_dif1n2 <- df_1n2
for(est_i in est_cols_rrepest){
  df_dif1n2 <- Rrepest::paired_indep_diff(df_dif1n2,
                                          paste0(est_i,"_isc2"),paste0(est_i,"_isc1"))
}
# Get length difference to select last variables
res_dif1n2 <- df_dif1n2 %>%
  select(cntry,(length(df_1n2)+1):length(df_dif1n2)) %>%
  mutate(idpop = "ISCED 1")

# ISCED 3
# Iterate through all estimation columns
df_dif3n2 <- df_3n2
for(est_i in est_cols_rrepest){
  df_dif3n2 <- Rrepest::paired_indep_diff(df_dif3n2,
                                          paste0(est_i,"_isc2"),paste0(est_i,"_isc3"))
}
# Get length difference to select last variables
res_dif3n2 <- df_dif3n2 %>%
  select(cntry,(length(df_3n2)+1):length(df_dif3n2)) %>%
  mutate(idpop = "ISCED 3")
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#table-isced-differences.

Finally, all results must be organised both as a data frame and as individual elements within a list to enable further analysis (e.g. creating figures). The process for restructuring the results is presented in the example code accompanying this analysis.

Figure 5.15. Table wrangling

```
# Joining all tables ------------------------------------------------------
res_table <- res %>%
  left_join(res_dif1n2, by = c("idpop","cntry")) %>%
  left_join(res_dif3n2, by = c("idpop","cntry")) %>%
  as_tibble() %>% arrange(idpop,cntry)

# Result table by isced and difference
result_table <-
  list("table" = res_table,
       # ISCED 2 for figures
       "isced2" = res_table %>%
         filter(idpop == "ISCED 2") %>%
         select(cntry,idpop,names(res)[2:(length(names(res))-1)]),
       "isced1" = res_table %>%
         filter(idpop == "ISCED 1") %>%
         select(cntry,idpop,names(res)[2:(length(names(res))-1)]),
       "isced3" = res_table %>%
         filter(idpop == "ISCED 3") %>%
         select(cntry,idpop,names(res)[2:(length(names(res))-1)]),
       "diff_isced1vs2" = res_table %>%
         filter(idpop == "ISCED 1") %>%
         select(cntry,idpop,
                names(res_dif1n2)[2:(length(names(res_dif1n2))-1)]),
       "diff_isced3vs2" = res_table %>%
         filter(idpop == "ISCED 3") %>%
         select(cntry,idpop,
                names(res_dif3n2)[2:(length(names(res_dif3n2))-1)])
  )

# Showing six columns of results data frame
result_table[["table"]] %>% select(1:6)
```

```
## # A tibble: 6 × 6
##   cntry idpop   b.mean.tt4g02 se.mean.tt4g02 b.sd.tt4g02 se.sd.tt4g02
##   <chr> <chr>           <dbl>          <dbl>       <dbl>        <dbl>
## 1 ESP   ISCED 1          43.4          0.208        10.1        0.125
## 2 TUR   ISCED 1          41.6          0.306         9.71       0.175
## 3 CHL   ISCED 2          41.1          0.396        11.3        0.249
## 4 ESP   ISCED 2          44.9          0.211         9.98       0.0888
## 5 TUR   ISCED 2          38.0          0.260         7.81       0.120
## 6 TUR   ISCED 3          40.7          0.260         8.61       0.105
```

Note: Example code accompanying this analysis is available in the project repository: https://gitlab.algobank.oecd.org/edu_data/rrepest/-/wikis/TALIS-2024-User-Guide-Chapter-5#table-wrangling.

The object *result_table* contains six distinct data frames, which are described as follows:

- ***result_table[["table"]]***: Presents the full layout of the table as featured in the *Results from TALIS 2024* publication (OECD, 2025[1]). It includes point estimates and standard errors by ISCED level, as well as calculated differences between ISCED levels 1 and 2, and between levels 3 and 2.
- ***result_table[["isced2"]]***: Point estimates and standard errors only for ISCED level 2.
- ***result_table[["isced1"]]***: Point estimates and standard errors only for ISCED level 1.
- ***result_table[["isced3"]]***: Point estimates and standard errors only for ISCED level 3.
- ***result_table[["diff_isced1vs2"]]***: Point estimates and standard errors for the difference between ISCED levels 1 and 2.
- ***result_table[["diff_isced3vs2"]]***: Point estimates and standard errors for the difference between ISCED levels 3 and 2.

Similar list objects are generated for each table of the TALIS 2024 initial report to facilitate the export to alternative formats (e.g. Excel) and to enable easier access to ISCED-specific data.

Additional examples of the statistical outputs produced using the Rrepest package are available in the associated GitLab repository (OECD, 2025[5]).

References

Ilizaliturri, R., F. Avvisati and F. Keslair (2025), "Package 'Rrepest' [reference manual]", in *An Analyzer of International Large Scale Assessments in Education*, https://cran.r-project.org/web/packages/Rrepest/Rrepest.pdf. [2]

Ilizaliturri, R., F. Avvisati and F. Keslair (2023), "Rrepest: An Analyzer of International Large Scale Assessments in Education", *CRAN: Contributed Packages* (database), https://doi.org/10.32614/cran.package.rrepest (accessed on 9 October 2025). [3]

OECD (2025), *Results from TALIS 2024: The State of Teaching*, TALIS, OECD Publishing, Paris, https://doi.org/10.1787/90df6235-en. [1]

OECD (2025), *Rrepest Gitlab Repository*, https://gitlab.algobank.oecd.org/edu_data/rrepest (accessed on 26 August 2025). [5]

Posit (2025), *RStudio Desktop Download*, Posit, https://posit.co/download/rstudio-desktop/ (accessed on 26 August 2025). [4]

6 Analysing GPK scale scores for TKS

This chapter will be completed for the final, published version of the user guide.

7 Comparing population parameters with appropriate standard errors

The complex sampling designs used in the OECD Teaching and Learning International Survey (TALIS) 2024 need to be considered when comparing estimates for population parameters. This chapter provides information and guidelines on the correct calculation of population parameters and standard errors for comparisons within and between one or more participating countries or territories. Correct standard errors are crucial to be able to determine the statistical significance of differences between estimated parameters.

Overview

When comparing TALIS 2024 estimates of population parameters, for example, estimates for parameters of two subpopulations within a participating country/territory, the comparison must be scaled using the appropriate estimates of sampling error. This is the case when comparing characteristics of two subpopulations within a participating country/territory, across two participating countries/territories, over time (e.g. change between 2018 and 2024) for the same country/territory, or a participating country/territory characteristic with the average of that characteristic over several participating countries/territories.

While using examples for the core survey, the principles and formulae described in this chapter also apply to analyses of TALIS Starting Strong and Teacher Knowledge Survey (TKS) data.

Where appropriate, the statistics in the international reports were verified using standard tests of statistical significance, conducted at the nominal $\alpha = 5\%$ level.

Comparing population parameters within a participating country/territory

The standard error for the difference between two estimates of population parameters on the same metric from one participating country/territory, for example $\hat{\theta}_1$ and $\hat{\theta}_2$, is given by:

$$se(\hat{\theta}_1 - \hat{\theta}_2) = \sqrt{\hat{V}_{FAY}(\hat{\theta}_1) + \hat{V}_{FAY}(\hat{\theta}_2) - 2\widehat{Cov}_{FAY}(\hat{\theta}_1, \hat{\theta}_2)} = \sqrt{\hat{V}_{FAY}(\hat{\zeta})}$$

where $\hat{\zeta} = \hat{\theta}_1 - \hat{\theta}_2$ is the difference between the estimates for the two characteristics of interest (e.g. hours spent on preparation of lessons and hours spent on general administrative work) collected from each participating teacher.

To compare subpopulations within a participating country/territory, the IEA IDB Analyzer software provides significance test results in a separate output file (see Chapter 4). Alternatively, such a comparison could be done with a regression on a dummy variable, as illustrated by the following example: suppose that the difference between novice (defined in this example as those with ≤ 5 years of teaching experience) and more experienced teachers (those with > 5 years of teaching experience) for a particular characteristic (e.g. TT4G14: total hours spent on tasks related to job at school during most recent complete calendar week) is of interest. One can set a dummy variable $Experience = 0$ if the teacher has ≤ 5 years of teaching experience, and $Experience = 1$ if the teacher has > 5 years of teaching experience. Then, a regression model can be written as: $Hours = a_0 + a_1 Experience$. Clearly, if $Experience = 0$, then $HoursNovice = a_0$; similarly, by setting $Experience = 1$, one obtains $Hours_{MoreExperience} = a_0 + a_1$. Design-based estimation of the regression parameters a_0 and a_1 can be done using appropriate software, for example the IEA IDB Analyzer. If the test of significance on a_1 cannot reject the null hypothesis H_0: $a_1 = 0$, then one cannot conclude that the total hours spent on tasks related to job at their school for novice and more experienced teachers are significantly different.

Comparing population parameters for two or more participating countries/ territories

Comparing population parameters for two participating countries/territories

The standard error for the difference of the estimated parameters for two participating countries/territories, for example $\hat{\theta}_c$ and $\hat{\theta}_d$, is given by the square-root of the summed squared errors computed for each country/territory using “balanced repeated replication” (BRR):

$$se(\hat{\theta}_c - \hat{\theta}_d) = \sqrt{\hat{V}_{FAY}(\hat{\theta}_c) + \hat{V}_{FAY}(\hat{\theta}_d)} = \sqrt{se(\hat{\theta}_c)^2 + se(\hat{\theta}_d)^2}$$

The test statistic *z* for the difference can then be derived following the usual rules for hypothesis testing (see Chapter 3, "Obtaining confidence intervals" section, for example) and checked against the tabulated critical value for the preferred confidence level ($\alpha = 5\%$ and $z_{1-\alpha/2} = 1.96$):

$$z = \frac{\hat{\theta}_c - \hat{\theta}_d}{\text{se}(\hat{\theta}_c - \hat{\theta}_d)}$$

Comparing population parameters for more than two participating countries/territories

Comparing more than two participating countries/territories is usually done by using regression-type models and tests. The principles laid out in Chapter 4 in the "Computing linear regression coefficients and their standard errors" section can be applied, using dummy variables for the country indicators (independent variables). To compare three participating countries/territories, the model could take the form:

$$Outcome = A + B + C + \text{error}$$

where A, B and C are dummy indicators (note that there is no intercept in this model); if an F-test rejects an intercept-only model (i.e. the coefficients on the dummy indicators explain some variation in the outcome), then it indicates that at least one (or perhaps all) of the participating country/territory means are different from each other.

An alternative model, using an intercept, would be:

$$Outcome = \beta_0 + B + C + \text{error}$$

where B and C are dummy indicators both set to 0 for country/territory A; then country/territory A becomes the reference and the tests show whether B and C are each different from *A*. However, it sheds no light on how B compares to C. For example, one could have B slightly less than A, C slightly more than A, but B and C far enough from one another to test as "different", but this model would not detect it.

Comparing population parameters over time for the same participating countries/territories

The standard error for the difference in the estimated parameters over time for the same country/territory (e.g. 2018 to 2024), for example $\hat{\theta}_{t1}$ and $\hat{\theta}_{t2}$, is given by the square-root of the summed squared errors computed for each cycle using "balanced repeated replication" (BRR):

$$se(\hat{\theta}_{t2} - \hat{\theta}_{t1}) = \sqrt{\hat{V}_{FAY}(\hat{\theta}_{t2}) + \hat{V}_{FAY}(\hat{\theta}_{t1})} = \sqrt{se(\hat{\theta}_{t2})^2 + se(\hat{\theta}_{t1})^2}$$

The test statistic *z* for the difference between estimates over time for the same country/territory can then be derived and used in a similar manner as above:

$$z = \frac{\hat{\theta}_{t2} - \hat{\theta}_{t1}}{\text{se}(\hat{\theta}_{t2} - \hat{\theta}_{t1})}$$

Here, it is important to note that scales cannot be compared over time (see Chapter 1). Beyond this limitation, before drawing conclusions about changes over time from the significance test, one must first check whether the data are comparable across cycles. For instance, the populations across the two cycles

should be the same (e.g. same ISCED levels participating, technical standards met in both the current and previous cycles, etc.). As another example, when comparing items across cycles, the wording should have remained consistent with identical response categories. If the data are not comparable across cycles, then comparisons between cycles are limited or may not be meaningful.

Comparing a country parameter and an average for several participating countries/territories

The reporting of the TALIS 2024 core survey results (OECD, 2025[1]) comprises nine different averages for several participating countries/territories: "OECD average-27", "OECD average-25 (trends 2018-2024 for teacher data)", "OECD average-24 (trends 2018-2024 for principal data)", "TALIS average-49", "TALIS ISCED 1 average-12", "TALIS ISCED 3 average-8", "TALIS ISCED 3 average-7", "OECD PIAAC average-29" and "EU total-22". Please see the list of participating countries/territories included in the respective averages in *Results from TALIS 2024* (OECD, 2025[1]).

If an individual country/territory contributed to the computation of an average such as the "OECD average-27", the score for that participating country/territory and the average are correlated. Therefore, the computation of the standard error for the difference between an estimated characteristic for this given participating country/territory, for example $\hat{\theta}_c$, and an average of that characteristic, $\hat{\bar{\theta}}$, based on a set of participating countries/territories that includes country/territory *c*, must take this correlation into account.

Computing the average and standard error of a number of country/territory results

First, the average, here referred to as $\hat{\bar{\theta}}$, of a statistic is defined as the average of the estimates for each participating country/territory contributing to the average:

$$\hat{\bar{\theta}} = \frac{1}{C}\sum_{c=1}^{C} \hat{\theta}_c$$

where *C* is the number of participating countries/territories contributing to the average $\hat{\bar{\theta}}$.

Because the country/territory samples are statistically independent, the standard error of this average $se\left(\hat{\bar{\theta}}\right)$ is the square root of the sum of the squared standard errors (i.e. the sum of the sampling variances) divided by the squared number of countries/territories:

$$se\left(\hat{\bar{\theta}}\right) = \sqrt{\frac{\sum_{c=1}^{C} se(\hat{\theta}_c)^2}{C^2}} = \sqrt{\frac{\sum_{c=1}^{C} \hat{V}_{Fay}(\hat{\theta}_c)}{C^2}} = \frac{1}{C}\sqrt{\sum_{c=1}^{C} \hat{V}_{Fay}\left(\hat{\theta}_c\right)}$$

where C is the number of participating countries/territories contributing to the average $\hat{\bar{\theta}}$.

These two formulae for $\hat{\bar{\theta}}$ and $se\left(\hat{\bar{\theta}}\right)$ were used in Results from TALIS 2024 (OECD, 2025[1]) to compute the arithmetic averages, such as the "OECD average-27", "OECD average-25 (trends 2018-2024 for teacher data)", "OECD average-24 (trends 2018-2024 for principal data)", "TALIS average-49", "TALIS ISCED 1 average-12", "TALIS ISCED 3 average-8", "TALIS ISCED 3 average-7" and "OECD PIAAC average-29", along with their associated standard error.

The formula used to calculate the estimate for the "EU total-22", which is a weighted average referring to the 22 EU Member states that participated in TALIS 2024 and passed data adjudication as an entity, was:

$$EU\ total = \frac{\sum_{c=1}^{C} \widehat{N}_c \widehat{\theta}_c}{\sum_{c=1}^{C} \widehat{N}_c},$$

where $\widehat{N}_c$ is the estimated target population size for country c, that is, the sum of the appropriate weights (i.e. for principal-level analyses, the sum of the school weights of country/territory c and for teacher-level analyses, the sum of the teacher weights of country/territory c); C is the number of participating countries/territories contributing to the estimate of the $EU\ total$; and $\hat{\theta}_c$ is the parameter of interest (e.g. a country/territory-specific average of an analysis variable) for country/territory c.

The formula used to calculate the standard error of the EU total is:

$$se_{EU\ total} = \sqrt{\frac{\sum_{c=1}^{C} \widehat{N}_c^2 se(\hat{\theta}_c)^2}{\left(\sum_{c=1}^{C} \widehat{N}_c\right)^2}}$$

where $\widehat{N}_c$, C and $\hat{\theta}_c$ are defined as above.

While all participating countries/territories equally contributed to the OECD and TALIS averages, this was not the case for the "EU total-22". Here, each participating country/territory contributed according to its estimated target population size, meaning that countries/territories with a large, estimated target population size (i.e. a larger number of teachers or principals) contributed more to the "EU total-22" than participating countries/territories with a small target population size. Thus, the "EU total-22" represents an "average European teacher" or "average European principal", whereas the OECD or TALIS average represents an "average country/territory".

To note, except for the "TALIS ISCED 3 average-8" and the "OECD PIAAC average-29", the Flemish and French Communities of Belgium were excluded from the calculations of all other averages as these populations were already included in the estimates for Belgium. Participating countries/territories for which estimates are flagged in tables within Results from TALIS 2024 (OECD, 2025[1]) (e.g. because the respective question was not administered) were also not included in the calculation of the averages.

Computing the standard error for the difference between a single country/territory's results and the average of a number of country/territory results

The difference between the estimated parameter $\hat{\theta}_c$ for a country/territory c and the average of a number of participating country/territory results, $\hat{\bar{\theta}}$, can be derived by simple subtraction $\left(\hat{\theta}_c - \hat{\bar{\theta}}\right)$. The standard error for the difference between the estimated country/territory parameter and an average that includes $\hat{\theta}_c$ in its calculation is given by:

$$se\left(\hat{\theta}_c - \hat{\bar{\theta}}\right)_{avg} = \sqrt{\frac{[(C-1)^2 - 1]\hat{V}_{FAY}(\hat{\theta}_c) + \sum_{k=1}^{C} \hat{V}_{FAY}(\hat{\theta}_k)}{C^2}}$$

$$= \sqrt{\hat{V}_{FAY}(\hat{\theta}_c) + \hat{V}_{FAY}\left(\hat{\bar{\theta}}\right) - \frac{2}{C}\hat{V}_{FAY}(\hat{\theta}_c)}.$$

For calculating the difference between the estimated country/territory parameter and a total (e.g. "EU total-22") that includes country/territory c in its calculation, the following formula can be used:

$$se\left(\hat{\theta}_c - \hat{\bar{\theta}}\right)_{total} = \sqrt{\frac{\left[\left(\sum_{k=1}^{C} \widehat{N}_k - \widehat{N}_c\right)^2 - \widehat{N}_c^2\right]\hat{V}_{FAY}(\hat{\theta}_c) + \sum_{k=1}^{C} \widehat{N}_c^2 \hat{V}_{FAY}(\hat{\theta}_k)}{\left(\sum_{k=1}^{C} \widehat{N}_k\right)^2}}$$

The test statistic *z* for the difference of two country/territory estimates can then be derived and used in a similar manner as above:

$$z = \frac{\hat{\theta}_c - \hat{\bar{\theta}}}{\mathrm{se}(\hat{\theta}_c - \hat{\bar{\theta}})}$$

References

OECD (2025), *Results from TALIS 2024: The State of Teaching*, TALIS, OECD Publishing, Paris, https://doi.org/10.1787/90df6235-en. [1]